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This conference in Konstanz on September 24th–25th, 2026, is the tenth international conference of the International Network on Innovative Apprenticeship (INAP). Previous INAP conferences have been in Germany, Austria, Italy, China, Australia, USA, South Africa and UK. INAP has steadily grown to incorporate new researchers from different parts of the world. The tenth conference, once more in Germany, symbolises the extraordinary development path that INAP has taken over the past 20 years. This book is a summary of partial papers presented and discussed at the Konstanz conference paying attention to the following seven core topics:

- History of apprenticeships
- Standing of apprenticeships
- Governance and institutional realisation of apprenticeship
- Apprenticeship curriculum, standards and delivery
- Apprenticeship delivery and teaching/training issues
- Apprenticeships and the “twin transition”: digitalisation and sustainability
- Apprenticeships, gender and diversity

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Apprenticeships: Surviving, reviving, thriving

Deissinger, Smith, Gonon, Grollmann, Zhao (Eds.)

Thomas Deissinger, Erica Smith, Philipp Gonon,
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Apprenticeships:
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学徒制：存续、复兴与繁荣

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Preface

This conference in Konstanz on September 24th–25th, 2026, is the tenth international conference of the International Network on Innovative Apprenticeship (INAP). Previous INAP conferences have been in Germany, Austria, Italy, China, Australia, USA, South Africa, and UK. INAP has steadily grown to incorporate new researchers from different parts of the world. The tenth conference, once more in Germany, symbolises the extraordinary development path that INAP has taken over the past 20 years.

In today's world, the development of vocational education faces multifaceted challenges, which are mainly reflected in the following aspects:

- The intensifying crisis of climate change, increasingly unstable global situations, the sustainability imperative, declining birth rates, and aging populations. The world is seeing increasingly complex and diverse population mobility. Enhancing learners' comprehensive skills and providing inclusive education and training services for vulnerable groups have become core tasks in vocational education.

- The deepening advancement of digital transformation. Digital technologies are triggering fundamental changes in the way human society thinks, organizes itself, and operates. The digital development of vocational education itself has become an important pathway to respond to crises and challenges and to open up a bright future.

- The growing prevalence of informal employment. With the widespread application of new digital technologies, the forms, venues, and working relationships of employment have undergone significant changes. Informal employment profoundly affects the training objectives and delivery methods of vocational education.

- The surging demand for new types of skilled talent. Society's demand for new workers equipped with digital, green, and sustainable skills is rising sharply. Carrying out education and training in new skills within these areas has become a common agenda for countries around the world.

- The increasing frequency of unforeseen economic and political shocks, affecting the operation of vocational education and training (VET) systems and the circumstances of companies and learners alike.

Only by conducting in-depth research and reporting on innovative practices in apprenticeship's response to these issues can we grasp the developmental

logic of vocational education. Through policy and practical innovation, we can contribute the wisdom and strength of vocational education to achieving green and healthy global development. Here, relevant international exchanges and discussions have become increasingly important.

The title of our tenth conference is "Apprenticeships: surviving, reviving, thriving". At this conference we discuss seven core topics. Each topic is approached in a variety of ways.

Topic 1: History of apprenticeships

How and when did apprenticeships develop in various countries? What was the role of the state and the role of employers in establishing apprenticeship as an institutional form?

Topic 2: Standing of apprenticeships

What value do countries attach to VET in general and apprenticeships in particular? How do apprenticeship systems in various countries attract employers to offer apprenticeships? How are potential apprentices, both young and mature, attracted to apprenticeships? What ideas are shared across the globe? How can apprentice completion rates be improved?

Topic 3: Governance and institutional realisation of apprenticeship

What are the varying roles of governments, vocational schools and colleges, employers, industry bodies, trade unions and intermediary organizations across the globe? What are the relations to other sub-systems?

Topic 4: Apprenticeship curriculum, standards and delivery

How are apprenticeship standards and curriculum developed in different countries? Who are the stakeholders involved in these processes, and how effective are they? What are the trends in partnerships between employers and vocational schools/colleges? How do apprenticeship credentials interface with university credentials? What is the role of higher apprenticeships and other new forms of apprenticeships?

Topic 5: Apprenticeship delivery and teaching/training issues

What strategies for formal and informal learning, both on and off the job, are effective in apprenticeships? What is the role of technology assisted learning, including online learning and AI? What characterises good VET teachers, how do they engage diverse learners, and what are the qualification and professional development regimes for teachers? What provisions and requirements are there

for workplace trainers of apprentices?

Topic 6: Apprenticeships and the "twin transition": digitalisation and sustainability

What role do technological developments play when it comes to apprenticeships, above all digitalization? How can the VET system, and apprenticeship in particular, cope with challenges associated with sustainability and environmental issues?

Topic 7: Apprenticeships, gender and diversity

How do, or could, apprenticeship systems encourage the equal participation of women? How do apprenticeship systems engage people from differing groups (age, ethnicity and socio economic status) and support their success? How do apprenticeships interact with migration and other movements of people around the globe?

These proceedings demonstrate how scholars, policymakers, VET practitioners, and early-career researchers from different countries have explored pathways for the integration of modern apprenticeship systems with economic and social development through multidimensional perspectives, responding to the urgent demands of youth employment and skills development, and preparation for an uncertain future.

At this conference, we have the honour of inviting two keynote speakers in the field of apprenticeship research: Stephanie Allais (University of the Witwatersrand) speaking on "Conceptualising apprenticeships in a changing world: learning from different contexts" and Stephen Billett (Griffith University) on "Apprehending: Apprenticeship as a mode of learning in the contemporary era". We also look forward to a presentation on the history of INAP by Professors Phillip Grollman (Technical University Dortmund) and Erica Smith (Federation University), and a "farewell lecture" by Thomas Deißinger (University of Konstanz). The conference is enhanced by a panel of experts from international organisations, comprising Christine Hofmann (ILO, Côte d'Ivoire), Daniel Neff (BIBB, Germany), Lisa Rustico (ETF, Italy), and Kelly Lima Teixeira (SENAC, Brazil).

These contributions, together with the submitted papers, will facilitate in-depth exchanges on the development of apprenticeship in the new era, practical models across different countries or regions, and innovations in research methodologies across related disciplines. The proceedings will make significant contributions to bridging the gaps between different research fields, and to advancing the development of international apprenticeship research.

Besides the main organisations behind the conference—INAP and the University of Konstanz—we are also grateful to the conference sponsors, and the journal *Vocation, Technology & Education*.

Prof. Zhiqun Zhao
Beijing Normal University
Prof. Erica Smith
Federation University Australia

Introduction



Dear participants of this year's INAP conference, dear colleagues from near and far!

I warmly welcome you to the University of Konstanz!

As a host and co-organiser of this international conference and on behalf of my colleagues, let me very briefly introduce our field of teaching and research which is also related to many issues dealing with apprenticeships in particular.

Business and Economics Education as an academic discipline has existed at the University of Konstanz since 1998. Since in Germany the "dual system" (similar to Switzerland and Austria) includes the vocational part-time school as a learning site, our Master graduates (about 70% decide to take up this career after graduation) are most likely to teach commercial apprentices in one or more occupational classes, such as banking or insurance once they enter the school system

We are a special area within the Department of Economics since Business and Economics are the subject fields which our future vocational teachers will teach when they take up employment in a commercial school. Teacher education in general, however, is an important area in our university and therefore we certainly appreciate that we can act at this conference as host and co-organiser with our specific focus on vocational pedagogy, vocational education and training (VET) politics, VET institutions, and didactics in our academic VET teacher programme.

The programme of this year's conference mirrors the issue that apprenticeships as "objects" of VET research are facing challenges in a tension field between preserving or re-inventing this model of vocational learning and alternative pathways into skilled employments. The topical focus covers academization, digitalization and modernization of apprenticeships, but also developments in the different countries which assemble at this year's conference.

Besides attending the conference, I hope you will have the chance to see a bit of our ancient city on the border to Switzerland, close to the Swiss and Austrian

Alps, which calls itself the "City belonging to the lake", not just "on the lake"!

Thanks to all who have contributed to the preparation of this conference!

I wish all of us success and good discussions at INAP 2026!

Prof. Dr. Dr. h.c. Thomas Deissinger

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INAP HISTORY

VTE VOCATION, TECHNOLOGY & EDUCATION

INAP HISTORY

Innovative apprenticeship: An initial analysis of topics of international network on innovative apprenticeship conferences and papers from the past 20 years

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ABSTRACT

This paper presents an initial analysis of the conferences and proceedings of the International Network on Innovative Apprenticeship (INAP) from its founding in 2006 to its tenth conference in 2025. Drawing on a review of ten conference volumes—comprising 339 papers across 1825 pages—the paper traces the development of the network and describes thematic focus over two decades. Three core themes are consistently represented: Governance and stakeholder roles, teaching, learning and competence development, and the transition from vocational education and training (VET) into the world of work. Themes also reflect the close relationship between technological and economic change and apprenticeships. The paper serves as a first overview of this substantial, publicly available corpus.

Key words: apprenticeship, international network on innovative apprenticeship, content analysis, vocational education and training

INTRODUCTION

This paper is written on the occasion of the 20th anniversary of International Network on Innovative Apprenticeship (INAP). It serves as an initial basis for a contribution to the 11th conference, taking place in Konstanz, Germany, in

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September 2026. The paper not only presents first results of this preparatory work, but also draws attention to what has now become a substantial, publicly available corpus of texts illustrating how the themes and content of research into apprenticeships have developed and changed over the past two decades (the Australian VOCEDplus team at NCVER has kindly made the INAP proceedings available online as a Special Collection [VOCEDplus, n.d.]).

METHODS AND RESEARCH DESIGN

In preparing this paper, we examined the papers from past conferences, the various locations where they were held, and the lists of topics that shaped each call for papers. We also carried out initial quantitative counts of topics, which we intend to develop further. At this stage, however, we decided first to describe the context of developments—that is, the background to the emergence of the INAP network. To do so, we drew on our review of the conference history, as well as background knowledge derived from the authors' direct involvement in the network and in the preparation and editing of conference publications. The information assembled and referred to here can subsequently be used to analyse specific questions relating to the conference papers, such as "What is understood by 'innovation' in apprenticeship, and how has the meaning of that concept changed over the years?" or "Which countries are involved in the international community of apprenticeship researchers?".

RESULTS

The first INAP event: How it came about

The INAP was established in 2005–2006, based on a cooperative research project initiated at the Institute for Technology and Education at the University of Bremen, Germany, in collaboration with international partners. The project set out to compare apprenticeship practices across different countries using a joint case study approach. Case studies examined the cost structures of apprenticeship while also taking into account quality, combining an economic with a pedagogical perspective. Case studies were carried out in a range of countries including Denmark, Germany, Italy, the Netherlands, the UK, Australia, and Austria. At the first project meeting, held as a workshop during the "Hochschultage Berufliche Bildung" in Bremen, the decision was made to establish a network.

The network's founding aim was to gain deeper insight into apprenticeship practices at the level of companies and individual learning—a dimension that had received little systematic attention in international comparative research at the time. The analytical lens was the triangle of costs, benefits, and quality. A key insight from this early work was that apprenticeship should be understood not exclusively as a fixed institutional arrangement, but also as a specific form of learning and interaction between the

individual and the work environment. Beside the proceedings that are presented below, findings of the initial project were also documented in a journal special edition (Smith & Grollmann, 2007).

Overview of meetings and conferences

After the founding meeting in Bremen in 2006, subsequent conferences have generally taken place at intervals of 18 months to two years. Each conference of the conferences was organised by the INAP Board with a number of organisational and scientific local partners. Table 1 lists the host organisations and keynote speakers of all conferences to date.

After the initial workshop, which proceeded by invitation, subsequent conferences followed normal academic procedures, with calls for papers, abstract requirements, and peer review processes.

The conferences all began with some introductory statements by members of the INAP community and organisers. From 2009 at least two keynote speakers were invited, and some conferences also included senior government figures, such as addresses from relevant ministers or senior personnel from international organisations.

The 2021 online conference during COVID-19 was an exception, when presentations were given by INAP Board members only, together with one invited paper on the English apprenticeship system, due to the difficulties of organising a broader event at that stage of the pandemic. All other conferences have produced published proceedings; all have been conducted in English.

While INAP maintained its own website at the University of Bremen, where conference proceedings and other information were available, the site was found in 2023 to have been inactive for a number of years. The papers and proceedings have since been preserved by Australia's national VET research agency, the National Centre for Vocational Education Research (NCVER), in its Key Conferences collection within the VOCEDplus database (VOCEDplus, n.d.).

Each conference from 2008 onwards listed suggested topics in its call for papers, devised by the INAP Board, with a "general" or "open" category sometimes also permitted. As examples, the topics for four selected conferences—2009, 2013, 2019, and 2025—are presented in Table 2, together with the number of papers assigned to each topic in the proceedings. These subtotals do not include keynote and plenary papers, as those speakers were not required to adhere to a specific topic.

Across all four conferences, three core themes can be identified that are consistently represented: Governance and the role of stakeholders, teaching, learning and competence development, and the links between VET and workplaces.

Changes in the work environment such

Table 1: Years, host organisation and keynote speakers at INAP conferences

Year	Host Organisation	Keynote Speakers
March, 2006	Institute Technology and Education, University of Bremen, Germany	Foundation meeting: Project workshop without keynotes
February, 2008	Austrian Institute for Research on Vocational Training, Vienna, Austria	No keynote papers
September, 2009	The European Training Foundation, Turin, Italy	Richard Sweet Ursula Scharnhorst Walter R. Heinz
May, 2011	Beijing Normal University, Beijing, China	Philipp Gonon Zhiqun Zhao
April, 2013	University of Witwatersrand, Johannesburg, South Africa	Christine Evans-Klock (based on a paper by Michael Axmann and Christine Hofmann Robert I. Lerman Volker Wedekind
April, 2015	Federation University, Ballarat, Australia	Stephen Billett Paul Comyn Raymond Patel
October, 2017	Urban Institute, USA	Michael Gessler
March, 2019	University of Konstanz, Konstanz, Germany	Leesa Wheelahan Dietmar Frommberger
May, 2021	Online	No particular keynote due to COVID-19
May, 2025	University of Hertfordshire, Hatfield, England	Ashwani Aggarwal Leesa Wheelahan

Thanks are due to Jule Rocholl and Liam Frost-Camilleri for assistance with data extraction and Michael Gessler of the University of Bremen, who located the inactive INAP web site within university archives. INAP, international network on innovative apprenticeship.

as Industry 4.0 and new employment patterns were added from time to time, reflecting the significant relationship between technological and economic dynamics and apprenticeship. In some cases, specific challenges and issues from the conference region have been addressed.

Overview of conference proceedings

As described above: Each of the conferences was preceded by an open call for papers, and full papers were published in the conference proceedings following a review process; the proceedings were usually finalised in advance and distributed at the conference. The calls for papers thus generated a substantial body of short conference papers, all documented in the published proceedings.

Between 2006 and 2025, a total of 339 scientific papers were published across the INAP conference proceedings, covering a combined 1971 pages. On average, papers are approximately 5.4 pages long.

Table 2: INAP conferences and topics of the call for papers

Conference	Topic	No. of papers
2009 Turin	The topics in the call for papers were slightly adjusted to produce the following categories for the published papers	
	Managing the transition from general schooling to vocational careers	17
	Building vocational identity: A central task of apprenticeship/competence evaluation and development	13
	Levels of governance and the role of stakeholders in apprenticeships	16
2013 Johannesburg	The topics in the Call for Papers were slightly rearranged, and one extra category added, to create the following categories for the papers in the conference proceedings	
	Introducing apprenticeship: Backgrounds, chances and difficulties	9
	Enabling workplace learning	6
	Apprenticeships in informal contexts	10
	Competence assessment and development	9
	Managing transitions from VET into the world of work	6
	Curriculum design, apprenticeships and NQFs: Does VET fit into NQFs?	4
	Open session	4
2019 Konstanz	Governance and stakeholders	11
	Teaching and learning	15
	Future work: New employment patterns	4
	Future work: Industry 4.0	5
	School to work transition and youth employment	2
	Diversity and inclusiveness in apprenticeships	2
	Academisation in apprenticeship	6
2025 Hatfield, UK	The topics in the Call for Papers, and authors' chosen topics, are listed below. The conference proceedings did not divide papers by topic, because of the short notice at which the conference had been called	
	Making apprenticeships more attractive to potential learners and to employers	9
	Apprenticeships and the future: The economy	4
	Apprenticeships and the future: Society	5
	Apprenticeship curriculum, standards and delivery	11
	Governance, including stakeholders' roles and responsibilities	6
	Teaching and teachers in VET	10

INAP, international network on innovative apprenticeship; VET, vocational education and training; NQFs, national qualification frameworks.

At all conferences, research-based papers were presented; at some conferences, workshops were organised, and at others, contributions on VET policy or practice were also included. The figures above include all types. The call for papers and submission guidelines have been broadly consistent across confer-

Table 3: Conference proceedings by year, number of papers and pages

Conference Year	Editors of proceedings	Topic of conference	No. of papers	No. of pages in proceedings
2006	Felix Rauner and Ines Herrmann	Rediscovering Apprenticeship: An Answer to Learning Enterprises	8	114
2008	Peter Schlögl, Felix Rauner, Philipp Grollmann, and Erica Smith	Situated Competence Development through Innovative Apprenticeships: The Role of Different Stakeholders	26	183
2009	Felix Rauner, Erica Smith, Ursel Hauschildt, and Helmut Zelloth	Innovative Apprenticeships: Promoting Successful School-to-Work Transitions	48	265*
2011	Zhiqun Zhao, Felix Rauner, and Ursel Hauschildt	Assuring the Acquisition of Expertise. Apprenticeship in the Modern Economy	56	274
2013	Salim Akoojee, Philipp Gonon, Ursel Hauschildt, and Christine Hofmann	Apprenticeship in a Globalised World: Premises, Policies and Pitfalls	51	254
2015	Erica Smith, Philipp Gonon, and Annette Foley	Architectures for Apprenticeship: Achieving Economic and Social Goals	40	206
2017	Bob Lerman and E. Adaeze Okoli	Modern Apprenticeships: Widening Their Scope, Sustaining Their Quality	35	163
2019	Thomas Deissinger, Ursel Hauschildt, Philipp Gonon, and Silke Fischer	Contemporary Apprenticeship Reforms and Reconfigurations	49	235
2021	Bob Lerman	The State of Apprenticeship during the COVID-19 Pandemic: Reports from Seven Countries	7	PPT presentations only
2025	Erica Smith, Zhiqun Zhao, and Liam Frost-Camilleri	Apprenticeships: Future Global Trends	48	277

*Two editions of the 2009 proceedings were produced. This table uses the second edition (2010).
PPT, powerpoint presentation.

ences from 2008 onwards, with relatively short papers of around five pages requested. Occasionally, shorter summary papers were published.

Table 3 provides an overview of all ten INAP conference proceedings published between 2006 and 2025, listing the editors, the thematic title of each volume, the number of papers included, and the total number of pages.

CONCLUSION

With ten conference proceedings published between 2006 and 2025, the INAP network has produced a substantial knowledge corpus covering two decades of international apprenticeship research. Taken together, these volumes constitute a unique record of how the field has developed, what questions have been asked, and which

answers have been put forward by researchers from across the world.

The sheer volume and geographic breadth of contributions reflect the considerable and sustained international interest in apprenticeship as both a widespread model of vocational education and training and as an object of research and development. The corpus demonstrates that apprenticeship has remained a live topic across diverse national contexts, in all inhabited continents.

It is also evident that many insights generated within the INAP network have fed into the broader policy discourse on apprenticeship and vice versa. Since the 2010s, organisations such as the ILO, Cedefop, ETF and the OECD have intensified their engagement with apprenticeship reform, and the thematic overlaps with INAP's research agenda are striking. The network's contribution to this policy-relevant knowledge base and the mutual dialogue should not be underestimated.

The corpus assembled here provides a basis for tracing what has been internationally relevant in apprenticeship research over the past two decades and how thematic priorities have shifted over time. The analysis presented in this paper is intended as a first overview—an appetiser rather than a full account.

Further and more detailed analyses of the texts are planned as a follow-up to this initial mapping. First results of these analyses will be presented at the INAP 2026 conference. We hope that this overview will stimulate discussion and invite others to engage with this rich body of work.

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Topic 1: History of apprenticeships

VTE VOCATION, TECHNOLOGY & EDUCATION

RESEARCH PAPER

From guild traditions to institutional apprenticeships: Reframing apprenticeship survival, revival and appraisal in India

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ABSTRACT

This paper examines India's apprenticeship system through a historical lens from the arc of guild traditions to institutional scale, framing contemporary reform as an institutional process of survival, revival, and appraisal (SRA) of skilling rather than mere program expansion. Traditional systems of apprenticeship in India constituted work-based learning embedded in caste-based craft governance and master-artisan relations. Modern India's large informal labour market witnesses skill-job mismatches, the discourse shifting to institutional pillars of apprenticeship and international policy learnings in Vocational Education and Training (VET). This paper develops an I-Triangle framework (Industry, Institution, and Inclusion) towards SRA of apprenticeship. This analytical framework is used to examine how apprenticeship systems can expand institutionally while preserving pedagogical depth, improving labour-market outcomes, and addressing historical inequities in access to skill formation. The paper contributes to international learning through a scalable framework to guide governance models that recognise skill ecosystems while strengthening institutional delivery.

Key words: apprenticeship governance, historical apprenticeship regimes, apprenticeship reform, institutional scaling of apprenticeship

INTRODUCTION

Traditional apprenticeships in India constituted a regime of work-based learning embedded in caste-based craft governance, employer oversight and

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master-artisan relations, and adapting crafts to trans-regional trade (Kumar, 2025; Thaplyal, 1996). Moving to modern day apprenticeship programs in India's large informal labour market amidst looming skill-job mismatches has led to the discourse shifting to institutional pillars of apprenticeship programs (Mehrotra, 2018) and contextual policy learnings in Vocational Education and Training (VET) (Rajagopalan *et al.*, 2026), in particular from German and Swiss models of dual VET and apprenticeships (Maurer, 2025; Pilz, 2019). Modern apprenticeship revival and appraisal in India represents deliberate effort to scale work-based learning amidst demographic expansion, labour informality, digital transition and global value-chain integration. Regulatory reforms, employer incentives and institutional infrastructure can position apprenticeship as a mechanism linking education, workplace learning, and labour-market entry. However, this is constrained by informal learning traditions, low employer participation, curriculum alignment gaps, trainer proficiency, completion quality, and equitable access (Schneider & Pilz, 2024).

The central objective of the paper is to examine how apprenticeship systems in India can expand institutionally while preserving pedagogical depth, improving labour market outcomes, and addressing historical inequities embedded in access to skill formation. This overarching goal is pursued through 4 lines of enquiry. First, mapping institutional continuities and ruptures that shape the present apprenticeship landscape, linking historical craft traditions and colonial restructuring to contemporary governance arrangements and employer participation. Second, analysing modern apprenticeship schemes and scalability across India's federal administrative structure, heterogeneous enterprise ecosystems, and persistent informal labour markets, raising broader questions about institutional legitimacy. Third, evaluating the relationship between apprenticeship participation and labour-market transition, particularly youth employment stability, skill utilisation, and pathways into productive sectors. Fourth, exploring issues of inclusion and access; how caste, gender, enterprise structure, and regional inequality influence entry into and progression within apprenticeship systems.

At the core are questions of how apprenticeship practices survive institutional disruptions, why contemporary efforts at revival remain uneven, and what conditions can enable sustainable apprenticeship systems at scale. Existing scholarship offers important albeit partial explanations. Historical perspectives indicate path dependence (Maurer, 2011), skill development perspectives highlight employer-trainer-labour market relationships and regulatory frameworks (Schneider & Pilz, 2024), and policy transfer literature examines adaptation of vocational education models across contexts (Pilz, 2017). However, these perspectives often locate policy frameworks, institutional mechanisms, or actors as the primary unit of analysis. The Indian experience suggests that apprenticeship trajectories are shaped by

multi-dimensional relationships between institutional structures, governance architectures, and social systems.

METHODS AND RESEARCH DESIGN

The paper develops an I-Triangle framework (Industry, Institution, and Inclusion) towards survival, revival, and appraisal (SRA) of apprenticeship. This framework conceptualises apprenticeship as a 3-I ecosystem; Industry refers to the organisation of production and demand for skills; Institution captures governance structures, regulatory frameworks, and training systems; and Inclusion represents distribution of apprenticeship opportunities across social groups. The framework's central focus is to analyse how apprenticeship outcomes are determined by alignment (or lack thereof) between institutional strength, policy interventions and industry needs. Apprenticeship sustainability and scalability arise from mutual reinforcement of productive systems, governance architectures, and inclusive mechanisms; misalignment perpetrates labour-market fragmentation, weak skill-employment translation, and exclusion. This framework shifts analytical focus from apprenticeship as a discrete training instrument towards an embedded ecosystem resting on alignment and adaption across changing socio-political-economic contexts.

The complementing SRA lens captures trajectories generated by these relationships. Survival represents resilience of apprenticeship practices amidst institutional and governance shifts, economic restructuring and technological change. Revival denotes deliberate efforts towards work-based learning via policy initiatives, institutional innovation and stakeholder engagement. Appraisal signifies processes of evaluation, adaptation and policy learning for apprenticeship systems to be relevant under changing labour-market conditions, technology transition, and sustainability and inclusion prerogatives. Beyond a chronological representation, SRA evaluates evolving capacities of apprenticeship systems to sustain and renew relationships between production, governance, and social participation over changing historical contexts. Together, the I-Triangle and SRA frameworks provide an analytical basis for understanding the organisation, evolution, endurance of apprenticeship systems.

Using a comparative-historical approach drawing on skill-formation regimes, the study employs a triangulated research design combining historical, quantitative, and qualitative evidence. Historical analysis draws on archival records, policy documents and secondary scholarship to trace evolution of apprenticeship from pre-colonial guild systems to contemporary reforms. Policy evolution situates present reforms within trajectories of skill governance. Quantitative analysis utilises nationally representative labour-market datasets and government apprenticeship statistics to examine participation patterns, sectoral absorption, and regional variation. The study also incorporates qualitative stakeholder perspectives

drawn from training partners and apprentices to complement these macro-level perspectives. Telephonic discussions were conducted in May 2025 under Suryamitra Skill Development Programme in Coimbatore (Tamil Nadu) and Jaipur (Rajasthan) cities of India, involving 10 trainees and 5 trainers. These are among the leading states in renewable energy development, and the Suryamitra programme forms an important skilling initiative in the solar sector.

Analytically, the triangulation is operationalised by examining convergence and divergence across historical, quantitative and qualitative evidence. Historical analysis helps identify long-term (dis) continuities in apprenticeship governance; quantitative evidence helps understand contemporary institutional and labour-market trends; qualitative stakeholder perspectives provide insights into trainee motivations, job aspirations, perceptions of training quality, and emerging sectoral skill demands. This triangulation captures interactions between policy intent, institutional capacity, workplace pedagogy, and lived learning experience. Engagement with international scholarship on vocational education, apprenticeship governance, informal skill formation, and labour transition provides the interpretive lens through which empirical findings are analysed, situating India's experience within wider debates on evolution of work-based learning systems.

RESULTS

The framework examines apprenticeship systems in varying degrees of alignment between Industry, Institution and Inclusion. Strong alignment across all three dimensions indicates institutional coherence, labour-market relevance, durable skill formation, effective skill-job transitions and social inclusion. Strong productive systems and institutional capacity with weak inclusion may expand apprenticeships but reproduce occupational segmentation and unequal opportunities. Strong industry demand but weak institutional systems often produce informal apprenticeship regimes sustained through workplace experiential learning and community networks, without formal governance mechanisms. Similarly, institutional expansion without meaningful industry participation may lead to credential-oriented systems with limited skill-job translation and weak employer ownership. The analytical value of this framework thus lies in examining processes of alignment and adaptation to shape apprenticeship resilience, scalability and inclusion across varying socio-political-economic contexts.

Viewed through the I-Triangle/SRA framework, historical evolution of apprenticeship in India can be interpreted as a process of fracture and attempted realignment between Industry, Institution, and Inclusion. Guild-based systems exhibited higher alignment between productive activity, occupational governance and socially-embedded skill transmission. This facilitated resilient apprenticeship ecosystems linking learning, production, and occupational legitimacy. Their sustainability was not solely dependent on formal state

regulation, but driven by institutional embeddedness of learning within production systems, trade networks, guild governance and community-based systems. Colonial restructuring fractured these relationships, disrupting indigenous production and weakening established institutions of craft regulation, leading to coexistence of formal technical education with residual informal apprenticeships. Contemporary reforms attempt to reconstruct apprenticeship through regulatory expansion, digital governance, employer engagement, and skill development initiatives. Yet, persistent social inequalities, labour-market informality and uneven industry participation suggest incomplete alignment across the three dimensions. India's experience demonstrates that apprenticeship development is not a linear process of institutional expansion but a recurring struggle to rebuild relationships between production, governance, and inclusion under changing economic, technological, and socio-political conditions.

The main contribution of this paper lies in proposing a historically grounded and conceptually integrative framework to analyse institutionalisation of apprenticeship systems in contexts of informal traditions and structural labour-market challenges. Against the backdrop of premodern guild structures linked with current institutional challenges, integration of comparative-historical institutionalism and stakeholder perspectives provides an analytical design through the I-Triangle framework combined with the SRA lens as a conceptual contribution. The analytical framework treats apprenticeship as an ecosystem shaped by governance structures, formal-informal learning interfaces, pedagogical delivery, labour-market translation, and social inclusion. The contribution of the I-Triangle/SRA framework lies in integrating Industry, Institution and Inclusion in a unified analytical architecture to explain governance of apprenticeship systems, why they persist/fracture, and how they can revive/ realign for institutional maturity under changing labour-market conditions. By refocusing from institutions/policy instruments towards dynamic relationships between production systems, governance and inclusion mechanisms, the framework seeks to explain apprenticeship resilience, scalability, and reform across historical contexts. This moves the analysis beyond design to examine how alignment, misalignment, and realignment between these dimensions shape long-term trajectories of apprenticeship systems.

From guild traditions to colonial transformation

Historical evidence indicates skill transmission in workshops organised by guilds or *śreṇi* (Kramrisch, 1958; Thaplyal, 1996), which controlled occupational entry, standards, and pedagogical authority in India. Early examples of institutionalising apprenticeships can be seen in Mauryan and Gupta administrative integration of education and trade, South-Indian trade guilds, and Mughal *karkhana* production, linking production, craft standards, and

collective regulation (Currie, 1982; Tabassum & Varma, 2025; Velayudhan, 1978). State control over guild production, quality and trade rather than informal craft practices is documented in Kautilya's *Arthaś ā stra* (Satsangi, 2024). Master-apprenticeship systems sustained skill legitimacy, embedding experiential learning into early vocational governance.

Colonial industrialisation through revenue extraction, monopolistic trade, and tariff preferences for British products led to de-urbanisation of artisanal centres, erosion of guilds, and rise of commercial intermediaries which fragmented learning ecologies (Singh, 2001). Colonial technical schooling and factory regimes introduced employer-controlled training; shifting from community-led apprenticeship governance to centralised, credential-driven vocational administration. Informal apprenticeship practices persisted within artisanal and small-enterprise sectors, leading to co-existence of divergent trajectories of institutional training and embedded workplace learning that persist in questions of apprenticeship governance and quality.

This transformation represents not just industrial decline but a systematic reordering of how skill, learning and legitimacy were institutionalised. The colonial period fractured the guild-apprenticeship nexus that historically linked production, governance, and social organisation. This produced a divided vocational landscape where inclusion took a backseat and capitalistic tendencies led to tensions between formal institutional scaling and relational workplace learning. This fragmentation of the I-triangle through deliberate fracture of industry, institution and inclusion continues to shape survival and revival challenges within apprenticeship reform in contemporary India.

Modern apprenticeship in India: Institutional revival and the challenge of scale

Scaling apprenticeship in India is constrained by structural duality; a large informal economy and micro and small enterprises dominating employment, sans formal apprenticeships (Biswas, 2011). Apprenticeship reform within India's federal system requires coordination between central ministries, state skill directorates, sector skill councils and private entities. While institutional fragmentation can dilute accountability, uniform regulatory frameworks mask regional labour realities. Further, integration into global value chains requires standardised portable credentials and employer confidence in skill quality, so apprenticeships cater to larger industries.

Institutional transformation of apprenticeship through technology via digital apprenticeship portals and direct stipend transfers match employers with trainees and enable e-governance, but require digital literacy. Even in the Industry 4.0 era, access disparities and infrastructural gaps threaten inclusiveness of scaled apprenticeship delivery (Upadhyaya,

2024). While modern policy emphasises equity and outreach to break historical caste and occupation patterns, evidence suggests that women and marginalised communities remain underrepresented in high-value trades (Samantroy & Chatterjee, 2026).

India's Periodic Labour Force Survey 2023-2024 reports 88% of the workforce in low-competency occupations; sectors accounting for over two-thirds of vocational training include Information Technology, Electronics, Textiles, Health, Beauty and Wellness. Meanwhile, under National Apprenticeships Promotion Scheme, Active-to-Registered ratio of establishments remains around one-fourth, suggesting gaps in registered establishments for apprenticeships translating to active engagement (NITI Aayog, 2026). Discussions with stakeholders under India's Suryamitra skill development programme revealed interesting insights. Unlike traditional guild-based systems combining workplace immersion and identity within production networks, contemporary trainees perceive short-term apprenticeships, internships, and vocational training as transitional credentials and continue seeking more secure employment opportunities outside sectors for which they trained. Trainers highlighted fragmented school-to-work transitions, and discontinuity between training and stable employment.

These findings raise broader concerns that modern short-term certification-oriented courses may struggle to cultivate deeper competencies and provide durable labour-market integration associated with traditional apprenticeship-based systems. India's apprenticeship revival requires translating historically-embedded traditions of learning-by-doing into scalable, regulated and technologically-mediated frameworks to thrive under demographic pressure, digital transformation, and globalisation. It extends to how skilling institutions adapt learning cultures to contemporary industry needs through inclusion of labour force, which is the crux of the I-Triangle and SRA framing.

CONCLUSION

The relevance of this research extends beyond programme evaluation. India's apprenticeship expansion represents contemporary efforts to institutionalise work-based learning at scale in a predominantly informal labour market. Understanding how such systems balance regulatory growth with relational learning traditions is essential for designing apprenticeship frameworks that are credible to employers, meaningful to learners, and responsive to economic transformation. The paper's contribution lies in reframing apprenticeship reform as a historical-institutional process rather than purely administrative. Integrating historical analysis, labour market evidence, and stakeholder perspectives, it develops a scalability framework to guide governance models that recognise informal skill ecosystems while strengthening formal institutional delivery.

Conceptualising apprenticeship as an ecosystem shaped by governance structures, formal—informal interfaces, pedagogical delivery, labour transitions, technological mediation, and inclusion, the analysis demonstrates the necessity of institutions to sustain experiential learning while enabling scalable coordination. By situating India's experience within broader comparative discussions on apprenticeship governance and policy reform, the study contributes to international learning about how apprenticeship systems within informal labour markets can move towards SRA into institutional maturity designing inclusive, and future-oriented frameworks that sustain workplace learning integrity while advancing decent employment, social mobility, and economic competitiveness.

The study demonstrates that resilience, legitimacy, scalability and effectiveness of apprenticeship systems rest on alignment of productive systems, governance architectures and social inclusion mechanisms. India's historical trajectory from guild-based learning and embedded occupational governance, through colonial institutional rupture, to contemporary efforts at apprenticeship expansion, highlights apprenticeship development as a process of alignment, adaptation, and adjustment rather than linear institutional growth. In this sense, the I-Triangle/SRA framework offers a historically grounded lens for understanding apprenticeship resilience and scalability. This contributes not just to understanding apprenticeship SRA in India, but to broader international debates on how learning systems can achieve institutional maturity in contexts of labour-market informality and socio-economic transformation. The future of apprenticeship lies not merely in expanding programmes, but in strengthening relationships between learning, production, and opportunity underpinning sustainable skill formation, decent work, and inclusive development.

DECLARATION

Article version statement

This article has been reviewed and preliminarily edited. It is intended solely for use at the 10th Research Conference of the International Network for Innovative Apprenticeship (INAP). The final version will be published in *Vocation, Technology & Education* (https://www.vtejournal.com).

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VTE VOCATION, TECHNOLOGY & EDUCATION

RESEARCH PAPER

Historical trajectory and characteristics of intergenerational learning between masters and apprentices in Chinese apprenticeship

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ABSTRACT

Master-apprentice intergenerational learning in Chinese apprenticeship is analysed through a historical comparative lens, drawing on Mannheim's generation theory and documentary evidence. Four stages are identified: Patriarchal-dependency (before 1890), contract-emerging (c. 1890s-1949), state-mobilised (c. 1949-late 1970s), and utilitarian-disintegrated (c. 1980-present). Genuine intergenerational learning—defined as bidirectional, mutually beneficial interaction—was absent in the first two stages, emerged in the state-mobilised stage through institutional incentives and limited reciprocity, and later fragmented under market transition and technological disruption. The reversal of knowledge potential differences, the collapse of institutional support, and technology-mediated but depth-weakened interactions characterise the current period. Post-marketisation institutional vacuum has produced a persistent shortage of highly skilled technicians.

Key words: intergenerational learning, master-apprentice, Chinese apprenticeship, historical trajectory, contemporary challenges

INTRODUCTION

In May 2022, the Chinese government amended the Vocational Education Law (this was the first revision of China's Vocational Education Law since its enactment in 1996, and apprenticeship was given explicit legal recognition within the vocational education system), establishing apprenticeship as a national-level institutional arrangement. In January 2025, relevant departments

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further proposed the systematic implementation of apprenticeship with Chinese characteristics. However, the rise of artificial intelligence (AI) poses profound challenges to traditional apprenticeship. Research indicates that in occupations most significantly affected by generative AI, the recruitment of entry-level workers is declining, while the recruitment of experienced workers remains largely unaffected (Brynjolfsson *et al.*, 2025). At present, the development of apprenticeship in China and beyond faces a critical structural tension: While the state is vigorously promoting apprenticeship, AI is undermining its very foundation, particularly the basis for the professional competence development of entry-level apprentices. To identify this impact and to consolidate the position of apprenticeship in the AI era, it is necessary to re-examine the core essence of apprenticeship. A central question needs to be answered: How does Chinese apprenticeship achieve intergenerational skill transmission? Focusing on this core question, this study aims to address the following three sub-questions: First, what is intergenerational learning, and is this theory applicable to analysing skill transmission in Chinese apprenticeship? Second, what has been the evolutionary trajectory of master-apprentice intergenerational learning in Chinese apprenticeship across different historical periods? Third, what are the characteristics of master-apprentice intergenerational learning in Chinese apprenticeship?

METHODS AND RESEARCH DESIGN

Intergenerational learning (IGL) originates from Mannheim's theory of generations, which distinguishes biological generations (birth cohort and age) from social generations (shared experiences and values) (Mannheim, 2023). IGL has two core features. First, intergenerational relationships presuppose generational differences among learners. Joshi *et al.* (2010) classified workplace generations into cohort-based, age-based, and position-based categories. Second, IGL is a bidirectional, interactive process involving resource exchange, experience sharing, and two-way transmission of values. Fischer *et al.* (2014) defined it as people from different generations acquiring skills, knowledge, attitudes, and values through purposeful, mutually beneficial activities. Cambridge and Simandiraki (2006) noted that IGL has long been an informal tool for transmitting knowledge and values across generations. The master-apprentice relationship in Chinese apprenticeship is predicated on generational differences and involves purposeful skill transmission and value transfer, aligning with IGL theory.

Because apprenticeship in China has varied across crafts, commerce, and industrial production, this paper does not claim to cover all occupational sectors equally. It focuses on representative forms of apprenticeship across four periods: Traditional craft and commercial apprenticeship, workshop and factory apprenticeship in the late Qing and Republican periods, state-owned industrial apprenticeship after 1949, and modern school-enterprise

apprenticeship under manufacturing upgrading and technological change. The documentary materials include historical studies of Chinese vocational education, early twentieth-century factory investigation reports, policy and legal documents, and sociological studies of factory apprenticeship in China. Using historical methods (Westberg, 2025) and historical comparative analysis, this study examines IGL across three dimensions: Intergenerational differences, relational maintenance, and learning purposes.

RESULTS

Historical trajectory

In the development of Chinese apprenticeship, master-apprentice intergenerational learning has gone through four distinct stages. The specific characteristics of each stage are presented in Table 1.

Kinship-dependent stage (before 1890)

The economic system was a clan-based feudal natural economy. Genuine IGL did not exist; instead, unidirectional skill transmission with high apprentice dependency prevailed. The knowledge potential difference was extremely large: Masters possessed full tacit skills and trade secrets. The power gap was extremely high, resembling a father-son relationship. Apprentices resided in masters' households, lost personal freedom, and underwent a one-year probationary period of menial tasks. Teaching methods included oral transmission, demonstration, and observation, following the complete production sequence. Apprentices in textiles learned every step of fabric production (Lu, 2011); commercial apprentices rotated through multiple positions (Wang & Xue, 1924). The goal was to become fully-fledged craftsmen for family-based, small-scale production. Knowledge transmission was complete but inefficient (3-7 years), with many skills lost due to secrecy. Nevertheless, apprentices acquired a clear vocational identity.

Contract-emerging stage (c. 1890s-1949)

The economic system had a dualistic structure of traditional patriarchy and modern contracts. IGL still failed to emerge. Knowledge potential difference remained high but content became fragmented: Masters taught only specific steps, not the whole process. The power gap began to narrow due to contracts, but masters maintained dominance through technical monopolisation. Teaching methods shifted to on-the-job supervision and simple instruction; apprentices learned partly from manuals. The relationship became utilitarian and employer-employee, leading to labour-capital antagonism. The goal was to produce "partial workers" (Braverman, 1998). Apprentices' vocational belonging weakened, identity blurred, causing skill fragmentation and the decline of traditional craftsmanship. Marxist critiques even called for abolishing apprenticeship.

State-mobilized stage (c. 1949-late 1970s)

The economic system of this stage was a

Table 1: Historical stages of master-apprentice intergenerational learning in Chinese apprenticeship

Dimension	Generational differences		Relational maintenance	Learning purposes	Characteristics of intergenerational learning
	Knowledge potential difference	Power gap			
Kinship-dependent stage (before 1890)	Extremely large	Extremely high	Apprentice completely obeys master's constraints	Cultivate fully-fledged craftsmen capable of independent practice	Genuine intergenerational learning has not yet taken shape
Contract-emerging stage (c. 1890s-1949)	Relatively large	Begins to decrease	Master is both teacher and employer, leading to antagonism	Cultivate partial workers who can quickly adapt to job positions	Genuine intergenerational learning has not yet taken shape
State-mobilized stage (c. 1949-late 1970s)	Exists but narrowing	Exists but narrowing	Master and apprentice like brothers, shifting from personal to organizational	Cultivate workers needed to support national industrialisation	The emergence of intergenerational learning, manifested as institutionally driven, limited bidirectional interaction
Utilitarian-disintegrated stage (c. 1980-present)	Narrows or even reverses	Nearly equal	Technology-mediated and fragmented characteristics	Cultivate high-quality technical and skilled talents required for national manufacturing upgrading	Intergenerational learning has distinctive features

highly centralised planned economy, in which the state exercised unified allocation of resources through administrative directives. Benefiting from the institutional drive provided by the highly centralised planned economy, genuine intergenerational learning began to emerge in this stage. Although a knowledge potential difference between master and apprentice still existed, it began to gradually narrow. The government promoted the systematic summarisation of outstanding masters' individual experiences, which were then compiled into standardised teaching materials and disseminated across entire industries. Concurrently, the power gap was restructured institutionally: While preserving the traditional authority of the master, the status of apprentices was safeguarded through measures such as master-apprentice contracts and evaluation mechanisms. The mode of interaction between master and apprentice shifted from a personal orientation towards an organisational one. The characteristics of master-apprentice intergenerational learning in this stage are as follows: (1) Highly efficient knowledge transmission-7.5 million

skilled workers trained through apprenticeship between 1949 and 1958 (Wang, 2014). (2) Apprentices could obtain state-recognised worker status. (3) Though primarily master-to-apprentice, apprentices began limited feedback (*e.g.*, technical suggestions), showing institutionally driven, preliminary reciprocity.

Utilitarian-disintegrated stage (c. 1980-present)

During the 1980s-1990s, China shifted from a planned to a socialist market economy, with market playing a decisive role. From the 1980s to the 2010s, new industrial equipment was imported from Germany, Belgium, and Spain, fundamentally altering production requirements and making many masters' skills obsolete. Consequently, in technology-intensive sectors, the knowledge potential difference between master and apprentice narrowed or reversed, as young apprentices mastered new technologies faster. The power gap eroded by market logic tended toward formal equality. The master-apprentice relationship lost its traditional purity; technological platforms became new mediators, enabling remote, asynchronous instruction but weakening face-to-face depth. Moreover, AI substitution of entry-level positions requires apprentices to possess foundational competence upon entry, raising the starting point of the relationship while shortening the window for building deep trust. Intergenerational learning in this period exhibits the following three characteristics. (1) Efficiency declined: Forward transmission ineffective, reverse transmission lacking institutional support, technology weakens tacit knowledge transfer. (2) Passive equality: Masters lost authority and incentives, apprentices lack clear career paths; mutual willingness to interact is absent. (3) Technology-mediated and fragmented: Long-term face-to-face replaced by short-term project-based pairing, reducing depth and sustainability.

Characteristics of intergenerational learning in Chinese apprenticeship

First, the direction of skill transmission changes with the transformation of knowledge potential difference. In technologically stable stages, masters possessed clear knowledge advantages, so learning mainly took the form of forward transmission. This does not mean that no learning occurred in the first two stages; rather, such learning was predominantly one-directional and asymmetrical, maintained by patriarchal dependency or utilitarian contractual relationships. Therefore, it is better understood as intergenerational skill transmission rather than genuine intergenerational learning. In rapid-change stages, knowledge differences narrow or reverse, producing sporadic reverse transmission. Yet without institutional support, such reverse learning cannot become sustained, mutually beneficial, and bidirectional IGL.

Second, intergenerational learning is highly dependent on institutional incentives and organisational guarantees. In the state-mobilised stage, institutional arrangements such as master-apprentice

contracts, evaluation mechanisms, and the regularisation of apprentices for the first time realised organised, reciprocal intergenerational learning, resulting in extremely high transmission efficiency. After the market transition, however, institutional support largely collapsed, leaving a de facto vacuum. Masters lost the incentives to teach, and apprentices lacked the anticipated value of learning traditional skills. Consequently, intergenerational learning rapidly degenerated into indifferent equality or fragmented interaction. This demonstrates that without institutional embeddedness, intergenerational learning cannot sustain itself spontaneously.

Third, technology-mediated learning expands the spatiotemporal scope of intergenerational learning but weakens its depth. Remote guidance platforms and knowledge management systems enable asynchronous, cross-locational skill exchange. Yet the transmission of tacit knowledge—such as intuitive fault diagnosis and manual experiential skills—depends on long-term, face-to-face immersive interaction. Technological mediation instead dilutes the quality of skill transmission, producing a paradoxical pattern of "increased breadth but decreased depth" in intergenerational learning.

CONCLUSION

This study has traced the evolution of master-apprentice intergenerational learning in China across four historical configurations shaped by changing economic structures, institutional arrangements, and technological pressures. The findings suggest that apprenticeship does not automatically produce genuine intergenerational learning; rather, it depends on the alignment of knowledge differences, reciprocal relationships, and institutional support. First, apprenticeship should be reinstitutionalised rather than merely revived as a traditional master-apprentice relation. Its future development requires redesigned incentives, assessment mechanisms, responsibility arrangements, and career progression systems. Second, conditions should be created for reciprocal learning between experienced workers and younger apprentices, as the former possess tacit knowledge and practical judgement while the latter may contribute digital competence and familiarity with emerging technologies. Third, vocational schools should serve as mediating institutions between workplaces and technological change by organising intergenerational learning, buffering technological disruption, and cultivating apprentices' foundational competences.

DECLARATION

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VTE VOCATION, TECHNOLOGY & EDUCATION

RESEARCH PAPER

The evolution of apprenticeship in Benin

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ABSTRACT

Apprenticeship is one of the oldest forms of transmission of knowledge and professional skills. In Benin, it historically developed within family and community settings before undergoing profound transformations linked to economic, social, and institutional changes. Today, in a context characterized by the predominance of the informal sector, artisanal apprenticeship remains a major tool for the socio-professional integration of young people and skills development. The evolution of apprenticeship in Benin reveals a gradual transformation from a family-based and informal system towards increasingly organized and institutionalized forms. This change is reflected both in the spatial evolution of apprenticeship, its organizational structures, and its mechanisms for skills recognition. This paper analyzes the main transformations that have shaped the evolution of apprenticeship in Benin, with particular emphasis on its spatial development, the transformation of its organizational forms, and the evolution of mechanisms for skills recognition and certification.

Key words: apprenticeship, craftsmanship, Benin, vocational training, enterprise

INTRODUCTION

Apprenticeship is an ancient phenomenon closely linked to human history. As a training system, it has undergone continuous evolution in its organizational forms and mechanisms for skills recognition. Initially practiced within the family sphere, apprenticeship gradually expanded into urban areas as a result of rural migration and the growth of artisanal activities. This evolution contributed to the emergence of small and micro-enterprises, which today account for nearly 45.6% of economic units in Benin. Traditional apprenticeship is primarily based on workplace practice. Learners initially serve as

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helpers or assistants before progressively acquiring apprentice status under the supervision of a master craftsperson within a system increasingly structured by artisans themselves.

Since the early 2000s, the Government of Benin has introduced the dual apprenticeship system, combining workplace-based practical training with theoretical and practical instruction in specialized training centers. This approach seeks to strengthen the complementarity between theory and practice in vocational skills development. At the same time, mechanisms for skills recognition have become progressively institutionalized. Following a period characterized by social recognition and certificates issued by artisans and their professional associations, the Traditional Apprenticeship Completion Examinations (EFAT) marked an important step toward formal certification. Subsequently, the Certificate of Occupational Qualification (CQM) and the Certificate of Professional Qualification (Certificat de Qualification Professionnelle, CQP) were introduced and are now officially recognized within the framework of West African Economic and Monetary Union (Union Économique et Monétaire Ouest-Africaine, UEMOA) regulations.

Apprenticeship in Benin therefore appears as a dynamic system whose evolution contributes significantly to the modernization of vocational education and training and to the enhancement of youth employability.

METHODOLOGY

This paper is based on a qualitative, historically oriented approach grounded in documentary analysis of scientific, institutional, and regulatory sources related to apprenticeship in Benin. It adopts a diachronic reading of apprenticeship forms and certification systems, complemented by a comparative perspective with vocational training policies in developing countries.

The analysis draws on specialized academic works, institutional documents, legal texts, administrative reports, and statistical data related to professional certification systems in the craft sector.

SPATIAL EVOLUTION OF APPRENTICESHIP

Apprenticeship and the school of life

In ancient times, villages were composed of families occupying clearly defined geographical spaces and performing specific roles in community life. Each family contributed to the functioning of the community through specialized activities.

Families were mainly engaged in weaving, blacksmithing, pottery, hunting, construction, pharmacopoeia, funeral rites, divination practices, and various socio-cultural activities.

This community-based organization

enabled intergenerational transmission of skills through observation, imitation, and daily practice.

Apprenticeship within the family circle

Within specialized families, skills were transmitted from generation to generation. Boys were trained alongside male relatives such as fathers, uncles, or cousins, while girls learned from mothers, aunts, or female cousins. Apprenticeship was therefore a natural extension of family and community life.

Apprenticeship beyond the family circle

Due to demographic growth and market saturation at the local level, the family system gradually weakened. Some skilled artisans were forced to leave their communities in search of better living conditions. Away from their families, they began to accept apprentices who had no family ties with them. This marked a shift in apprenticeship, which gradually moved beyond its strictly familial foundations, opening a new phase in its historical evolution.

Apprenticeship during the colonial period

Colonization contributed to the expansion of apprenticeship through the emergence of new professions linked to the economic exploitation and infrastructure development of the Dahomey colony. Public works led to the development of trades such as masonry, carpentry, joinery, bricklaying, and heavy machinery operation. The importation of manufactured goods (bicycles, mopeds, radios, typewriters, sewing machines, vehicles, *etc.*) also fostered the growth of maintenance and repair occupations. Local labor was trained and employed in production and service sectors. Over time, many skilled workers became self-employed, leading to the emergence of micro and small craft enterprises specializing in mechanics, electronics, winding, electricity, welding, woodworking, and maintenance services. These craftsmen gradually opened their workshops to apprentices, contributing to the expansion of vocational training in newly emerging colonial-era trades.

Apprenticeship after independence

Following independence, urban development and increasing population needs led to the expansion of artisanal enterprises. These enterprises continued their tradition of in-house vocational training, making apprenticeship more accessible to young people.

EVOLUTION OF APPRENTICESHIP MODELS

Unorganized apprenticeship

Unorganized apprenticeship represents the oldest form of vocational skills transmission within the artisanal sector. It is essentially an informal learning system characterized by the absence of explicit regulations governing the relationship between the master craftsperson and the apprentice. In this model, the acquisition of competencies relies primarily on participation in productive activities without

a clearly defined pedagogical framework.

This form of apprenticeship is characterized by the apprentice's status as a helper or assistant, the absence of formally established mutual commitments between the parties, the indefinite duration of the training period, and the lack of predefined learning conditions. It is also distinguished by the absence of a written contract or any formal document regulating the training relationship.

Unorganized apprenticeship therefore constitutes the most representative form of informal learning traditionally practiced within family settings and artisanal enterprises. For many years, it served as the principal mechanism for the intergenerational transmission of occupational knowledge and skills.

Self-organized apprenticeship

In response to the absence of structured public vocational training initiatives, artisans gradually developed self-regulated mechanisms for training young people. This evolution led to the emergence of self-organized apprenticeship, characterized by a higher level of organization and structure in the training process. This mode of apprenticeship is mainly based on observation, imitation, and the gradual reproduction of occupational skills and work practices. Competency development occurs through a progressive integration into production or service delivery activities. The training pathway generally follows several successive stages.

The first stage is the inactive apprenticeship phase. During this period, apprentices mainly perform auxiliary tasks such as cleaning workshops, maintaining equipment, and running errands. This stage allows them to become familiar with the work environment and to acquire the discipline and behavioral norms associated with the occupation. The second stage is the semi-active apprenticeship phase. At this level, apprentices develop their observational skills and begin to participate in simple work activities under the supervision of the master craftsperson or more experienced apprentices. The third stage corresponds to active apprenticeship. Apprentices are progressively involved in technical operations and undertake increasingly complex tasks under the guidance of the master craftsperson or the assistant master. The final stage is that of assistant master (submaster). At this level, the apprentice has acquired substantial experience and contributes to the supervision of junior apprentices while assisting the master craftsperson in managing production activities and customer relations.

These stages can be broadly grouped into three major phases: An observation and socialization phase, a progressive integration into productive activities phase, and a responsibility and professional autonomy phase.

Dual apprenticeship

Dual apprenticeship represents a significant evolution of traditional vocational training systems. It constitutes a modernized form of artisanal apprenticeship based on the integration of

workplace training and institution-based learning.

Unlike traditional apprenticeship, which takes place entirely within the enterprise, dual apprenticeship combines periods of practical training in the workplace with periods of theoretical and practical instruction in a vocational training center. This complementary approach aims to strengthen technical competencies while providing learners with the theoretical and technological knowledge required for effective occupational practice.

Within this system, workplace training remains predominant, accounting for approximately 75% to 80% of the total training duration. Vocational training centers provide theoretical instruction, technological education, and complementary practical exercises.

The dual apprenticeship approach is founded on the pedagogical principle that theory and practice are mutually reinforcing dimensions of learning, a concept often associated with Immanuel Kant, who emphasized the interdependence of theoretical knowledge and practical experience.

In Benin, dual apprenticeship was institutionalized in 2003 as part of broader vocational education and training reforms. The program extends over a period of three years and leads to the award of the CQP, established in 2005 to provide formal recognition of competencies acquired through apprenticeship training.

EVOLUTION OF SKILLS RECOGNITION

Non-certified apprenticeship

Initially, apprenticeship was entirely managed by master craftsmen, who alone decided when training was completed. Skills recognition was purely social, without formal certification. However, graduation ceremonies served as symbolic public recognition of skills.

Certification by master craftsmen

Master craftsmen later began issuing completion certificates specifying the trade, duration of training, and identities of both apprentice and master. These certificates were formally awarded during public graduation ceremonies marking the transition from apprentice to artisan.

Certification by professional associations

From the mid-1990s, craft associations became involved in issuing apprenticeship completion certificates. They organized graduation ceremonies under their institutional authority while maintaining recognition of the master's role.

EFAT certification system

The creation of communal associations led to the establishment of EFAT. These examinations standardized skills assessment at the communal level. First EFAT: Malanville (1997), Kandi (2002), Djougou (2004). Two generations exist: First generation, organized by craft organizations only; second generation,

involving local authorities (municipalities).

Official certification (CQM and CQP)

Public authorities introduced two main certificates: CQM (for fully enterprise-based apprenticeship and CQP (for dual apprenticeship). Between 2013 and 2025, 377,409 candidates obtained the CQM, while 12,089 obtained the CQP (2005–2022). These certifications now constitute the main institutional framework for recognizing vocational skills in Benin's artisanal sector.

CONCLUSION

The evolution of apprenticeship in Benin reflects a historical transformation from family-based transmission systems to increasingly structured and institutionalized training frameworks. These changes demonstrate the adaptability of the artisanal apprenticeship system to economic and social transformations, particularly through dual apprenticeship, EFAT systems, and the institutionalization of the CQM and CQP. However, challenges remain, including formalization of apprenticeship relations, improvement of training quality, sustainable financing, curriculum adaptation to technological change, and enhancement of youth employability. Overall, apprenticeship remains a strategic lever for skills development, youth employment, and structural transformation of the artisanal sector in Benin.

DECLARATION

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VTE VOCATION, TECHNOLOGY & EDUCATION

RESEARCH PAPER

Surviving or reviving? Traditions and innovation in Hungarian dual vocational training

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ABSTRACT

The paper, based on historical research, illustrates the interaction between traditions and innovations through examples of contemporary developments in the Hungarian vocational training model. This process has sought to serve a dual purpose from the beginning (from the second half of the 20th century to the present day). On the one hand, by developing the workforce's qualifications, it has served the development and efficiency of the economy in the short and medium term, and on the other hand, in the longer term, it has also contributed to improving the structure and professional mobility of society. Hungary's dual vocational training system has undergone significant changes since 2020, reflecting efforts to renew it across many aspects. The research summarizes the main traditional factors and innovative initiatives whose interaction is decisive in the contemporary renewal of dual vocational training in Hungary.

Key words: apprenticeship, dual vocational training, innovation, tradition

INTRODUCTION

In the European history of the development of the dual vocational training model and institutional system, in the last third of the 19th century, for about the next four decades, the dualist system following the Austro-Hungarian Compromise was one of the success stories of the Habsburg Empire. This paper illustrates the connections between innovation and tradition in Hungary over the past century and a half, as an international model of economic and political duality and of dual vocational and apprenticeship training. The devel-

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opment trend of European vocational training, which has significant traditions (Billett, 2011), accelerated in the first decades of the 21st century (Bainbridge, 2024), and the dual training model became the focus of innovative efforts (Deissinger & Gonon, 2021). The research, which is based on comparative methods and is of a historical nature, has in recent years been treated as a reference to the thematic orientation of the International Network on Innovative Apprenticeship (INAP) 2019 conference on Contemporary apprenticeship reforms and reconfirmations (Benedek & Molnár, 2019). Following this general research orientation, which focuses on the interrelation of innovation, technical skills, and vocational education and training (Lewis, 2025), there was an opportunity within last year's 2025 INAP conference to analyze the innovative results of Hungarian dual vocational training. Since 2020, this system—while maintaining traditions—has undergone several renewal attempts, which are characteristic of it (Kersch, 2019).

METHODS AND RESEARCH DESIGN

Hungarian dual vocational training has sought to serve a dual purpose from the beginning (from the second half of the 20th century to the present day). On the one hand, by developing the workforce's qualifications, it has served the development and efficiency of the economy in the short and medium term, and on the other hand, in the longer term, it has also contributed to improving the structure and professional mobility of society (Li & Pilz, 2021; Rauner, 2024). In the latest phase of European integration, at the beginning of the 21st century, the pragmatic integration of two distinct policy approaches (education and economic policy) was achieved. Meanwhile, due to technological changes, digitalization, and global crises, the traditional employment structure has undergone significant transformations in vocational education and training across Europe, both horizontally and vertically (Laczik & Kristensen, 2025).

Based on the complex process, the next research question was formulated: How is modern dual vocational training in the 21st century changing, and what are the main driving factors and key players behind this change? Are there, and what are the new elements of innovative change, and how are traditions and innovations related to each other in this process? The research methodology was complex. On the one hand, the comparative historical analysis and description of domestic and international development history are the subject of the study; on the other hand, the examination of new vocational training models is. In the final stage of the research, four workshops were organized at the university with the main stakeholders in vocational training—employers, chamber experts, management of vocational training institutions, and innovation experts and the discussion of the development ideas formulated during these consultations made a significant contribution. The summary of the results provided a framework, as a structured

evaluation criteria system for understanding the contemporary challenges of Hungarian dual training and for incorporating the traditional and innovative factors of dual vocational training.

RESULTS

Our research group has been researching the theoretical background of the global renewal of the vocational training system, to compare this process with the Hungarian traditions in relation to the new innovative initiatives of dual apprenticeship, which also have an impact on the modernization of dual vocational training. According to the findings of our research analyzing the traditional values and successful innovative initiatives of Hungarian vocational training, the main elements of the 2019 Hungarian vocational training reform process are: (1) The abolition of the National Qualifications Register, which was developed and introduced in the 1990s based on the principles of the German model as a state-recognized qualification register, and the introduction of a single Vocational Register (2020) that is rationalized in size and procedure and covers all sectors. (2) The transformation of the vocational training institutional system, the introduction of a more prestigious technical school, and a vocational training school primarily suitable for training in dual, company-based practice settings. (3) Strengthening the dual training system, modernizing the legal and economic conditions for the active participation of economic actors. (4) Establishing a new scholarship system that serves to financially encourage students and thus encourage learning in vocational training, as well as introducing a vocational training employment contract that replaces the previous apprenticeship contract, thus bringing the legal status of students closer to an employment relationship.

The essential output of our research is the description of the categories that are present in traditional dual vocational training (apprenticeship contract, organization of practical training) today, and in addition to which, precisely as a result of innovation initiatives, new essential categories providing flexible training opportunities. In Hungary, over the past decade and a half, the essential conceptual element of the Hungarian economy and social policy has been the "creation of one million new jobs" (in March 2026, the number of active employees was 4 million 627 thousand). There is no doubt that between 2013 and 2019, the number of active employees increased by about 850-900 thousand people, and employment reached its historical peak. In 2025, the economic activity rate of the 15-64 age group was 77%-78%. Between 2010 and 2025, youth unemployment decreased from 26.0% to 12.5%, and vocational training became a clear priority in the complex field of educational and economic policy.

The Hungarian example also illustrates that strong management dominance and central administration inhibit the more differentiated enforcement of economic interests in vocational training. The dynamics and interactions of the factors listed in Figure 1 result in a development

Traditional factors	Innovative factors
Industrial approach and sectoral traditions	Increasing complex sectoral diversity in the economy
Conservative organizational and attitudinal effect of theoretical education	Support for new forms of education-economy cooperation
Inhibiting effect of state dominance, strong central administrative management	More differentiated enforcement of economic interests
Striving to expand employment and reduce training dropout	Introduction of a new vocational training scholarship and training contract system, improving the attractiveness of vocational training with new communication tools

Figure 1. Traditional and innovative factors in Hungarian dual vocational training (2020-2025).

process that currently affects the transformation and renewal of the vocational training system in Hungary.

DISCUSSION

In Hungary, according to the current (2012) regulation, compulsory education lasts until the age of 16; early school leaving significantly limits the effectiveness of vocational training, especially for disadvantaged groups. The impact of initiatives aimed at reducing early school leaving (introduction of flexible training and catch-up programs, administrative support for public administration procedures) has been clearly positive in the past decade. Given the technological transformation of the economy and the international development of the labor market, one of the key professional and social debate topics in the coming period will be the extension of compulsory education to age 18.

In the "larger system" of education, in addition to basic and higher education, vocational training, especially the renewal of dual vocational training, has become a significant focus of innovation in its organization and conditions due to the new legal regulation adopted in 2019. The primary effects of this can be seen in changes in the number of vocational training students, in changes in the ratios between training types, and in favorable changes in the values of dropout indicators. A permanent decrease between 2005 and 2020, mainly due to demographics and structural changes, and then moderate growth and stabilization can be seen after 2020. Over the last 3-4 years, the number of students has increased, and the introduction of scholarships, and wage supplements has increased the attractiveness of vocational training. Another important issue is the easing of the strong policy centralization of the past nearly two decades, the creation of the framework for professional autonomy, which has become a strategic demand since the spring of 2026. Our research has sought to highlight the following problem areas

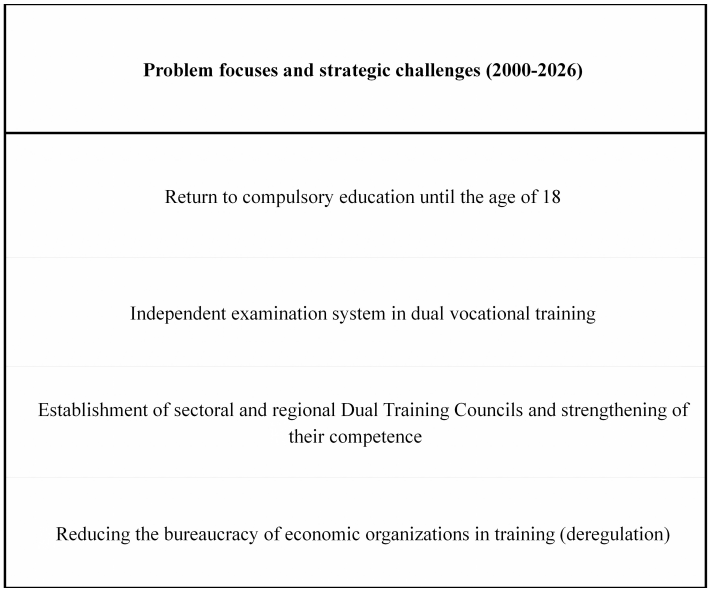


Figure 2. Contemporary challenges of Hungarian dual training.

which have become apparent in recent years (Figure 2).

CONCLUSION

The current stage of Hungarian vocational training is presumably also of international significance for the modernization of dual vocational training. Especially during the search for European solutions, comparative research is justified to examine the impact of tradition-based innovations on the development of a new model of dual vocational training in the 21st century. Encouraging new forms of cooperation between education and the economy, a more differentiated representation of economic interests, and the development of support systems for active participation in vocational training will presumably be essential elements of a future dual model. In Hungary, the election held in the spring of 2026 with significant social support could presumably trigger a moral and professional transformation, as part of which the concepts of "survival or revival" can be interpreted as realistic issues in the world of vocational training, which are organically linked to model-valued changes within historical frameworks.

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VTE VOCATION, TECHNOLOGY & EDUCATION

RESEARCH PAPER

The resilience of the apprenticeship model: Reflections of a former apprentice school manager

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ABSTRACT

This paper investigates the resilience of the traditional apprenticeship model in manufacturing by drawing on the experience of the author as an Apprentice School Manager in the UK car industry during the early 1980s and comparing these reflections to the current state of apprentice training in the UK and Australia. The aper concludes, that traditional apprenticeship model is highly resilient and adaptable to technological and work organisation change.

Key words: history of apprenticeship, traditional models of apprenticeship, technological change

INTRODUCTION

This paper draws on the experience of the author as a Training Manager in the UK car industry during the early 1980s and comparing these reflections to the current state of apprentice training in the UK and Australia. The research is set in the British Leyland (BL) car manufacturing company during the 1980s, specifically the former Drews Lane manufacturing plant in north Birmingham which was responsible for the production of component parts such as braking and wheel systems for the company. The plant employed around 2500 people at the time of the study. The Drews Lane plant had a long history of employing a range of apprentices in trades such as electrician and machine tool fitting.

RESEARCH AND METHOD

The research question for this paper was: How resilient is the traditional model of

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Apprenticeship training in the face of rapid technological and work organisation changes?

The method draws on a form of participant observation and case study analysis together with document analysis of apprenticeship models of skills training. The author spent 3 years, 1981-1984, as Training Manager for the plant which included the management of the Apprentice Training School at the plant. In this position the author was able to observe the working of the apprenticeship training model at the plant in full. At the same time, the plant was also, in common with many BL plants, undergoing rapid technological innovation as computerised machine tools were adopted and the work of machine operators and the skilled craftsmen that maintained and set the machines was undergoing significant change.

RESULTS

Setting: BL and the UK car industry in the 1980s

During the time that the author worked at the Drews Lane plant, the UK car industry was undergoing significant upheaval. The BL company had been formed through a series of mergers of former independent British car companies such as Austin, Morris and Rover into a single very large company supporting dozens of manufacturing and assembly plants across Britain. This process had begun in the 1960s as the UK car industry started to face significant competition from international car makers in Europe and the USA, many of which established car plants in the country. The final iteration of this process occurred in the late 1960s with the formation of BL. This process of consolidation was intended to produce a more efficient and high quality car industry. However, by the late 1970s, it became clear that the consolidation of the industry had not worked as planned. Inefficiency, low quality and poor management and union relationships dogged BL and resulted in the car company's market share dropping to the point of insolvency. By 1975, BL had been nationalised. However, the problems remained.

In the 1980s, continuing low productivity, poor product quality and confrontational industrial relations led to BL becoming the site for a strong re-assertion of management prerogative encouraged by the Thatcher Government. Aggressive productivity reforms, large scale plant closures and redundancies together with a significant investment in new models helped BL to regain its competitive edge. At the same time, BL invested heavily in new manufacturing technologies including the introduction of robotic manufacturing, computer-controlled machine tools and flexible manufacturing systems. These changes were expected to increase productivity and quality and reduce the level of employment in the industry. Technological change was accompanied by reforms to work organisation as BL sought to engage employee commitment including the implementation of teamworking, enhanced management

consultation and communication and employee involvement schemes.

Technological and workplace change

At the Drews Lane plant, technical change primarily involved the introduction of Computer Numerically Controlled (CNC) machine tools and Flexible Manufacturing Systems (FMS). CNC had a major impact on the jobs of machine operators and on machine tool fitters. Both these groups of workers were required to be trained in the programming of the small computers that now controlled machines. This included the apprentices for whom the introduction of programming became a key element in the apprenticeship curriculum. FMS likewise involved the use of computers to guide production schedules that also allowed 24-hour work cycles to be established in small areas within the plant. In this case, the major change for operators and skilled workers was the requirement to work in small teams and over 24 work cycles, a considerable change to work organisation.

These changes to production technology and the accompanying changes to work organisation bear an uncanny resemblance to the changes that are being introduced into workplaces today. Industry 4.0, artificial intelligence (AI), new configurations of work practices and a re-defining of the role of management have heralded alarmist predictions of large-scale unemployment, slave-like conditions of work for those who retain their jobs and widespread economic recession (Autor, 2022; Henseke *et al.*, 2026). However, these pessimistic views have been questioned by commentators and researchers who point out that technological determinism is an historically common reaction to sweeping changes in the workplace and that far from being an external shock technological change can be moulded by the choices that we make about how new technologies are harnessed and for whose benefit (Joyce *et al.*, 2023). Recently Buchanan and his colleagues have highlighted the role of education and training systems, including apprenticeship, in facilitating such choices (Buchanan *et al.*, 2025).

The apprentice training model at the Drews Lane plant

The apprentice training model at the plant centred on a first year off-the-job model, delivered on-site in the company owned Apprentice Training School. Here all first-year apprentices were able to cover the basic skills and knowledge of their chosen trade through a combination of class delivery and working on machines installed in the Training School. The school was staffed by six instructors—usually former skilled tradesmen from the plant—and a manager who reported to the Plant Training Manager. After the first year off-the-job training, apprentices progressed to a block release model of attendance at a local Further Education (FE) College combined with employment within the plant in the appropriate section. The full span of the apprenticeship was usually four years.

This was also a model used in other plants throughout BL. The advantages of the Training School off-job model were that it not only allowed the apprentices to learn about their trades but also the culture and organisation of the company within the safe environment of a company owned facility. Thus, unlike most traditional models of apprenticeship that combined both work and release to a training provider on a weekly basis, the apprentices at the Drews Lane plant were highly acculturated when they began their working experience in second year. The Training School model also replicated the safe environment of a school from which the apprentices would have entered the company. This allowed young school-leaver apprentices to undertake their first year of training in an environment that was similar to the one that they had just left with an identifiable physical location and permanent staff. Moreover, the Training School model allowed the Apprentice Training School to focus on developing other aspects of the apprentices' skills such as teamwork and interpersonal skills in practical ways.

As an example of this "soft skills" development process, each year the apprentices were encouraged to enter a local "raft race" on the River Severn. This involved not only the design, construction and testing of a suitable raft to carry eight persons but also arranging the logistics of supporting an 8-person team over a three-day race. The apprentices, under the supervision of the instructors competed each year in this race which taught them design and construction skills but also teamworking, communication and organising skills. Another example of the use of the Training School model to develop non-technical skills was the construction of a replica Wolsey Hornet sports car from the 1940s. The Drews Lane plant had been the home of Wolsey Cars before its incorporation not BL and the Hornet was a classic example from its design heyday. Over a 3-year period, apprentices worked with instructors on all facets of designing and building the replica car providing the opportunity for the development of the non-technical skills that helped the apprentices adapt to working like in the plant and to the changes that were occurring at the time.

The Training School model used at BL was unusual in its time. However, there is evidence that it has survived into the 21st century as a possible model run by Group Training Associations (GTA) in the UK where smaller employers, not possessing the resources to run this model for themselves, have formed a GTA to run the model on behalf of the participating companies (Smith, unpublished). The model also works towards the fulfillment of many of the measures of success of an apprenticeship system identified by the International Labor Organisation and the World Bank (Smith & Brennan Kemmis, 2013).

The Training School model also worked well within the context of swift organisational and technical change at BL. The model allowed the apprentice curriculum to be tailored towards the new machines that were transforming the production

processes in the company. This would have been much more difficult to achieve within the more traditional model of day release to a local FE College. Instructors at the Training School were able to teach the basis of machine tool programming and other computer skills required by the skilled tradesmen that were needed in the company to successfully manage the transformation to the new manufacturing technologies. At a deeper level, the ability of the Training School model to develop the non-technical skills of apprentices as described enabled the apprentices to develop the flexibility and personal skills required to cope with the pace of change in technology and work organisation within BL at that time.

CONCLUSION

This paper has examined the role of the apprenticeship model, combining off-the-job training in an educational institution with on-the-job training delivered in the workplace, in preparing apprentices for the technological and work organisation changes that have and continue to shape the workplace (Smith & Brennan Kemmis, 2013). The paper focused on the role and operation of the Apprentice Training School at the BL car components plant during the early 1980s. Although an old model of apprentice training, the BL model worked well during the early 1980s to allow the new apprentices to deal with the technological and workplace changes that were occurring at that time. It is likely that the traditional apprenticeship model, is sufficiently flexible to similarly accommodate the current technological and work organisation changes that are causing such a pessimistic societal reaction in the present day.

DECLARATION

Article version statement

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VTE VOCATION, TECHNOLOGY & EDUCATION

RESEARCH PAPER

Apprenticeships in the United States: History and recent trends

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ABSTRACT

This article traces the evolution of apprenticeship in the United States (US) from colonial craft traditions to today's registered apprenticeship system. Unlike European models, the US system developed as a decentralized, voluntary approach, shaped by employers, unions, and limited government oversight. The article examines major milestones, including the National Apprenticeship Act of 1937, the role of unions and construction trades, the rise and decline of youth apprenticeship initiatives, and the expansion of state and federal support since 2015. It highlights the growing importance of apprenticeships beyond construction, including in manufacturing, healthcare, teaching, and the military, while noting persistent barriers such as regulatory complexity, limited employer incentives, and inadequate public funding. Although apprenticeship participation has increased significantly in recent years, the US still trails many advanced economies in scale, underscoring the need for policy reforms and sustained investment.

Key words: registered apprenticeships, construction, youth

INTRODUCTION AND EARLY APPRENTICESHIPS

Unlike the centralized apprenticeship systems of Europe, the United States (US) system evolved as a decentralized model that encouraged flexibility but limited scale and consistency.

Apprenticeship in the US originated in colonial craft traditions but evolved into a distinctive institutional model characterized by voluntary employer participation, decentralized occupational standards, and limited government direction. As in Europe, apprenticeships trained young men in return for indentured service over several years.

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Apprenticeship played a central role in the life of Benjamin Franklin, one of America's founding fathers. Beginning at age 12, Franklin apprenticed in his brother's print shop, where he learned printing, editing, and writing skills. Although legally bound for nine years, Franklin left at age 17 and moved from Boston to Philadelphia. His apprenticeship helped shape his later success as a publisher, scientist, and revolutionary leader.

In the early 1800s, despite most youth attending formal schooling for less than two years, apprenticeships and home learning contributed to literacy rates of about 70% among those not enslaved. Estimates indicate that about 20% of young men were apprentices. Yet long-duration, unpaid apprenticeships became increasingly difficult to enforce in a society influenced by revolutionary ideas about liberty and economic mobility (Jacoby, 2001).

Skill shortages after the Civil War encouraged the development of "trade schools" that competed with apprenticeships and contributed to the growth of craft unionization. Issues surrounding apprenticeship contracts and union restrictions on the number and composition of apprentices emerged during this period. By the early 1900s, states began regulating apprenticeship contracts, with Wisconsin enacting the first comprehensive state program.

The National Vocational Education Act of 1917 initiated federal support for vocational education that has both supplemented and competed with apprenticeships ever since. In some cities, schools provided apprentice extension classes in the building trades, limited to union members. The Davis-Bacon Act of 1931 reinforced the dominant role of unions in construction by requiring prevailing, usually union, wages on government-funded projects. The Act also allowed apprentices to earn reduced wages, but only in officially registered apprenticeship programs.

Historically, many union-controlled apprenticeship programs limited access for African Americans, contributing to later equal-opportunity regulations governing registered apprenticeship programs.

THE NATIONAL APPRENTICE ACT INAUGURATES A SYSTEM

The National Apprenticeship Act of 1937 created the statutory basis for the registered apprenticeship system, empowering the federal government to promote labor standards and cooperation among employers, labor, and states. The Secretary of Labor implemented the law through regulations governing classroom instruction, progressive wages, and ratios of journeymen to apprentices. Unlike apprenticeship systems in many countries, the US system never mandated national occupational skill standards or provided substantial direct public financing. Instead, individual employers, employer groups, and joint

union-management programs developed their own skill requirements and training structures.

The US Department of Labor's Bureau of Apprenticeship (later the Office of Apprenticeship) administered the formal apprenticeship system while permitting State Apprenticeship Agencies (SAAs) to register and monitor programs and designate apprenticeable occupations. SAAs relied on apprenticeship councils that often imposed stringent standards, delayed applications, or rejected competing programs.

Given the complexity of registration, extensive regulations, and limited incentives for participation, many firms developed apprenticeship programs outside the registered system. As a result, the registered apprenticeship system captures only part of apprenticeship activity in the US. The Federation for Advanced Manufacturing Education (FAME) illustrates this trend: Although its network includes nearly 500 employers, only about 15% register their apprenticeship programs. A study of FAME found impressive earnings gains (Jacoby & Haskins, 2020). Unfortunately, the US lacks reliable data on the number and composition of unregistered apprenticeships.

THE ROLE OF CONSTRUCTION TRADES

Historically, registered apprenticeship programs operated primarily in construction, manufacturing, and utilities, although they later expanded modestly into occupations such as firefighting and policing. Apprenticeships represented about 0.275% of the US labor force in 1952 and remained near that level for three decades. Over time, construction increasingly dominated. In 1948, about 40% of apprenticeships were in construction; by 1971 the figure had reached 50%, and between 1996 and 2004 construction accounted for roughly 75% of new apprentices. Electricians have consistently ranked among the largest apprenticeship occupations.

Unions played a central role. With no government funding, unions and construction employers developed Joint Apprenticeship and Training Committees (JATCs) to oversee financing, selection, registration, and training centers. Contractors paid apprentice wages and provided on-the-job instruction, while jointly financed training centers delivered classroom instruction and skill upgrading for journeypersons. By the 2020s, JATCs generated more than $2 billion annually to support apprenticeship programs. In recent decades, however, nonunion employers have expanded their role. The Associated Builders and Contractors reported that by 2024, 31% of construction apprentices worked in nonunion programs.

Although apprenticeships remained strongest in construction, reformers increasingly sought to broaden the model into youth and professional occupations.

THE YOUTH APPRENTICESHIP DIVERSION

In the late 1980s and early 1990s, researchers and advocates promoted apprenticeships beginning in late high school, modeled partly on systems in Germany and Switzerland (Hamilton, 1990; Lerman & Pouncy, 1990). Reports highlighted weaknesses in US school-to-work transitions, particularly for young people not pursuing college. At a 1990 conference entitled "Youth Apprenticeship American Style", keynote speaker Governor Bill Clinton joined education leaders such as Albert Shanker and Herbert Grover in supporting the approach.

The George H. W. Bush administration sponsored youth apprenticeship demonstrations and proposed the National Youth Apprenticeship Act of 1992. State and local initiatives also emerged in Oregon, Wisconsin, Arkansas, Boston, Rochester, and Tulsa. Although President Clinton expressed support for youth apprenticeship, his administration's School-to-Work Opportunities Act focused broadly on school-to-work reforms and provided little direct support for apprenticeships.

The movement ultimately faltered because youth apprenticeship remained weakly connected to registered apprenticeship, faced union resistance, raised fears of premature specialization, and collided with the enduring national commitment to "college for all".

A few states, notably Wisconsin, sustained a strong commitment to youth apprenticeship. Wisconsin has developed skill standards, mobilized employers and educators, and maintained programs in occupations ranging from automotive technology to biotechnology and finance. By 2025, more than 8000 employers were training over 12,000 youth apprentices.

US MILITARY APPRENTICESHIP PROGRAM (USMAP)

One often-overlooked component of the US Apprentice system is USMAP, which has been operating since 1976. Apprenticeships in the Navy, Coast Guard, and Marine Corps now account for about one in six registered apprenticeships. Unfortunately, USMAP has serious challenges, including low completion rates and little connection to civilian employers (Hanson & Lerman, 2016).

A SECOND CHANCE FOR APPRENTICESHIP EXPANSION

Between the 1990s and 2015, apprenticeships received little policy attention outside the building trades, even within the Labor Department. South Carolina's Apprenticeship Carolina was a notable exception, expanding from 90 employers in 2008 to more than 700 by 2013. During this period, federal funding for apprenticeship remained only about $30 million annually—barely enough to administer and promote the system.

In 2015, the Obama administration awarded $175 million over 5 years in grants to 46 grantees to expand apprenticeships, especially outside the construction industry. The first Trump administration and Congress increased annual funding to more than $250 million. A debate later emerged over Industry-Recognized Apprenticeships, which critics feared would weaken oversight and quality standards. Between 2021 and 2024, the Biden administration and Congress maintained high apprenticeship funding and promoted expansion through the CHIPS Act, Infrastructure Investment and Jobs Act, and Inflation Reduction Act.

Governors and employers increasingly championed apprenticeships as confidence in the increasingly costly "college for all" strategy weakened. Labor shortages in skilled trades, manufacturing, health care, and teaching further increased employer interest in apprenticeship models.

State legislatures doubled the number of apprenticeship-related bills enacted between 2014 and 2023. More governors highlighted apprenticeship initiatives in their State of the State addresses, more states established apprenticeship offices and SAAs, and several streamlined registration and integrated apprenticeships with high school and community college career programs. States such as California, Colorado, and South Carolina also introduced substantial subsidies for apprenticeship sponsors (Apprenticeships for America, 2024).

The renewed emphasis on apprenticeship is producing measurable growth. Between 2016 and 2025, civilian apprenticeships rose 77%, from 330,000 to 586,000. Apprenticeships increased from 0.21% to 0.32% of the US labor force during this period, but the American share remains well below levels in Australia, Canada, England, France, Germany, and Switzerland. Unlike many European systems, the US provides limited direct public financing and lacks national occupational frameworks that support large-scale apprenticeship participation.

Construction accounts for much of the increase, but growth in non-construction apprenticeships has also been substantial. Entrants in non-construction apprenticeships increased from 61,000 in 2016 to 109,000 in 2025. New apprenticeship programs are emerging in professional fields such as teaching and nursing.

Despite these gains, the US is unlikely to achieve apprenticeship participation rates approaching those of other advanced countries without substantial and sustained public investment.

SELECTED RESEARCH ON EARNINGS GAINS

Several non-experimental studies of US registered apprenticeships have found large and statistically significant impacts of apprenticeships on participant earnings. These include estimates of earnings gains of 40% for apprentices in Washington state over a matched group

of comparable workers (Hollenbeck & Huang, 2017). A recent evaluation compared apprentices in advanced manufacturing, information technology (IT), and health care with two matched comparison groups, including a sample of individuals enrolled at a community college and trained in apprenticeship industries (Deutch *et al.*, 2025). The findings yielded statistically significant gains in earnings and employment of both registered and unregistered apprenticeship programs. The increases in employment in the 9th quarter after the start of apprenticeships ranged from 5% to 10%. Earnings gains for apprentices were substantial: Apprentices earned 50% more than entrants into community colleges in the same fields and 29% more than comparable workers entering job placement agencies.

CONCLUSION

The US experience with apprenticeship shows positive earnings gains for apprentices but also highlights the limitations of weak government support. Expanding apprenticeship at scale will require simplifying registration, strengthening connections with education systems, building occupational skill standards, improving data on unregistered programs, providing sustained public investment, and convincing more employers that apprenticeship is a productive long-term investment rather than a short-term cost.

DECLARATION

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TOPIC 2:
STANDING OF APPRENTICESHIPS

VTE VOCATION, TECHNOLOGY & EDUCATION

RESEARCH PAPER

Managing VET clusters: Challenges and good practice

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ABSTRACT

As vocational education and training (VET) systems look for innovative approaches to becoming future-proof, the German Federal Ministry of Economics and Energy pilots VET clusters as a new impulse to strengthen VET. Drawing on three pilot clusters in East-German brown-coal regions, we analyse how VET cluster management is organized with the aim of identify good practice, challenges and prerequisites for the success of the cluster approach. Findings show that trust-based relationships, frequent personal exchanges, and clear strategic leadership are pivotal bases for VET clusters. Effective cluster management must also secure long-term financing to sustain their impact.

Key words: vocational education and training clusters, cooperation, innovation in vocational education and training

INTRODUCTION

Vocational education and training (VET) systems across the globe are confronted with a multitude of challenges, including megatrends such as digitalisation, decarbonisation or difficult demographics (OECD, 2023). Hence, policymakers and VET practitioners are faced with the question of how VET systems can become future-proof. How can VET retain or increase its attractiveness, and become more innovative and adaptable to meet the challenges mentioned above?

One of the aspects considered essential for maintaining successful VET systems is cooperation, a topic that has been approached from different disciplinary and analytical angles (Busemeyer &

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Trampusch, 2012; Dehnbostel, 2020; Kunath *et al.*, 2024; Peters & Krichewsky-Wegener, 2021; Schwede *et al.*, 2025; Thelen, 2004; Wilbers, 2003). A more recent development in the context of skill formation is the attention being paid to clusters as cooperation structures.

The focus on cluster structures as an instrument of economic policy rests on the assumption that cluster initiatives create and leverage synergy effects. In doing so, they foster innovation, enhance competitiveness, and increase value creation through so-called agglomeration advantages (Clusterplattform Deutschland, n.d.; Lindqvist *et al.*, 2013).

Clusters can not only provide the framework for trusting cooperation between companies and other partners, but also potentially represent regional education and training ecosystems. In these skill ecosystems, knowledge and technology transfer, informal learning, a high level of experience exchange and employee turnover between cluster members ensure that skills and knowledge are secured in the long term and increase competitiveness and capacity for innovation (Finegold, 1999). Building on these promises, in 2024, the German Federal Ministry of Economics and Energy (BMWE) initiated the funding of so-called VET clusters, with the explicit aim of strengthening VET in certain regions or industries, promoting VET-related innovation and cooperation and improving the quality of training. Currently, three different VET cluster initiatives are being piloted. The pilot clusters are located in East German brown coal regions which are undergoing profound structural changes due to the process of phasing out brown coal mining until 2038.

This contribution explores the following question: Under which conditions can regionally embedded VET clusters be a successful approach to building future-ready vocational skill formation through enabling cooperation between companies offering apprenticeships and other relevant stakeholders? We focus particularly on how cluster management is organised since cluster management organizations (CMOs) are considered a crucial factor for the success of clusters (Drewello *et al.*, 2015): CMOs take on the strategic management of clusters and develop measures and activities supporting knowledge transfer between cluster members.

METHODS AND RESEARCH DESIGN

In the case of the three German VET clusters, their initiation, expansion and management are in the hands of so-called cluster agents. Cluster agents administrate the governmental funding available for the establishment and management of the cluster and are to offer a number of services tailored to the needs of the cluster companies.

In line with the funding guidelines, cluster agents may be companies, private or public educational institutions, inter-company vocational training centers,

external continuing education centres, trade associations, business development agencies, craft chambers or chambers of commerce and industry.

Focusing on three case studies that encompass the pilot VET clusters, we examine the real-world manifestations of VET cluster management, shedding light on commonalities and differences, as well as challenges and good practice regarding cluster management, covering the first one and a half years of cluster implementation. Our analysis is informed by the European Secretariat for Cluster Analysis' (ESCA) indicators for benchmarking and labelling cluster initiatives, focusing on those indicators that are most relevant for cluster management, including: The legal form of the CMO, clear definition of the roles of the cluster management team, implementation of a governing body, degree of involvement of the cluster participants in the strategic decision making, human resource competences and development in the CMO, number of personal contacts between cluster management team and participants, strategic and operational planning, and financial sustainability of the CMO (ESCA, n. d.).

Our data include both qualitative and quantitative sources: A yearly survey for the cluster agents ($n = 5$) and cluster companies ($n = 52$) as well as yearly structured interviews with the cluster agents. Surveys and interviews have been implemented since 2024 by the project management agency VDI/VDE-IT to which the authors belong, focusing on assessing the state of project implementation for the BMWE along dimensions including cluster management and structure, key activities, challenges and regional embeddedness. Following the approach of qualitative content analysis (Mayring, 2015), we engage in deductive category-driven analysis of survey and interview data. The framework of categories is based on ESCA cluster management indicators listed above.

RESULTS

Since June 2024, three pilot projects have been testing the VET cluster approach in Germany.

(1) Die Zukunftsmacher (The Future Makers) supporting companies of all sizes in improving apprenticeships in the manufacturing industry as well as construction trades, roofing, and plumbing, heating and air conditioning technology in the Lusatian region; led by the registered association Lausitz-Matrix e. V. in cooperation with the further education provider Gesellschaft zur Förderung von Bildungsforschung und Qualifizierung mbH (GEBIFO) and the regional management consultancy Tragwerk Consulting.

(2) TAB_MINT based in the Central German mining area in the Halle region aiming at future-proofing apprenticeships in the field of mechatronics; coordinated by the educational institute Berufliches Bildungswerk e.V. Halle-Saalkreis.

(3) Lausitz-Cares in the Bautzen district

of the Lusatian region, strengthening apprenticeships in small, micro and medium-sized enterprises in the field of care and home economics; headed by the educational institute Bildungswerk der Sächsischen Wirtschaft gGmbH.

Their main activities include the coordination of publicity and career orientation measures to support the filling of apprenticeship positions in cluster companies, the professionalization of trainers and strengthening their digital and sustainable development skills to increase training quality and attractiveness, and the development of innovative training content not covered by the original training regulations.

Having been newly initiated none of the clusters has formed a separate legal form, yet. Cluster agents act on behalf of their respective origin organisation. There are at least two cluster agents per cluster, who avail themselves of existing regional networks and many years of experience regarding the cluster's focal industry. Agents also combine expertise in initial and further training, digitalisation and artificial intelligence, public relations and training-marketing. Cluster agents are a platform for stimulating and facilitating cooperation between cluster members, identifying needs and translating them into activities and tangible solutions. There seem to be differences between the agents' host organizations in organizational culture, with the more economically oriented registered association of the Zukunftsmacher showing slightly more efficient project implementation structures compared to the less profit-oriented education providers in charge of the other two clusters. It has proven effective to include an extended core team with further personnel each being responsible and qualified for supporting at least one of the cluster's core strands of activities. For instance, in the VET cluster Zukunftsmacher the partner GEBIFO leads development of further training for in-company trainers while Tragwerk coordinates the innovation transfer process.

In all clusters, the responsibility for strategic decision-making lies in the hands of the cluster management, *i.e.* the agents, although all of them use surveys, bilateral talks and networking events for identifying their members' needs. In one case, an additional advisory board consisting of relevant regional governance and educational stakeholders meeting once a year ensures that activities are aligned with regional needs and existing services.

In all clusters, there are core members who engage in most of the clusters' activities and other cluster members who instead choose among measures. Regular contact and perceiving an added value from the cooperation seem to be the key to members' engagement and building trust. Therefore, all clusters have established fixed communication structures (*e.g.,* websites, newsletters, personal contact) and regular digital as well as face-to-face meetings, though in varying intensities. More frequent, hands-on and low-threshold meetings and joint activities have a positive effect on the feeling of trust and added value within the

cluster (also see Baumann *et al.*, 2025; Fünfhaus *et al.*, forthcoming). Cluster members value the cluster's support in marketing apprenticeship positions, the development of digital learning content, bilateral consultations as well as workshops, networking events and the development of synergies among the members.

Beneficial to innovation in the cluster is the inclusion of large companies with specific resources for VET innovation, as well as strategic partners with expert knowledge on topics relevant to cluster members, such as regional consultancies, research institutions or startups.

The change of leadership in one cluster has shown the importance of continuity on the management level. The change of the cluster agent as the main contact person—at least at an early stage of cluster implementation—leads to the disruption of built relationships and slows down project implementation due to the need to rebuild trust as well as knowledge.

Currently, the projects are implemented solely with the BMWE's funding and the cluster agents' host organization own resources, and are only beginning to deal with questions of financial sustainability, for instance through adaptation of business models already in place for other services.

CONCLUSION

Our findings pertain to the first half of the cluster establishment and implementation period; they are therefore preliminary. Insights suggest that cooperation and knowledge transfer between companies and within clusters fundamentally depend on trust-based relationships, which provide the foundation for sustainable collaboration and mutual learning and that cluster management holds the key to establishing said trust-based relations. The VET clusters show that regular personal exchanges at frequent intervals and mutual appreciation promote trust-building when cluster structures have not yet grown over many years. Thus, further professionalisation of cluster management should be pursued, aiming to create a strategic linkage also to municipal or regional education management and establishing a closer connection between innovation policy and VET policy. However, these efforts must also address the notable "clash of cultures" between educational stakeholders and actors guided primarily by an economic mindset, as overcoming these differences is crucial for achieving coherent and effective collaboration. Moving forward, developing robust, long-term financing mechanisms will also be essential to ensure the clusters' continued impact and growth.

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VTE VOCATION, TECHNOLOGY & EDUCATION

RESEARCH PAPER

Changes in apprenticeship in Europe: How is it defined and does it have a future?

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ABSTRACT

Apprenticeship has been an important option for many who do not intend to enter higher education, but aspire to enter worthwhile, well paid and secure employment. The main topic addressed is the standing of apprenticeships today, particularly in Europe, and how far they can meet the challenges of climate change, digitalisation, and equitable participation. The paper represents a conceptual, policy and historical analysis, arguing that recognised and regulated work-based training, which has usually taken the form of apprenticeship, needs to play a major role in the vocational education and training (VET) system. The question raised is, however, whether it can transition further given the lack of a training infrastructure in the labour market, and, if so, what form this might take and how it might be achieved. The paper begins by asking "What is an apprenticeship?", looking at historical, anthropological and educational conceptions and tracing its development through the introduction of systematic technical knowledge and a civic and liberal element. We introduce the concepts of an "equitable transition" and suggest, with the example of sustainable construction, that increasing knowledge requirements, together with the necessity of teamworking, problem solving competences and project management understanding, render expansive apprenticeship particularly valuable—educationally, socially and economically. Incentivisation of employers and finding alternative means to provide work-based experience for apprentices are, therefore, important policy issues. We conclude that countries with well-developed social partnerships and those where public authorities are able to directly train and employ their workforces are better placed to ensure the good quality, continuity, guidance, and coordination required for expansive apprenticeships.

Key words: dual system, the vocational education and training systems, sustainability, equitable transitions

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INTRODUCTION: WHAT IS AN APPRENTICESHIP?

The main topic addressed is that of the standing of apprenticeships, particularly in Europe, and how far they can meet the challenges of climate change, digitalisation, and equitable participation. The paper represents a conceptual, policy and historical analysis of apprenticeship, drawing on research carried out over many years, together with a consideration of trends. The argument is that recognised and regulated work-based training, which has usually taken the form of apprenticeship, needs to play a major role in the vocational education and training (VET) system. Indeed, employee status and an important workplace learning element have been central features of apprenticeship in the last 150 years following the innovations of Kerschensteiner (1908) (Kerschensteiner, 2022) and others (Gonon & Deissinger, 2025).

Apprenticeship is critical in the transition into employment and for many young people also the transition into adulthood through occupational engagement. It is also an important option for many who do not intend to enter higher education, but aspire to enter worthwhile, well paid and secure employment. It has, nevertheless, been subject to considerable change over the centuries, from being—for instance in construction and engineering—primarily male and employer-based to being shared and jointly regulated with the education system and leading to a recognized labour market qualification. The question raised is, however, whether it can transition further, and, if so, what form this might take and how it might be achieved.

CHANGES IN APPRENTICESHIP IN EUROPE: HOW IS IT DEFINED AND DOES IT HAVE A FUTURE?

The transition into the labour market for many occupations for which apprenticeship was the main entry route in the past, including nursing and surveying in Britain, is now through higher education, though often with a work-based element. Some occupations also allow for entry through an apprenticeship with a higher education element incorporated into the qualification. For other occupations, especially in a sector like construction, apprenticeship is in jeopardy because of the lack of a training infrastructure in the labour market, increasingly dominated by a myriad of small and micro firms, subcontractors and self-employment, and only offering a narrow scope of work experience (Brockmann *et al.*, 2010).

At European and global levels, both the European Union (EU) and the International Labour Organisation (ILO) have adopted fairly expansive definitions of apprenticeship, though bodies such as the OECD seem much less committed. The current development of micro-credentials within the European Skills, Competences, and Occupations (ESCO) framework, however, threatens to undermine a stable, inclusive,

knowledge-based and expansive conception of apprenticeship.

Given these key aspects and obstacles to apprenticeships in sectors such as construction, what might be the basic requirements in contemporary times? We suggest that, as a minimum, it should: Include an employment contract and a substantial element of off-site learning, both workshop and classroom; be at least three years in length and at upper secondary level in educational terms; have a meaningful relationship to a broad, recognised occupation; include climate literacy and up-to-date digital and technological elements; embrace and target women and different ethnic minority groups; and provide the resources for further educational and occupational progression. Different VET systems such as the English standards-based apprenticeships and the German dual system serve as points of reference.

One prime purpose of an apprenticeship, we argue, is to facilitate occupational entry and for many young people to serve as transition into adult life, often following a protracted period after leaving compulsory education. For others, it serves as a means of occupational change in adulthood. In providing an equitable transition, allowing entry into interesting, well paid and secure employment, apprenticeship needs to be of high quality, as exemplified in, for instance, the dual system scaffolding apprenticeship in Germany and the English craft joiner and carpenter.

Apprenticeship is, however, in secular decline across Europe and questions arise as to why this is occurring and whether it is important to preserve and, if possible, expand it. Sources of the decline include the increased take-up of higher education, flexible labour markets and the "disappearing employer". Steps to ameliorate these tendencies are proposed, as well as alternative models such as found in school-based VET and public sector- rather than private employer-based systems. The tendencies do, nevertheless, mean that apprenticeship plays a different role from the past and that this needs to be defined, a task we undertake.

THE FUTURE OF APPRENTICESHIP: AN ILLUSTRATIVE EXAMPLE

Developments in the construction sector show the role expansive apprenticeships can play in promoting environmentally, socially, and technically advanced forms of work and in making near zero energy building (NZEB) a reality. VET for NZEB requirements, particularly—but not exclusively—for retrofit, are best met by apprenticeships that, in addition to skill development, foreground higher order know-how, such as problem solving and project management abilities, as well as teamworking. These in turn require the development of capabilities for planning, communication, co-ordination, control and evaluation that are best developed in work environments, supplemented by classroom and simulatory work.

Effective NZEB also requires a broad understanding of the context in which it takes place, including a degree of inter-occupational operability, and of cognate occupations working alongside, as well as awareness of the impact of NZEB on the immediate environment and society more broadly and of working methods and attitudes on the successful completion of NZEB projects, their durability and public and political acceptance. Understanding of purpose and context, encompassed in the concept of climate literacy, is thus essential in developing commitment to new ways of working. This can be incorporated into the curriculum via a transparency tool, serving as a conceptual map for curriculum development.

Such requirements are demanding and require extensive curriculum development and awareness of choice points in curriculum design. Following previous work on curriculum design and evaluation (Clarke *et al.*, 2019), the transparency tool developed has been further adapted in the context of NZEB and climate literacy (Calvert *et al.*, 2026). This approach, with suitable modification for individual occupations, is relevant to the construction sector as a whole together with related occupations, such as electrician, plumber, insulator, and the scaffolder. However, while NZEB in the construction sector serves as illustrative example, the broader approach, adopting the transparency tool as a template, is capable of use to develop expansive apprenticeships in a range of sectors. While the examples that we offer are benchmarked at EQF levels 3/4, our approach need not be confined to these levels and is suitable for apprenticeships at levels 5-7.

Though apprenticeship is not always and everywhere the optimum form of initial VET, it has particular advantages for the modern workplace over college-based forms of VET. Increasing knowledge requirements, together with the necessity of teamworking, problem solving competences and project management understanding, render expansive apprenticeship particularly valuable—educationally, socially and economically. Problem solving and project management competences are consolidated within the workplace, though requiring a knowledge basis that cannot be imparted within the operational exigencies of the workplace, particularly in environments like construction that impose significant constraints in terms of safety, timing and cost. These are best developed in classrooms and a simulatory workshop environment before consolidation and competence is realised within workplace conditions. This in turn suggests that the way in which these three elements—classroom, workshop, workplace—are articulated and co-ordinated with each other is a crucial aspect of apprenticeship curriculum design.

Central to the success of expansive apprenticeship is recognition of the dual role of apprentices as both "earners" and "learners" and the complexity of workplace relationships that this recognition involves. Traditionally, while some employees in workplaces with appren-

tices have a pedagogical and pastoral role, they are not necessarily adequately prepared for this, partly owing to lack of co-ordination between the three sites in which apprentices learn: Classroom, workshop, and workplace. The pedagogic role salient to each of these environments needs to be developed for greater understanding of the complementary nature of each. Whilst this would ideally involve role interchangeability, this will in most cases not be possible; understanding of the different roles and how they fit together is, however, necessary.

THE MAIN CHALLENGES

The "disappearing employer" is one no longer taking responsibility for developing and educating the future workforce and/or without the capacity, resources, time, range of work, or portfolio of future contracts to take on apprentices. This phenomenon has become increasingly common in construction across Europe, aggravated by extensive subcontracting and sub-sub subcontracting, the use of agency labour, and self-employment. Yet, the workplace is a central site of learning for future occupations. Incentivisation of employers and finding alternative means to provide work-based experience for apprentices are, therefore, important policy issues, for both the social partners (unions and employer associations) and the state. The growth of the "virtual" employer includes the large employers who generally rely on subcontractors to employ the site workforce. Becoming an apprentice employer involves legal, financial, pastoral and pedagogical responsibilities that even larger employers may hesitate at, let alone small and medium enterprises (SMEs). As a result, the provision of apprenticeships rests on national, regional and local government initiatives, regulation and procurement measures, especially with regard to public sector building. Given also the risk of cutting short an apprenticeship programme due to the often-short-term nature of building contracts, it is important to ensure continuity. One means to achieve this in Britain is through regional and local authority building departments directly training and employing the workforce needed for retrofitting the public building stock, a policy promoted by the main construction union, Unite, and the Trade Union Congress (Clarke, 2026).

One influential counter proposal is to increase the use of microcredentials (Stolte & Spöttl, 2025) as a means of developing a flexible and responsive labour market, using ESCO as a curriculum template (Winch *et al.*, 2025). It has been shown, however, that qualifications developed in this way are woefully inadequate for the modern economy tending towards a lowest common denominator rather than a high specification (Clarke *et al.*, 2020; Mottweiler *et al.*, 2023).

CONCLUSION

The policy challenge for those advocating a revival of a form of apprenticeship fit for contemporary conditions is, therefore, to demonstrate its

economic and social advantages and the structures that need to be in place for it to work successfully. Those countries with well-developed forms of social partnership in which employer associations work with unions are better placed to develop such structures than those who do not (Conchon, 2013). So too are those countries, such as Britain, where public authorities are able to directly train and employ their workforces in sectors such as construction and thus ensure the good quality, continuity, guidance, and coordination required for expansive apprenticeships.

DECLARATION

Article version statement

This article has been reviewed and preliminarily edited. It is intended solely for use at the 10th Research Conference of the International Network for Innovative Apprenticeship (INAP). The final version will be published in *Vocation, Technology & Education* (https://www.vtejournal.com).

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VTE VOCATION, TECHNOLOGY & EDUCATION

RESEARCH PAPER

Basic vocational education and training in the Swiss mechanical and electrical engineering, metalworking and watch industry: Context, trends and prospects

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ABSTRACT

In Switzerland, dual vocational education and training (VET) in the mechanical engineering, electrical engineering, metalworking and watch industries is under pressure. This contribution, focusing on technological change, contextualizes the latest reforms, which are intended to secure the future of this sector based on apprenticeship, learning fields, practical skills and digital platforms.

Key words: Swiss mechanical, electrical and metalworking industry, technological changes, apprenticeships, polymechanics

INTRODUCTION

Traditionally, the mechanical, electrical and metalworking industry (MEM) has been one of the main pillars of dual vocational education and training. However, the ever-increasing importance of service activities, demographic trends and, in particular, global developments are putting pressure on this sector. Today, commercial and service professions have far overtaken craft-based training in the ranking of chosen vocational training courses.

The advent of computerized numerical control (CNC) machines in the 1970s, work and career options for workers as well as training conditions and training profiles gradually changed (Balmer *et al.*, 1988). In addition to "classic" skills and abilities such as turning, drilling, filing,

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grinding, woodturning, assembly, activities, the MEM industry requires IT-related knowledge, an understanding of technical work processes, programming and, above all, the operation of digitally controlled instruments. In other words, it is technological change that has pushed back the heavily craft-based work and driven a redesign of interaction with machines and technical systems. As a result, new ways of working and learning are becoming more important, replacing habits, attitudes and skills that are often based on many years of craft-based experience. Manual skills and manufacturing-related knowledge now serve only as background information for potential applications in special situations.

RESEARCH QUESTION AND METHODOLOGY

Insofar the research question is whether apprenticeships for mechanical vocations are still attractive and accessible for learners and meet the requirements of technological and economic change. The research is based on an analysis of documents, statistics and studies related to vocational education and training (VET) in the MEM-industry. Furthermore, it relies on own studies and empirical data, which focused on changes in learning in this field and on careers of former apprentices in the MEM-sector. In addition, a comparing perspective with other vocations and industries, like the watch industry, highlights common and related issues, especially in strongly export-oriented sectors. 80% of products and services of the MEM sector get outside Switzerland (60% in the EU), meanwhile the watch-industry, the third pillar (after pharmaceuticals) exports 95% of its products (FHS, 2024; SBFI, 2026).

RESULTS

In Switzerland, too, secondary II general education is experiencing a (slight) upturn, which makes it more difficult, to fill vacant apprenticeships, especially in vocational training programs with very high technical requirements. In the year 2025, more than 50%, *i.e.*, 46,000 young people started a VET program after completing mandatory school. But 13% of the offered apprenticeship places remained vacant (Gfs bern, 2026).

Also, within vocational training itself, training courses with a larger academic component beyond technical subjects (such as commercial vocational education and training) and seemingly more open and diverse career prospects are in higher demand among men and, above all, women. This trend reflects the fact that service activities are considered more rewarding and career-enhancing than industrial activities, both today and in the future. This is creating and exacerbating a recognized shortage of sufficiently qualified skilled workers, especially in metal industry. Among young people the most sought-after apprenticeships are service-based vocations like commerce clerk, health care and medical practice assistant and social work (Yousty, 2026). There is much less demand for VET in craft-

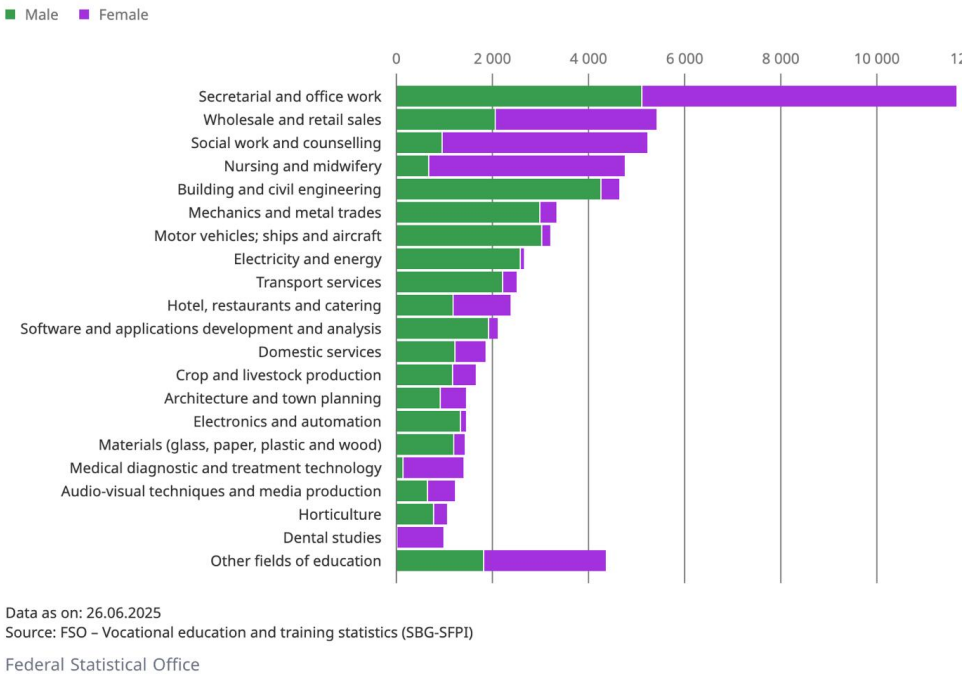


Figure 1. Most chosen basic VET-programs in Switzerland by males and females 2025 (Federal Statistical Office, 2026). VET, Vocational education and training.

based skilled trades (Figure 1).

MEM-industry, often small firms located in the German speaking part of Switzerland, but also watch-industry, mainly in the French speaking Swiss regions, could recruit (much) more apprentices. High academic and technical standards seem to deter young people from pursuing this type of VET. Furthermore, MEM-industry and dual apprenticeship as a whole are under pressure from technological change, global trends such as deindustrialization, but also from digitalization and demographics.

The arrival of CNC-technology in the end of the 1970s also affected the relationship between apprentices and master craftsmen. Younger apprentices are often more adept at using new technologies. As a result, the authority of the master craftsman—who in the past had more expertise relying on his long-term experience, and was more skilled in handling tools and machinery—has shifted towards a more open setting (Gonon *et al.*, 1988).

The associations involved in the MEM-industries, who take care for the development of technical professions are

sufficiently alarmed, so to speak, especially since they continue to regard VET and a highly skilled workforce as key factors for their economic progress. The two associations (Swissmechanic and Swissmem) are the dominant forces in the design and steady renewal of vocational education and training, which in Switzerland takes place every five years for each occupation (Bürgi & Gonon, 2021; Verein Schweizerischer Maschinenindustrieller, 2023). The trade unions in the metal and machinery industry have comparatively little influence on the design of basic vocational education and training than in Germany (Emmenegger *et al.*, 2021). These associations intended to facilitate the examination procedure, vocational marketing and vocational revisions for initial VET, but also for vocational continuing education (Sarno, 2026).

In MEM industry eight technical professions are currently (2026) undergoing revision. These are the four-year training programs for plant and equipment engineers, automation engineers, automation technicians, electronics engineers, design engineers, polymechanics, production mechanics and, at the level of a shorter 2-year-apprenticeship, mechanics practitioners.

The learning field approach is being introduced as a new training concept which, as is well known in Germany, is no longer based on a subject structure but is action-oriented and geared towards real work situations. The regulations, or—as they are called in Swiss terminology—training ordinances, are being made more flexible to meet industry—and company—specific needs by introducing compulsory but freely selectable elective areas for apprentices.

Polymechanics, the most prestigious and demanding apprenticeship in the MEM sector is like most VET programs based on action competencies. More than 6000 young people joined in 2022/2022 a MEM industry apprenticeship, among them 4286 were involved in a polymechanics apprenticeship. The training program for polymechanics covers the following competencies.

Product development

Including preparation for manufacturing documentation for products in the MEM-industry. (1) Product manufacturing: Including operation of CNC machines, and robots for the production of MEM-industry products, creation of programs for CNC machines using computer-aided manufacturing (CAM). (2) Assembly, commissioning, or maintenance: Including setting up a workstation for the assembly, commissioning, or maintenance of MEM industry products. (3) Assuming operational responsibility: Including monitoring and evaluation of results from project-oriented assignments in the technical field of the MEM-industry and tests of mechanical products for an MEM industry sector, and assuming overall technical responsibility for the manufacture of products in an MEM-industry sector (FutureMEM, 2025).

A particular challenge is that vocational education and training in technical

professions is, as already noted, very demanding, requiring not only manually skilled young people, but also those who are academically strong. Unfilled training places, apprenticeship dropouts and the preference of potential trainees for purely academic courses of study are therefore not so surprising in a sector where polyvalent skills and abilities play such a central role.

In addition to this overhaul of vocational training, ongoing efforts are being made to boost the appeal of MEM professions through vocational training marketing.

Further priority for swissmem is to raise awareness of vocational training in technical professions beyond the traditional target group of young men. In particular, greater efforts should be made to attract women to these professions by highlighting career opportunities in schools, in addition to offering open houses at companies (Studer, 2025).

For sure, this is not only a problem of the MEM industry. In the watch-industry an also very demanding 4 year-apprenticeship included in the year 2025 approximately only 387 watchmakers with a similar polyvalent profile as a watchmaker (Convention Patronale de l'Industrie Horlogère Suisse, 2014). These over years declining numbers are meant to be very low, regarding the importance of the watch industry (Munz, 2021). Also, in this sector there is a discrepancy between more technical knowledge, often acquired in academic study programs and work (*e.g.*, in assembly lines) with a low qualification profile. The traditional watch craftsmanship is still kept and promoted in public as a selling argument and a sign of quality, "weaving together of heritage and contemporary technology" even as a global brand (Unwin, 2017). But the knowledge and skills acquired in the apprenticeship do not correspond with the industrial production process, which leads to disillusionment among former graduates. Thus, the vocation of a watchmaker gets deprofessionalized (Munz, 2016, 2021).

CONCLUSION

Today new challenges are emerging. One of the game changers for the coming years is artificial intelligence which will particularly affect the MEM-industry. It will begin with product design and production organization. The findings reveal that choices for VET programs in Switzerland will likely remain stable, but that MEM-industry and the watch-industry still need to compete to attract young people. Manual work and the craft aspect of VET will certainly remain under pressure.

Despite all the planned revisions, the question arises as to whether the reforms presented will actually be sufficient to remedy stagnation, declining demand and participation in basic VET in the MEM industry.

DECLARATION

Article version statement

This article has been reviewed and

preliminarily edited. It is intended solely for use at the 10th Research Conference of the International Network for Innovative Apprenticeship (INAP). The final version will be published in *Vocation, Technology & Education* (https://www.vtejournal.com).

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VTE VOCATION, TECHNOLOGY & EDUCATION

RESEARCH PAPER

Reframing apprenticeship standing from within: Trade unions as overlooked social partners in the politics of quality in the Swiss VET system

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ABSTRACT

Swiss apprenticeship enjoys high standing because of strong employer involvement, labour market integration and coordinated governance structures. Yet this employer-centred configuration also constrains reforms oriented toward broader social objectives. This paper examines how trade unions, as often overlooked social partners in Swiss vocational education and training (VET) governance, seek to advance such reforms without destabilising employer commitment to the dual system. Drawing on collective skill formation theory, gradual institutional change and a scholar-practitioner perspective, the paper argues that quality functions as a strategic arena through which social concerns become institutionally legitimate. Through the politics of quality, trade unions connect demands concerning trainer qualifications, apprentice protection, well-being, completion and attractiveness to shared concerns about apprenticeship sustainability and standing. Empirical examples include the Tripartite Conference on Vocational Education and Training (TBBK), occupational development and recent parliamentary interventions on trainer development, holidays and safety. The Swiss case suggests that apprenticeship standing is continuously reconstructed through negotiation and strategic reframing.

Key words: apprenticeship standing, trade unions, quality, Swiss vocational education and training

INTRODUCTION

Swiss apprenticeship is widely regarded as a high-standing model of vocational education and training (VET). Its legitimacy rests on strong employer involvement, favourable labour market outcomes and deep institutionalisation.

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Employers provide training places, shape occupational profiles and guarantee the labour market relevance of qualifications. This employer-centred foundation simultaneously supports the system's legitimacy and constrains reform.

The tension is straightforward: Due to labour market transformations, growing uncertainty and changing generational expectations regarding work, apprenticeship must adapt to new social expectations—concerning apprentice well-being, inclusion, trainer qualifications, permeability and completion—while preserving the willingness of firms to train. Comparative research on collective skill formation has shown that apprenticeship systems characterised by strong employer involvement are resistant to reforms perceived as threatening firms' willingness to train (Busemeyer & Trampusch, 2012; Trampusch, 2010). In coordinated systems such as Switzerland, institutional change therefore frequently depends upon reforms that preserve employer commitment while adapting apprenticeship to new social and educational expectations—in an agile manner.

This paper asks how apprenticeship can evolve toward broader social objectives without destabilising its employer-centred foundations. More specifically, it investigates whether quality functions as a strategic arena through which trade unions can reshape apprenticeship standing while keeping employers committed to the system. The argument is that socially oriented reforms are more likely to become acceptable when framed not primarily as redistributive demands—that is, demands imposing additional obligations, costs or constraints on employers—but as contributions to apprenticeship quality, attractiveness and long-term system sustainability.

METHODS AND RESEARCH DESIGN

The paper develops an institutional case study of Swiss apprenticeship governance from a scholar-practitioner perspective. It draws on document analysis of federal VET strategies, parliamentary interventions and social partner position papers. It also builds on the author's embedded participation as Head of Education Policy at Travail. Suisse, a national trade union umbrella organisation involved in Swiss VET governance.

This position provides access to negotiation dynamics that are rarely visible in formal documents: How actors choose their wording, where compromise is possible, and which arguments are perceived as legitimate in a consensus-oriented system. The analysis includes participation in bodies such as the Swiss Tripartite Conference on Vocational Education and Training (Tripartite Berufsbildungskonferenz—TBBK, https://www.tbbk-ctfp.ch/de [German]) and related institutional arenas. This insider position offers privileged access, but also requires analytical distance.

RESULTS

Institutional setting: Employer-centred partnership

Swiss VET is formally based on

partnership between the Confederation, cantons and organisations of the world of work. Since 2021, the TBBK has strengthened tripartite coordination by bringing the main actors together at the strategic level. It was created to strengthen coordination between federal authorities, cantons and organisations responsible for occupations. It is therefore an important arena for observing how system-level compromises are prepared before they become formal policy. This governance architecture is important because it gives trade unions access to system-level debates. However, it also shows the limits of such access: Participation in coordination does not necessarily mean equal influence and consideration over the concrete development of occupations.

The clearest example is occupational development *Berufsentwicklung*). The State Secretariat for Education, Research and Innovation (SERI) manual "Handbuch Berufsentwicklung" presents organisations of the world of work as the main bodies responsible for developing occupations (SBFI, 2025; SERI, 2025). It states that training content is developed according to labour market needs and that companies participate voluntarily while exercising considerable influence through responsible organisations. The manual explicitly emphasises that, in VET, employer interests are particularly important because companies provide apprenticeship places and employ qualified workers. This confirms the employer-based core of the system. It is precisely because employers provide workplaces and occupational integration that apprenticeship enjoys high labour market credibility. The analytical issue is that this credibility gives employers a structurally privileged position in defining what counts as necessary reform.

For trade unions, this creates an ambivalent institutional position. They are recognised as social partners in the broader governance of VET, but they are not systematically embedded as decisive actors in all occupational development processes. The institutional vocabulary itself reflects this ambiguity: Swiss VET governance sometimes refers broadly to "organisations of the world of work" and sometimes more specifically to "social partners", without always clearly defining the place of trade unions within these categories. In some arenas, such as occupational development, the partnership language mainly refers to the Confederation, cantons and organisations of the world of work, while trade union expertise is less visible. This shows that influence is unevenly distributed and that trade unions must often act through framing, consultation and coalition-building rather than direct control over training content.

Trade union strategies and reform limits

Trade unions in Swiss apprenticeship governance operate as institutional insiders. Their task is to defend apprentices as learners and workers while preserving the conditions that make dual training possible. This is a difficult balance. Without employers, there are no

apprenticeship places; without social standards, apprenticeship loses legitimacy as an educational pathway. This explains why trade union strategies often combine critique with constructive moderation. Claims for better holidays, stronger occupational safety, more support for apprentices or continuing professional development for in-company trainers (*Berufsbildner*) can easily be interpreted by employers as additional burdens. The institutional question is therefore not only whether such reforms are justified, but how they can be formulated so that they strengthen rather than weaken the apprenticeship compromise.

Recent parliamentary interventions illustrate this tension. Parliamentary motions are formal proposals submitted by elected representatives requesting the Federal Council to take action; if adopted by both chambers, they become binding mandates for government action. The examples below refer to motions introduced between 2024 and 2025 and illustrate different ways of framing quality-related reforms in VET.

Motion Brizzi 25.3678 on continuing professional development for in-company trainers (submitted in June 2025 and currently under parliamentary consideration) frames enhanced trainer competences as a matter of quality, completion and attractiveness (Simona, 2025). Motion Jost 25.4051 on additional holidays for apprentices (submitted in 2025) raises a more distributive issue, because it directly concerns working conditions and costs (Marc, 2025). Motion Daucourt 24.4106 on health and safety similarly (submitted in 2024) connects apprentice protection with the risk of increasing regulatory obligations, while also underlining that training quality is inseparable from safe learning conditions (Martine, 2024).

These examples show that trade unions cannot simply import general labour market claims into VET. They must translate them into system-oriented arguments. This is visible in debates on dangerous work and the Ordinance on the Protection of Young Workers (OLT 5), where stronger protection must remain compatible with firms' capacity to train in occupations involving supervised professional risks (Swiss Federal Council, 2007). Thelen's theory of gradual institutional change helps explain this strategy: Coordinated systems often change through layering, conversion and negotiated adaptation rather than confrontation (Streeck & Thelen, 2005; Thelen, 2004). In Swiss apprenticeship, this means expanding the meaning of legitimate quality without directly challenging employer primacy.

Quality as a bridging and compromise concept

Quality is the key concept through which this translation becomes possible. Drawing on Boltanski and Thevenot's sociology of justification, quality can be understood as a compromise concept that allows actors to coordinate while relying on different normative logics (Boltanski & Thévenot, 2006). Employers can support quality because it improves productivity, innovation capacity, recruitment and reputation.

Trade unions can support quality because it includes apprentice protection, equality of access, permeability and completion. The state can support quality because it strengthens legitimacy, attractiveness of VET, competitiveness and social cohesion.

This multidimensional understanding is supported by VET quality research. Berger, Wenger and Sauli conceptualise quality in initial VET as something broader than labour market outcomes: It includes learning environments, coordination between learning locations and the experience of learners. Their work draws on a Swiss research programme on the quality of initial vocational education and training that developed a multidimensional framework and assessment tools for evaluating VET quality across learning sites (Berger *et al.*, 2022). Lamamra's work on apprenticeship discontinuation is particularly important here. It shows that contract termination is not only an individual failure, but is often linked to workplace relations, psychosocial conditions, recognition and the quality of integration in the company (Lamamra, 2017). In this sense, social concerns are not external to apprenticeship quality; they are part of it.

The political strength of quality lies in its capacity to connect social demands with the standing of apprenticeship. Better trained in-company trainers, safer workplaces, more supportive company cultures, sufficient time for school-based learning and stronger permeability can all be presented as ways of making apprenticeship more attractive and prestigious. Quality therefore helps reframe social reform as investment in excellence. For example, continuing professional development for in-company trainers can be presented not merely as an additional obligation, but as a response to the growing complexity of training: Digitalisation, heterogeneous learning biographies, mental health concerns, language needs and the coordination of workplace and school-based learning. This is crucial in a context where apprenticeship must maintain its value vis-a-vis academically oriented pathways.

Quality also clarifies what trade unions can contribute to apprenticeship governance. Their role is not to replace employers in defining occupational content. Rather, they can broaden the criteria through which good apprenticeship is evaluated (a kind of safeguard). A high-standing apprenticeship system should not only produce employable workers; it should also provide young people with safe, inclusive and educationally meaningful training conditions. This is also why the role of vocational schools and research should not remain peripheral. If quality is understood broadly, it requires stronger bridges between companies, schools, cantonal authorities, social partners and applied VET research.

CONCLUSION

This paper has argued that apprenticeship standing is not simply an institutional outcome but an ongoing political process shaped by competing expectations and negotiated compromises. It is

continuously reconstructed through conflicts, compromises and strategic reframing. Although the employer-centred core of the system remains indispensable, it also constrains reforms perceived as redistributing costs, obligations or decision-making power away from firms. This paper has argued that trade unions can nevertheless influence apprenticeship development by broadening the meaning of quality. Through the politics of quality, they connect apprentice protection, trainer development, completion and attractiveness to the shared objective of sustaining the dual system and thereby make broader social objectives more institutionally acceptable.

The Swiss case also suggests that the contribution of trade unions to apprenticeship development is often overlooked when analytical attention focuses primarily on employers' role in training provision and occupational governance. Although unions are not systematically positioned as dominant actors across all arenas of occupational development, they shape reform debates through framing, consultation, coalition-building and the translation of social concerns into the legitimate language of quality and system sustainability.

Recent European and international debates on skills governance point in a similar direction. European social partners have emphasised the need for coordinated governance capable of balancing labour market responsiveness, inclusion and training quality (European Trade Union Confederation, 2026). Likewise, the International Labour Organization (ILO) increasingly frames skills systems as governance arenas requiring cooperation between governments, employers and workers in support of sustainable and socially inclusive skills development.

Standing is therefore not only a result of labour market outcomes or historical prestige. It is a political achievement, produced from within the system by actors capable of translating social concerns into quality, attractiveness and sustainability. For countries seeking to strengthen apprenticeship systems, particularly in contexts where apprenticeship still struggles to gain legitimacy or social recognition, the Swiss experience offers three broader lessons. First, strong employer involvement does not necessarily prevent socially oriented reforms when these are framed around shared understandings of quality and long-term sustainability. Second, institutional change may be more durable when it occurs through negotiated adaptation rather than direct confrontation. Third, social partners can contribute to apprenticeship standing even without occupying dominant positions in formal governance arrangements. These observations suggest that apprenticeship standing should be understood not as a fixed institutional characteristic, but as an ongoing political and social achievement.

DECLARATION

Article version statement

This article has been reviewed and preliminarily edited. It is intended solely

for use at the 10th Research Conference of the International Network for Innovative Apprenticeship (INAP). The final version will be published in *Vocation, Technology & Education* (https://www.vtejournal.com).

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VTE VOCATION, TECHNOLOGY & EDUCATION

RESEARCH PAPER

Similar systems, different paths? Monitoring developments of dual vocational education in the D-A-CH region over time

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ABSTRACT

Our study investigates the development of vocational education and training (VET) in Germany, Austria, and Switzerland (the D-A-CH countries) over the last 20 years. Which similarities and differences occur? Building on the question of whether "similar systems" have followed "different paths", the paper monitors and compares the evolving trajectories of dual vocational education in Germany, Austria, and Switzerland, highlighting both converging trends and country-specific developments within the D-A-CH region.

Key words: dual apprenticeships, monitoring, Austria, Germany, Switzerland

INTRODUCTION

Germany, Austria, and Switzerland (the D-A-CH countries) are considered to be prime examples of the dual-track vocational education and training (VET) system combining company-based and classroom-based education. While the countries' VET systems have much in common, the similarities often seem to be overemphasized, as differences exist that are influenced by the economic

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framework conditions and different historical trajectories (DC dVET, 2016; Greinert, 1995). While the structural differences of the three VET systems have been rather well researched (Graf, 2016), and each country is monitoring the development of its system (*e.g.*, Germany: annual data report on VET [BIBB, 2025], Austria: annual overview of the current situation of its dual VET system [Dornmayr, 2025], Switzerland: reports by the Swiss Observatory for Vocational Education and Training [Graf *et al.*, 2024]), comparative representations of the developments in dual education/apprenticeships in the D-A-CH countries are hardly available. This is mostly due to considerable variations regarding the underlying terms, definitions, classifications, and measurement methods between the countries.

Based on the initial findings from selected indicators, our study investigates the quantitative developments of dual VET in the D-A-CH countries and tries to provide a comparative picture (the study is based on the findings generated by the cross-country research project "Development of a Comparative Monitoring of Dual Vocational Education and Training in the D-A-CH Region", which has been ongoing since 2004). The leading questions are: How have these dual-track systems developed over the last 20 years in terms of participation? Which similarities and differences occur and what are potential explanations for the differences?

METHODS AND DATA: CENTRAL NATIONAL DATA SOURCES

Our analysis rests on a descriptive analysis of data derived from different official sources in the three countries. For Germany this includes the "Trainee Data System" (DAZUBI) of the Federal Institute for Vocational Education and Training (BIBB), which is based on the data of the vocational training statistics of the statistical offices of the federal and state governments (survey as of December 31) and with regard to population statistics based on the 2021 census of the Federal Statistical Office (Destatis). The Austrian data is derived from the Austrian Economic Chamber (WKO) with reference date December 31 and the population data from Statistics Austria. In Switzerland, the data at the Federal Statistical Office are bundled in various sub-statistics. The number of apprentices and the number of apprentices in their first year are recorded in the statistics of learners, based on the reference date of July 31. The population data is derived from ESPOP and STATPOP.

COMPARATIVE RESULTS

Demography, number of apprentices, and training participation rate

One of the most central indicators for the performance of the dual-track systems is the number of apprentices over time. In order to properly assess the development, the demographic devel-

opment of the young population as well as the number of new apprentices must also be taken into account.

Germany experienced a continuous decline in 15-year-olds, which also resulted in a continuous decline in apprentices since 2004 (Figures 1 and 2). This downward trend in the number of apprentices could only temporarily be stopped between 2015 and 2019 through the entry of refugees into dual training. This influx into dual training has however significantly declined since then, even though a slight increase in the number of 15-year-olds in 2022 and 2023 could be observed. Moreover, due to the COVID-19 pandemic and the associated containment measures, Germany experienced a significant drop in the number of new apprentices in 2020, which to date has not reached pre-pandemic levels.

In Austria, the decline in the number of 15-year-olds as well as apprentices was mainly decreasing between 2010 and 2015 and has remained stable since then (Figures 1 and 2). Although the COVID-19 pandemic led to a substantial fall in the number of new apprentices in 2020—as fewer dropouts from secondary schools were available for apprenticeships because transition was made easier—it hardly affected the total number of apprentices.

In contrast to Germany and Austria, Switzerland experienced no nationwide decline in the number of 15-year-olds and the number of apprentices at the upper secondary level (excluding regional peculiarities) since 2004. On the contrary, a slight overall growth of both numbers could be recorded. Moreover, the COVID-19 impact did not affect the number of new apprentices (not shown) nor the total number of apprentices (Figure 1).

Dual VET participation

In order to derive a dual VET participation rate—which can be considered to be a good indicator for the attractiveness of dual VET in the three countries—we further calculated the proportion of new apprentices of a fictional birth cohort (we defined the fictional birth cohort as one-sixth of all persons in the age group of 15-20-year-olds in the particular year). Our estimates suggest that in 2024 around 34% of young people (over the course of their lives) begin an apprenticeship in Austria, in Germany around 53%, and in Switzerland even just over 75% (Figure 3).

Share of female and foreign apprentices

The comparison of the three countries also shows differences in the share of female apprentices over time, which must however be viewed in connection with the available dual training opportunities in the respective countries (Figure 4).

Notable is the sharp decline in the proportion of female apprentices in Germany from 2004-2024, which cannot be solely explained by changing educational interest of young women towards

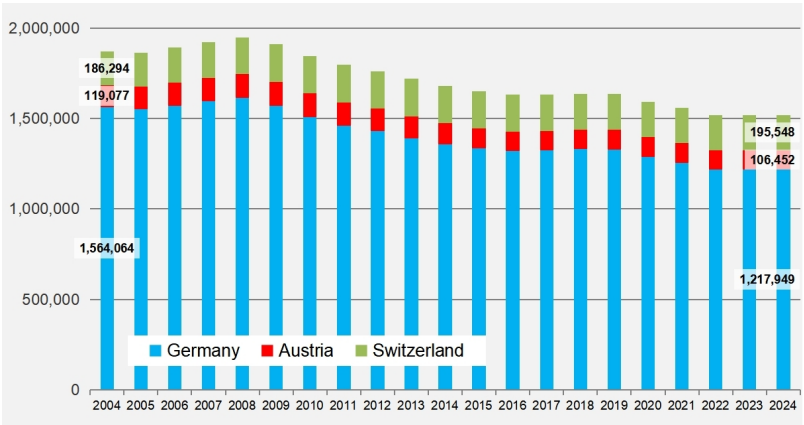


Figure 1. Total number of apprentices (2004-2024).

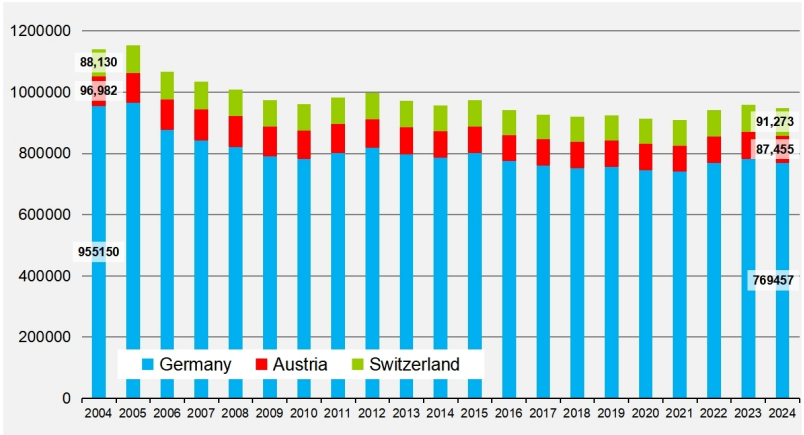


Figure 2. Total number of 15-year-olds (2004-2024).

training opportunities outside the dual vocational training system (*e.g.*, full-time school-based educational programs in the health, education, and social professions or university studies). A major explanation for the accelerated decline in the proportion of women from the year 2016 onwards is the influence of the refugee movement from 2015: While the number of young native people of both genders in Germany has significantly decreased in recent decades due to low birth rates, the strong influx of predominantly male migrants from 2015 largely

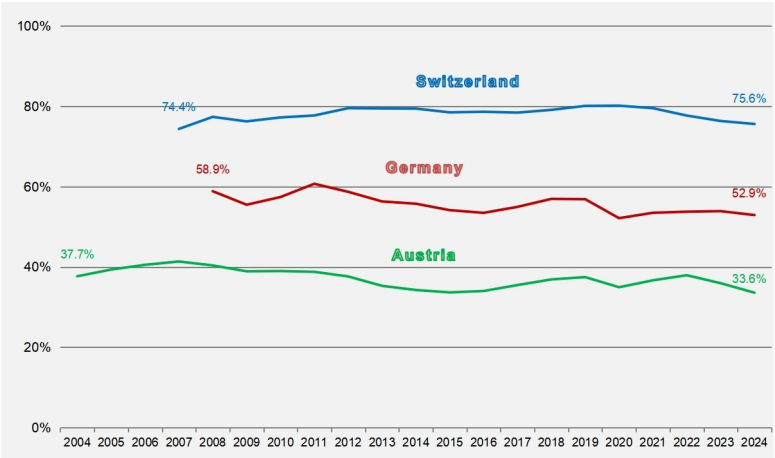


Figure 3. Dual VET participation rate by fictional birth cohort (2004-2024). VET, vocational education and training.

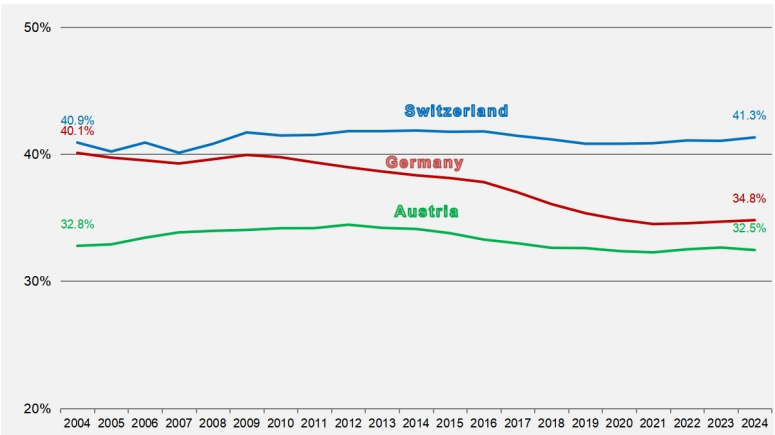


Figure 4. Share of female apprentices (2004-2024).

filled the demand gaps for dual vocational training among men. This compensation effect occurred for women either not at all or only to a limited extent. Therefore, there was a significant decline in the proportion of women, which has, however not continued in the more recent past.

In Austria and Switzerland, the share of

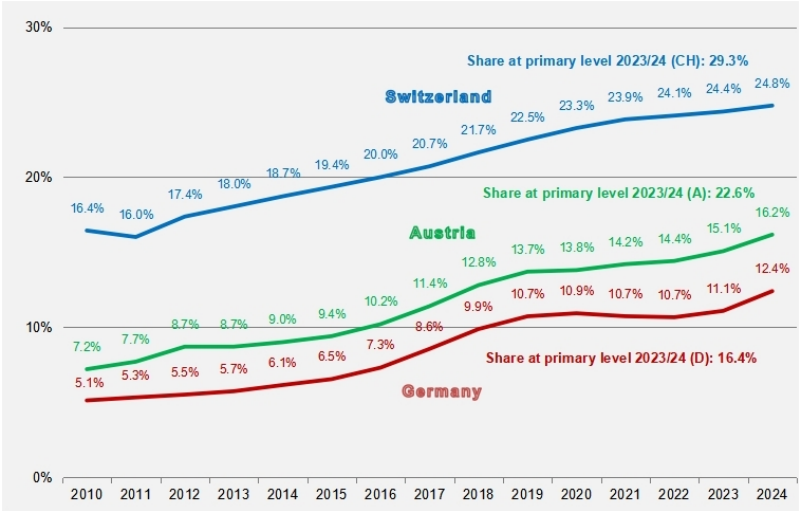


Figure 5. Share of international apprentices (2010-2024).

female apprentices has remained stable over time. In Switzerland this can—at least partly—be explained through the stronger integration of health and social professions into the dual vocational training system. In Austria, the female share is stable only in relative terms and remains comparatively low: In 2024, 32.5% of apprentices were female. Gender-specific occupational choice is still pronounced, despite policy efforts to attract girls and young women to technical training. In Austria, apprenticeship training offers comparatively few opportunities in the health sector compared with Switzerland, and fewer opportunities in administrative occupations than in Germany—both fields that typically attract a higher share of female.

The proportion of foreign apprentices has increased significantly in all three countries studied during the period 2010-2024 (Figure 5). While in Switzerland almost 25.0% and in Austria roughly 16.0% of all apprentices are foreign nationals, this share is substantially lower in Germany with around 12.0%. The long-term increase in the share of foreign national apprentices was however stronger in Germany with 7.3 percentage points (to 12.4%) compared to Switzerland (+ 8.4 percentage points) and Austria (+ 9 percentage points).

DISCUSSION

In order to better contextualize the results, it is necessary to take a look at the developments in the three countries.

While the share of vocational education at the upper secondary level in Germany has continuously declined in favor of

general education since the 1990s, in Austria and Switzerland, the importance of vocational education relative to general education (slightly) increased—albeit along different developmental paths (Cedefop, 2019).

In Germany, many young people aspire to higher education and at the same time, the number of companies offering apprenticeship places is significantly declining (BIBB, 2025). Moreover, the share of female apprentices is decreasing and gendered occupational preferences persist. This is putting the dual VET system under substantial pressure. Without migration, the dual system cannot be sustained over time.

Austria, by contrast, has evolved into a hybrid system in which the decline in company-based apprenticeship training since the 1990s has been offset by the expansion of school-based vocational education. Only over the past decade have both the absolute number and the relative share of apprentices stabilized.

Switzerland, in turn, strengthened its dual system through comprehensive reforms: For example, occupations in agriculture and healthcare were integrated. Furthermore, the vertical permeability was systematically increased by the introduction of the federal vocational baccalaureate in the 1990s. This baccalaureate offers direct entry to the newly founded universities of applied sciences. However, the access to general education at upper secondary level is still restricted to some extent within the cantons.

CONCLUSION

In this contribution we have provided selected insights into the results of a monitoring project of the D-A-CH region, which aims to generate systematic comparative indicators of dual vocational education in order to provide a foundation for an evidence-based, comparative assessment of the developments in the region. As the results show, the project has the potential to further strengthen the existing informal exchange between the countries and to generate mutual impulses and stimuli and thus contribute to the further development and professionalization of VET in this part of Europe.

DECLARATIONS

Article version statement

This article has been reviewed and preliminarily edited. It is intended solely for use at the 10th Research Conference of the International Network for Innovative Apprenticeship (INAP). The final version will be published in *Vocation, Technology & Education* (https://www.vtejournal.com).

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VTE VOCATION, TECHNOLOGY & EDUCATION

RESEARCH PAPER

Can full-time VET "compete" with dual apprenticeships? Empirical evidence on students' aspirations attending the "vocational college with practice firm" in the federal state of Baden-Württemberg

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ABSTRACT

Germany's education and training system at first glance seems to be resilient to possible deviations from traditional paths and dual training is still seen as a major non-academic option for school-leavers to start their working lives. This implies that school-based training is not one of the well-known features of the German vocational education and training (VET) system. However, since graduates of the secondary school system who do not embark on an apprenticeship either can choose to pursue a formal vocational qualification school-based, or strive for a higher level of educational achievement outside general education, opportunities exist outside the dual system. Empirical evidence on the so-called "vocational colleges" (BK) in the German federal state of Baden-Württemberg shows that the major aspiration of young people when entering a vocational full-time school in many cases is educational and meritocratic rather than vocational or labour-market orientated. Against this background, there have always been endeavours to strengthen the work-related features of VET beyond the so-called "school occupations" (*e.g.* in the health sector). One of the tools is the implementation of "practice firms" in full-time VET. Qualifications at the "vocational college" can even be considered as "hybrid" since young people can obtain an "assistant qualification" together with the entry qualification for Universities of Applied Sciences. This paper throws light on this type of a full-time vocational school and its relationship with the dual apprenticeship system.

Key words: dual system, full-time vocational education and training, vocational college, practice firm

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INTRODUCTION

The "vocational college" (Berufskolleg or BK) is aimed at young people with an intermediate school leaving certificate who want to obtain an entrance qualification for Universities of Applied Sciences after two years. Optionally, students can also obtain a qualification as a state-certified Wirtschaftsassistent (Business Assistant). Consequently, the vocational college combines the two functions of vocational schools—certification orientation and career guidance—thereby enabling students to acquire a hybrid qualification (Buchmann, 2021; Deissinger *et al.*, 2013; Seeber & Michaelis, 2015). This feature distinguishes the BK quite significantly from apprenticeships in the dual system. Some 50,000 young people visit a vocational college in the German federal state of Baden-Württemberg. This number equals 13.4% of all learners in the vocational school system (full-time and part-time) (https://daten.statistik-bw.de/genesisonline/online/table/21121_0002#abreadcrumb). The reasons for choosing the vocational college course can vary considerably, which is partly due to its two-stage structure, as the two-year course is divided into BK I (first year) and BK II (subsequent second year). Whilst BK I merely offers vocational orientation and (though in rare cases) a credit transfer option for subsequent vocational training, the BK II opens up the option of acquiring the hybrid qualification described above. Our article aims to examine the extent to which the hybrid qualification actually influences young adults' decision to attend a BK and what role it plays in young people's planned next steps. This article is based on a larger survey, the main findings of which have already been published (Findeisen & Deissinger, 2025). While this paper aligns with the project publication, it provides a broader context for the findings.

This paper builds on two previous studies on commercial vocational colleges with practice firms in Baden-Württemberg (Breuing *et al.*, 2017; Deissinger, 2007; Deissinger & Ruf, 2006, 2007). The aim was to evaluate the impact of training in a school-based simulation context (Stock & Riebenbauer, 2007; Tramm, 1996). In Baden-Württemberg, practice firms were introduced in the 1998/99 academic year. The evaluation study on behalf of the Ministry of Education focused on both the "internal functionality" of the vocational college (*e.g.* facilitating realistic learning experiences, promoting vocational skills) and its "external functionality" (applicability and acceptance of the qualification in the labour or training market) from the perspective of (training) firms. The perceived fit between young people and vocational activities or training programmes can be regarded here as a positive predictor of satisfaction and learning progress during training (Findeisen *et al.*, 2022; Nägele & Neuenschwander, 2015).

METHODS AND RESEARCH DESIGN

This paper focuses on the "internal functionality" and therefore draws solely on the student survey from the comprehensive evaluation study (Deissinger &

Ruf, 2006), which in 2003 comprised n = 949 students at the commercial vocational college. Around ten years after the first study, in 2014, a follow-up study was conducted, in which n = 282 students of the commercial vocational college in Baden-Württemberg were surveyed (Breuing *et al.*, 2017; Heck, 2014). The empirical study presented in this article builds on the two studies described above. The central question has remained: What factors are decisive when choosing a vocational college course, and which further pathways do students aim at after completion? In the current wave of the survey, in addition to the previous studies, the vocational college students were asked to assess the extent to which a commercial role suits them personally, and their vocational self-efficacy (*i.e.*, their belief in their ability to perform a specific behaviour in a professional context).

The survey of students (Findeisen & Deissinger, 2025; Hugger, 2024) was conducted between November 2023 and January 2024. A total of 936 students took part in the survey, of whom 560 were at BK I and 376 at BK II. The participants on average were 17.5 years old and the majority were born in Germany (89.2%). The gender distribution was fairly balanced (51.3% female, 47.5% male, 1.2% diverse). The instruments used in the questionnaire were closely based on the previous studies. The reasons for choosing the vocational college and the planned next steps were surveyed in the same way as in the original study (Deissinger & Ruf, 2006). The assessment of vocational competence was based on students' self-assessments and utilised items from the questionnaire from Deissinger & Ruf (2006) for the constructs of technical competence, interpersonal competence, methodological competence and social competence.

RESULTS

In this paper, with respect to results of our research on this topic over the last twenty years, we focus on the motivation and the career goals of students in the vocational college (Breuing *et al.*, 2017; Deissinger & Ruf, 2006, 2007; Findeisen & Deissinger, 2025).

The reasons that were decisive for students in choosing a commercial vocational college are shown in Figure 1. In the survey, participants were asked to rate each of the six given reasons on a four-point scale (1 = strongly disagree to 4 = strongly agree). The results clearly show that most students attend the vocational college to obtain the University of Applied Sciences entrance qualification. Other key reasons include increasing their chances of securing a training place in the dual system, gaining additional time to choose a career, and acquiring basic commercial knowledge. Less significant were bridging the gap whilst searching for a training place and obtaining the Business Assistant qualification. Compared to previous studies, it is evident that the focus on eligibility (University of Applied Sciences entrance qualification) has gained even greater importance, whilst the focus on the value of a labour market qualification (Business Assistant qualification)—at least

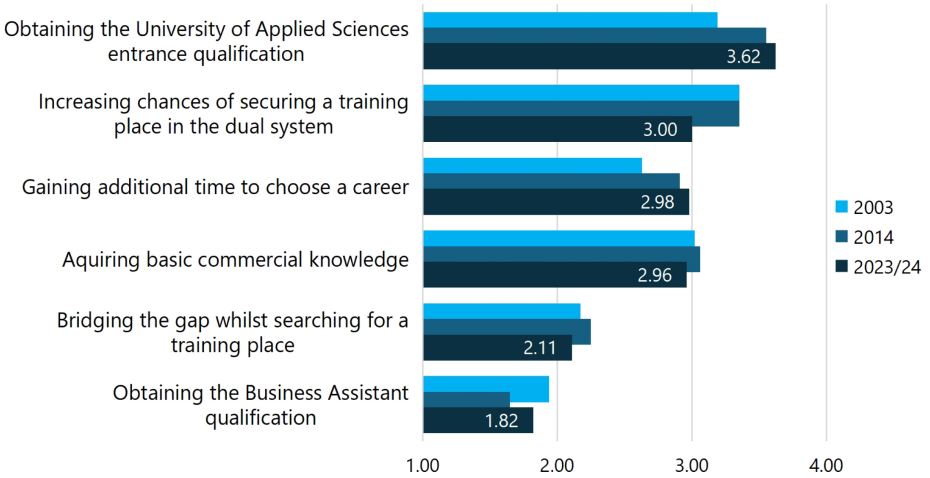


Figure 1. Reasons for choosing a commercial vocational college (mean values; scale: 1 = disagree, 4 = strongly agree). Data sources: 2003 (Deissinger & Ruf, 2006); 2014 (Breuing *et al*., 2017); 2023/24 (Findeisen & Deissinger, 2025).

compared to around twenty years ago—has lost some of its significance.

Another question concerned the next steps that students aim to take after vocational college (and, where applicable, a gap year). Figure 2 shows the students' responses. Although vocational training still received the highest level of support from vocational college students as a next step, this option has lost significant ground compared with the surveys conducted 10 and 20 years ago. Similarly, entering higher education following vocational college is considered more frequently than in previous studies. Additionally, the current survey included the option of commercial apprenticeship training and a degree in economics. For the group as a whole, the results show moderate levels of support for domain-specific post-qualification pathways. However, when looking only at students who showed a high level of support for vocational training, it becomes apparent that 71.4% also showed high levels of support when asked about commercial apprenticeships. Similarly, among the 482 individuals with a high level of support for a higher education programme as a follow-up option, a high level of support was observed for the option of studying economics (69.1%). Finally, the option of seeking direct employment as a Business Assistant without further education is just as insignificant in the current survey as it was in the previous studies.

CONCLUSION

The two previous studies, conducted in

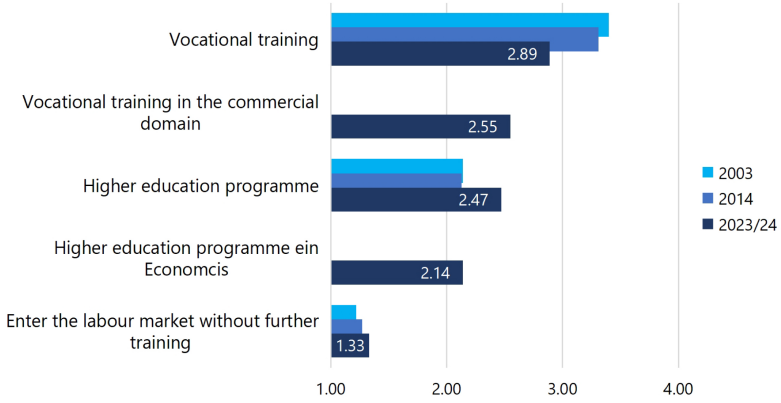


Figure 2. Planned steps after graduating from vocational college (mean values; scale: 1 = disagree, 4 = strongly agree). Data sources: 2003 (Deissinger & Ruf, 2006); 2014 (Breuing *et al.*, 2017); 2023/24 (Findeisen & Deissinger, 2025).

2003 and 2014 at the commercial vocational college in Baden-Württemberg, showed that, from the students' perspective, the role of the BK in providing labour-market relevant qualifications is of little significance. Instead, the vocational college is used primarily to fulfil academic aspirations or as a preparatory measure for an apprenticeship in the dual system. The motivation to obtain the University of Applied Sciences entrance qualification is even more evident in the current survey, and higher education is also considered as a follow-up option significantly more frequently. Furthermore, the survey on which this article is based (Findeisen & Deissinger, 2025) also highlights the positive perception of the quality of practice firm lessons and their impact on the development of key competence areas, a finding already evident in the two previous studies. The current study of 2023/24 provides new insights regarding the positive correlation between the quality of practice firm instruction and students' perceived fit, as well as their vocational self-efficacy. This further underscores the importance of the vocational college with a practice firm in its role as a preparatory training institution. With regard to our research question, however, it can be noted that hybrid qualifications in a narrow/strict sense (Deissinger *et al.*, 2013)—that is, in the sense of a full qualification as a *Wirtschaftsassistent* (Business Assistant) plus eligibility for higher education—is not really sought after or utilised by young people.

Even when considering the external role of vocational colleges with training firms—a topic not addressed here—from the perspective of companies (Deissinger & Ruf, 2006), the standardisation and perception of vocational

competence in the German vocational education and training (VET) system, when it comes to training, continue to be determined by the institutional coherence of the dual apprenticeship system and by the certification culture in the hands of chambers (Deissinger, 2022). However, the recent relative decline in student numbers in part-time programmes (dual training) compared to full-time programmes in vocational schools also points to an "internal logic" in the development of German VET since the 1970s, which nevertheless appears to be influenced by international trends (Deissinger, 2018). The great importance attached to the *Fachhochschulreife* (entrance qualification for Universities of Applied Sciences) when using the "vocational education pathway" to higher education strongly underscores this, as academisation does indeed occur (also) within the VET system, though largely outside hybrid structures.

DECLARATION

Article version statement

This article has been reviewed and preliminarily edited. It is intended solely for use at the 10th Research Conference of the International Network for Innovative Apprenticeship (INAP). The final version will be published in *Vocation, Technology & Education* (https://www.vtejournal.com).

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VTE VOCATION, TECHNOLOGY & EDUCATION

RESEARCH PAPER

Degree apprenticeships in England: Motivation, prestige and engagement

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ABSTRACT

This paper reflects on how, if at all, the introduction of degree apprenticeships (DAs) has influenced the prestige of Technical vocational education and training (TVET) and apprenticeships in England. Through drawing on a selection of data from employers and degree apprentices, it argues that given the benefits of DAs to individuals and organisations, DAs fulfil their expectations in relation to contributing to the local and national economy. There is some evidence that DAs support social mobility, however, it is also known that DAs are competitive and selective. The extent to which social mobility and diversity of degree apprentices is achieved often comes down to individuals in the recruitment process. Some employers clearly consider their corporate social responsibilities and proactively aim to develop a diverse workforce. If benefits of DAs are acknowledged and communicated wider, DAs would positively influence the prestige of TVET.

Key words: work-based learning, degree apprenticeships, higher vocational education

INTRODUCTION

Technical vocational education and training (TVET) has been seen as secondary to academic learning and suffers from poor prestige globally (Billett *et al.*, 2019) similarly in England (Wolf, 2011). This is important because prestige is linked to attractiveness and impact engagement. Consecutive UK governments have been aiming at raising the attractiveness of apprenticeships (Chankseliani *et al.*, 2016) and introduced policies to achieve this. Some of these policy developments include increasing the minimum length of apprenticeships

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for the 16-18 year olds to one year in 2012 (this has now been reduced), introducing Degree Apprenticeships (DAs) in 2015 and from 2023 enabling young people to apply for DAs via the UCAS website similarly to applying for any other university programme. These initiatives represent pro-active policy developments that aim to raise the attractiveness of apprenticeships.

In England, there are high expectations of apprenticeships, in particular of DAs. According to Department for Education (2020) they should contribute to national economic growth and fill higher level skills shortages; they should address low levels of productivity and low investment in skills training. These aims are in line with OECD's (2017) argument that the skills that are taught and developed through the TVET route are imperative for economic productivity and growth.

We plan to focus on DAs in England as one major policy development. DAs have direct links to the workplace and should have clear economic impact. DAs also might raise the attractiveness and standing of TVET in general and apprenticeships in particular. Offering apprenticeships at degree level signals progression opportunities for those who take the vocational path and who thrive through experiential learning. DAs were introduced in the UK in 2015 as a novel alternative to traditional undergraduate programmes to obtaining a degree. During their programme, degree apprentices have to spend at least 20% of their time on off-the-job training for funding purposes and the remaining time with their employer. DAs include Level 6 programmes, leading to bachelors' degrees and Level 7 leading to Masters' degrees identical to Degrees that can be obtained from "traditional" universities. DAs are funded by employers through the Growth and Skills Levy from April 2026, used to be Apprenticeship Levy, that was introduced in 2017.

Frequent policy churn characterises the English TVET landscape. In 2024, the Labour Government came into power a set of reforms of the apprenticeship system was proposed. The Institute for Apprenticeships and Technical Education (IfATE) was replaced with Skills England and formally established in June 2025. Their remit covers and extends of the remit of IfATE, it: "*Identifies skills gaps in the economy and uses this insight to improve provision so that people and businesses can access the right training to connect people to jobs*" (https://www.gov.uk/government/organisations/skills-england).

From the 1 January 2026, the funding of L7 DAs changed with the aim to increase the number of young people taking up DAs. This change means that still all L7 DAs will be funded for those under 21 years of age and of those who are care leavers of with Education and Health Care Plan. The government's latest financial incentives target small and medium-sized enterprises (SMEs) in order to encourage them to take on young apprentices and reduce the burden of administration. From August 2026, apprenticeships in SMEs will be

fully funded for under 25 year olds. In general, policy developments aim at increasing the number of apprenticeships, focus on young people and encourage small and medium size enterprises taking on apprentices at all levels.

METHODS AND RESEARCH DESIGN

The presentation will be based on our completed research (Laczik *et al.*, 2025). We aim to address the following research questions: How (if) have DAs as new qualifications influenced the prestige of TVET/apprenticeships and what does our research evidence say? How do employers and degree apprentices perceive the value of DAs? What are the levers and barriers to recruitment of young people to DA programmes? We plan to discuss these questions in the context of the latest policy developments in England.

The research took a qualitative approach and 99 semi-structured interviews were conducted, transcribed and anonymised. We utilised Braun and Clarke's (2006) thematic analysis steps and used NVivo to structure and analyse the data. We have followed British Educational Research Association (BERA) Ethical Guidelines (BERA, 2024) during our research.

RESULTS

DAs have grown in scale and stature in the education sector, in policy, and in the public view. DAs offer a clear progression route from lower-level apprenticeships and an alternative to all those learners who prefer experiential learning. Degree Apprentices do not pay tuition fees and receive remuneration from their employer, making them financially very attractive to prospective apprentices.

While the number of L6 and L7 DAs starts have increased in 2024/25, compared to 2023/24 by 20.4% to 60,350 (Department for Education & Department for Work and Pensions, 2025), the numbers are still small. Degree Apprentices are employees, DAs are jobs. The number of DAs will only increase by the creation of jobs requiring degrees. The initiation and job creation lay with the employer.

There are concerns, and statistics underpin them, that the increase in expensive DAs normally taken by existing employees is to the detriment of resourcing and support for apprenticeships to help young people enter the workforce. The potential capacity of DAs to act as instruments of social mobility has been acknowledged and at the same time questioned (Cruikshanks *et al.*, 2025).

All interviewees articulated clearly the benefits and challenges they experienced with DAs. Employers signalled very different approaches to recruitment. Some interviewees were proactively seeking opportunities for inclusive recruitment. *"They've got this huge gender gap to fill in their middle management and into their senior leadership team. So they're really looking at*

ways of growing that pipeline" (Employer B06).

Employers embraced DAs for securing long-term, sustainable employees while simultaneously addressing skill gaps within their industries. For some DAs offered a way to develop their workforce and at the same time support social mobility, as one large employer explained: *"I think the DAs is the way forward, because you will offer opportunities for people that wouldn't be able to afford them first of all. You're showing that you're actually investing and that you're serious in terms of your long-term… That you've got a long-term vision in terms of, you know, upskilling local, you know, your staff for the long-term, and hopefully you'll reap the reward"* (Employer [Large] 06).

Another employer refers to looking for solution in relation to their diversity agenda: *"They've got this huge gender gap to fill in their middle management and into their senior leadership team. So they're really looking at ways of growing that pipeline"* (Employer B06).

In response to these, degree apprentices aimed at entry and progression in a chosen industry sector as one young apprentice expresses their eagerness to engage with employment. *"I knew that I wanted to be like a biological scientist since I was about fifteen or something. So I think when you're sort of presented with the fact that when you're 18 you can just go and do it rather than having to wait three years"* (Apprentice 14).

They often talked about gaining a degree while engaging in paid employment and potentially securing a job at graduation. Degree apprentices are reportedly ready to slip into their job role after graduation, hence contribute to business growth. Many noted the financial benefits and appreciated a student debt free future: *"I don't quite know why I'd go to university, incur all those fees, when there's this all-inclusive package that would give me every single thing, if not more"* (Apprentice 10).

While benefits outlined challenges, and the views of employers and apprentices greatly overlapped, these linked to individuals and organisations, rather than signalled impact on the TVET system.

CONCLUSION

Creating apprenticeship places, that is increasing the number of DAs is difficult because they are jobs. If there is no job available in the enterprise at degree level, there is no DA available. Nevertheless there is constant policy urge to incentify employers to take on more apprentices.

DAs have been positively perceived by the interviewees even though they have reported mixed experiences with it. While those who engage with DAs experience and acknowledge its benefits, there still seems significant gap in awareness of and detailed knowledge about DAs.

L6 and L7 DAs are clear signals for career path for those that are taking the technical and vocational route. However, it is debatable what signals the change of funding of L7 DAs. There are clear benefits of DAs for all stakeholder groups that should positively influence

the prestige of TVET and apprenticeships, however, these should be widely shared. DAs can evidently live up to their expectations of developing highly skilled workforce, hence contributing to national and local economic growth. This, however, has to be recognised also by those not engaging with DAs. Nevertheless, there is much to learn from the experience of DAs in England for approaches to the prestige of apprenticeships and TVET more generally.

Considering the benefits of DAs not only to individuals but also to local communities and local and national economy, should contribute to the enhancement of the prestige of TVET. This is yet to be seen.

DECLARATION

Article version statement

This article has been reviewed and preliminarily edited. It is intended solely for use at the 10th Research Conference of the International Network for Innovative Apprenticeship (INAP). The final version will be published in *Vocation, Technology & Education* (https://www.vtejournal.com).

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VTE VOCATION, TECHNOLOGY & EDUCATION

RESEARCH PAPER

The acceptance of applied degrees in Canada between vocational foundation and academic aspiration

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ABSTRACT

The growing demand for higher education and the increasing need to align qualifications with labour market requirements have contributed to the emergence of hybrid qualifications (HQs) in the higher education sector. HQs like the applied degrees in the Canadian province of Ontario integrate academic and vocational education. In order to analyse the acceptance of these new educational formats in higher education, society and the labour market, an interview study with ten experts from the higher education sector in Ontario was conducted based on an analysis instrument for HQs, developed from a literature and document analysis. The results indicate that the practice-oriented curriculum as well as cooperation with industry partners facilitates a direct entry into the labour market. Despite research experience and the qualification of a Bachelor's degree, access to Master's degrees at universities is often restricted. In society, a higher standing of university pathways still exists which is predominantly visible at the educational choices at the end of high school.

Key words: hybrid qualifications, higher vocational education, Canada

INTRODUCTION

The expansion of higher education has been a global phenomenon since the 1960s, especially in Anglophone countries. With 65 percent, Canada currently represents the country with the highest rate of tertiary education within the Organization for Economic Co-operation (OECD) countries (OECD,

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2025). Apart from the assumption that a higher education level has positive effects on economic growth as well as individual income levels, problems that come with the "academic drift" have also been discussed for the Canadian case. Shortages of skilled workers and "overeducation" indicate that matching problems between the needs of the labour market and the obtained qualifications in the education system exist (Galarneau, 2021). These can be explained through thinking patterns in society that favour university education which leaves vocational pathways as a second-class option associated with low status (Braun, 2022). Furthermore, labour market structures in liberal market economies like the weak link between qualifications and occupations lead to a high demand for higher education degrees non-specific to an occupation (Wheelahan *et al.*, 2017).

As a possible solution, since 2002 applied degrees have emerged in the Canadian province of Ontario as a form of higher vocational education (Moodie *et al.*, 2018). These new qualifications show structural features of traditional academic study programmes, but also cooperate with industry by integrating work-placements and aligning the curriculum with the needs of the labour market. These new qualifications integrate theoretical and practice-oriented learning and therefore can be identified as a "hybrid qualification" (HQ) (Heininger & Deißinger, 2025). Based on a developed analysis instrument for HQs, this paper aims at analysing "applied degrees" in Ontario according to their hybrid nature regarding their acceptance at the labour market, in society and within the higher education system through the following research questions.

(1) What status is assigned to applied degrees in the higher education sector and in society given their hybrid nature in comparison to traditional vocational and academic study programs?

(2) How should applied degrees be designed to better align with the specific labour market requirements in Anglophone countries and the highly academic education sector in Canada?

DEVELOPING AN ANALYSIS INSTRUMENT FOR HQS

HQs are defined as (1) a combination of academic and vocational practice-oriented learning contents and curricular structures, (2) which aims at a qualification for entering the labour market, and (3) the possibility to formally move on to higher education (or to the next higher level within the educational system (Heininger & Deißinger, 2025)". Therefore, HQs often classify as newly designed educational formats bridging traditional vocational and academic education on a curricular or structural level (Euler & Severing, 2022).

In order to provide a theoretical foundation for HQs that is especially focused on HQs in the higher education sector, a literature and document analysis was conducted. Therefore, in a first step theoretical approaches for characterising

HQs or new educational formats located between traditional academic and vocational education were collected from existing literature. Overall, three different theoretical approaches were identified: (1) Focusing on the historical roots of double qualifications. (2) Explaining the development of HQs in higher education through the differentiation of the higher education sector focusing on dual study programs in Germany. (3) Identifying HQs through the differentiation of the tertiary education sector within the international educational landscape (including higher vocational education outside the higher education sector).

Based on these three approaches, an analysis instrument for HQs in higher education (on ISCED level 6) was developed by deducting key characteristics which were then summarised to broader categories in order to assure an implementation into different cultural contexts. The analysis instrument contains the three major categories "acceptance within the education sector", "acceptance at the labour market" and "acceptance in society" which can be further subcategorized, as shown in Figure 1.

METHOD AND RESEARCH DESIGN

In order to observe applied degrees as HQs based on the analysis instrument, a qualitative-explorative interview study was conducted from December 2024 until Mai 2025 with ten experts from the higher education sector in Ontario. Overall, interview material of 356 min was generated. The interviews were analysed through a qualitative content analysis following the approach for explorative interviews with experts by Gläser and Laudel (2010) which allowed for open described categories and modifications to the category system along the process of analysis if new information would emerge. A total of 359 codes were assigned and analysed through 14 deductive and 75 inductive categories. One third of the material was additionally coded by a research assistant and an inter-rater reliability (Brennan & Prediger, 1981) of 0.89 was achieved.

RESULTS

Acceptance within the higher education sector

Applied degrees can be located between traditional academic and vocational qualifications as practice-orientation (p. 2, Pos. 43) as well as "research experience" (p. 6, Pos. 17) are central didactical principles of each study program. Therefore, there are teachers involved that "come from industry" (p. 1, Pos. 21) as well as teachers that provide research experience by having a PhD (p. 4, Pos. 49). Cooperation structures with the industry contribute to the study program as co-op placements as a form of work integrated learning "provide students … with a great opportunity to not just experience the workplace, but to practice and to learn more of the work environment" (p. 9, Pos. 29). These co-ops also facilitate the

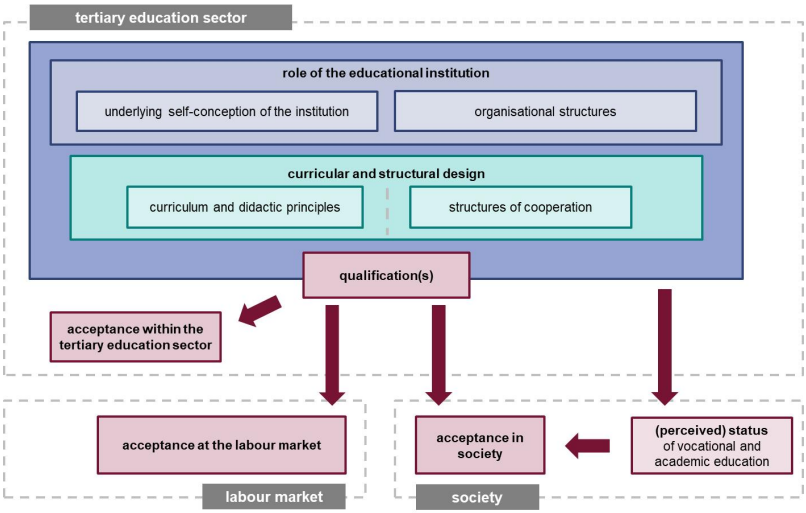


Figure 1. Analysis instrument for hybrid qualifications.

transition into employment as "[they give] employers an opportunity to work with eminent graduates that they might want to hire later on" (p. 9, Pos. 29).

Colleges as the providing educational institutions also operate between academic and vocational structures. They show a strong vocational identity as they "serve the areas of strength for industry in the region" (p. 7, Pos. 13). The cooperation with industry partners not only for co-op placements, but also in the process of curriculum development further strengthens the vocational foundation. The implementation of the required academic culture necessary for the implementation of applied degrees is currently undermined by existing organisational structures. Nevertheless, colleges aim for a status as polytechnics for higher recognition within the postsecondary education sector in Ontario (p. 10, Pos. 29).

The acceptance of applied degrees as a hybrid qualification in the overall higher education sector remains limited. When applying for Master's programs at universities students with applied degrees are "not treated like other degree holders" (p. 6, Pos. 13) due to the universities restrictive admission policies.

Acceptance within society

Applied degrees as a qualification obtained at colleges do not receive the same status as degrees from university in society: "I'm not very confident that the public would see an applied degree at a college as the same credential as a bachelor's degree at a university" (p. 8, Pos. 45). However, a higher reputation is associated with applied degrees in

specific occupational fields: "I think some of the applied programs really are excellent. They have a great reputation. Musical theatre, for example, great reputation. Animation, great reputation. … students will absolutely seek them out and move for them" (p. 6, Pos. 41). Furthermore, "colleges in Ontario are very strong and very well-respected institutions" even though compared to a university "they will never have the same status" (p. 5, Pos. 49). Therefore, parents and teachers in high schools "aim at getting the students into university" and studying at a college is often not an option.

Acceptance at the labour market

College graduates from applied degrees are "employed often prior to them ending, finishing the program"(p. 4, Pos. 37). Connections to employers within study programs at colleges lead to employment opportunities so that even university graduates "might go then to a college to train for a year or two to land a job, because the university did not provide an experiential learning opportunity"(p. 9, Pos. 37). In addition, a combination of an applied degree with a professional status, *e.g.* in engineering, secures a successful transition into employment: "By the time the four years (of engineering) are completed, not only has the student got four years of the equivalent of university study … Plus, on top of that, they've got the … professional status and … work experience. It really is very successful" (p. 10, Pos. 21).

CONCLUSION

Applied degrees combine traditional vocational and academic curricular and organisational structures and therefore can be considered as HQs. Because of the integration of work-integrated learning with industry partners, the program facilitates a direct labour market entry after finishing the program. Access to Master's programs at universities remains limited due to the higher standing of universities and their restrictive admission policies, despite having obtained a Bachelor's degree. Even though a high status exists for applied degrees in certain professional fields, the overall higher status of universities remains to persist through the preference of university education at the end of high school.

These overall findings lead to the conclusion that the development of HQs in higher education might result in a lower standing of vocational education in general due to an increased competition between vocational and academic education. The relatively high status of colleges in Ontario therefore seems to be founded in the strong established vocational structures rather than in their characteristic as a higher education institution or polytechnic. For the long-term success of applied degrees, a stronger regulation at the labour market with more occupations that require a professional status is necessary. Otherwise, applied degrees might need to be less occupation-specific in order to compete with university graduates in a liberal market economy like Canada.

DECLARATION

Article version statement

This article has been reviewed and

preliminarily edited. It is intended solely for use at the 10th Research Conference of the International Network for Innovative Apprenticeship (INAP). The final version will be published in *Vocation, Technology & Education* (https://www.vtejournal.com).

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VTE VOCATION, TECHNOLOGY & EDUCATION

RESEARCH PAPER

From allocation to choice: How (post-) soviet concepts of profession and choice travel, collide and reconfigure in the Swiss Vocational Education and Training encounter

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ABSTRACT

Ukrainian refugee families navigating Swiss post-compulsory vocational pathways encounter a system with fundamentally different historical and institutional foundations from those that shaped their own educational experiences. This contribution argues that the encounter between the Swiss Vocational Education and Training (VET) system and families whose educational experiences were shaped by the Soviet allocation tradition and its post-1991 inversion constitutes a structural collision of concepts without a shared ground. The Swiss system is grounded in Beruflichkeit, a deeply institutionalised coupling of vocational identity, work and Bildung—a tradition that has no equivalent in the Ukrainian educational system. Drawing on Mieke Bal's framework of travelling concepts, the paper analyses how Beruf, професія (profesiya), and choice carry historically divergent weight, compounded by the conditions of institutionalised temporariness under Status S. Through problem-centred and expert interviews, and a qualitative cultural-analytic approach, the study traces the concepts at stake in this encounter. Three analytical patterns—collision, negotiation and reconfiguration—frame the ongoing empirical inquiry.

Key words: travelling concepts, vocational guidance, Ukrainian refugees

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INTRODUCTION

When Ukrainian refugee families encounter the Swiss vocational education and vocational guidance system, they meet a system whose historical and institutional foundations differ fundamentally from those that shaped their own educational experiences. Concepts of profession, choice, next to qualification, and prestige carry a weight that cannot be assumed to travel across institutional and historical boundaries without transformation. In these encounters, two diametrically different understandings of educational systems and their purposes meet.

In German-speaking countries, the concept of Beruflichkeit—the cultural and institutional coupling of vocational identity, work, and Bildung—underpins a Vocational Education and Training (VET) system in which the transition to apprenticeship is constituted as the norm (Deissinger & Gonon, 2021). Vocational guidance is central to this transition, embedded in a mandatory institutional architecture with a tradition of over 200 years (Bonoli, 2021; Mazzarella, 2023; VSA, 2026). Individual vocational choice, professional identity, and institutional guidance are inseparable both culturally and institutionally.

The Ukrainian case stands in stark contrast to this understanding. In the Union of Soviet Socialist Republics (USSR) (1917-1991) vocational guidance existed but served the needs of the planned economy and the collective rather than an individual vocation: Young people were allocated to occupational positions, into the collective in which [they had] to work (Kostin, 1986). Following Ukrainian independence in 1991, the allocation system ended, leaving an institutional vacuum. University credentials rapidly became the dominant marker of social mobility; VET, discredited by its association with the Soviet economy, was reduced to a stigmatised "last resort", while educational corruption increased in the post-independence educational reform vacuum (Braun, 2024; Klein, 2017; Melnyk, 2021). The cumulative effect of these developments is visible in the profile of Ukrainian refugees today: Among those in Switzerland, 69% hold university degrees—which could be read as a direct consequence of this post-Soviet meritocratic turn—while approximately 70% of Swiss youth complete vocational pathways (Braun, 2024; Bundesamt für Statistik, 2025; Mubi, 2024; UNHCR, 2023).

Drawing on Mieke Bal's (Bal, 2007, 2009) framework of travelling concepts, the contribution analyses how Beruf, професія (profesiya) and choice carry fundamentally different historical and cultural notions. When Ukrainian refugee families navigate Swiss VET pathways, these concepts require translation across institutional frameworks that share no common ground. This translation is further complicated by the language barrier and by the conditions of institutionalised temporariness under Status S: Families must make educational

commitments of three to four years while their legal right to remain is unresolved (Bonoli & Otmani, 2023; Hett & Ruedin, 2025).

METHODS AND RESEARCH DESIGN

The contribution draws on interview material collected through social-scientific methods and interpreted through an interdisciplinary cultural-analytical lens. Problem-centred interviews (Witzel & Reiter, 2022) are conducted with Ukrainian adolescents currently enrolled in the Swiss VET system and with their parents. Adolescents and parents are interviewed separately, as each group holds distinct knowledge about the transition to the Swiss VET system, the guidance encounter and the decisions around it. The interviews are complemented by expert interviews (Gläser & Laudel, 2010) with vocational guidance counsellors and Ukrainian community organisers who support Ukrainian families in navigating the Swiss VET system. The fieldwork takes place in the German-speaking part of Switzerland, primarily in the Canton of Zurich, which hosts the largest share of Ukrainian refugees under the protection status S and, as Switzerland's economic centre, has received the highest proportion of placements (SEM, 2026; UNHCR, 2026). First interviews are planned for July 2026.

The material is analysed through qualitative content analysis (Kuckartz & Rädiker, 2023), predominantly inductively. Where deductive anchoring applies, it draws on the travelling concept framework and on statements that make transitions visible—the simultaneous disruption of multiple life domains, including legal status, educational biography, professional identity and future imaginaries, to name a few. The inductive approach allows the lived experience of the families to surface on their own terms, opening space for contextualisation across cultural analysis, Swiss migration policy, Eastern European studies and VET research.

The design positions the interviewees as actively engaged in the process of knowledge constitution and the reconstruction of practical problems and social processes (Gläser & Laudel, 2010; Witzel & Reiter, 2022). Equally, the cultural-analytical lens makes it possible to treat the concepts at stake as objects of inquiry rather than as pre-given analytical categories. Rather than fixing these concepts in advance, the approach keeps the analytical space deliberately open (Bal, 2007, 2009). It is the narratives themselves that will determine what Beruf, професія (profesiya) or choice mean in this encounter. At this intersection of adolescent, parental, and expert perspectives, the travelling of concepts becomes visible.

RESULTS

As the fieldwork is in its early stages—first interviews are planned for July 2026—this section does not present

empirical findings but rather the analytical orientation that will guide their interpretation. What can already be traced, based on the theoretical framework and the structural conditions outlined above, is the shape of the encounter itself.

The encounter between Ukrainian refugee families and the Swiss vocational education and guidance system brings together two educational histories with no shared institutional ground. The Swiss systems presuppose vocational choice as an expression of individual identity where guidance is built into a two-century-old (mandatory) architecture, and Beruflichkeit (vocationalism) underpins the transition to apprenticeship as the dominant post-compulsory pathway (Bundesamt für Statistik, 2025; Bonoli & Otmani, 2023; Deissinger & Gonon, 2021; Mazzarella, 2023). The Ukrainian educational context carries a different history: Vocational guidance in the Soviet period served the planned economy and the collective rather than individual vocation (Kostin, 1986), and its post-1991 successor—marked by institutional vacuum, VET stigma and educational corruption—produced a meritocratic turn toward university credentials as the primary marker of social mobility (Braun, 2022, 2024; Klein, 2017; Melnyk, 2021).

One concrete site of collision is the vocational guidance encounter itself. When a guidance counsellor presents an apprenticeship as a prestigious, identity-forming pathway, a Ukrainian family brings to that encounter a concept of professional education freighted with associations of coerced allocation and academic failure. The counsellor and the family are discussing the same thing; conceptually, they are not.

A second collision point concerns institutionalised vocational choice. In the Swiss system, individual occupational choice is not merely assumed but embedded in the curriculum, in mandatory cooperation with guidance services, and in the transition process itself. This institutional form has no equivalent in the Ukrainian educational experience. For parents who experienced Soviet allocation directly, a guidance counsellor who presents VET as the structured, recommended pathway may trigger the opposite of what the Swiss system intends: Not the opening of choice, but its closure. The institution designed to enable individual vocational identity can be received as a form of direction, familiar in its logic, but carrying entirely different historical weight.

The conditions of institutionalised temporariness under Status S add a further dimension: Families navigate educational decisions spanning three to four years without a resolved legal right to remain, while language acquisition functions as the primary gateway to VET pathways—and therefore to integration—steering those with insufficient proficiency disproportionately toward lower-prestige apprenticeships (Bonoli & Otmani, 2023; Hett & Ruedin, 2025).

This asymmetric encounter is the site where concepts travel, collide and potentially reconfigure. How concepts are negotiated in the guidance encounter is one of the questions the ongoing fieldwork addresses. Three analytical patterns, theoretically derived from the framework above, orient the empirical inquiry: The collision across historical and institutional registers; the negotiation of legitimate pathways; and the reconfiguration of professional identity and future at the biographical level under conditions of cascading transitions and unresolved legal temporariness. These are not presented as findings but as analytical orientations that ongoing fieldwork will inductively fill.

CONCLUSION

This contribution examines how Beruf, професія (profesiya), and choice collide and reconfigure in the encounters between Ukrainian families and the Swiss vocational education and guidance system. As Bal (2002) reminds us, concepts are never merely descriptive; they are normative forces that shape both research and lived experience. The travelling concepts framework is therefore not only an analytical tool but a means of taking seriously what families, adolescents and guidance professionals bring to the encounter. A cultural-analytic approach, as developed here, is equipped to grasp this encounter in its full complexity.

For counsellors, teachers and other professionals, the findings of the ongoing fieldwork may imply the need to move beyond the assumption that integration will happen naturally once language barriers have been overcome or that entry into VET pathways alone is sufficient for integration (Bonoli & Otmani, 2023). The concepts being applied in the Swiss guidance encounter differ from the institutional architecture that Ukrainian families are familiar with. A cultural-analytic approach provides tools for bridging this gap, not by defining the "other", but by making visible the historical and institutional distance between two educational systems.

The scale and speed of Ukrainian displacement since 2022 has few precedents in Swiss and European history (SEM, 2023; UNHCR, 2026). The framework developed here, while grounded in this specific case, holds potential for other contexts in which educational cultures meet without shared institutional ground—and for other population groups whose encounters with VET systems remain underexplored.

DECLARATION

Article version statement

This article has been reviewed and preliminarily edited. It is intended solely for use at the 10th Research Conference of the International Network for Innovative Apprenticeship (INAP). The final version will be published in *Vocation, Technology & Education* (https://www.vtejournal.com).

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VTE VOCATION, TECHNOLOGY & EDUCATION

RESEARCH PAPER

Enterprise-based new apprenticeship: Historical evolution, institutional pathways, and key factors of quality assurance in China

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ABSTRACT

This paper examines China's enterprise-based new apprenticeship system as a response to industrial upgrading, artificial intelligence (AI), and the reorganization of work. It argues that the system should not be understood merely as a vocational training program, but as a state-coordinated and enterprise-embedded model of skill governance. In this model, government agencies coordinate standards, funding, and supervision; enterprises embed learning in real production processes; and technical colleges mediate between work and education by translating workplace skill demands into pedagogically organized learning arrangements. By analyzing the Chinese case, the paper contributes to international debates on how apprenticeship systems can support workforce adaptation, technological transition, and sustainable skill formation.

Key words: apprenticeship, technical colleges, quality assurance, skill formation

INTRODUCTION

Apprenticeship has regained international attention as economies confront digitalization, intelligent manufacturing, artificial intelligence (AI), and green industrial transformation (Brandl *et al.*, 2024). These changes are reshaping production processes, occupational structures, and skill requirements. Work is becoming more dynamic, data-informed, and collaborative, while occupational tasks are increasingly reorganized through digital systems,

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intelligent equipment, and human-machine interaction (Warning *et al.*, 2022). In this context, skill formation has become central to industrial upgrading and sustainable workforce development.

China's enterprise-based new apprenticeship system emerged within this transformation of work and vocational education (Chen *et al.*, 2019). As a national policy initiative, it aims to strengthen skilled workforce development, deepen school-enterprise cooperation, and improve the alignment between vocational training and industrial demand (Zhao, 2018). It also responds to two persistent limitations in skill formation: The weak connection between school-based training and production practice, and the lack of systematic pedagogy and quality assurance in informal workplace learning.

The institutional development of new apprenticeship

China's enterprise-based new apprenticeship system developed through a gradual process of policy experimentation and institutional consolidation. Its emergence should be understood against the background of industrial upgrading, growing demand for skilled workers, and the need to modernize vocational education and training (Zhang, 2021). In 2014, the Ministry of Human Resources and Social Security and the Ministry of Finance introduced pilot policies for enterprise-based apprenticeship training. From 2015 onwards, pilot programmes were implemented in selected provinces, marking the formal beginning of this reform.

During the pilot stage, apprenticeship mainly focused on newly recruited and transferred workers. Training was organized around workplace requirements and combined enterprise practice with systematic instruction delivered by technical colleges. This model shifted the centre of skill formation from classrooms to workplaces, emphasizing occupational competence, production processes, and enterprise demand (Ran *et al.*, 2025). Apprenticeship thus became linked not only to enterprise training needs, but also to national strategies of industrial upgrading, workforce transformation, and technological adaptation.

With the expansion of pilot experiences, enterprise-based new apprenticeship evolved from localized experimentation into a more institutionalized governance arrangement. Enterprises became responsible not only for providing training positions, but also for participating in curriculum planning, mentor selection, workplace training, and assessment. Technical colleges increasingly assumed responsibilities in curriculum development, pedagogical organization, process management, and quality evaluation. Government agencies strengthened their roles in standard setting, funding coordination, and institutional supervision.

New apprenticeship and skill governance

Enterprise-based new apprenticeship represents a governance arrangement

through which different institutional actors are coordinated around skill formation. This arrangement can be conceptualized as a state-coordinated, enterprise-embedded, and college-mediated model of apprenticeship.

The system is state-coordinated because government agencies provide the policy framework, funding mechanisms, standards, and supervision necessary for system construction (Kuang, 2024). In contrast to apprenticeship systems that rely primarily on employer associations or market coordination, China's enterprise-based new apprenticeship depends strongly on public policy design and administrative coordination (Yu & Kuang, 2025). Government intervention creates incentives, defines institutional responsibilities, and stabilizes cooperation among enterprises, technical colleges, and industry organizations.

The system is also enterprise-embedded because training is organized around real production processes, workplace tasks, and enterprise skill demands. Enterprises are not merely sites for practice after school-based learning; they become central spaces where occupational competence is formed (Billett, 2006). This is particularly important under AI and digital transformation, where work tasks are increasingly mediated by data systems, intelligent equipment, and human-machine collaboration (Klingenberg *et al.*, 2019; Nardo *et al.*, 2020). Apprentices need to learn not only fixed operational procedures, but also how to interpret data, respond to changing technical conditions, coordinate with others, and adapt to new forms of work organization.

Technical colleges as mediating institutions

The strategic role of technical colleges lies in their capacity to mediate between enterprise demand, occupational standards, curriculum design, and learning processes. While enterprises generate workplace-based skill requirements, such requirements do not automatically become learning content (Ceelen *et al.*, 2023). They are often embedded in specific equipment, production routines, organizational cultures, and local problem-solving practices. Without pedagogical transformation, workplace learning may remain fragmented, implicit, or dependent on individual mentors (Köhler & Goller, 2024).

Technical colleges perform a knowledge-conversion function by transforming workplace tasks into curricula, training projects, learning sequences, and assessment criteria. In doing so, they make enterprise skill demands teachable and assessable. This transformation is crucial because apprenticeship should not be reduced to task imitation or short-term enterprise training (Billett, 2016).

A further mediating mechanism lies in work-process-oriented learning (Tūtlys & Spöttl, 2017). Enterprise-based new apprenticeship cannot be organized around isolated knowledge points or fragmented operational skills. Instead, training content needs to be recon-

structed according to real production tasks and typical work processes. By converting workplace activities into pedagogically organized learning tasks, technical colleges connect curriculum, practice, assessment, and occupational competence development. This is especially relevant under AI-supported production systems, where work processes are increasingly dynamic, data-informed, and collaborative.

Technical colleges also coordinate workplace learning and college-based instruction. Effective apprenticeship requires more than the coexistence of enterprise training and school teaching (Sauli, 2021). These two learning sites must be connected through shared goals, coordinated content, and coherent assessment. Through curriculum planning, mentor communication, joint assessment, and feedback mechanisms, technical colleges help align workplace practice with educational progression.

Quality governance in new apprenticeship

Quality assurance is a central challenge for enterprise-based new apprenticeship. Because apprenticeship involves multiple institutional actors and learning environments, quality cannot rely solely on enterprise experience or administrative inspection. It requires an integrated governance framework that combines institutional standards, competence-oriented curriculum, pedagogical coordination, digital process monitoring, and continuous improvement. Under AI and industrial restructuring, this issue becomes more important because occupational tasks, workplace technologies, and competence requirements are continuously changing.

Firstly, quality governance depends on clear institutional standards and coordinated responsibilities (Kuhlee, 2015). Government agencies, enterprises, technical colleges, and industry organizations all participate in apprenticeship, but their responsibilities differ (Remington, 2018). Government agencies coordinate policies, funding, standards, and supervision. Enterprises organize workplace training and implement job-based standards. Technical colleges provide curriculum design, pedagogical support, and assessment arrangements. Industry organizations contribute to occupational standards and certification. Technical colleges play a mediating role by aligning these standards with curriculum, training plans, and assessment practices.

Secondly, apprenticeship quality depends on whether training content supports comprehensive vocational competence rather than narrow operational skills. Enterprise-based new apprenticeship should develop technical skills, problem-solving ability, teamwork, safety awareness, occupational ethics, and capacity for continuous learning. These capacities are particularly important under digital, intelligent, and green transitions, where workers must adapt to changing technologies and production processes. Technical colleges contribute by transforming real production tasks into curriculum projects and organizing project-based or task-driven learning. This prevents apprenticeship from

becoming short-term task training and supports transferable occupational competence.

Thirdly, a high-quality dual-mentor system is central to apprenticeship quality. Enterprise mentors and college teachers provide different but complementary forms of support. Enterprise mentors are familiar with production processes, workplace norms, and practical skill requirements, while college teachers contribute theoretical instruction, pedagogical organization, and learning support (Mikkonen *et al.*, 2017). The effectiveness of apprenticeship depends on whether these two groups can form a collaborative teaching community. Mechanisms for mentor selection, professional development, assessment, and cooperation are therefore necessary.

Fourthly, quality governance should cover the whole process of apprenticeship training rather than only final outcomes. Digital platforms can record training plans, learning progress, mentor-apprentice interactions, attendance, assessment results, and feedback. These records make training more visible and traceable, enabling government agencies, enterprises, and technical colleges to identify problems in a timely manner. More importantly, digital support transforms quality management from experience-based supervision toward evidence-informed governance. Technical colleges can serve as important nodes in this system by collecting learning data, analysing training quality, and feeding problems back into teaching improvement.

Finally, outcome evaluation should not be treated merely as the final stage of quality assurance, but as the starting point for continuous improvement. Evaluation should focus on occupational competence and combine enterprise assessment, college-based evaluation, and third-party certification where appropriate. Technical colleges can use evaluation results to revise curricula, improve teaching design, and adjust training plans.

DISCUSSION AND CONCLUSION

China's enterprise-based new apprenticeship system represents a state-coordinated and enterprise-embedded model of skill governance developed in response to industrial upgrading, AI, and the reorganization of work. Its development reflects a shift from traditional master-apprentice transmission and school-centered vocational training toward a more institutionalized and collaborative framework integrating government agencies, enterprises, technical colleges, and industry organizations (Figure 1).

The Chinese case contributes to international debates on apprenticeship models. It suggests that apprenticeship development does not necessarily follow a single dual-system pathway (Zhang & He, 2018). Rather than reproducing an existing international model, China's enterprise-based new apprenticeship reflects a distinctive institutional

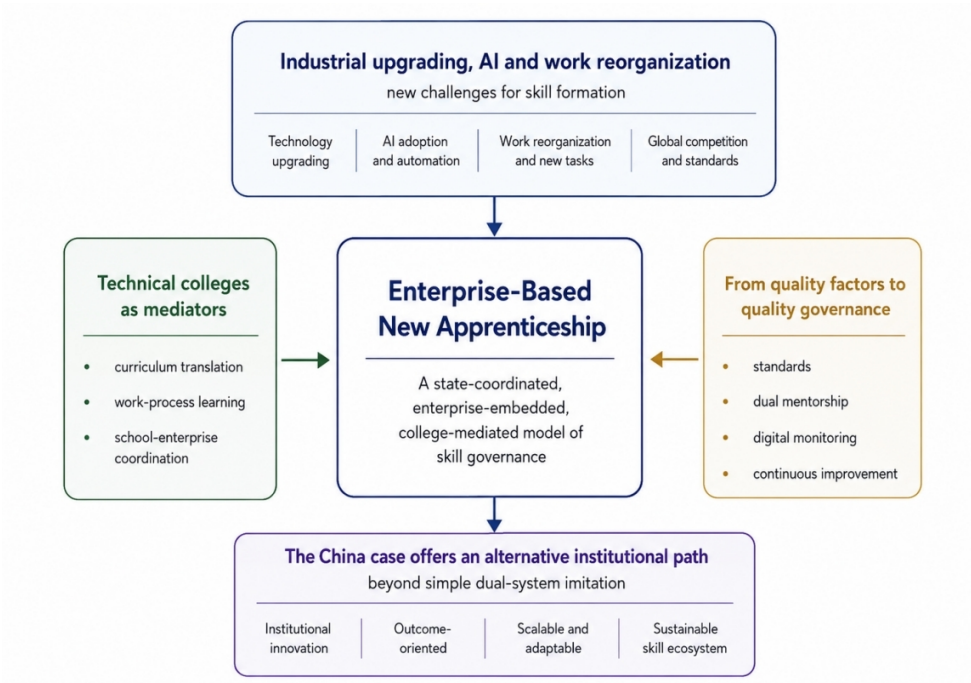


Figure 1. Theoretical framework of China's enterprise-based new apprenticeship. AI, artificial intelligence.

arrangement shaped by state coordination, enterprise embedding, and college mediation (Kong & Jiang, 2020). This model shows how apprenticeship can be reconstructed to support technological transition, workforce adaptation, and sustainable skill formation. Future development should further strengthen institutional coordination, work-process-oriented curriculum reform, dual-mentor collaboration, and digital quality governance.

DECLARATION

Article version statement

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VTE VOCATION, TECHNOLOGY & EDUCATION

RESEARCH PAPER

Uncertainty, meritocracy and the mitigating effect of apprenticeships in the biographies of university dropouts in Germany

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ABSTRACT

The pilot study on (un)certainty among university dropouts demonstrates that a dual apprenticeship following withdrawal from higher education mitigates uncertainty. Five university dropouts who had completed or were in the process of completing a dual apprenticeship after dropping out were interviewed using the biographical-narrative method. Drawing on two cases, the paper illustrates that a dual apprenticeship provides, on the one hand, employment certainty and a recognised basis for further qualifications through the vocational credential obtained. On the other hand, it offers opportunities to gain a sense of certainty through social integration—both at vocational school and in the workplace—as well as through the experience of recognition, appreciation, and being seen. Two core limitations exist, however, both of which are linked to the meritocratic logic: The perceived social recognition accorded to vocational qualifications and the perceived opportunities for advancement to higher-level positions.

Key words: university dropout, dual apprenticeship, Germany, uncertainty

INTRODUCTION

In recent years, university dropouts have emerged as a target group that education and training policy in Germany increasingly seeks to engage (Ebbinghaus, 2018; Heublein *et al.*, 2018)—particularly in response to recruitment challenges faced by small and medium-sized enterprises in filling dual apprenticeship positions (Bundesministerium für Bildung, Familie, Senioren, Frauen und Jugend, 2025).

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The majority of the university dropouts who leave the higher education system transition into dual apprenticeships (Heublein *et al.*, 2018). Dual apprenticeships involve a contract with a company for work-based training and are accompanied by vocational education at a vocational school. The completion certificate provides access to certain occupations and certifies the capability to perform the activities of a standardized and state-recognized profession.

The situation in which university dropouts find themselves following their withdrawal from higher education is fraught with numerous challenges and uncertainties on different levels. Bähr *et al.* (2026) distinguish between disciplinary, individual, interactional, and contextual uncertainty as interrelated facets that may mutually influence one another. The present study focuses on individual uncertainty: At the individual level, the concept encompasses "experiences of uncertainty, uncertainty tolerance, and coping with uncertainty" (Bähr *et al.*, 2026) as well as questions of personal identity.

University dropouts must come to terms with the experience of dropping out that might be interpreted as a failure—that is, they must interpretively integrate it into patterns of meaning that appear coherent within the context of their own biography (Bergmann, 2020). In many cases, they are uncertain about their own abilities and interests (Heublein *et al.*, 2018). They face a pivotal decision: They must find a way to navigate the transition into the labour market and secure their livelihood through successful occupational integration. One option to do so is attending a dual apprenticeship which leads to a vocational qualification that, according to meritocratic logic, could be understood as inferior to a university degree (Braun, 2023).

As a systematic literature review demonstrates, current research primarily considers the economic and labour market policy perspective of firms, offering limited insight into the experiences of the university dropouts themselves (Braun, 2025). In particular, there is a notable gap in "overarching" analyses exploring the interplay between personal and contextual preconditions of university studies, the processes of study and career orientation, the university dropout process, transition dynamics, and long-term retention.

This study focuses on the aspect of uncertainty and specifically examines the question: To what extent do the experience and interpretation of a dual apprenticeship program provide university dropouts with a sense of certainty within their biographical context?

METHODS AND RESEARCH DESIGN

The pilot study comprises five autobiographical-narrative interviews with university dropouts (two female, three male) who were completing or had completed a dual apprenticeship program after withdrawing from university. Dropouts are a difficult-to-reach population (Bergmann, 2020), which meant that the-

oretical sampling was only feasible to a certain extent. Contact was established through acquaintances and relatives of acquaintances.

The interviews were transcribed and analysed using the qualitative reconstructive method based on Schütze's biography analysis framework (Schütze, 2016). Accordingly, the analysis aimed to identify process structures, following steps including formal text analysis, structural-in-content description, analytical abstraction, and knowledge analysis. The process was conducted within interpretation groups to ensure reliability and depth of understanding. The aim was to find out how the dropouts experience their dual apprenticeships and how they conceptualise and interpret their effects in the context of their biographies.

In the following, I illustrate how uncertainty is experienced and negotiated within the biographies of the interviewees, drawing on selected examples. All names used are pseudonyms.

RESULTS: DUAL VOCATIONAL EDUCATION AND TRAINING AS A STRATEGY FOR NAVIGATING UNCERTAINTY

Two biographies in which (un)certainty plays a significant role are those of Simone and Karel. Simone is the daughter of very young parents with a migration background. By her own account, she was a shy and introverted adolescent. She portrays herself as a good student, although she experienced motivational difficulties from fourth grade onwards. After completing her secondary school leaving certificate, she enrolled in a teacher education programme at university, which she discontinued after two semesters, citing fear of failure as the primary reason. During her studies, her shyness proved to be an additional obstacle.

This changed when she completed one dual apprenticeship and was in the process of completing a second, both of which she used as a strategy to overcome her uncertainty that manifested in shyness and fear of failure.

Simone emphasises her personal development towards greater individual confidence, which becomes evident, among other things, at the interactional level—that is, in her engagement with other people. The work environment challenged her to communicate with others, and it is through this challenge that she grew. "*And then I started medical assistant, completed the apprenticeship in two years […] and was top of my class. […] and I also came out of my shell, because I had to make phone calls, had contact with patients and everything, that's why. Yes, that was quite useful*" (Simone, l. 84-88, translated and smoothed version).

The experiences at vocational school give her certainty because she achieves considerable success, not only in terms of grades. This is elaborated upon in a subsequent excerpt: "*[…] But simply for myself, I took away a huge amount of self-confidence compared to back then. […] I have be-*

come much more open in dealing with people. By now they all turn to me as well. I would never have thought that before—that someone would say in a group assignment: Yes, Simone, can you help me?, or something like that. Because before I used to think: No, I'm so introverted in group work, I won't say anything. And by now my opinion has become important to them as well—and that only because through my apprenticeship I have just become, well, more open" (Simone, l. 259-266, translated and smoothed version).

Karel grows up in a village and is separated from his peer group at an early age, as he is the only one who, due to difficulties with reading attributed to him, continues his education after primary school (years 1-4) at a Hauptschule—the "lowest" track within Germany's tripartite secondary school system. During his adolescence, his parents separate. He subsequently lives with his mother and witnesses firsthand her struggles with balancing work, further education, and family life, as well as financial hardship. Karel portrays himself as a student who achieves a great deal with relatively little effort, ultimately completing his university entrance qualification. He half-heartedly begins a degree programme, which he eventually abandons due to academic difficulties. In order to obtain a professionally qualifying certificate—and with it a degree of certainty—in a timely manner, he opts for an apprenticeship.

For Karel, the experience of being entrusted with responsibility and receiving feedback in the workplace proves particularly significant, providing him with a sense of certainty and motivation: "*And at times I was also called up to management and helped out there for two months when they were short-staffed, exactly. And through that I then had deeper insights into the company and was then also relatively certain that I would be taken on*" (Karel, l. 121-125, translated and smoothed version). "*And what I really liked about the training was that you get direct feedback. So, you get—one had, for example, at employer 1 a feedback meeting after each department. And in my case it was always consistently positive, which motivated me much more than a [...] exam at university*" (Karel, l. 341-347, translated and smoothed version).

Karel uses the apprenticeship—as well as further and continuing education built upon this foundation—as a strategy to gain certainty and expand his options through educational credentials: "*It's not about titles or job designations for me, it was simply always about having as many options as possible and then also, at the end of the day, being able to choose for myself where I want to go or what I want to do and not to have barriers straight away due to my level of education*" (Karel, l. 663-667, translated and smoothed version).

Choice and options are of great importance to Karel, and he seeks to safeguard these, which is why he continues to pursue further and continuing education. This demonstrates that the certainty conferred by the apprenticeship qualification has, for him, very clear boundaries: "*[…] A great many positions are also advertised as requiring a degree, where the recruiter essentially just looks at your, your thing: No degree! Ok, then you get filtered out. And that was also the point, the reason why I always continued my education, for the Fachwirt qualification* [note:

Advanced vocational commercial certificate] *for example. Because I essentially wanted to clear that first hurdle, when the recruiter scans your application documents*" (Karel, l. 644-650, translated and smoothed version).

Thus, Karel does not consider a certificate from a dual apprenticeship sufficient, because the experienced conditions in the labour market require university degrees for "higher" positions.

CONCLUSION

A salient commonality among the respondents, including the two examples described, is individual uncertainty. The dual apprenticeship exerts a stabilizing effect. It fosters certainty regarding the academic self-concept through competence experiences and affirming feedback: Nearly all participants completed their dual apprenticeship exceptionally well. A significant source of individual certainty is found in the work-based (training) environment. The nature of the activities they have to perform challenges respondents to overcome shyness and social reticence.

Social integration at the workplace contributes additional certainty. The certification obtained at the end of training provides certainty within a profession-specific labour market and establishes a solid foundation for further qualification. Most respondents plan to pursue "higher" types of education and training, driven by motivations such as further overcoming the stigma associated with dropout or opening doors to advanced career opportunities. This simultaneously points to the limits of the certainty that an apprenticeship—particularly at the formal level—can provide. The limitation relates to the meritocratic principle and the associated valuation of educational pathways, which places university degrees at the top and thus constrains the promotion prospects of vocationally qualified employees (Braun, 2023).

Future research could explore further biographical cases to deepen the understanding of the interplay between dual apprenticeship experiences and uncertainty as well the links to meritocracy.

DECLARATION

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Topic 3: Governance and institutional realisation of apprenticeship

VTE VOCATION, TECHNOLOGY & EDUCATION

RESEARCH PAPER

Organizational support for modern apprenticeship in China

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ABSTRACT

This study examines the organizational support for modern apprenticeship in China under the national strategy of industry-education integration. Using literature analysis and case study, the study explores the functions, structure, and interaction of different organizational forms supporting modern apprenticeship. The findings show that China has gradually developed a three-level organizational support structure. At the macro level, city-based industry-education consortia and sectoral industry-education communities mainly provide resource coordination and strategic guidance. At the meso level, industry colleges and practice centers support school-enterprise cooperation and resource support. At the micro level, order-based training programs directly organize work-study alternation. The case study further shows how these three levels interact in practice. However, overlaps between organizational functions may also create coordination burdens for colleges and enterprises. The paper suggests clarifying the functions of different organizational forms to improve the effectiveness of modern apprenticeship implementation.

Key words: modern apprenticeship, organization, China

INTRODUCTION

Under the background of industrial development and digital transformation, modern apprenticeship has become an important approach for aligning education with changing skill demands. In China, the systematic exploration of modern apprenticeship began in 2014, when the Ministry of Education issued *the Opinions on Carrying out Modern Apprenticeship Pilot Work*. Since 2020, the

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concept of "Modern Apprenticeship" has gradually evolved into "Apprenticeship with Chinese Characteristics", which was formally incorporated into the 2022 *Vocational Education Law*.

Modern apprenticeship inherently crosses the boundaries between industry and education, requiring deep collaboration between colleges and enterprises. Its effectiveness depends not only on pedagogical design, but also on organizational support from both sectors. In China, this cross-sector collaboration has been systematically pursued under the national strategy of "industry-education integration". Driven by a series of policies, different stakeholders have been encouraged to participate in modern apprenticeship. As a result, several new organizational forms have emerged, including city-based industry-education consortia, sectoral industry-education communities, industry colleges, and regional practice centres (Nie *et al*., 2020). These organizations have gradually become the structural foundation for implementing modern apprenticeship at different levels.

This study therefore asks three questions: What functions do these typical organizations perform? and what kind of multi-level structure have they formed? How do different levels interact with each other?

METHODS AND RESEARCH DESIGN

This study uses document analysis and case study. The document analysis was conducted on national policy texts and academic publications. To answer the research questions, we analysed the main roles of organizations and how they are structurally related. A case study of Tianjin Medical College was used to see how these organizations operate in practice. The case was chosen on purpose because the college co-leads a national consortium, has set up several industry colleges and order-based training programs, and is geographically accessible. Data were collected from institutional reports, official college documents, and consortium publications.

RESULTS

Organizational support patterns: A three-level structure

Based on their core functions, organizational support for modern apprenticeship in China presents a clear multi-level structure. These organizations are distributed across three levels—macro, meso and micro—and each level performs different but interconnected functions (Pan *et al*., 2025). It should be noted that these three levels refer to the primary functions of different organizational forms. In practice, one organization may participate in activities across multiple levels, but its main role and strategic contribution are usually concentrated at one level (Table 1).

Organizational support in practice: Case study

The three-level structure only becomes

Table 1: Three-level organizational support for modern apprenticeship in China

Level	Scope	Core functions	Organizations
Macro level	Regional/cross-regional	Resource coordination, strategic alignment (Shi & Fan, 2025)	City-based industry-education consortia Sectoral industry-education communities
Meso level	Institutional/school-enterprise	School-enterprise cooperative, resource support	Industry colleges Practice centres
Micro level	Instructional/work-based learning	Work-study alternation	Order-based training

meaningful when operationalized. This section examines how the college draws on multi-level organizational support to implement modern apprenticeship.

At the macro level, the college participated in establishing a biomedical consortia. The consortium created four information lists: Enterprise project and resource needs, college research capacities, university intellectual property, and talent demand. These lists help reduce information gaps and improve matching between colleges and enterprises. Enterprises also regularly share recruitment information, allowing colleges to adjust enrolment plans and training programs. In addition, the consortium coordinates equipment sharing and internship opportunities among enterprises. At the meso level, the college has established nine industry colleges. Enterprises provide funding, place, equipment and trainers, while college is responsible for theoretical teaching and student management. Both sides jointly design curricula and conduct assessments. One example is the Hetong Long-term Care College, which provides order-based training for elderly care services. At the micro level. the college carries out order-based training programs. For example, inside a beauty college, students are selected each year and sign an agreement with enterprises. They have a dual identity as both students and apprentices. Enterprises provide monthly allowances, and students who pass the final assessment are directly employed (Tianjin Medical College, 2026). Through this three-level support structure, students gain practical skills and work experience, while enterprises receive graduates who are already prepared for employment.

CONCLUSION

This study finds that China has gradually established a three-level organizational support system for modern apprenticeship through its industry-education integration strategy. This development is important for promoting closer cooperation between vocational education and industry. However, the large number of organizational forms has also created

some practical problems. The boundaries between different organizations are not always clear. For example, macro-level consortia sometimes coordinate equipment and internship resources for colleges, which is closer to a meso-level function. Similarly, meso-level industry colleges often organize order-based training classes, which belong more directly to the micro level. Such overlaps may increase coordination costs for both colleges and enterprises. They need to spend additional time understanding the functions of different organizations and responding to multiple arrangements. Based on this, this study suggests that different organizational forms should clarify their core functions and focus primarily on their own level of responsibility. If cross-level activities are necessary, they should be treated as temporary or experimental arrangements rather than becoming permanent functions.

At present, this study has not yet collected direct feedback from colleges and enterprises about their role confusion through interviews or surveys. Future research could use qualitative methods to explore how participating organizations experience and respond to multi-level organizational arrangements.

DECLARATION

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VTE VOCATION, TECHNOLOGY & EDUCATION

RESEARCH PAPER

Research on the behavioral patterns and influencing factors of enterprises' participation in vocational education

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ABSTRACT

School-enterprise cooperation constitutes the fundamental institutional arrangement for vocational education. This study takes 1032 enterprise annual reports on higher vocational education talent cultivation as empirical data, adopts text analysis, analytic hierarchy process (AHP), and multiple linear regression models to systematically examine the behavioral patterns, breadth, depth, and influencing factors of enterprises' participation in vocational education. The findings indicate that enterprises engage in vocational education through 25 typical forms, which can be categorized into comprehensive system cooperation, factor-based cooperation, and project-based cooperation. However, the overall level of participation remains low, with shallow involvement, unbalanced structure, and insufficient sustainability. Industry-education integration enterprises and high-tech enterprises exhibit significant advantages in both participation breadth and depth. Enterprise asset scale imposes a significantly positive impact on both breadth and depth, while operating years only affect the breadth positively. This research reveals the realistic dilemmas and driving mechanisms of enterprise participation, and proposes targeted paths to optimize cooperation forms, enhance participation depth, and stabilize long-term partnerships. The conclusions provide empirical evidence and practical references for promoting high-quality industry-education integration in vocational education.

Key words: school-enterprise cooperation, vocational education, participation breadth, participation depth

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INTRODUCTION

School-enterprise cooperation is the core school-running model of vocational education and the key to cultivating high-skilled technical talents (Song, 2022). In recent years, the Chinese government has issued a series of policies and legal documents to emphasize the important role of enterprises in vocational education (Pan, 2103). The newly revised Vocational Education Law of the People's Republic of China in 2022 clearly defines the legal status and responsibilities of enterprises in school-enterprise cooperation, and encourages enterprises to deeply participate in talent training, curriculum development, and practical teaching. From the perspective of institutional design, school-enterprise cooperation has been elevated to a national strategic level, aiming to break the separation between education and industry, and build a dual-subject collaborative education system.

However, in practical operation, school-enterprise cooperation still faces multiple dilemmas. First, the forms of cooperation are relatively single, and most enterprises only stay at the level of providing internship positions and building training bases, lacking in-depth involvement in professional construction, curriculum development, and talent evaluation. Second, the initiative of enterprises is insufficient. Due to cost considerations, benefit uncertainty, and information asymmetry, many enterprises are reluctant to carry out long-term and high-investment cooperation (Ran, 2023). Third, the stability of cooperation is poor. Short-term, fragmented, and loose cooperation is common, making it difficult to form a sustainable and stable partnership. These problems seriously restrict the quality improvement and high-quality development of vocational education.

Existing studies have explored the models, dilemmas, and influencing factors of school-enterprise cooperation from multiple perspectives. Some studies focus on theoretical analysis and put forward ideal cooperation frameworks; some studies conduct case analysis on specific regions or schools; others discuss the motivation and behavior of enterprises from the perspective of cost-benefit. However, most studies lack large-scale empirical evidence based on authentic enterprise data, and few studies systematically classify the behavioral forms of enterprise participation and quantitatively measure the breadth and depth of participation. Therefore, based on 1032 enterprise annual reports, this study conducts a comprehensive empirical analysis to clarify the behavioral patterns and influencing factors of enterprises' participation in vocational education, so as to provide a realistic basis for deepening school-enterprise cooperation.

METHODS AND RESEARCH DESIGN

Data sources

The data of this study come from the

2022 Annual Reports on Enterprise Participation in Higher Vocational Education Talent Cultivation published on the Modern Higher Vocational and Technical Education Network. After screening and sorting out samples with missing information, a total of 1032 valid enterprise samples were obtained. These enterprises cover 30 provinces, autonomous regions, and municipalities directly under the central government in China, and involve 18 major industries in the national standard, including manufacturing, construction, information technology, and scientific research. The sample has strong representativeness and can reflect the overall situation of enterprise participation in vocational education in China.

In addition to the cooperation behavior data from the annual reports, this study also collected enterprise attribute data through enterprise information query platforms such as Tianyancha, including asset scale, number of employees, operating years, whether it is an industry-education integration enterprise, and whether it is a high-tech enterprise. These data are used as independent variables and control variables in the regression model to ensure the accuracy and reliability of empirical analysis.

Research methods

First, text analysis and grounded coding were used. Through open coding, axial coding, and selective coding of 1032 annual reports, 25 specific forms of enterprise participation were extracted, and then classified into three categories: comprehensive system cooperation, factor-based cooperation, and project-based cooperation. This coding process has reached theoretical saturation, which can fully cover the behavioral spectrum of enterprise participation.

Second, analytic hierarchy process (AHP) was adopted to construct an evaluation index system of enterprise participation depth. By assigning weights to different cooperation forms according to their investment intensity, cooperation closeness, and long-term sustainability, a comprehensive score of participation depth was calculated for each enterprise. The number of cooperation forms was used to measure the participation breadth, so as to realize the quantitative characterization of enterprise participation.

Third, multiple linear regression models were constructed. Taking participation breadth and depth as dependent variables, taking whether it is an industry-education integration enterprise and whether it is a high-tech enterprise as core independent variables, and taking asset scale, number of employees, and operating years as control variables, this study empirically tested the key factors affecting enterprise participation behavior, and revealed the internal mechanism of different enterprise characteristics on participation willingness and level.

RESULTS

Behavioral forms and participation breadth

Through systematic coding and classific-

ation, this study identified 25 typical forms of enterprise participation in vocational education, which are divided into three types.

The first type is comprehensive system cooperation, which represents the highest level of school-enterprise integration, including joint construction of secondary colleges, joint construction of industrial colleges, joint construction of majors, and joint formulation of talent training programs. Such forms involve long-term investment, resource sharing, and risk sharing, with high cooperation cost and strong sustainability. However, the proportion of enterprises participating in such forms is relatively low, indicating that deep institutionalized cooperation is still rare.

The second type is factor-based cooperation, which centers on key educational elements, including providing part-time teachers, building dual-qualified teams, developing textbooks and curriculum resources, building training bases, and providing internship positions. This type of cooperation is the most common form at present, accounting for the highest proportion. It focuses on the support of single educational resources and has the characteristics of convenient operation and low short-term cost.

The third type is project-based cooperation, which takes specific projects as the carrier, including order-based classes, modern apprenticeship, joint scientific research, skill certification, and staff training. Such cooperation is flexible, targeted, and task-oriented, but mostly short-term and project-dependent, making it difficult to form continuous cooperation.

From the perspective of participation breadth, the average number of cooperation forms per enterprise is 6.33. Most enterprises only choose 3-8 forms, and few enterprises carry out more than 10 forms of cooperation. It shows that enterprise participation is relatively limited and lacks systematic and diversified layout.

Participation depth and structural distribution

The participation depth measured by AHP shows that the average comprehensive score of 1032 enterprises is only 12.81 points (full score 100 points), which means that the overall depth of enterprise participation in vocational education is seriously insufficient and presents a typical "shallow trap".

According to the score interval, enterprises are divided into six levels: shallow participation (0-10 points), general participation (10-20 points), medium participation (20-30 points), relatively deep participation (30-40 points), deep participation (40-50 points), and heavy participation (50 points and above). The results show that 63.37% of enterprises are in the shallow participation level, and no enterprise reaches the heavy participation level. The overall distribution is pyramid-shaped: The higher the participation level, the fewer the number of enterprises. This reflects the obvious structural imbalance of school-enterprise cooperation: large-scale shallow particip-

ation and extremely scarce deep participation.

From a specific perspective, enterprises are more willing to participate in low-investment links such as providing internship positions and donating equipment, but less willing to participate in high-investment and long-term return links such as joint construction of colleges, curriculum system development, and scientific research platform construction. This fully reflects the short-term tendency and utilitarian characteristics of enterprise participation.

Influencing factors of participation breadth and depth

The multiple linear regression results show that enterprise type, asset scale, and operating years have significant impacts on participation behavior.

First, industry-education integration enterprises have a significantly positive effect on both participation breadth and depth. Such enterprises have policy support, clear institutional orientation, and stronger willingness and ability to carry out multi-form and in-depth cooperation. Their regression coefficients are higher than those of high-tech enterprises, indicating that policy-driven and institutional positioning play a stronger role in promoting deep participation.

Second, high-tech enterprises also show significant advantages in participation breadth and depth. As technology-intensive enterprises, they have a strong demand for high-skilled talents, so they are more active in school-enterprise cooperation. However, their influence is slightly lower than that of industry-education integration enterprises.

Third, enterprise asset scale has a significant positive impact on both participation breadth and depth. Enterprises with larger assets have stronger resource endowment and risk tolerance, can bear higher cooperation costs, and are more capable of carrying out diversified and in-depth cooperation.

Fourth, operating years only have a significant positive impact on participation breadth, but have no significant impact on depth. Enterprises with longer operating years have more mature experience and social resources, and tend to adopt richer cooperation forms, but this does not mean deeper involvement.

Fifth, the number of employees has no significant effect on both breadth and depth, indicating that simply expanding the scale of employees cannot promote enterprises to participate more extensively or deeply in vocational education.

CONCLUSION

This study shows that enterprises participate in vocational education in diversified forms, but the overall level is low, showing the characteristics of "shallow, fragmented, and unstable". Industry-education integration enterprises and high-tech enterprises have significant advantages in driving school-enterprise cooperation, and asset scale is an

important material basis for deep participation.

To break through the realistic dilemmas of school-enterprise cooperation, three paths can be taken. First, expand the scope of participation and attract more enterprises, especially small and medium-sized enterprises, to participate through policy support, information docking, and cost sharing, and enrich the forms of cooperation. Second, upgrade the depth of participation, focus on supporting industry-education integration enterprises and leading enterprises to carry out joint construction of colleges, curriculum development, and scientific research cooperation, and promote the transformation from shallow cooperation to deep integration. Third, stabilize cooperative relations, build a big data information platform to reduce information asymmetry, establish a benefit sharing and risk sharing mechanism, and form a sustainable school-enterprise community of shared future.

This study has important theoretical and practical significance. It constructs a systematic analysis framework of enterprise participation behavior, provides large-scale empirical evidence for understanding the status quo of school-enterprise cooperation, and also provides decision-making reference for policymakers to optimize the industry-education integration system and improve the quality of vocational education.

DECLARATION

Article version statement

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VTE VOCATION, TECHNOLOGY & EDUCATION

RESEARCH PAPER

A case study on the construction of the "Industry-Training-Evaluation Skills Ecological Chain" in Guangdong Province

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ABSTRACT

To bridge the gap between vocational training and employment, Guangdong province has explored a new college-enterprise cooperation model since 2022 and launched the "Industry-Training-Evaluation Skills Ecological Chain" (ITEEC) program. It aims to build a new type of apprenticeship mechanism that connects industry, training and evaluation, and strengthens the supply of skilled talents oriented to the demand of industrial chain. Main contents of the program are apprenticeship training, college-enterprise cooperation, and training base construction. This case study analyses the basic approach, achievements, and problems encountered in this program.

Key words: college-enterprise cooperation, Guangdong province, Industry-Training-Evaluation Skills Ecological Chain, new type of apprenticeship

INTRODUCTION

China's labour market has increasingly witnessed supply-demand imbalances and structural mismatches due to a confluence of factors, such as the expansion of higher education enrolment and economic slowdown. In 2025, the number of college graduates reached 12.22 million. When combined with unemployed graduates from previous cohorts, the total number of job seekers exceeds the number of available positions. The rapid increase in the number of master's and doctoral degree holders has contributed to the devaluation of academic credentials, while the escalating educational requirements for high-skilled positions have narrowed employment opportunities for graduates

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of vocational institutions. At the same time, a large number of manufacturing positions remain persistently vacant. In Guangdong Province, one of China's most economically advanced regions, there exists a pronounced structural contradiction in which industries lack young skilled workers while young people lack adequate employment opportunities. On the one hand, enterprises face a severe shortage of skilled labour; on the other hand, many young job seekers demonstrate limited willingness to enter certain occupations.

In response to the growing disconnect between talent cultivation and labour market demand, Guangdong has, since 2022, explored a new model of college-enterprise collaboration through the implementation of the so-called "Industry-Training-Evaluation Skills Ecosystem Chain" (ITEEC) initiative (People's Government of Guangdong Province, 2023). The program seeks to construct an integrated skills development system that combines industrial participation, job training, and competency evaluation, thereby strengthening the supply of skilled labour aligned with the needs of enterprises within industrial chains.

The guiding principle underlying this program's design is the alignment of training sprograms with industrial standards. Leading enterprises situated at the core of industrial chains are expected to capitalize on their advantages by transforming real production tasks associated with key enterprise positions into training content.

In July 2025, the provincial government issued the Implementation Measures for Deepening the ITEEC, which institutionalized earlier practical experiences into a more formalized policy framework (People's Government of Guangdong Province, 2025). It seeks to transform enterprises from passive "participants" in vocational training into "full-chain leaders" capable of guiding the entire process of training, evaluation, and employment, thereby achieving a more precise alignment between workforce development and labor market demand. To date, 171 chains have been established. They engaged 837 enterprises, and trained approximately 130,000 skilled workers (Han, 2025). Nevertheless, significant variation exists in the developmental trajectories and effectiveness of these chains. This paper undertakes case studies (literature analysis and expert interviews) of two chains to examine their practical outcomes. The central research questions addressed in this paper are as follows: What are the main characteristics of Guangdong's new Chinese-style apprenticeship program? What goals has the program achieved and what problems have it encountered?

DESCRIPTION OF CASES

Case one: KUKA Robotics Corporation

KUKA Robotics Corporation, established in Germany, is one of the world's leading robot manufacturers. In 2017, it became part of the Midea Group. In 2025, KUKA was designated as the

leading enterprise of the ITEEC in the field of industrial robotics. KUKA organizes enterprises and colleges within the chain, introduces the German "dual system" model with localized adaptations, and facilitates collaboration in talent training, evaluation, and employment through the integration of the industrial and educational chains.

KUKA established the KUKA Academy, which was recognized by the government as an Industry-Education-Evaluation Shared Base and received RMB 7 million in public funding. The government provides policy support, for example, by encouraging enterprises to develop skill evaluation standards aligned with actual production needs and granting official recognition to such standards.

KUKA has signed agreements with over ten upstream and downstream enterprises within the industrial chain, to establish a training network. KUKA has conducted job surveys among chain enterprises, identified over 100 typical tasks, and developed training projects based on these tasks. In accordance with the principle of aligning job positions with academic majors, enterprises recruit students from colleges within the chain as apprentices, arrange internships, offer internship allowances higher than the local minimum wage, and grant priority employment to qualified graduates.

KUKA has identified twelve colleges of varying types and levels, encompassing both undergraduate- and associate-level vocational colleges as well as technician institutes, to conduct collaborative training. These institutions integrate the KUKA-courses into their teaching plans. Prior to the commencement of the internship period, instructors and teachers from both the enterprise and the colleges jointly develop implementation plans. Those who pass the internship assessment receive KUKA certificate and government-recognized certificates, and subsequently sign employment agreements with enterprises within the chain. KUKA has also established collaborative relationships with over 70 vocational institutions nationwide to provide services including teacher training.

In 2025, the KUKA Academy enrolled 118 students to participate in undergraduate-level apprenticeship programs. Based on the Electrical Automation Technology major, the program trains professionals such as robotics commissioning technicians. The training lasts four years, with the first three years spent at college (including one year of KUKA courses) and the final year at the company. The costs are covered through government subsidy and enterprise contribution, reducing the financial burden of training on the students.

Comment: KUKA, drawing on the German "dual system" philosophy, has developed a closed-loop training model characterized by "job demand + training + skill evaluation + employment services". This is not a conventional internal recruitment and pre-employment training program, but rather

a collaborative training network established by multiple enterprises and institutions. It translates enterprise technical requirements into industry-wide training standards, thereby empowering small and medium-sized enterprises (SMEs) within the chain and supporting broader regional industrial upgrading (Du, 2026).

Case two: Xpeng Motors

Guangzhou Chengxing Zhidong Automotive Technology Co., Ltd. is a private enterprise founded in 2014 that manufactures Xpeng electric vehicles (hereinafter referred to as Xpeng). As the leading enterprise of ITEEC in new energy vehicle, Xpeng has introduced cutting-edge technical standards into its training system, established a training network characterized by "standard leadership, industry-training integration, and ecosystem empowerment".

Establishment of a network and formulation of industry training standards. In response to the rapid pace of technological development, which renders the learning content of colleges able to meet enterprise needs, the network translates enterprise job requirements directly into curricula, ensuring that curricula remain synchronized with industry demands. By constructing a regional digital platform, the network integrates assessment data from enterprises within the chain, training performance records from training institutions, and skills certification results, thereby achieving (partial) data interoperability. Students who complete their coursework and pass the certification test can directly enter Xpeng Motors' after-sales service.

Joint establishment of training bases. Xpeng and Mechanical & Electrical Polytechnic have co-built a battery training center and an intelligent connected vehicle data annotation studio. They adopt a blended training system combining virtual and real environments as well as lightweight virtual simulation to replicate complex scenarios, thereby reducing physical vehicle wear and safety risks.

Co-establishment of industry academies and operation of apprenticeship. Enterprises and colleges train talent in accordance with job requirements. To address the lack of industry experience among teachers, teachers are placed in enterprises within the chain for practical training upon successful completion of which they obtain trainer qualifications. These qualified teachers can then conduct job training and serve as examiners in enterprises. Xpeng has established also specialist liaison positions stationed at partner colleges.

In response to the uneven development levels among enterprises and colleges within the chain, Xpeng co-established industry academies, while smaller or less developed peripheral colleges can access the online courses of the network. SMEs from upstream and downstream segments of the chain can obtain the foundational courses and standards free of charge, as well as receive technical support from the leading enterprise.

Comment: The ITEEC has shortened the time required for the translation of new technologies into instructional

content and has, to some extent, alleviated the talent supply-demand contradiction. Guangdong Province's support policies, such as dedicated funding or policy subsidies, have reduced enterprises' equipment investment and training costs. The "shared among enterprises, rotated among institutions" model for procuring advanced precision equipment has alleviated the equipment procurement burden. Industry associations and leading enterprises established unified standards for credit transfer and assessment conversion, thereby promoting mutual recognition between enterprise intern certificates and college course credits, and enhancing the social recognition of enterprise training certificates.

CONCLUSION

With ongoing technological upgrading and transformations in production modes, the Chinese traditional and relatively fragmented model of college-industry cooperation has become increasingly insufficient to meet enterprises' growing demand for highly skilled talent. The ITEEC established in Guangdong Province has fundamentally reshaped the previous "point-to-point" cooperation model between individual colleges and enterprises by constructing a collaborative, integrated, and multi-dimensional training system.

Through mechanisms of resource sharing and coordinated development, the ITEEC generates mutually beneficial outcomes for both enterprises and colleges. The network formed between "chain-leading enterprises" and "chain-member enterprises" enables the realization of complementary advantages among firms located at different segments, and provides SMEs with diversified and institutionalized training services, thereby reducing recruitment and training costs and enhancing the competitiveness of the industrial chain (Lin & Lai, 2025).

Enterprises can develop a systematic understanding of vocational education principles through sustained collaboration with colleges. This, in turn, enables them to optimize job structures and talent management in a more targeted manner, improve employee retention rates, and strengthen the alignment between workers and occupational roles. Participation in the ITEEC facilitates a more direct alignment between educational provision and enterprise demands. Through involvement in production and the joint curriculum development, teachers acquire access to advanced technologies, enhance both professional competencies and teaching effectiveness.

Nevertheless, it has encountered a number of challenges, particularly with regard to organizational structures and mechanisms. For example, the coordination among human resources (HR), finance and government relations department shape the efficiency and outcomes of project implementation, and requires an active senior leadership. Colleges continue to face limitations stemming from their insufficient understanding of enterprise culture. Many colleges remain inadequately informed

about the needs of MSEs, even though these companies are the workplace for the majority of their graduates.

DECLARATION

Article version statement

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VTE VOCATION, TECHNOLOGY & EDUCATION

RESEARCH PAPER

Localization of German dual apprenticeship and evolution of skill ecosystem in Taicang (China)

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ABSTRACT

The internationalization of the German apprenticeship system is widely studied in vocational education. Over three decades, this system has been adapted and localized in Taicang adjacent to Shanghai. This paper explores its localization process, stakeholders' roles, underlying influencing factors, mechanisms and practical implications. Based on long-term observation and in-depth interviews with government, school and enterprise managers, the study reveals its successful localization relies on Taicang's skill ecosystem, balancing international introduction and local adaptation. German enterprises participate in training, while local vocational institutions optimize teaching arrangements. The government invests in school facilities, teacher development and enterprise training equipment. Such coordination builds Taicang's featured ecosystem, offering references for the transfer and internationalization of China's Vocational Education and Training (VET).

Key words: transfer of VET, vocational education and training, skill ecosystem, Taicang

INTRODUCTION

German Dual Vocational Education and Training (VET) has become a model for international reference due to its international reputation. Many countries have attempted to learn from its measures. Existing studies indicated that the strategies for the overseas transfer of the dual VET vary significantly across different target regions. The extent to which the transferred system adheres to the classic German approach is strongly influenced by the context of the target country (Gessler, 2020). At the enterprise dimension, the practice of transfer

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is affected by multiple factors such as the local VET system, labor market and culture. Generally, the German model cannot be replicated entirely; instead, it adapts to local context by "boundary objects" including policies, funds and standardized tools (Li *et al.*, 2019; Pilz, 2016).

Although the above studies have covered the national-macro and enterprise-micro levels, they pay insufficient attention to regional variations of target countries. In China, there are relatively few cases that realize the institutionalized operation of the dual VET system at the regional level. Taicang City in Jiangsu Province constitutes a rare and successful example for the localization of the dual VET system, a practice scarcely replicated in other areas. Both many German enterprises and Chinese local enterprises carry out dual vocational education. This paper dissects the localized adaptation pathways of Germany's dual vocational education and explores the key factors of its success.

METHODS AND RESEARCH DESIGN

This paper attempts to answer the following questions: How did German style dual apprenticeship gradually develop in Taicang? What role did different stakeholders play? What were the influencing factors and mechanism behind this process? What can be learned from this?

This study adopts a qualitative research paradigm, focusing on the localization of the German dual vocational education system in Taicang, and employs triangulation through literature review, in-depth interviews and field observation methods.

We have made multiple visits to enterprises, vocational schools and government institutions in Taicang over the past decade. Through semi-structured in-depth interviews with several core stakeholders—including school personnel, enterprise managers, and government staff—this paper conducts an in-depth exploration of the history, interaction and operation of modern apprenticeship in Taicang. Meanwhile, field observations are carried out on the training center, teaching procedures and school-enterprise interactions. The whole research process follows the principles of informed consent and anonymity. This study adopts the skill ecosystem theory to interpret the development and localization of German dual VET in Taicang.

Skill ecosystem consists of multiple branches. Some branches focus on analysing its role in innovation and economic growth. For instance, the High-Skill Ecosystem that underpins industrial innovation and economic growth in Silicon Valley shares four core elements with natural ecosystems in its construction and maintenance (Finegold, 1999). Other branches, such as Social Ecosystem Model (SEM) (Wedekind *et al.*, 2021), addresses systemic interactions, social governance, and balanced regional development.

In the field of VET, the model of High

Progression and Skills Networks emphasizes the driving role of multi-stakeholder collaboration for regional sustainability. SEM proposed by Wedekind includes horizontal collaboration (networks of actors and institutions within a region), vertical enablement (support from national policies and resources), and mediating mechanisms (leadership and collaborative structures connecting horizontal and vertical dimensions). It expands the model's applicability in complex socio-economic environments.

Focusing on the interdependence and dynamic balance of internal system elements, skill ecosystem theory helps us examine the interaction of multiple stakeholders in VET from a holistic perspective and comprehend the operation of regional VET models.

RESULTS: CONSTRUCTION OF THE "TAICANG MODEL" OF THE SKILL ECOSYSTEM

The localization of dual VET in Taicang was tortuous, with multiple rounds of negotiations and consultations conducted among enterprises, vocational schools and government across diverse dimensions. This paper attempts to discuss two key dimensions of the construction of Taicang's skill ecosystem, outlining its characteristics, mechanisms, and pathways for localizing the dual system.

Conflict and coordination

Exploration of the dual VET

In the initial discussions and negotiations, due to disparities in the economic and educational systems between China and Germany, German enterprises and Taicang Secondary Vocational School held remarkable divergences in their basic understanding of school-enterprise cooperation. The major disagreements centered on two core issues: The training locations and the payment of apprenticeship stipends.

In terms of training venues, the German side insisted that training should be carried out in enterprises' real workplace environments, whereas the Chinese side tended to arrange training on campus to maintain greater control over the educational process. After repeated debates and confrontations, leading officials in Taicang made key concessions to advance the project.

"We negotiated many times. Both sides stuck to their own views, the talks almost failed. German experts said dual vocational education needs to train students in real enterprise settings. I knew very little about vocational education at that time, but their words moved me a lot. In the 1990s, investment promotion followed the principle of not insisting on ownership, but ensuring presence. For this project, we put practical running ahead of site ownership. The government finally agreed to let the project go ahead" (S1).

Years of practice has proved that the decision was reasonable and correct. Now, both the government and vocational schools fully recognize the value of real enterprise environments. This also boosts the further development of school-enterprise cooper-

ation.

"Now I truly feel that vocational education can only thrive in a real enterprise environment. When leaders from Jiangsu Provincial Education Department came for a visit, they also agreed. The training center still looks brand new after five years of use. It would never keep such a good condition if it were located in a school" (S1).

On apprenticeship stipends, enterprises wanted to follow German practice and pay apprentices starting from the first year. The Chinese side believed this would create a gap between apprentice students and ordinary students, making management difficult. It would also bring heavy financial pressure to enterprises. After further negotiation, both sides reached a compromise. Students still needed to pay tuition, and stipends were only given during internship periods.

"In Germany, students pay no tuition and also get apprenticeship stipends. But Chinese schools would have no income without tuition fees, and local enterprises could not afford stipends in the early stage. So we made a rule based on actual conditions: Schools still charge tuition, and students can only get stipends when they learn on production posts" (S1).

Overall, differences among stakeholders are unavoidable at the initial stage of localization. Instead of confronting each other or staying deadlocked until cooperation breaks down, schools, the government and enterprises resolve disputes through negotiation. They make compromises based on real conditions and achieve win-win outcomes. This plays a key role in helping the dual VET model take root and achieve innovative development in a new context.

Cost and responsibility sharing in training

There is subtle tension between the government and enterprises, and also among enterprises themselves in sharing the cost of training. Driven by public interests and institutional duties, the government and vocational schools focus on training and reserving students for the whole region. By contrast, enterprises put profit first. They mainly train employees for their own use and seldom take the initiative to undertake public education and social training responsibilities.

In 2014, the government proposed providing an independent building for Deutsches Ausbildungswerkstatt Taicang (DAWT) to expand its training scale and cultivate more for Taicang. Nevertheless, enterprises firmly turned down the proposal out of cost and benefit considerations. This interest game clearly reflects the different goals and behavioral logic of all stakeholders in collaborative training.

"The development zone government planned to offer a building as a training site, and expand the training scale to 200 or more students. But the enterprises disagreed. They believed they only trained workers for their own needs, since they were not educational institutions. Besides, they insisted that the training center must be set up

inside the enterprise" (C1).

Different-sized enterprises adopt distinct strategies to engage in vocational education. Corporate participation in the dual system involves short-term economic costs, whose core benefit is long-term human resource supply. Thus most Small and Medium-sized Enterprises (SMEs) recruit students based on actual demands. In comparison, mature large enterprises including Kern-Liebers prioritize sustainable development. They abandon short-term profits to steadily cultivate reserve workers through training centers.

"Companies recruit people based on actual needs. …Our leaders always insist on keeping the enrollment unchanged. They prefer cutting social recruitment and rely on the training center to cultivate workers instead. Gradually, we want all staff to be self-trained. Even though the company is developing steadily now, we still recruit more than thirty trainees every year" (C1).

To balance enterprises' short-term profit pursuit and vocational education's long cycle, the Taicang government has built a cost-sharing and risk mitigation mechanism. By arranging employment support and offering financial subsidies (such as providing a training subsidy of 15,000 yuan for graduates employed locally in Taicang), it effectively maintains the stability of the vocational education ecosystem.

"Many students faced employment difficulties in the 2008 financial crisis. Some enterprises had vacancies but offered low salaries. The development zone intervened to mediate, with enterprises paying 10,000 yuan and the government providing an extra 20,000-yuan subsidy" (S2).

Overall, in Taicang's vocational education system, stakeholders have different goals and interests, causing divergences and even tensions over training orientation and the allocation of training costs and responsibilities. Fortunately, they have avoided a deadlock and explored effective interactive methods through pragmatic cooperation.

The government fulfills public responsibilities and provides bottom-line support through active coordination and financial subsidies. Large enterprises maintain steady enrollment based on long-term development strategies, while SMEs participate indirectly via industry associations and cooperative platforms. Taicang has gradually formed a shared-responsibility and mutually beneficial collaborative mechanism, laying a solid foundation for the stable operation of its skill ecosystem.

Economic development and social responsibility

After completing basic micro-level institutional construction through negotiation and compromise, Taicang's skill ecosystem has begun to generate external value in promoting social equity, improving quality of life and realizing lifelong learning goals.

In the life dimension, the system strives to build an inclusive community. A typical example is the Sino-German

Rongchuang Workshop, co-founded in 2015 by German Taicang Roundtable (TRT) member enterprises. Drawing on Germany's employment model for people with intellectual disabilities, it provides professional training and tailored posts for them. Its sustainability depends on multi-stakeholder collaboration: The local Disabled Persons' Federation provides free venues, the German Investment and Development Corporation funds operations, and surrounding foreign enterprises place production orders. Breaking away from a single economic-oriented logic, this model reflects care for the quality of life of socially vulnerable groups.

In the learning and work dimension, the system promotes youth development through lifelong learning services. The Limang Youth Program, co-launched by TRT, Taicang Municipal Bureau of Human Resources and Social Security and Jianxiong Vocational and Technical College, offers modular employment guidance for young people. Unlike conventional employment support, it leverages German-funded enterprises' agglomeration advantage to improve youth employment quality while inheriting and spreading German enterprises' cultural essence. This indicates that Taicang's school-enterprise-government tripartite cooperation has exceeded simple vocational skill training, moving toward creating more humane employment opportunities and promoting the sustainable development of the regional economy, society and education.

Construction of the skill ecosystem

The transfer of a Technical and Vocational Education and Training (TVET) system is extremely difficult, because context matters greatly. On a national level, differences in cultural and socio-economic contexts between the countries make the transfer nearly impossible; On an organizational level, it is difficult to build a context for the sustaining of the transfer.

Nevertheless, Taicang's practice shows that within a specific regional scope and supported by favourable industrial and social conditions, a resilient and sustainable localized skill ecosystem can gradually evolve. This is the core reason why the dual VET system with strong German characteristics has taken root and achieved further development in Taicang.

This system is deeply rooted in Taicang's unique industrial foundation and regional endowments, with different actors playing differentiated roles. German enterprises give full play to industrial agglomeration advantages, introduce advanced technical standards and management experience, and maintain the core orientation of the German dual VET while adapting to local context. Local private enterprises' accelerated participation expands industrial coverage to a broader private manufacturing field. Vocational schools undertake key skill transformation and cultivation functions; they draw on the Germany's core elements and develop localized teaching strategies and practical

models, balancing the German characteristics and local adaptation. Industrial institutions are responsible for standard formulation and quality certification. Local governments provide support via policy guidance and resource input, guaranteeing labor supply for German enterprises and reserving human resources for long-term regional development. Together, these participants have built a distinctive innovative vocational education arena.

CONCLUSION

In the development of the skill ecosystem, regional characteristics play a vital role in shaping the context, including geographical advantages, German enterprise concentration, manufacturing expansion, and proactive government support backed by strong local economic strength. Together, these factors have gradually reshaped enterprises' traditional human resource recruitment and allocation models.

Overall, this paper's conclusions align with existing studies: VET transfer is never a rigid copy of foreign models, but an integrated innovation rooted in local realities. On this basis, this study specifically describes and analyzes the impact of the destination's economic and cultural environment and VET ecosystem. It also supplements the regional conditions and their interactions that promote vocational education internationalization and transfer.

DECLARATION

Article version statement

This article has been reviewed and preliminarily edited. It is intended solely for use at the 10th Research Conference of the International Network for Innovative Apprenticeship (INAP). The final version will be published in *Vocation, Technology & Education* (https://www.vtejournal.com).

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VTE VOCATION, TECHNOLOGY & EDUCATION

RESEARCH PAPER

Who is responsible? Who decides? Who has influence on Apprenticeship? Public governance, private providers and intermediary institutions: An examination of interaction in different temporal, regional and institutional contexts

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ABSTRACT

In Austria, governance of the state dual education system is clearly regulated by law: It is designed together with social partners and stakeholders and implemented in cooperation with the federal states. However, it is evident that there are significant differences in the federal states, in urban and rural regions, which require specific approaches. Since the Austrian education system is very fragmented, the transitions from initial school education to further education are of particular importance. Using the example of the Province of Styria, it is shown how regional governance can be effective at the strategic and operational level. The role of intermediary organisations and how they can make significant contributions is presented. Effects and results are presented qualitatively and quantitatively. On the basis of concrete results, considerations and suggestions are formulated that can also be relevant for national governance under different systemic conditions in the European and international environment.

Key words: public governance for apprenticeship, regional strategic and operational governance, role of intermediary organizations, relevance at European and international level

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INTRODUCTION

Based on the Austrian education system, this article reflects on Vocational Education and Training (VET) governance at different levels—in particular on workplace-based learning form of dual apprenticeship.

First it is necessary to briefly describe the Austrian education system. Noticeable is, that this system is very fragmented. A comparison with systems in Finland or Sweden makes this immediately visible (Figure 1).

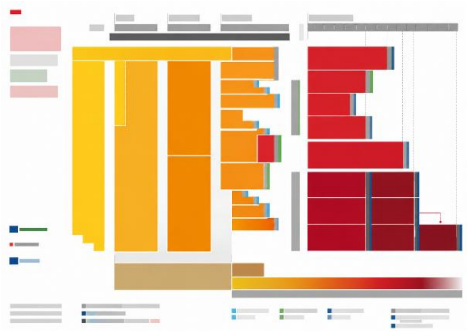


Figure 1. Scheme of Education System; based on Euroguidance. OeAD, Austrian Federal Ministry of Education.

Responsibilities of Austrian governance are also very differentiated. While pedagogical competencies in school sector are generally regulated by federal law, other agendas regarding personnel, buildings, equipment are divided between federal government, states, municipalities. In the field of VET, it is even more complex. At federal level exists the Federal Training Advisory Council, in which all responsible federal ministries and all social partners are represented. Depending on areas of responsibility, apprenticeships, job profiles, training content for companies and part-time VET schools are defined here (CEDEFOP, 2021; OECD, 2025).

This calls for creation of qualitative information and orientation offers for VET paths, so that young people can be approached for vocational, dual training pathways. These structures also exist at province level—since conditions in federal states are very different, details of implementation at state level are regulated in province VET advisory councils.

This can only be understood against the background of centuries of historical development (Dorninger, 2025). In Austria, as well as in Germany and Switzerland, not only companies, but also respective industries want to take responsibility for VET of their young skilled workers. The state contributes through accompanying part-time school-based VET—but the majority of VET takes place in companies. These are challenges to maintain and strengthen motivation of companies to train young people, which can be very cost-intensive, especially in economically challenging times.

Intensive personal contact between training companies, schools and young people is crucial for this (CEDEFOP, 2026). This cannot be done only at national level. Regional, local initiatives are essential. In addition to public actors,

NGOs and intermediary institutions are also effective in this regard. The following examples from province of Styria are presented for regional governance approaches, and further considerations are derived nationally and internationally.

Developments in recent decades

In the 1990s, youth unemployment rose in Austria, also throughout Europe. Styria was particularly affected, as the high proportion of nationalised industry collapsed economically, many training centres for apprentices were closed. This resulted in contact between the Styrian government and Styrian Association for Education and Economics (STVG) on how positive developments could be shaped. The effective results are well documented and are not explained in detail here (Härtel, 2025). This resulted in a regional governance process that took up topics of lifelong learning, including dual VET, and in particular educational and vocational orientation at interfaces and transitions between initial school education and further education pathways. Elements of this process are current until now.

The establishment of a "Strategic Committee" on BBO, which includes representatives of all relevant governance units as well as social partners, PES, *etc.*

An "operational body" in which representatives of organizations jointly make essential practical decisions on design, quality and development of BBO, as well as working groups that deal with specific topics, *e.g.* early orientation for education and career, inclusion, gender issues, *etc.* To this end, regional coordinators—RBBOK's—have been set up to support strategic networking in seven educational regions of Styria.

METHODS AND RESEARCH DESIGN

Research intended by provincial governance

In 10/2024, STVG was commissioned by Styrian Province Governance to carry out an evaluation of effects of work in the committees and to derive recommendations for further action. Based on results of this evaluation, the contract for process support for implementation of recommendations was commissioned in 08/2025.

In addition and to accompany this, surveys were carried out among relevant stakeholders such as young people, parents, educators and trainers and companies within STVG's own sphere of activity. Research approaches are briefly outlined below.

First, evaluation of committee work in Styrian governance, both strategic-political committees and operational committees and working groups, was carried out on basis of available meeting minutes, presentations, materials and documents from committee work. From these questions, theses were derived that served as basis for further investigations. These were first carried out in standardised surveys (via easy feedback), differentiated according to participants

of strategic and operational committees as well as thematic working groups.

From this, a structured interview guideline was developed. In personal interviews with people from all committees and working groups—partly online, partly face-to-face—these theses were discussed, compared, specific and general conclusions were derived.

This resulted in suggestions and recommendations, which were submitted to the commissioning body—responsible areas of the Styrian Provincial Government, as a result report (Marterer & Härtel, 2025). These recommendations formed the basis for further development and implementation of measures on the part of governance for preparation of strategic positions for the next period of political formation and were also included in government program of the Styrian provincial government.

This governance process can be regarded as exemplary for interaction of "policy" and "politics", in that evidence-based, scientifically supported foundations form the foundation for further shaping of community in general, in particular vocational education and training and timely orientation of all those involved and affected groups of people in the country.

Research by intermediary institutions—additional approaches

One of the findings and recommendations from the research process was that regional governance and politics alone cannot fulfil the necessary tasks to promote and further develop dual apprenticeship training in companies. This requires additional institutions and providers who, with the support of politicians, carry out intermediary work. However, this work must also be evidence-based and science-based (Wirtschaftskammer Steiermark & Arbeiterkammer Steiermark, 2023). An essential institution is STVG, which also regularly evaluates and reflects on its work scientifically. Selected results of the STVG research are presented below.

Surveys on the work of STVG 2025

One of the main intermediary organisations working at interfaces between initial school education and further education and training paths, in particular workplace-based education in form of dual apprenticeship training, is STVG. This organisation is commissioned by authorities in state government—education and business—to organise meetings between young people, schools and educators, parents and training companies.

The aim is to make VET in companies known, to familiarise young people with the variety of VET opportunities and to reconcile them with their personal interests and abilities, and to derive conscious decisions from this—also for dual VET paths. The basis for this intermediary task on behalf of governance was scientific expertise (Marterer & Härtel, 2025) as well as scientific evaluation of activities and results. STVG

follows this regularly. The following methods were used in research surveys 2025: (1) Online feedback survey of students/teachers/parents/companies, organizations, institutions (each specifically focused on target groups). (2) The surveys were carried out in the period 03/2025-01/2026. (3) Number of valid responses: Students 1122, teachers 50, parents 63, companies 244.

This means that representative data are available in different weightings that confirm acceptance, relevance and results of intermediary work. In addition, the participating companies were asked how many apprentice recruitments can be causally attributed to intermediary work of STVG.

This online survey was supplemented and deepened by a personal structured group interview with ten responsible persons who work as networkers between schools, companies and institutions in Styrian regions as part of the STVG's career orientation support (17 April 2026, MS Teams). From these research approaches at strategic and operational level, insights can be derived that lead to further considerations and recommendations in the area of governance of Province of Styria.

However, this also gives rise to ideas and consequences that are important at national level, but can also be important for European and international comparisons. Results, findings and recommendations are presented in following chapter.

RESULTS

Results of the research intended by provincial governance

Outcome of this process was a quite complex, but high accepted and effective structure of strategic and operational governance in Styria (Styrian Government, 2026).

It was made visible that, in addition to formal actors of governance—government, administration, social partners, public employment service, *etc.*—there are about 200 offers from 80 providers in regional environment, which move with interfaces and transitions between formal education and further, also workplace-learning apprenticeship training paths. Some of these are regionally limited, focused on specific topics—such as gender, special needs, migration—but are effective in any case. In this regard, essential findings emerged from the multi-stage—online, face-to-face—surveys, which are outlined here in excerpts.

Between 85% and 100% of the participants surveyed in the strategic and operational committees as well as in the working groups rated the work as clear, communicative and effective. This provides a basis for regional governance to intervene in steering, coordinating and optimising manner, exploiting synergy potentials and reducing duplication of multiple processes. Work of RBBOKs is crucial and effective for this. The way of strategic and operational cooperation was consistently perceived as appreci-

ative and beneficial.

Supplementary and in-depth, qualitative interviews yielded decisive indications that in comparison of the regions in Austria, the "Styrian climate" of cooperation between the most diverse groups with the common goal of strengthening education and vocational education and training is perceived as exemplary.

Detailed reports of surveys and summarized minutes of in-depth interviews were summarized in internal overall reports, which also form the basis for further political and strategic decisions (Marterer & Härtel, 2025). The general results and findings are publicly available on website of Province of Styria.

Results and findings from the Perspective of intermediary actors

Here are some examples of feedback from the regular evaluations of the STVG, which carries out intermediary work between schools and companies on behalf of Provincial Governance (Figure 2). Similarly meaningful results are available from surveys of educators and teachers as well as parents.

Additional to these results, there are also quantitative effects. Surveys of companies show that at least 243 apprentices in 189 companies were in training as result of career guidance support. Since only a smaller proportion of companies have responded, the effect can be seriously estimated to be twice as much. This means that approximately 15%-18% of training relationships in approximately 10%-12% of training companies can be traced back to work of the intermediary institution STVG.

A key indicator is the percentage of drop-outs from dual training. Compared to average in Austria of 20.1% (2023), this is far lower in Styria at 14.6% (minus 27.0%) (Dornmayr, 2025). This leads to the conclusion that strategic, operational and regional measures in Styria lead to a better fit between school preparation, expectations of young people and requirements of training companies.

CONCLUSION

In Austria exists a clearly regulated legal governance of dual apprenticeship sector at national and provincial level, with the involvement of social partners, professional associations and stakeholders. Nevertheless, there are significant regional differences that call for specific actions at regional, local level. The example of governance in province of Styria is an outstanding example of this, which has developed from individual approaches and has now been supported for years by provincial government, all social partners, Public Employment Service and many other organisations (AMS Public Employment Service Austria, 2025). Findings, experiences and surveys prove that this cooperation has factual effectiveness and benefits all parties involved (ILO, 2023).

This can only be achieved in cooperation with public governance bodies in conjunction with intermediary institu-

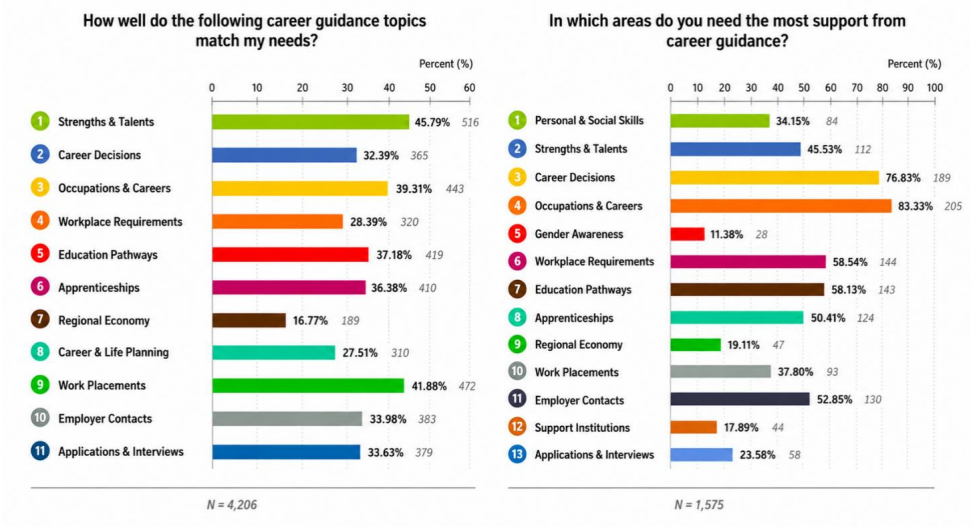


Figure 2. Examples of feedback from the regular evaluations of the STVG. Left: Statement by students "I know more about it now" (n = 1122) Source: Survey STVG Feedback students January 2026. Right: Statement by company "supports the project at..." (n = 244). Source: Survey STVG Feedback Companies and Institutions November 2025. Abbreviated category labels were used for readability. STVG, Styrian Association for Education and Economics.

tions that also have direct contact with actors in education and apprenticeship, schools, companies and in the 7 Styrian regions.

General findings can be derived from this for different systems of apprenticeship in Europe and internationally—in coordination with the respective national legal and systemic frameworks, initiatives at regional and local level are crucial.

In addition to raising general awareness of workplace-based training and education, personal, permanent, trust-building contact between all stakeholders involved is crucial, which also makes benefits for each group involved visible.

DECLARATION

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VTE VOCATION, TECHNOLOGY & EDUCATION

RESEARCH PAPER

Governance and institutional realisation of apprenticeship in Montenegro

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ABSTRACT

Considering that the quality of vocational education depends entirely on cooperation with the real sector, the subject of this research is the analysis of the governance system and institutional framework for the implementation of vocational education and training (VET) in Montenegro with a special emphasis on practical education/apprenticeship. The research should show whether practical education is managed only at the level of decision-makers in the field of education or whether responsibilities are delegated to other partners. Governance and responsibilities of institutions and partners in the realisation of practical education is regulated by the General Law on Education and the Law on Vocational Education. Representatives of partners participate in the creation of policies in VET through participation in the work of national councils and committees. Employers' associations are not involved in the monitoring, assessments of student achievements and evaluation of school and dual type of practical education. It is necessary to encourage their more active involvement and create conditions for sharing responsibilities in the quality and governance of VET.

Key words: laws, apprenticeship, employer, student

INTRODUCTION

The responsibilities of bodies and institutions in vocational education are regulated by The General Law on Education (MESI, 2026). The Ministry of Education, Science and Innovation (MESI) is responsible for the preparation and implementation of regulations, educational policies and financing education for all levels and sub-sectors of education, including vocational education and training (VET). The Vocational Education Centre (VET

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Centre) is responsible for the development educational programmes, CPD and quality assurance in VET. The National Education Council (NEC) is responsible for adopting educational programmes with learning outcomes up to the level of higher education. The members of the NEC are representatives of institutions involved in the development of education, a representative association of employers (Union of Employers), the Chamber of Economy, relevant ministries, universities, professional associations of teachers, and the student parliament.

The Law on the National Qualifications Framework (MESI, 2025a) established the Qualifications Council (QC), which is responsible for the definition of occupational and qualification standards based on identified needs for qualifications. The working bodies of the QC is sectoral committees. Members of the QC and sectoral committees are representatives of the Employers' Union, the Chamber of Economy, trade unions, institutions dealing with the development of education, competent ministries, universities, *etc.* The VET Centre is responsible for the development educational programmes, CPD and quality assurance in VET.

In accordance with the Law on Vocational Education (MESI, 2025b), vocational education in Montenegro is implemented as lower vocational education with a duration of two years, secondary vocational education with a duration of three and four years and higher vocational education with a duration of two years as a continuation of four-year vocational education. All vocational education programmes must have a work-based learning (WBL) component, in a real work environment, with the employer, in accordance with the Methodology for development VET programmes, adopted by the NEC. There are two modalities of realization of practical education: School type and dual type. The dual type can only be implemented for educational programmes with a duration of three years. Learning at the workplace accounting for about 45% of the duration of the programme, which is the same for both school and dual type.

The current strategic framework for the implementation of vocational education is given in the Education Reform Strategy (2025-2035) (MESI, 2025c) which highlights the importance of ensuring the quality of learning through work and cooperation with employers.

Strategic and methodological documents regulating vocational education follow the recommendations of relevant documents of the European Commission: The Osnabrück Declaration, The Council Recommendation on VET for Sustainable Competitiveness, Social Fairness, and Resilience, European Quality Assurance Reference Framework for VET (EQAVET) and others.

METHODS AND RESEARCH DESIGN

The aim of the research is to examine whether the governance of vocational

education and the responsibilities of partners in the implementation of practical education, defined by regulations, enable the participation of partners in decision-making and the sharing of responsibilities for their implementation.

In accordance with the aim of the work, the research methodology focuses on the review and analysis of regulations and key strategic documents and analytical reports related to practical education: General Law on Education (MESI, 2026), Law on Vocational Education (MESI, 2025b), Law on the National Qualifications Framework (MESI, 2025a), Reform-agenda-Montenegro (Ministry of European Affairs, 2025), Report of the External Evaluation of Dual and School Practical Education in Montenegro (MESI, 2025d), Work-Based Learning in Montenegro—an Assessment Per EU Quality Standards (European Training Foundation, 2025), Guide for the Organisation and Implementation of School-based and Dual Practical Training at Companies (OeAD-GmbH, 2024) and Rulebook on the Distribution of Funds from the Dual Education Support Fund (MESI, 2025e).

In this way, it is examined whether there is a legislative and institutional framework for governance of VET that provides quality practical education, relevant for the economy and the students, with the active involvement of employers and their associations in the evaluation of practical education (WBL and dual type of practical education) and its organization and implementation, monitoring of student progress, and the professional development of in-company trainers. By identifying good practices but also open questions and challenges in the governance and concept of legal solutions, the basis is created for further improvement of practical education.

RESULTS

The analysis of regulations shows that in Montenegro there is a regulatory framework that regulates the roles and responsibilities of partners in vocational education—vocational schools, employers and their associations, ministries and other authorities and bodies in the governance and implementation of practical education. Employers' associations are included in the work of advisory bodies at the national level that make key decisions in the field of vocational education and they are not included in the organization, realisation, monitoring and evaluation of vocational education in the school and dual type as well as in the training of in-company trainers. The challenge is creating durable cooperation mechanisms between social partners. These challenges are also recognized in Reform-agenda-Montenegro.

The Law on Vocational Education, among other things, provides the possibility of implementing practical education in school and dual type and conditions for in-company trainers. This Law prescribes in detail the method of implementing dual type practical education, including the content of the contract between the student and the employer, the duties of the employer, the student

and the school, compensation for students and incentives for employers in dual type (Dual Education Support Fund), *etc.*

Mechanisms for ensuring the quality of school and dual type of practical education exist (MESI, 2021). The Guide contains detailed procedures on the rights and obligations of employers and students, the organisation and implementation of practical education in school-based and dual type, the assessment of students' achievements in dual type, the obligations of in-company trainers, *etc.* (OeAD-GmbH, 2024).

VET Centre determines the conditions for the employers for the implementation of dual type of practical education and maintains a database of employers participating in dual type of practical education. In-company trainer training programme exist, it has not been organized for many years.

The rights and obligations of the employer and student in the dual type are regulated by the individual education contract. Students in the dual type do not have the status of an employee. Compensation for students of the first grade in the dual type of practical education is at least 10%, in the second grade at least 15% of the average net salary in the previous year. The MESI provides compensation for students in the first and second grades, compensation for the third grade is provided by the employer. The compensation in the third-year amounts to at least 20% of the average net salary.

Monitoring of the implementation of dual type of practical education is carried out by the school, and the assessments of student achievements at the end of the grade are carried out jointly by the school and the in-company trainers. During the school year, students' progress is monitored by in-company trainers.

In accordance with the Rulebook on the distribution of funds from the Dual Education Support Fund (MESI, 2025e), the Dual Education Support Fund was formed. Fund resources are intended for incentives for employers as well as support for in-company trainers.

There are no mechanisms at the national level for systematically collecting data on the careers of VET graduates. There is no database on available work-based learning places. In-company trainers, given that they are key for the quality of WBL, need systematic pedagogical support through the organization of structured, continuous training.

CONCLUSION

The legislative framework defines the roles and responsibilities of partners (MESI, VET centre, employers and their associations, schools) in the planning, organisation, implementation and evaluation of VET and practical education in school and dual type. The analysis of the partners' responsibilities shows that the cooperation of partners in planning policies in vocational education is achieved through joint participation in the work of consultative bodies (councils

and commissions). The key role in monitoring and evaluating practical education is carried out by the education sector, there is no systematic involvement of other partners, primarily employers' associations, in monitoring and evaluating practical education. It is necessary to more clearly define the mechanisms and structure of cooperation, the hierarchical structure and responsibility schemes, and to strengthen both horizontal and coordination between partners in planning, implementation and evaluation of practical education results.

Reports on the implementation of practical education that are part of the evaluation reports are mainly administrative, containing an overview of the activities carried out. It is necessary to develop a relevant monitoring and evaluation system supported by indicators that measure the impact/costs on the quality of practical education in order to ensure accountability for what has been done.

To improve the quality of practical education, it is necessary to provide continuous training for in-company trainers. The system of graduate tracking of VET school students needs to be established.

In order to improve practical education in both school and dual forms, it is necessary to follow the recommendations given in the European Framework for Quality and Effective Apprenticeships.

DECLARATION

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VTE VOCATION, TECHNOLOGY & EDUCATION

RESEARCH PAPER

Dual vocational education and training governance and management in the Western Balkans

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ABSTRACT

This study examines dual vocational education and training (VET) in Albania, Kosovo (this designation is without prejudice to positions on status, and is in line with UNSCR 1244/1999 and the ICJ Opinion on the Kosovo declaration of independence—hereinafter "Kosovo*"), North Macedonia, Montenegro, and Serbia, focusing on governance structures and social partner involvement. All countries have introduced legal frameworks and expanded work-based learning, yet their systems remain largely centralised and state-led with weak coordination and limited involvement of social partners as autonomous co-regulators. Hybrid governance arrangements have emerged through the selective delegation of implementation tasks to intermediary actors, particularly Chambers and vocational schools. The role of trade unions remains marginal in most countries. The findings suggest that European Union (EU)-driven policy transfer has promoted the formal adoption of dual VET more rapidly than the development of institutional capacities and social partnership mechanisms needed to sustain collectively governed systems, raising concerns about their long-term sustainability, especially once donor support ends.

Key words: apprenticeships, dual vocational education and training, Western Balkans, social partners, governance

INTRODUCTION

Work-based learning (WBL) is a key pillar of the European agenda on vocational education and training (VET). A significant milestone was the 2015 Riga Declaration, in which the ministers responsible for VET of European Union

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(EU) Member States and candidate countries committed to "promote WBL in all its forms, with special attention to apprenticeships, by involving social partners, companies, chambers and VET providers" (European Commission, 2015). The Riga Declaration marked the beginning of an era of far-reaching reforms in the then candidate countries of the Western Balkans—Albania, Montenegro, North Macedonia, Serbia—as well as in Kosovo*, which is officially recognized by the EU as a potential candidate country for EU membership. Whilst there were few programmes with a strong workplace-based training component at the time of the Declaration (European Training Foundation, 2017), such programmes are now widespread, and the five countries have established legal frameworks or pilot projects for dual VET (the term "apprenticeship" is not used in the countries of the Western Balkans) with substantial support from multilateral and bilateral donors (European Training Foundation, 2025a, 2025b, 2025c, 2025d, 2025e).

This has been crucial given the persistent low youth employment, high Not in Education, Employment or Training (NEET) rates, and since many young people continue to experience delayed, mismatched or unstable entry into employment.

To address these challenges the EU has extended the Reinforced Youth Guarantee to EU candidate countries since the early 2020s (European Council, 2020). Apprenticeships are among the possible "quality offers" for 15-29-year-olds not in employment or education (beneficiaries should receive a quality offer within a period of four months of becoming unemployed or leaving formal education). Their quality should respond to the European Framework for Quality and Effective Apprenticeships criteria (European Council, 2018).

In this context, governance and social partner involvement from system design to its management and implementation are of crucial importance. Our analysis, focusing on initial dual VET, investigates the roles and responsibilities of employer and employee representatives in learner selection, programme design, financing mechanisms, system monitoring, supervision and evaluation.

METHODS AND RESEARCH DESIGN

This paper is based on a comparative analysis of five country assessments of WBL quality in Albania, Kosovo*, North Macedonia, Montenegro, and Serbia (European Training Foundation, 2025a, 2025b, 2025c, 2025d, 2025e, 2026). The data collection at country level was carried out in 2024 and 2025, based on desk-based research and stakeholder interviews in the selected countries.

The scope of our research includes apprenticeship programmes at upper secondary level, which countries call "dual VET" or "dual education", of a duration ranging between three and four years.

Adopting a comparative logic based on the traditional classification of skills formation regimes (Busemeyer & Trampusch, 2012), we analyse the extent to which the selected countries display characteristics of state-led versus collectively coordinated systems, with a focus on the governance role of employers, trade unions, and chambers in dual VET.

The five countries are compared against selected criteria of the EU Framework for Quality and Effective Apprenticeships (EFQEA), looking at the "fair and equitable partnership approach" "underpinning the legal framework, social partners involvement" in the design, governance and implementation of apprenticeship schemes' and aspects of cost-sharing mechanisms (see criteria 8-10 of the EFQEA). The term "social partners" in this article is commonly used to indicate not only employer and employee organisations but also Chambers.

RESULTS

All countries analysed regulate WBL in upper secondary education and offer dual VET. Our analysis sheds light on the involvement of social partners in the governance and management of dual VET.

The rights and obligations of learners, training companies and vocational schools are regulated by contracts or training agreements in the five countries. The relevant legal frameworks, minimum requirements and standards are set by government or regulatory bodies. Employer and employee organisations have only an advisory role, for example within national bodies on VET.

Social partners in the five countries are not directly involved in decisions regarding the financing of WBL. In none of the countries social partners are directly and systematically involved in determining the remuneration or financial compensation of learners, as is the case, for example, in other countries within the framework of structured collective bargaining processes. In some countries, such as Montenegro or Serbia, there are state subsidies for learners or training companies, for example for dual programmes that are in high demand on the labour market. However, the state ultimately decides on the design of the subsidies and the recipients.

The revision of qualifications or the development of new ones is coordinated in all cases by state institutions, often qualification agencies. Social partner involvement may be more or less formalised. The Kosovo* Chamber of Commerce is a member of the governing board of the National Qualification Authority. In Albania and Serbia, sectoral committees are involved only for few economic sectors, and their remit of competence is VET in general, not dual VET. In the other countries, employer participation is mostly ad hoc, at company level.

Trade unions play a marginal role in the process of developing or revising qualifications in most countries. Serbia is an exception: Union representatives parti-

cipate in the sector skills councils and the council for the National Qualifications Framework. The education trade union in North Macedonia has a legal mandate to protect learners from exploitation, but its activities focus on teachers rather than learners. In Montenegro, unions participate in advisory bodies at national level and contribute to strategic decisions, but their involvement in implementation and assessment of WBL is negligible. In Serbia, trade unions are represented in councils and sector skills bodies but have no role in WBL implementation.

In some areas of dual VET, chambers play an important intermediary role, although their functions and degree of institutionalisation vary significantly across countries. In Kosovo* (Kosovo* Chamber of Commerce, KCC), Serbia (Chamber of Commerce and Industry of Serbia, CCIS) and North Macedonia (Economic Chamber and Skopje Chamber of Crafts), chambers act as relatively strong intermediaries with operational responsibilities such as accrediting training companies, supporting instructor training, coordinating employer engagement and facilitating school-company cooperation. They also contribute to monitoring WBL implementation and, in some cases, manage platforms that match learners with training opportunities, reflecting features of more collectively coordinated skill formation systems.

By contrast, Albania and Montenegro rely more heavily on vocational schools and state institutions, with limited involvement of chambers in governance or implementation. In these cases, employer coordination remains weak and largely decentralised, with individual firms engaging directly with schools rather than through structured intermediary bodies.

Overall, while chambers in some countries have developed into semi-operational governance actors, their role remains uneven across the region and insufficiently institutionalised to ensure consistent employer coordination. In the five countries, the task of matching learners with training companies is still largely the responsibility of vocational schools, which can make it difficult for transparent, national markets for WBL placements to develop.

DISCUSSION

The analysis highlights several structural strengths in the multi-governance of WBL across the five countries. The involvement of chambers represents an important operational asset. The presence, albeit limited, of social partners in advisory bodies and sectoral committees provides a formal channel for stakeholders to contribute their views, which can help ensure that dual programmes remain relevant to the labour market.

Among structural weaknesses, instead, the limited, largely consultative and fragmented influence of social partners on key decision-making processes reduces the extent of shared ownership. This may weaken the responsiveness of

VET systems to labour market needs and constrain long-term investment, by also reducing incentives for broader stakeholder engagement. Trade unions play only a marginal role in the governance of dual VET in the region, making it difficult to speak of a fair and equitable social partnership. This asymmetry may give relatively greater priority to training companies' interests over aspects such as the protection of learners (*e.g.* monitoring compliance with training agreements) or inclusion (*e.g.* support services for underachieving young people or those from socially disadvantaged backgrounds). Furthermore, in none of the five countries are the training and working conditions of learners are negotiated in collective bargaining agreements, which contrasts with more established dual systems and may limit the development of sustainable and balanced funding arrangements. The centralised nature of governance, while ensuring coherence, can also lead to rigidity and insufficient adaptability at sectoral or local levels.

Overall, the findings for Kosovo*, North Macedonia and Serbia point to a hybrid yet asymmetrical model of governance, where authority and influence are concentrated in the hands of state actors despite the formal involvement of multiple stakeholders. These countries are characterised by selective delegation of implementation tasks to intermediary actors, particularly chambers. However, the extent of their involvement varies: In Kosovo* and Serbia chambers have a wider range of responsibilities, whereas in North Macedonia they mainly cooperate with the Centre for the Development of VET on certain tasks.

In Albania and Montenegro, key responsibilities are instead delegated to state actors or vocational schools, confirming their classification as state-led systems. The findings raise doubts about whether the currently very low number of learners in dual VET can be increased, and whether quality can be sustained and further developed. In the short term, adequate human and material resources for vocational schools will be crucial. In the medium term, there appears to be no alternative to transferring key tasks—such as recruiting training companies, providing information and advice to companies and learners, and matching companies with learners—to intermediary organisations, in order to prevent fragmentation and duplication.

Strengthening structured and balanced engagement of social partners could therefore represent a key avenue for enhancing both the effectiveness and legitimacy of WBL governance in these countries. The overall dominance of the state and the weak role of trade unions remain common structural characteristics. This produces a governance configuration in which operational responsibilities are partially delegated or shared, while authority over financing, regulation and programme design remains concentrated within the state.

The findings therefore nuance traditional distinctions between state-led and collective skill formation regimes by

highlighting the emergence of intermediary governance arrangements in some of the five countries. The limited institutionalisation of social partner participation, particularly of trade unions, may constrain the responsiveness, inclusiveness, and labour market alignment of dual VET systems in the long term.

The findings also suggest that the EU accession-related policy transfer primarily promoted the formal introduction of dual VET programmes (occupational and qualification standards, curricula, trainer training, *etc.*), rather than the comprehensive institutional frameworks underpinning collectively regulated dual VET.

CONCLUSION

The analysis demonstrates that the dual VET systems of the five countries remain close to a predominantly state-led model of skill formation (Busemeyer & Trampusch, 2012; Hall & Soskice, 2001), marked by weak collective coordination and limited involvement of social partners as autonomous co-regulators. While social partners have some influence, particularly in the development of qualifications, their role in central governance issues such as financing mechanisms, contractual frameworks, and programme structures remains limited. Although some decision-making powers have been delegated to lower levels and different actors, these systems have not transitioned to multi-level or multi-stakeholder governance. Trade unions are largely absent, and employer organisations may be involved but to a limited extent and, in any case, mostly at national level and without decision-making powers. At the same time, the findings suggest the emergence of hybrid governance arrangements characterised by the selective delegation of implementation tasks (*e.g.* company accreditation or limited curricular adaptation) to intermediary actors, particularly Chambers without a corresponding decentralisation of strategic decision-making powers.

In this context, the role of donors in funding the establishment and rollout of dual VET programmes is of central importance. The analysis also raises concerns about the sustainability of such governance arrangements, once donor funding ends.

The findings contribute to comparative political economy literature by illustrating how skill formation regimes in EU candidate countries may evolve through partial institutional borrowing, producing hybrid governance arrangements rather than convergence towards classic dual-system models. They also suggest that policy transfer processes linked to EU accession have primarily promoted the formal adoption of dual VET structures rather than the full institutional conditions underpinning collectively governed apprenticeship systems.

DECLARATIONS

Article version statement

This article has been reviewed and preliminarily edited. It is intended solely for use at the 10th Research Conference

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VTE VOCATION, TECHNOLOGY & EDUCATION

RESEARCH PAPER

Effects of the German dual system's macro-social structurings on the transmitter-acquirer-knowledge relation, that bear upon the standing of vocational education and training among learners

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ABSTRACT

This presentation underpins assumptions, that the institutional arrangements are an important factor for the dual system's standing. It draws on a conceptual language developed by the British educational sociologist Basil Bernstein, on a Bernstein-based theoretical model of education beyond schooling, and on findings from Bernsteinian analyses of problem-centred interviews with German dual system graduates. The analyses revealed that the dual system's transmitter-acquirer-knowledge-relations differ from the better-known scholastic relations, but are explicable by taking into account the dual system's macro-social structurings. For instance, the institutional arrangements legitimise trainees'/apprentices' control-taking over the social basis of their learning, and they help them to recognise skills and practices as socially positioned and to think of alternatives. In conclusion, the dual system, due to its institutional arrangements, offers learners an alternative to scholastic knowledge transmission, without concurrently limiting their futures to narrow jobs—high-standing education.

Key words: governance, Germany, dual system, Bernstein

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INTRODUCTION

Deissinger argued for the relevance of the historically developed institutional arrangements as a crucial factor for the standing of dual system vocational education and training (VET) in Germany, and suggested that these arrangements serve employers well (Deissinger, 2022). For a more detailed picture, this presentation draws on the conceptual language developed by the British educational sociologist Basil Bernstein, which permits researchers to identify macro-micro-relations, and also to develop, theoretically, modalities of education from absences in "what is". High-standing education should, in Bernstein's terms, take learners beyond themselves and give them an "elaborated orientation" towards the "ultimate mystery" of the knowledge to be acquired. "The mystery of the skill is the site of the 'unthinkable', that is, the *alternative* possibilities which inhere in the skill" (Bernstein, 1990, p. 188; italicized for original emphasis). Education should help learners to see that things can be done and thought of in different ways (to think critically), and to recognise knowledge as socially positioned (time-, space- and context-related). In contrast, the lower standing of vocational education is frequently attributed to the narrowness of the skills formation, the ability to perform only narrow specific work tasks.

This presentation draws on a systematic and non-circular Bernsteinian analysis of problem-centred interviews with German dual system graduates, which revealed that transmitter-acquirer-knowledge-relations differ from the better-known scholastic relations, but are explicable by taking into account the dual system's macro-social structurings. Findings also suggest that the strong boundary between company and Berufsschule nudges learners into critical thinking. Put differently, the dual system's institutional arrangements legitimise trainees'/apprentices' control-taking over the social basis of their learning and help them to recognise the skills and practices they learn as socially positioned. In conclusion, the dual system, owing to its institutional arrangements, offers learners an alternative to scholastic knowledge transmission, without concurrently limiting their futures to narrow jobs.

THEORY, METHOD AND RESEARCH DESIGN

In Bernstein's conceptual language, the fundamental systems of education, pedagogy, curriculum, and evaluation, are realised in the structures of classifications (boundaries between or within categories, agents or sites, which arise as a result of power struggles) and framings (control over the social basis that makes the transmission possible). Both can take stronger or weaker values, in shorthand: $\pm C / \pm F$ - Bernstein's famous code. More or less strongly classified and framed curriculum, pedagogy and evaluation are identifiable in school-based and company-based VET and, also, in the dual system. Pivotal is the principle of

regulation underlying the code, which establishes a fundamental classification, that is, context-specific boundaries for legitimate code realisations. Learners experience this principle of regulation, as it is expressed in the code of curriculum, pedagogy and evaluation:

$$\frac{\pm \mathrm{C} / \pm F}{\mathrm{C}}.$$

The well-known and often taken for granted principle of regulation in schooling is established in power struggles between the state and a specialised educational field in relative autonomy (Bernstein, 1990, 2000). Schooling's fundamental classification is strong (Bernstein, 1990): The basic categories "agents" and "knowledge" are strongly classified from the non-school world. Differently put: Children are taken out from the community, segregated by age (Hart, 2008), removed into a new context specialised for acquisition (Elmholdt, 2003; Sfard, 1998) with agents specialised for transmission (*i.e.*, teachers) of knowledge that is selected from the field of production of knowledge and pedagogised for transmission, again by specialised agents (Becker, 1972). In accordance with the basic strong classification, school knowledge, what "people… would not otherwise know" (Becker, 1972, p. 85), is transmitted in "elaborated code", that is, context-independent language (Gogolin & Duarte, 2016). Yet context-independent language is not always effective, *e.g.*, to explain an instruction (Bernstein, 1990, p. 57), and, for cultural reasons, not easily acceptable for all learners. In search of an alternative modality of educational transmission with an elaborated, beyond the local context, orientation, Moore (1984) theoretically pushed the central categories of education "transmitters", "acquirers" and "knowledge" across the limits of schooling. Then, a socio-occupational community, possibly broad-based, would act "as agents directing activity and drawing upon the resources of the school (including most crucially the intellectual resources of the teachers—the representatives of the forms of knowledge) according to their own criteria of relevance" (Moore, 1984, p. 399), and the community knowledge would become valid. This resonates strongly with the social partners' activities in Germany's dual system (which Moore did not know), where the social partners (experts in the corresponding vocational field, namely representatives from employers' and employee's organisations, and the state in obligatory consensus) direct activities concerning Beruf education: curriculum, evaluation, pedagogy, and support the VET schools to adapt their curricula. From here, Deissinger's (2022) argument for the dual system's standing becomes clear: The institutional arrangements, conceived as weak (compared to schooling) classification to the world of work, ensure labour-market functionality of the knowledge transmitted.

But Moore's Bernstein-based theorising takes an educational perspective; he intends to develop, theoretically, a modality of education beyond schooling,

yet giving an elaborated orientation. This goes beyond labour-market functionality. Referring to Bernstein's as a positioning theory, Moore (1984, p. 412; emphasis original) explained: "The development of elaborated orientations through education invariably occurs where individuals are directed towards new sets of *unfamiliar* positioned-practices so that it is the *practices* not the *positions* which become the object". Put differently, acquirers should be able to see that things (practices) can be done and thought of in different ways. Other researchers call this "critical thinking". The non-specialisation of agents and knowledge eventually implies that teachers can be acquirers in the same context where students are acquirers (Moore, 1984, pp. 404, 406). Moore (1984, p. 412) argued: "Now if the transmitters became acquirers within that same educational programme it would not be the practices that constituted the content (because they are already competent performers) but the positions themselves". This means: Theoretically, high-standing education beyond schooling implies that acquirers recognise the skills and practices they learn as positioned (time-, space- and context-related). It also means that acquirers have considerable control over the social basis that makes the transmission possible, because they "generate categories" (Moore 1984, p. 407), *i.e.*, they elect whom to learn from and what to learn. "The social principle of hierarchy and exclusion which separated teachers-as-acquirers from other categories of acquirers is abolished. All agents can in principle freely exchange knowledges regardless of social hierarchy" (Moore, 1984, p. 408). To argue for the dual system's high esteem because of its so-defined elaborated orientations, requires a framing and classification analysis.

"Framing relations" is Bernstein's concept for the locus of control over the selection, sequencing and pacing of learning contents, the evaluative criteria and the hierarchy in the transmitter-acquirer-relation. "Where framing is strong, the transmitter explicitly regulates the distinguishing features of the interactional and locational principles, which constitute the communicative context. Where framing is weak, the acquirer has a greater degree of regulation" (Bernstein, 1990, p. 36). Following this recognition rule and the procedures for a rule-directed, non-circular identification of "framing" in the world, as explained in, *e.g.*, Morais and Neves (2010), we, a small team of two researchers, analysed 30 problem-centred interviews with dual system graduates with different socio-demographic characteristics, who had acquired different Berufe in differently sized and organised companies, *e.g.*, traditional crafts, Berufe in industry and commerce, assistant Berufe. In an iterative move between the interviews and theory (Bernstein, action theory and others), we, first, developed an indicator, by which framing realisations come to show across all Berufe: "Doing tasks in the company". Then, we selected from all interviews the text passages about "doing tasks in the company" and sorted them by strength of transmitter's control over the selection/sequencing and

pacing of learning contents and the criteria. Likewise, we analysed the hierarchical relation between transmitters and acquirers in the company by the indicator "communicative relations". Each time, the goal was to develop four-scale tables with different framing strengths, and descriptors, how these strengths came to show in the interviews (Höhns, 2018, 2022).

As for the classification to the vocational school, we selected all the narrations about the school and sorted them by boundary strength, assuming that a very strong boundary means "no relation or contradiction between school and company", strong boundary means: "School and company complement each other" and weak boundary means: "School and company cooperate closely" (Höhns, 2025).

RESULTS

Against Bernstein's expectation that acquirers' control is at most apparent (Bernstein, 1990, p. 36), we found not only narrations illustrating trainers' control by different strengths, but also instances of acquirers' control-taking over the framing relations. A lawyer's assistant's response, that she took control over the expected speed of acquisition (the pacing) by reducing the overall duration of training, turned the researchers' attention to the dual system's macro-social provisions. Indeed, prior documentary analyses of the Vocational Training Act (with the German acronym BBIG) and subsequent legislation (Höhns, 2016) had revealed that admission to final examinations before completion of the prescribed overall training time is permitted if performance so warrants, and that an application is to be handed in to the competent body jointly by trainee/apprentice and training employer (BBIG, 2005, s.8). Also, in-company individual training plans allow for flexible realisation, "…depending on the abilities of the trainee/apprentice…" (BIBB, n.d., Main Committee's Recommendation 12, s. 2.6). Recommendations 27, 47 and 129 specify reasons for extension/reduction of the overall training time. Altogether, the dual system's regulations individualise time (whereas in schooling, individuals become homogenised over time; cf. Bernstein & Díaz, 1984, p. 76f). From here, trainees'/apprentices' alleged control-taking over the pacing must be considered as real and an upshot of the system's institutional arrangements.

Speaking about examination preparation, respondents sometimes reported that they made their trainers explain, practice or check, what was required for the exam, but was not necessarily or not to a sufficient extent part of the company's everyday practice. They claimed control-taking over the selection/sequencing of learning, nudged by the upcoming examination. Since the examination is organised outside the company, by the Competent body's VET committee, we considered trainees'/apprentices' control-taking over the selection/sequencing likewise as an upshot of the institutional arrangements.

Concerning modalities of the locus of

control over the hierarchy in the trainer-trainee/apprentice-relation, we could not discount the trainees'/apprentices' agency in narrations about teaching others. Eight out of 30 respondents spontaneously reported, that in later stages of their apprenticeship they taught others, with the trainers' consent. Here, macro-social provisions did not immediately offer explanations. But a re-consideration of Bernstein's theory suggested that such a flattening hierarchy between transmitters and acquirers would be a matter of course if the dual system was a real-life case of Moore's theoretical modality of educational transmission, where the categories "transmitter" and "knowledge" are not specialised, like in schools. Then, obviously, it is not amazing, that trainees/apprentices can choose whom to learn from, and that in the same "context, where trainers are transmitters, trainees/apprentices are transmitters, teach others and even inform their trainers what they need to learn for the examination" (Höhns, 2022, p. 16). Moore's (1984) model suggests that trainees'/apprentices' control over the hierarchy must also be an upshot from the dual system's principle of weak fundamental classification or from its institutional arrangements.

Concerning the boundary between company and Berufsschule, we only found instances of very strong and strong classification. However, talking about divergences, the respondents remarked that they realised that things can be done and thought of in different ways, depending on material, spatial, temporal conditions (Höhns, 2025). Confronted with obvious contradictions, trainees/apprentices had to think critically and to decide for themselves what was the correct answer or appropriate way to procede in which context and for what reason. With the Berufsschule legitimately complementing the company, trainees/apprentices experienced that a Beruf is a social construct and comprises more than learning to work in the company.

CONCLUSION

The Bernstein-based language of description requires from researchers a conscious submission, but then it allows them to empirically underpin Deissinger's claim that the dual system's institutional arrangements bear upon the standing of VET (Deissinger, 2022), not only because of labour-market functionality, but also owing to specific educational qualities. Theoretically, this bearing should work for all training Berufe regulated by the Vocational Training Act or the Crafts and Trades Code. The trainees'/apprentices' control over the "when", "what", "how" and "from whom" of learning and the flattening hierarchy, which the dual system's institutional arrangements legitimise, may well contribute to its high esteem among young people, particularly those who have problems with the school's strong classification.

The (very) strong boundary between Berufsschule and company and the exchange with trainees/apprentices from other companies helped learners to experience knowledge and practices as

time-, space- and context-related and to think critically. Berufsschulen might consider to explicate this time-, space-, and context-relatedness, to make learners more consciously aware, that Beruf-learning implies more than working in a company, and to encourage them to take a critical stance towards their practices. Considering that the transmission context for Moore's modality of education must be one where knowledge is not only transmitted, but also created, the role of companies as epistemic agents requires further reflection.

The dual system offers learners, seeking an alternative to schooling, an "elaborated orientation", beyond the local context of a company, including access to the "ultimate mystery" of the Beruf, which is not limited to the training company. From here, challenges to the dual system are: Young people who are not interested in academic learning nor in taking control or responsibility at a workplace, but consider the only good of work in making money.

Future research, the findings suggest, should not neglect the different underlying principles between scholastic/academic education and education in the dual system and their differential effects on teaching and learning.

DECLARATION

Article version statement

This article has been reviewed and preliminarily edited. It is intended solely for use at the 10th Research Conference of the International Network for Innovative Apprenticeship (INAP). The final version will be published in *Vocation, Technology & Education* (https://www.vtejournal.com).

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VTE VOCATION, TECHNOLOGY & EDUCATION

RESEARCH PAPER

Reforming a mature apprenticeship system: Lessons for policymakers and practitioners from the Victorian apprenticeships Taskforce

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ABSTRACT

This paper evaluates the findings of the 2024 Victorian Apprenticeships Taskforce, examining the regulatory challenges facing mature, market-led apprenticeship systems amid changing work practices, and how such systems can be reformed to better mitigate modern workplace risks and harms. In response to escalating reports of bullying, wage theft, discrimination and workplace fatalities among apprentices, the Victorian Government established the Taskforce to assess existing regulation and to identify actions to improve physical and psychosocial safety. The Taskforce identified that Victoria's current regulatory system is "no longer fit-for-purpose" and is failing to adequately protect apprentices and trainees. This paper outlines the approach taken by Taskforce in identifying regulatory gaps and reviews the actions proposed to transition toward an active, comprehensive "safeguarding ecosystem" and a modernized regulatory framework. The findings offer lessons for policymakers and practitioners seeking to modernize regulatory architecture to support physical and psychosocial safety in contemporary apprenticeships and traineeships.

Key words: workplace health and safety, regulatory reform, apprenticeship governance, psychosocial safety

INTRODUCTION

Apprenticeship systems are vital for workforce development (ILO, 2022). Yet, as traditional trades adapt to evolving work practices and flexible

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sourcing strategies, many apprenticeship systems have struggled to maintain stakeholder engagement and to ensure that incentive structures, governance models and compliance processes continue to deliver safe, fair and successful outcomes for apprentices, employers and regulators (DEWR, 2025).

Australia has a mature apprenticeship system, and the apprenticeship model is widely understood in the community. Throughout the twentieth century, apprenticeship was a core national skills formation model, with government entities creating demand for apprenticeships through direct employment. As Australia's economy was deregulated and public entities privatized, apprenticeship governance underwent major structural reform. The system became a market-led model with competitive training markets and national qualification standards, while each state retained responsibility for regulating apprenticeships within its jurisdiction.

Despite repeated policy interventions, Australian apprentices continue to experience workplace harms, including bullying, harassment, wage theft, risk-taking and unsafe work practices (Corney & Du Plessis, 2011; Holdsworth *et al.*, 2020).

Women and traditionally underrepresented cohorts experience these harms more acutely (Smith, 2025). They impact apprentice mental health, completion rates and the status of apprenticeships in the community.

In the Australian state of Victoria, increasing reports of harmful and exploitative practices, including workplace fatalities and apprentice suicide, prompted the state government to establish the Victorian Apprenticeships Taskforce in July 2023.

The Taskforce was led by independent experts and comprised employer and employee (trade union) representatives. Its mandate was to assess the suitability and responsiveness of Victoria's existing regulatory frameworks, identify regulatory gaps, consider policy measures to improve safety and fairness, and assess options to structurally reform the system, including clarifying objectives and stakeholder responsibilities.

A distinctive element of the Taskforce's work was its focus on the lived experience of apprentices and trainees. To better understand how and where policy intent was not translating into practice, it established an apprentice reference group representing diverse cohorts, occupations and training statuses across Victoria. The Taskforce consulted with this group in a qualitative focus group setting to understand common concerns and challenges faced in the field, and the drivers of disengagement, non-completion and poor workplace experiences.

METHODS AND RESEARCH DESIGN

This research employed a qualitative case study approach to examine and evaluate

the work and findings of the Victorian Apprenticeships Taskforce and the Victorian Government's response. Data sources included key documents and semi-structured interviews with Taskforce members, government officials and sector representatives. The authors' professional experience in the Victorian apprenticeship sector further informed interpretation of regulatory limitations and the reform process.

RESULTS

After consulting with stakeholders and reviewing existing structures and common workplace challenges, the Taskforce's 2024 Final Report (Victorian Government, 2024) delivered a comprehensive analysis of Victoria's apprenticeship system. The Report made clear findings about the current system, including that: It "is failing apprentices, and by extension the Victorian Public"; its regulatory framework "does not meet the needs of apprentices, employers and other stakeholders"; and urgent reform is needed because the system is "no longer fit for purpose".

A key finding was that Victoria's regulatory model, rooted in educational governance, was failing to address industrial risks such as psychosocial safety, and employer accountability. The Taskforce concluded that substantive change is required to better protect, support and train apprentices to reduce exposure to risks and harms in the modern workplace.

To address these issues, the Report set out sixteen recommendations and three supporting actions across three themes: (1) Strengthening the safeguarding ecosystem; (2) reforming regulatory frameworks; (3) improving supports across the apprentice and trainee journey.

The safeguarding ecosystem

The Taskforce found the safeguarding ecosystem overseeing Victoria's apprenticeship system is excessively complex, with fragmented oversight, regulatory, coordination and support roles distributed across multiple entities. It contended that oversight is not sufficiently intelligence-led and that regulators and support services do not consistently share information or coordinate responses. The result is a system that can be slow to respond to emerging risks and workplace harms.

To address these gaps, the Taskforce recommended mandating data-sharing processes and improving communication and coordination between regulators to more effectively track the journey of each apprentice and sectoral completion rates.

The Taskforce also recommended establishing a central Apprenticeship Help Desk to provide a single point of contact for information and guidance, and to support triage and active case management when issues arise. The Taskforce advocated for increasing the number of Apprenticeship Support Officers (who support apprentices on an as-needed basis, particularly early in

training) and developing updated information to clearly set out roles, rights, responsibilities and expectations of employers and apprentices at commencement, with greater emphasis on defining workplace harms and pathways to support.

Reforming regulatory frameworks

The Taskforce asserted that Victorian apprentices "are not being adequately protected by the regulatory framework". It argued that, because the legislation regulating apprenticeships in Victoria had not been substantially revised for 25 years, the framework was "no longer fit-for-purpose" given substantial changes in labour markets and in how apprenticeships and traineeships are delivered.

The Taskforce found that the existing regulatory arrangements do not specify clear safety or quality objectives for the apprenticeship system and provided limited tools and powers to monitor and enforce compliance. It also identified limited legislative capacity to impose conditions, set standards, develop guidelines or implement early intervention measures such as formal warnings for employers.

The Taskforce recommended establishing a new independent regulator spanning Vocational Education and Training (VET), apprenticeships and traineeships, alongside legislative modernization to clarify objectives and to strengthen safeguards. It proposed enhanced oversight of training plans and contracts, a risk-based employer registration scheme, and common employer standards to improve supervision, training quality, cultural, physical and psychological safety, and ongoing mentoring and support for apprentices.

The Taskforce further proposed new powers and tools to allow the new regulator to monitor and enforce compliance and undertake investigations with existing workplace regulators. The new legislation would also empower the regulator to define new forms of apprenticeships, so emerging models can be regulated within the new framework.

Apprentice and trainee journey

Taskforce consultations revealed that many apprentices and trainees find the system difficult, confusing and unsatisfying. Low pay, dangerous conditions and a lack of employer attention to psychosocial safety were recurring themes. These issues were reported most often by underrepresented cohorts, notably women.

The Taskforce recommended a range of actions to reduce systemic disadvantage and to improve the apprentice journey. These included: Establishing a gender equity employer list to assist female apprentices to find supportive employers; providing additional non-wage financial supports for apprentices; advocating to lift minimum rates of pay; improving the breadth and quality of training; and supporting graduating apprentices with essential small business skills and licensing examination support.
In response to the Taskforce's Report, the Victorian Government supported

seven of the sixteen recommendations in full, and supported the remainder in principle, subject to the development of detailed implementation proposals.

Collectively, these themes reflect a proposed shift from educational administration toward active industrial safeguarding.

CONCLUSION

The Victorian Apprenticeships Taskforce provides a useful model for regulators, policymakers and practitioners seeking to modernize apprenticeship systems within mature, market-led contexts, and offers a blueprint for reviewing and redesigning regulatory architecture through three transferable lessons.

Clarify objectives and accountability

Explicit system objectives (including safety, fairness and training quality) are necessary to align regulatory practice with contemporary risks.

Design for coordination, not fragmentation

Safeguarding requires data-sharing, navigation support and intelligence-led oversight across multiple regulators and support providers.

Move from administrative compliance to risk-based safeguarding

Gatekeeping tools (employer standards, registration, early interventions) serve to support earlier detection and prevention of harms, rather than relying on downstream complaint handling.

The Victorian case highlights the limitations of apprenticeship governance that is primarily educational in orientation, when the risks and harms affecting apprentices are industrial in nature. Persistent workplace harms, experienced acutely by women and other underrepresented cohorts, undermine apprentice wellbeing and completion, and weaken the standing of apprenticeships as a broader workforce development strategy.

The Taskforce's proposed shift toward active safeguarding—including a coordinated safeguarding ecosystem, clearer system objectives and stronger regulatory tools and employer standards—reflects an attempt to align governance arrangements with contemporary risks.

This paper is limited by its focus on a single jurisdiction and a reform process still in progress. As implementation proceeds, evaluation will be required to determine whether structural and legislative changes translate into measurable reductions in harm and improved completion outcomes. Future research may focus on evaluating the efficacy of the structural reforms enacted by the Victorian Government in response to the Taskforce's Report.

Nevertheless, the Taskforce's work suggests that the capacity for apprenticeship systems to survive, revive and

thrive depends increasingly on regulatory architectures that treat apprentice safety, including psychosocial safety, as a core safeguarding function rather than a peripheral compliance issue.

DECLARATION

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VTE VOCATION, TECHNOLOGY & EDUCATION

RESEARCH PAPER

Training of early years educators between the dual and the school-based vocational system: The role of learning places

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ABSTRACT

Praxisintegrierte Ausbildung (PiA) introduces paid, practice-integrated training for early-years educators in Thuringia, combining nursery employment with vocational schooling. Based on a mixed-methods evaluation, the study examines how this model changes the role of learning environments. Unlike traditional school-based training, PiA gives nurseries greater importance, but without clear regulations or didactic guidelines for workplace learning. Mentors value their qualification, especially for reflection and support, yet criticise missing content on law, curriculum, assessment, and structuring training. Interviews show three views on school–nursery cooperation: Effective networking, limited collaboration, and structural challenges. Overall, PiA shifts expectations and responsibilities between schools and nurseries, but its potential remains underused because workplace learning is not yet sufficiently recognised as an equal, pedagogically distinct learning place.

Key words: Dual System, school-based system, learning places, trainer education

INTRODUCTION

In Germany, vocational education is divided into the Dual and the full-time school-based system. The former mainly concerns technical and economic vocations, the latter social and health vocations. While the former includes an apprenticeship allowance, the latter does not. That (and other reasons) makes the school-based education programmes less attractive, particularly for people *e.g.*, with an own family. As Germany has experienced a shortage of qualified

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professionals in social care professions in the last years, a "practice-integrated training" (Praxisintegrierte Ausbildung, PiA) programme for childcare workers was introduced in which students also have a training contract at a nursery. This gives the nursery greater significance compared to the school-based education. This article examines the consequences this has for working with apprentices in the nursery and what it means for the role of learning places.

PRACTICE-INTEGRATED TRAINING: "DUALISATION" OF SCHOOL-BASED VOCATIONAL EDUCATION

The basic structure of the PiA is similar to that of a dual vocational training programme: Apprentices sign an apprenticeship contract (including allowance) with a nursery operator and additionally become students at a higher vocational school. The training takes place in both institutions, but the school has sole responsibility for the whole programme (TMBJS, 2019). There are no specific regulations for the "workplace" part of the training and no specific didactic guidelines.

In contrast to vocations in the business sector, social professions are usually trained in full-time vocational schools with work placements in often changing institutions. People often begin the training fairly soon after leaving compulsory school and don't get a training allowance. That is why training as a childcare worker often is less appealing to those who rely on remuneration, for example because they already have families of their own.

Therefore, the PiA was developed to make nursery teacher training more attractive (Kultusministerium Baden-Württemberg, 2014). In Thuringia it started in 2019 as a pilot project. It was evaluated by us in two phases using the Context, Input, Process, Product (CIPP) model. Firstly, an online survey was conducted across both training models (PiA and school-based training). Secondly, eleven PiA participants, ten mentors and four representatives from childcare centre providers were interviewed in a qualitative interview study. The interview guides for the qualitative survey were developed from the results of the quantitative study, following the deepening model or explanatory design (Creswell, 2014; Kuckartz, 2014).

LEARNING PLACES

One component was the relation between the nursery and the school: In the school-based way, the school assigns tasks for the comparatively short placements. The students are generally supervised by instructors of the nursery, implementing the tasks. They are dependent on the schools' pedagogical and didactic concepts, without being able to set own priorities; the students are generally not in the institutions for long enough to do so.

In PiA, participants are both employees of the institution and students. Thus, the institution formulates own expectations

regarding the deployment of apprentices due to greater integration into the daily operations. That leads to a changed understanding of the role of learning places and thus also to potential for conflict. This problem is not new (Wahle, 2009) but becomes different significance. It results from changing roles and demands of learning places.

"A learning place is to be understood as an institution recognised within the framework of the public education system that organises learning opportunities. The term 'place' implies, first, that learning is structured not only temporally according to timetables, blocks, terms or school years, but also spatially. However, these are not merely spatially distinct places, but places that can be distinguished in terms of their pedagogical function" (Deutscher Bildungsrat, 1974, own translation). Thus, learning places are related not only to the spatial aspect but also to the didactic aspect, which distinguishes one learning place from another (Euler, 2015).

School is the place created primarily and almost exclusively for learning (Mitchell, 1974). Others can become learning places through the integration of teaching methods. Feige (2006) describes them as "secondary places of learning". From the perspective of vocational education and training (VET), the workplace itself is a learning place with its own legitimation due to its own didactisation of the workplace, independently of, yet in collaboration with, the school. This happens, amongst other things, through the creation of regulatory instruments such as training framework plans within the context of turning a work into a vocation ("Verberuflichung"). This independence simultaneously entails a responsibility on the part of both the company and the trainers.

MENTORS AS TRAINERS

In the PiA training supervisors are called "mentors". Every facility in PiA must have a mentor. A dedicated training programme has been created, rather than integrating them into existing trainer qualification schemes of the Dual System. This programme is designed to meet the requirements of working in a nursery (TMBJS, 2021). The curriculum places great emphasis on reflection and counselling processes. Vocational didactics, teaching and learning methods, vocational training law and other aspects of trainer qualification are less prominent. However, this does not meet with the mentors' demands.

In general, the mentors rated the various aspects of the programme's structure and content positively, particularly the more conscious use of methods in training processes (90% agreement), better support for vocational students in the PiA (84%) and in terms of reflecting on their own activities and role in training (84%). Agreement regarding the training content on law (74%), assessment of training progress (72%) and structuring of training content (63%) was somewhat lower. Almost all mentors confirm that the qualification makes an important contribution to high-quality training in

the PiA (90%) (Vonken *et al.*, 2022). However, the traditional "training content" such as labour, education and social legislation, assessment of training progress and structuring of the training are more frequently missed by the mentors. This becomes clearer in the interviews (all translated by the authors) with the mentors.

Some did not learn much new in the further training: "*I'd already done training of this kind before and it was basically the same*" (M9, 96). For others, the training lacked content they needed, particularly legal content like labour, education and social legislation. Furthermore, a lack of guidance on opportunities for cooperation between learning places and on dealing with dropouts was mentioned, as well as insufficient reference to the curriculum: "*The Thuringian curriculum—we touched on that. […] But this subject-specific preparation—and no vocational school has time to sit down and say: This is how it looks*" (M6, 144).

The content focuses primarily on interacting with apprentices and less on the four-part cycle typical of dual vocational training: "Assessing training requirements and planning training", "preparing training and assisting with the recruitment of trainees", "delivering training" and "completing training" (see Ausbilder-Eignungsverordnung, AEVO). Mentors are aware that management and structuring of training get a higher priority. Additionally, training has become more complex: "*Ten years ago, I was introduced to completely different planning models [...]. With this one, everything is broken down again*" (M10, 114).

MENTOR'S ASSESSMENT OF LEARNING PLACES

Interviews revealed shifting responsibilities for learning places. The issue is less about didactic linking than the shift in expectations due to PiA participants' employment. Learning places are characterised by educational distinctiveness, if not independence. When different learning places operate within the same programme, an appropriate distribution of responsibilities is essential. Mentor statements revealed three perspectives.

(1) Networkers engage with schools, reporting designated contacts and information sessions. "*We then also went to the school (location), where we were told that if we had any questions, we would be prepared for them. Each trainee also has a specific teacher as a contact person*" (m5, 16). They collaborate with schools, using personal contacts, and describe communication as swift and unbureaucratic, supported by regular online meetings.

(2) Critics report a lack of collaboration. "*It was very often the case that it was simply, well, the obligation, that typical thing: 'We don't have to do it that way, I haven't covered that in school yet' [...] and then it would be nice to have even closer cooperation [...]*" (m2, 172). Others note minimal communication: "*I'd say it's good, but rather minimal. We have little contact*" (m7, 32). Limited feedback makes school processes opaque: "*Sometimes they're unsure what they're actually supposed to do […] another thing that's*

completely unacceptable: He has to hand in his practical workbook and gets a mark of 4, but receives no feedback" (M10, 28).

(3) Challengers identify difficulties in establishing cooperation. "*The general challenges are, first of all, to build up this whole structure [...] ensuring that a sensible structure emerges and that communication is established. That is a major challenge*" (m3, 26). While communication exists, theory and practice are perceived as separate: "*So there is cooperation [...] but they just do their own thing [...] there's a bit of a lack of that bridge [...] in theory, all that might be important, but in practice, you can't always put it into action like that*" (M1, 42).

CONCLUSION

It is worth considering whether such an approach actually makes full use of the potential of practice-integrated training. Cooperation between learning places in the Dual System provides for equal status between the places, with a slight emphasis on the workplace. In the workplace, therefore, it is not merely a case of applying knowledge acquired at school; rather, knowledge acquired at the workplace is supplemented at school. To use the workplace knowledge in PiA, an own workplace curriculum would be necessary and a curricular independence from the school together with a mentor training that is more focused on apprenticeship than on school learning. However, as long as nurseries in Germany are part of the educational system, it is unlikely to happen.

DECLARATION

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VTE VOCATION, TECHNOLOGY & EDUCATION

RESEARCH PAPER

Repositioning apprenticeship at Senac: Bringing companies and young apprentices closer together in Brazil

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ABSTRACT

Apprenticeship programs have gained increasing international relevance as a strategy for youth inclusion and workforce development in economies undergoing transformation. In Brazil, however, apprenticeship policy is heavily structured around regulatory mechanisms, which often limits company engagement to mere legal compliance. This article analyzes the repositioning of Professional Apprenticeship at Senac, aimed at building stronger connections between companies and young apprentices. The study adopts a mixed-methods approach, combining quantitative research with approximately 40,000 partner companies and focus groups conducted across the commerce, security, and information technology sectors. The findings highlight an emphasis on socio-emotional and technological competency development, greater flexibility in program offerings, and the creation of new solutions and services tailored to companies' needs. The study concludes that closer collaboration between productive sectors and training institutions can enhance both the effectiveness and legitimacy of Brazilian apprenticeship policy.

Key words: professional apprenticeship, repositioning, business engagement, youth workforce development

INTRODUCTION

Professional apprenticeship occupies a strategic position in international debates on Technical and Vocational Education and Training (TVET), driven by digital-

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ization, productive transformation, and the need to integrate young people into the labor market (Cedefop & OECD, 2024). Comparative scholarship linked to European dual systems stresses structured employer engagement, institutional cooperation, and the joint construction of competencies (Deissinger, 2015; Rauner & Smith, 2010). In emerging economies, however, apprenticeships are often shaped by regulatory mandates rather than voluntary participation. In Brazil, Law No. 10.097/2000 established Professional Apprenticeship as national policy, requiring medium and large firms to meet mandatory apprentice quotas.

International research on the economics of apprenticeship asks primarily why firms choose to train, distinguishing an investment rationale—employers bearing net training costs to retain skilled workers—from a production rationale, in which apprentices generate value during training itself (Wolter & Ryan, 2011). These accounts assume that participation is voluntary. However, quota systems reverse this premise: Since hiring is mandatory, the question is not whether companies participate, but how they do so, given that the logic of talent development is not necessarily what motivates their engagement, as occurs in other contexts. In this context, Senac launched, in 2024, a structured process for repositioning Professional Apprenticeship, aimed at strengthening relationships with the productive sector, so that apprenticeships generate value for companies and are not merely treated as quota compliance. This article examines this institutional movement and addresses the following research question: How can regulated apprenticeship systems evolve into models that create shared value for companies, training institutions and young people?

Brazilian professional apprenticeship policy

Within the context of public labor and vocational education policies, professional apprenticeship in Brazil was conceived as a structuring instrument to promote the well-prepared transition of adolescents and young people into the labor market, especially those in situations of greater social vulnerability. Based on dual training principles, its structure seeks to ensure qualifications aligned with labor market demands while guaranteeing comprehensive protection for apprentices. Throughout its consolidation, apprenticeship has come to occupy a strategic position in addressing youth unemployment, eradicating child labor, and promoting the social and productive inclusion of young people.

In 2025, the year in which Brazil's apprenticeship policy completed 25 years since the enactment of Law No. 10.097/2000, the country reached its highest historical level of apprentice hiring, totaling approximately 725,000 adolescents and young people enrolled in apprenticeship programs (Ministry of Labor and Employment of Brazil, 2022). Despite this significant achievement and the progress made over recent decades, the policy has yet to fully reach its legal potential. Considering the mandatory minimum hiring quota established by

Brazilian legislation, it is estimated that the number of apprenticeship positions should exceed one million nationwide. This scenario simultaneously highlights the strategic relevance of the policy and the challenges that still remain for its expansion and consolidation.

Senac's role and the apprenticeship repositioning project

Founded in 1946, Senac is one of Brazil's leading vocational education institutions focused on the commerce, services, and tourism sectors. As a private institution within the Commerce System, Senac has strong national reach and plays a central role in implementing Brazil's apprenticeship policy. In response to labor market transformations, increasing competition among training institutions, and the need to strengthen relationships with levy-paying companies, Senac launched, in 2024, the Professional Apprenticeship Repositioning Project.

The project aims to improve educational offerings, enhance products and services, strengthen relationships with companies, and consolidate Senac as a national reference in professional apprenticeship. As a first step, Senac conducted a large-scale survey entitled "Survey for the Repositioning of Professional Apprenticeship", designed as a broad active-listening strategy involving the productive sector.

METHODS AND RESEARCH DESIGN

The research adopted a mixed-methods approach, combining quantitative and qualitative inquiry. The quantitative phase surveyed approximately 40,000 contributing companies from the commerce, services, and tourism sectors, seeking to understand operational challenges, perceptions regarding educational offerings, interest in new services, and expectations related to apprenticeship programs.

In addition, the qualitative research was conducted through focus groups with representatives from the commerce, security, and information technology sectors. Discussions focused on four main areas: Communication and relationships; management challenges; service demands; and apprentices' trajectories and training needs. Documentary analysis also included strategic implementation plans developed by Senac's National Department based on the survey findings (National Service for Commercial Apprenticeship, 2024).

RESULTS

The findings revealed that companies recognize the relevance of Senac's apprenticeship programs but demand greater institutional proximity, technical support, and operational agility. Key findings included perceptions of excessive bureaucracy, the need for faster responses, and the simplification of operational procedures.

Quantitative data reinforced these findings by indicating growing demand for apprenticeship models aligned with digital transformation and new organiza-

tional dynamics. The results also revealed concerns regarding young people's lack of interest in low-complexity operational occupations, highlighting the need to make training pathways more attractive and connected to real professional development opportunities.

Another central aspect concerns curriculum updating and the strengthening of transferable skills. Companies highlighted the growing importance of digital skills, adaptability, innovation, socio-emotional skills, problem-solving, and communication. Particularly in the information technology sector, demands emerged for training related to software development, data science, artificial intelligence, technical support, and computer networking.

The survey findings also prompted the development of new institutional strategies. In response to the issues identified, Senac strengthened initiatives focused on four central dimensions: Improving communication with young people and companies, updating apprenticeship curricula according to sector demands, digitalization and continuous support for companies, and strengthening corporate services. One of the main initiatives is the Professional Guidance Platform, an environment developed by Senac to support young people in their educational and professional trajectories. Through this platform, Senac aims to strengthen connections between companies and young people, build a job-opportunity database, provide career guidance, offer employability dashboards, and create competency-matching systems.

DISCUSSION

The results indicate that Senac's apprenticeship repositioning process represents a broader institutional transformation. The research highlights the importance of more collaborative models involving schools, companies, and students, as well as greater flexibility and alignment with contemporary transformations in the labor market.

As part of this movement, Senac assumed, in 2025 the pro tempore leadership of the Alliance for Dual Training in Latin America and the Caribbean, a network aimed at promoting cooperation among vocational education institutions in the region, encouraging knowledge exchange and the dissemination of best practices related to dual training systems.

Senac's apprenticeship repositioning movement is aligned with the international quality apprenticeship principles proposed by International Labor Organization (ILO) Recommendation No. 208, which emphasizes shared governance, structured dialogue, training quality, apprentice protection, and linkages to lifelong learning pathways.

The Brazilian case, however, does more than apply established quality apprenticeship principles; it extends the employer-engagement debate to conditions that the dominant theory, developed for voluntary systems, does

not directly address. Where that theory asks why firms train, a quota-and-levy model shifts the question to how engagement can be deepened once participation is compulsory. The discussion on how to foster employer engagement as a meaningful component of apprenticeship programs within a regulated context offers a new perspective for emerging economies that organize apprenticeships through mandatory quotas rather than voluntary incentives. Its contribution, therefore, lies less in confirming existing findings and more in reframing employer engagement as a central challenge in compulsory apprenticeship systems.

CONCLUSION

The study demonstrates that Senac's Professional Apprenticeship repositioning represents an institutional effort to rebuild relationships between companies and young apprentices. The results show that companies demand greater proximity and continuous support, that digital and socio-emotional competencies have become central, and that process digitalization is strategic for the sustainability of apprenticeship policy.

Furthermore, training pathways more connected to the future of work tend to strengthen the legitimacy of apprenticeship among young people and the productive sector. The analyzed case suggests that regulated apprenticeship systems can evolve into more collaborative models by transforming regulatory scale into relational depth. By strengthening cooperation mechanisms with the productive sector and aligning itself with international debates on quality apprenticeships, Senac contributes to the development of new perspectives for professional apprenticeship in emerging economies.

DECLARATION

Article version statement

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VTE VOCATION, TECHNOLOGY & EDUCATION

RESEARCH PAPER

The limits of state-led governance in the transition from informal apprenticeship to formal technical vocational and education training in Nigeria

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ABSTRACT

The persistent failure of implementing government-led vocational reforms in Nigeria exposes a major gap between formal training policies and the long-standing informal apprenticeship practices that shape skills in technical vocational and education training (TVET). Such models presuppose institutionally embedded systems and are ill-suited to contexts where informality remains the dominant governance logic. This study explains why political attempts to formalise apprenticeship in Nigeria fail the existing regulatory logics of informal apprenticeship systems. Using Yin's case study research methodology, the findings reveal that governance operates across three levels: The micro level of informal apprenticeship, where regulation is structured through moral economies and occupational authority, the meso level of institution-organisation where TVET teachers act as crucial regulatory mediators and the macro level where national reforms fail institutional implementation. This paper demonstrates that in contexts of weak state institutionalisation, governance is a contested and negotiated process which unfolds across overlapping regulatory fields.

Key words: policy formation, apprenticeship, skill development, governance

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INTRODUCTION

The puzzle of apprenticeship beyond the state in Nigeria

The landscape of skills development and formation in Nigeria is demonstrably varied. On one side, the formal technical vocational and education training (TVET) frameworks which exist are encompassed by technical colleges at the primary level where graduates obtain a National Technical Certificate (NTC) to pursue their training at the secondary level to achieve an Advanced National Technical Certificate (ANTC). At the post-secondary and tertiary level, polytechnics allow graduates to reach a National Diploma (ND) or Higher National Diploma (HND) to facilitate entry to higher education. Although other government-backed training initiatives exist, most Nigerian formal TVET provision is overseen by bodies such as the National Board for Technical Education (NBTE) and the Industrial Training Fund (ITF) (Jinadu & Bello, 2025).

Yet, on the other side, informal apprenticeship serves as the predominant mode of skills acquisition within the informal economy and operating independently of formal state intervention (Catherine, 2014; Ngyah-Etchutambe *et al.*, 2022). This self-regulating and self-financing system is primarily structured around kinship, friendship, and philanthropic networks, with minimal governmental attention or patronage. The concept of moral economy, as originally articulated by Thompson in his analysis of pre-industrial English food markets, describes systems of exchange organised by shared norms, reciprocal duties, and collective legitimacy (Thompson, 1971; Ukah, 2023). Applied to Nigerian informal apprenticeship, this logic manifests in systems such as the Igbo Igba-Boi model: A self-governing institution where skill transfer is governed by moral obligation, social trust, and occupational reputation (Antai *et al.*, 2024; Irene *et al.*, 2024). This system not only produces practically proficient and entrepreneurially minded graduates but also provides a form of social settlement upon completion of training such as a start-up capital or goods that formal TVET cannot replicate. Its governance logic is inherently relational and community embedded as demonstrated within communities of practice (Lave & Wenger, 1991).

The persistent policy-implementation gap in TVET reform

Despite the importance of TVET for economic development, Nigeria experiences significant disconnections between policy formulation and practical implementation. Governmental efforts to reform and formalise training fail to account for informal apprenticeship (Figure 1). Furthermore, this fragmented TVET governance distributed across multiple ministries and agencies with overlapping and often contradictory mandates, produces inconsistent standards (Rahman *et al.*, 2025). This prevents the development of coherent national skills strategies, therefore leaves the most effective pathway into skilled work structurally outside the reach of formal policy.

The gap between policy and implementation has been extensively documented within Nigerian TVET scholarship

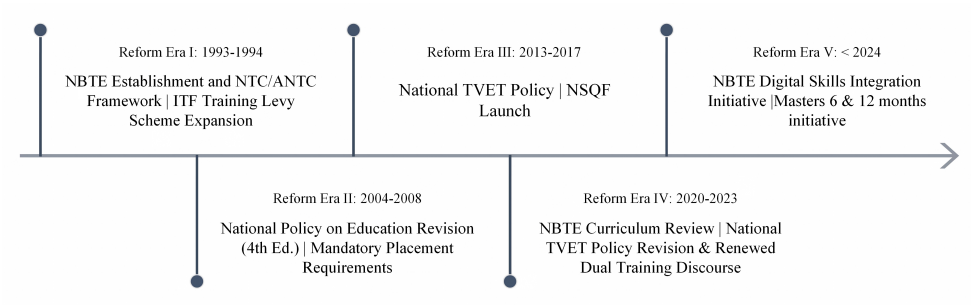


Figure 1. Major Nigerian TVET policy reforms and implementation outcomes, 1993-2025. NBTE, national board for technical education; NTC, national technical certificate; ANTC, advanced national technical certificate; ITF, industrial training fund; TVET, technical vocational and education training; NSQF, national skills qualifications framework.

(Adewale, 2022; Akanbi, 2017; Okorafor & Nnajiofo, 2017). However, what has not been adequately theorised is precisely why this gap endures despite decades of repeated reform efforts. This paper proposes a theoretical corrective to existing comparative apprenticeship research. Utilising a multi-level qualitative analysis of Nigerian TVET governance, it argues that governance in Nigeria's apprenticeship transition operates across three distinct levels, each possessing its own regulatory logic. This analysis provides a more nuanced understanding of the challenges in bridging the formal and informal sectors of skill development in Nigeria, moving beyond simplistic views of policy failure.

METHODS AND RESEARCH DESIGN

Case study research methodology

The study adopts a qualitative case study design following Yin (2018), who defines the case study as an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-world context, particularly when the boundaries between phenomenon and context are not clear. Second, the research question is an explanatory question concerning mechanisms and processes. Yin (2018) argues that explanatory why or how type questions are precisely the domain where case study methodology holds comparative advantage over survey-based or experimental designs.

The unit of analysis is the Nigerian formal TVET institution as a governance site: A meso-level organisation operating at the intersection of state policy mandates and informal apprenticeship economies. Multiple cases are embedded within this single national context, corresponding to Yin's (2018) embedded single-case design. Each institutional interview constitutes an embedded unit,

enabling within-case comparison across regions, institution types, and educator roles while preserving the integrity of the national governance context as the bounding case.

Empirical design

The empirical foundation of this paper is based on a multi-level qualitative design carried out between November 2025 and February 2026, employing cross-source triangulation. At the macro level, the analysis synthesises existing peer-reviewed literature and policy documents pertaining to Nigerian TVET reform trajectories. At the meso level, contextual insights were gathered from a qualitative survey of 45 TVET stakeholders (67% of whom were teachers or school trainers, geographically distributed with a concentration in northern Nigeria). At the micro level, eight in-depth, semi-structured interviews with educators, training coordinators, and institutional administrators were conducted across various Nigerian formal TVET institutions. Both the survey and interview instruments were conducted in English, recorded with full participant consent, and subsequently subjected to a two-cycle thematic coding process: Initial descriptive codes were consolidated into analytical categories structured around the proposed governance layering framework.

RESULTS

Overview of the findings

The findings across all sources used in this study map onto the three-level governance model proposed in the introduction as shown in Table 1.

Interpretation and discussion

The four themes show a governance system which is broken at every level simultaneously, and in ways that reinforce each other. At the macro level, Theme 1 reveals a reform culture in which policies are written, institutions are renamed, and frameworks are adopted, yet nothing changes in the workshop or the classroom. This is the predictable outcome of a hierarchical authority model that assumes governance flows downward from ministerial design to institutional practice, in a context where the institutional architecture to carry that flow has never been built.

Themes 2 and 3 show what happens at the meso level when the macro level cannot deliver. Teachers are left to personally navigate between a formal system that demands credential-based instruction and students who arrive shaped by sometimes years of informal apprenticeship experience. Companies are asked to engage voluntarily with a system that offers them no governance role beyond hosting placements. Neither educators nor employers are failing individually; both are being asked to bridge a structural gap that should have been closed by institutional design.

The training pathway that operates with no state involvement, no curriculum framework, and no formal certification is consistently identified in theme 4 as producing more practically capable and en-

Table 1: Governance logics in practice: Key findings by analytical theme

Main themes and governance level	Key findings
Theme 1: Policy without architecture Macro level	Reforms adopted as vocabulary; implementation estimated at approximately 30% effectiveness; funds diverted; programmes abandoned at political transitions
Theme 2: Teacher competence crisis Meso level	Educators hold academic credentials but lack practical competence; teacher functions as improvised mediator between incompatible governance logics without institutional support
Theme 3: School-industry decoupling Meso level	Industry present as placement host only; absent from curriculum co-design and governance; North-South regional disparity structural; conflict-affected regions have no viable industry partners
Theme 4: Informal sector as asset Micro level	Informal apprenticeship produces practically proficient, entrepreneurially minded graduates that formal TVET aspires to but has not achieved; three integration mechanisms proposed; none exists at scale

TVET, technical vocational and education training.

trepreneurially confident graduates than the system the state has spent decades trying to build. The three integration mechanisms that participants propose to create a path from informal apprenticeship towards formal training are therefore summarised: (1) recognition of prior learning, (2) tiered certification, and (3) recruitment of master craftspersons. Each mechanism reaches toward the result that the micro-level relational logic is the foundation to be built upon.

CONCLUSION

State-led reform instruments operate through hierarchical authority and are designed for contexts where institutional infrastructure already exists to carry policy into practice (Billett, 2013). In Nigeria, that infrastructure does not exist, and the informal apprenticeship sector operates through a relational authority logic that hierarchical instruments cannot reach.

The practical implication is that the direction of reform needs to be reversed. Rather than attempting to absorb informal apprenticeship into formal institutional frameworks, policy should ask what the formal system can offer that informal apprenticeship structurally cannot provide for itself: Portable credentials, theoretically grounded knowledge, and pathways into further education. The three integration mechanisms that emerged independently across multiple interviews point toward what a complementary architecture might look like in practice. None requires dismantling what already works.

For comparative apprenticeship research, the contribution is a call for greater analytical precision about what governance means in contexts of weak state institutionalisation. Governance is

not absent where the state is weak; it is organised differently, at different levels, and through different sources of authority. Future research should examine whether the layered authority model developed here travels to other West African contexts, and whether hybrid governance architectures that connect relational and hierarchical authority can be designed without reproducing the dependency logics that have historically accompanied externally driven TVET reform in the region.

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VTE VOCATION, TECHNOLOGY & EDUCATION

RESEARCH PAPER

Institutionalising apprenticeship in informal labour markets: Governance and system architecture in Zambia's construction sector

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ABSTRACT

Apprenticeship governance in hybrid labour markets raises fundamental questions about institutional realisation, coordination, and regulatory capacity. This paper analyses how apprenticeship is established within the construction sector in Zambia, based on qualitative data from 64 interviews and 15 focus groups (n = 142) across four provinces. The sector has 87.5% of its employment classified as informal. Mandates are dispersed across actors without a coordinating backbone; training institutions absorb operational burdens while employer participation remains voluntary. Informal contractors dominate entry-level pathways, enabling access but weakening standardisation. Inclusion outcomes depend on individual champions rather than embedded safeguards. The paper argues that effective governance requires a dedicated coordination mechanism, clearer mandates, sustainable financing, and formalised engagement with informal firms.

Key words: apprenticeship governance, work-based learning, informal economy, construction sector

INTRODUCTION

Apprenticeship governance in hybrid labour markets—where formal regulation coexists with widespread informal practice—remains poorly understood (Allais, 2020; Hofmann *et al.*, 2022). While many countries have

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adopted competency-based frameworks, implementation in contexts where informality is structural rather than transitional is rarely examined (ILO, 2024a; UNESCO, 2021). Zambia's construction sector offers a critical case. It contributes approximately 10.0% of GDP and employs 188,232 workers, yet 87.5% are in informal employment (Zambia Statistics Agency, 2024). The remaining 12.5% in formal employment benefit from social security coverage, paid leave, and other statutory protections—entitlements largely absent in the informal sector (Zambia Statistics Agency, 2024).

The trend of informality has dominated Zambia's construction sector (Phe Goursat & Pellerano, 2015) and existing projections suggest that it is likely to remain the dominant form of employment (ILO, 2024b). In shaping the characteristics of *employment,* informality also shapes the characteristics of *apprenticeships*. The Government of Zambia is in the process of drafting an Apprenticeship and Work-Based Learning Bill 2025 to replace the 1964 Apprenticeship Act (World Bank, 2023). However, the regulatory components of the Bill risk preventing, rather than promoting, informal sector participation in apprenticeship. During this critical policy transition, this research demonstrates how governance arrangements can be structured to promote apprenticeship in an economy dominated by informality.

Drawing on a large-scale qualitative study commissioned by Build It International, this paper asks: How is apprenticeship conceptualised, structured, and operationalised within Zambia's construction sector, and what governance arrangements shape its realisation in a predominantly informal labour market? We analyse mandate distribution, coordination gaps, the role of informality, and conditions for embedding inclusion. The analysis is framed by the ILO WBL Continuum (ILO, 2024a), Skills Ecosystem Theory (Grainger & Spours, 2018), and a Gender Equality, Disability and Social Inclusion (GEDSI) lens (FAO, 2023).

METHODS AND RESEARCH DESIGN

A qualitative exploratory design was adopted, conducted between October 2025 and January 2026 across four Zambian provinces: Lusaka, Central, Copperbelt, and Southern. These sites capture variation from high-density urban centres to peri-urban and semi-rural areas. Data collection comprised 64 in-depth interviews (IDIs) and 15 focus group discussions (FGDs). IDI participants included policy and regulatory actors (n = 30), training institution representatives (n = 17), industry and employer representatives (n = 21), and youth trainees or graduates (n = 13). The 15 FGDs involved 78 youth (32% women), disaggregated into current Work-Based Learning (WBL) participants, WBL graduates, and youth without WBL experience. Total sample size was 142 respondents. Purposive sampling enhanced diversity in gender,

geography, role and WBL exposure. Analysis followed inductive-deductive thematic analysis, supported by NVivo and double-coding of 20% of transcripts. Triangulation across actor groups strengthened validity. Ethical approval was obtained from the University of Zambia (Ref. HSSREC: 2025DEC013); all participation was voluntary and anonymised.

RESULTS

How apprenticeship is understood

No single national definition of apprenticeship exists. Across all groups, participants described it primarily as "learning on the job" or "industrial attachment"—a practical experience rather than a structured system. An informal contractor explained: "*For us, apprenticeship is when a young person comes to my site, I show them the work, they help me, and they learn bit by bit. There is no form, no contract—just agreement between us*" (IDI, Industry, Southern, Male).

Regulators acknowledged the gap between framework and practice: "*We have standards, we have policies … but out there, people still do it the way they have always done it. The law is ahead of reality*" (IDI, Policy, Lusaka, Female).

This conceptual divergence means rules exist but are not universally understood or adopted, creating parallel systems—one written, one lived. This points to the structural dominance of informal apprenticeship practice, which operates largely outside the formal regulatory framework.

How governance is organised

Roles are dispersed across multiple bodies—the Technical Education Vocational and Entrepreneurship Authority (TEVETA) sets standards, the Ministry of Labour registers schemes, the National Council for Construction oversees quality—but no single entity has clear authority to coordinate or enforce coherence. A training manager described the resulting confusion: "*If I have a problem with training, do I go to Labour? TEVETA? The Council? I don't know. Sometimes I go to all three and still get no answer*" (IDI, Training, Copperbelt, Male).

Institutional actors confirmed that coordination meetings are ad hoc, under-resourced, and lack binding decisions. For youth, this fragmentation translates into uncertainty about recognition: "*When I finished my attachment, the institution said it was recognised, but the contractor said it meant nothing. Who decides what counts?*" (FGD, Youth Graduate, Central, Female).

Inclusion in governance is almost absent. Regulatory decision-making bodies remain overwhelmingly male, and persons with disabilities were rarely mentioned. A youth participant noted: "*We want more women, but the rules don't say we must. It depends if the owner of the company is willing*" (FGD, No-WBL Youth, Lusaka, Female).

Entry-level pathways

Over 80.0% of entry-level access happens through informal channels—family connections, word-of-mouth, or

direct approach to small contractors. A young apprentice described her route: "*I got this place because my uncle knows the foreman. No papers, no interview—just start working and learn. It's the only way in*" (FGD, Current WBL Youth, Copperbelt, Female).

While informality is valued for enabling access, it carries significant risks. Unlike formal employment—which entitles workers to social security, worker protection, and paid sick leave—informal work is characterised by unregulated hours, irregular pay, and minimal use of safety equipment.

Geographic disparities compound these challenges. A policy actor acknowledged a geographical structural challenge: "*Industry is not evenly distributed across Zambia… making attachment mandatory without addressing this could disadvantage learners*" (IDI, Policy, Lusaka, Male).

Geographic concentration exacerbates uneven access: Lusaka and Copperbelt provinces together employ 57.6% of all construction workers (Zambia Statistics Agency, 2024). Rural entrants face significant barriers.

Financing and incentives

Employers receive no tax relief, grants, or recognition for hosting apprentices; participation is entirely voluntary. A formal contractor expressed reluctance: "*Why should I take a trainee? They slow me down, I have to pay them something, and no one helps me. Only if I really want to help a young person*" (IDI, Industry, Lusaka, Male).

Youth bear most of the costs—transport, tools, basic needs—making apprenticeship unaffordable for many. A former apprentice explained why she stopped: "*I stopped because I had to pay to go to site, and sometimes they didn't even give food allowance. My parents couldn't support me anymore*" (IDI, Youth Graduate, Southern, Female).

Incentives for inclusion are non-existent; employers have no reason to adapt sites or practices to accommodate women or persons with disabilities, leaving the most marginalised learners unprotected.

Implications for policy and practice

Zambia's upcoming draft Work-Based Learning Bill offers a key policy opportunity. Effective governance in informal economies requires more than legislation, and three priorities stand out. First, a dedicated coordination mechanism is vital. A sector skills body for construction, inspired by Kenya's National Industrial Training Authority (NITA, 2024) or South Africa's Sector Education and Training Authority (ILO, 2020), could bring together TEVETA, training institutions, industry associations, and informal contractor networks to negotiate placement quotas, standardize assessments, and manage feedback. While the WBL Bill does provide for a Work-Based Learning Committee, its proposed membership prioritises formal regulatory bodies and line ministries, whose mandates are ill-suited to engaging Zambia's large informal sector.

Second, clear mandates and sustainable funding are essential. The Skills Devel-

opment Levy (SDL) should support trainee allowances, PPE, and insurance, while incentives such as tax relief, levy rebates, or subsidized supervision could encourage MSME participation. Without these, employer involvement will be limited. Importantly, the WBL Bill does reference funding mechanisms and incentives—including bursary schemes for host enterprises, interns, apprentices, and learning institutions—for enterprises registered under the future Act. However, registration requirements are not explicitly stated. If they mirror existing SDL criteria, eligibility would be confined to formally registered and regulated enterprises, thereby excluding the majority of Zambia's construction sector.

Third, formal engagement with informal firms is necessary. Recognition of Prior Learning pathways, modular assessments, and accredited master artisan programs can formalise informal training while preserving its flexibility (van der Waldt *et al.*, 2025). Inclusion and safety must be embedded from the outset, rather than left to individual discretion. This means mandating gender-sensitive facilities, disability accommodations, health and safety measures, and safeguarding mechanisms. Notably, "Inclusiveness" is already cited as one of six guiding principles in the WBL Bill—a foundation that should be operationalised into enforceable requirements.

For Zambia, the lesson is clear: Effective apprenticeship reform must recognise that informality is structural, not transitional. The appropriate response is to build on existing practices by strengthening, standardising, and safeguarding what already works—not to impose formal systems from scratch.

CONCLUSION

Apprenticeship in Zambia's construction sector is valued and practiced but remains weakly institutionalised. Mandates are scattered, coordination fragile, and inclusion relies on individual champions rather than systemic safeguards. Informality allows entry but hampers standardisation, portability, and learner protection. The upcoming WBL offers a chance to establish a coordinated mechanism, allocate mandates with sustainable funding, and formally engage informal contractors. This can shift Zambia from a fragmented system to a coherent, equitable apprenticeship model responsive to labour market needs.

DECLARATION

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VTE VOCATION, TECHNOLOGY & EDUCATION

RESEARCH PAPER

Social dialogue in apprenticeship reforms in Benin and Côte d'Ivoire: Reality or wishful thinking?

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ABSTRACT

This contribution examines the extent to which social dialogue has effectively structured and influenced recent apprenticeship reforms, particularly those related to informal apprenticeships, carried out in Benin and Côte d'Ivoire over the last ten years. It analyzes the degree and quality of involvement of social partners and other stakeholders in the introduction of dual apprenticeship and traditional apprenticeship certification (CQM/CQP), the robustness and consistency of the institutional frameworks governing consultation, the organizational and technical capacities of the actors, and the quality of the dialogue processes mobilized in the design, adoption, and implementation of the reforms. It finds that social dialogue constitutes a real but uneven mechanism for governing reforms. Despite important advances in reforms, the influence of stakeholders remains asymmetrical: The State retains the power of arbitration, employers control access to apprenticeship positions, while trade unions and craft sector representatives have more limited technical and institutional resources.

Key words: apprenticeship, social dialogue, governance, West Africa

INTRODUCTION

Social dialogue is not only one of the four strategic objectives of the ILO's Decent Work Agenda and a means for social justice. It is an essential ingredient of effective skills and labour market reforms—not only on paper but in practice (Global Deal *et al.*, 2020). The ILO's Recommendation No. 208 on

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Quality Apprenticeships (2023) emphasizes that well-functioning apprenticeship systems require strong governance frameworks grounded in social dialogue. Social dialogue includes all types of negotiation, consultation and exchange of information between or among representatives of governments, employers and workers and hence regulates divergent interests through pluralistic but organized industrial relations (Flanders, 1970; Schmitter 1974; Standing, 2008) based on free, independent, representative and capable organizations of workers and employers.

As reconfirmed by recent International Labor Organization (ILO) estimates (International Labor Organization, 2024), most apprentices in countries with large informal economies are trained outside formal regulatory frameworks, often with limited quality assurance and recognition of skills. Several countries have aimed to introduce quality improvements and strengthen formal arrangements through qualifications, standards, contracts, or access of apprentices and master craftspersons to further learning (Akoojee & Werquin, 2026; Hofmann *et al.*, 2022). Benin and Côte d'Ivoire serve as examples to show in how far social dialogue has structured and influenced recent apprenticeship reforms over the last 10 years.

METHODS AND RESEARCH DESIGN

The paper asks if social dialogue has been a real mechanism for co-defining, co-designing and regulating reforms, or has it been limited to a formal consultative function with no substantial impact on strategic direction, normative choices, and their operational implementation. It adopts a comparative qualitative approach based on a systematic documentary analysis of the legislative and regulatory texts relating to apprenticeship reforms in both countries; an examination of national frameworks for social dialogue and vocational training in light of relevant ILO standards, in particular Conventions No. 87, 98, 144, and Recommendation 208 on Quality Apprenticeships; semi-structured interviews with representatives of relevant ministries, employers' and workers' organizations, trade and professional associations, chambers of trade, and other actors; an analysis of the processes used to identify key moments of influence, negotiation, or exclusion of social partners in the different phases of the reform cycles (design, normative adoption, implementation, evaluation).

The analysis is based on a conceptual framework linking multi-level governance, institutional capacities, and the procedural quality of social dialogue.

RESULTS

The results show that, in both countries, apprenticeship reforms have been driven by a strong political will to modernize apprenticeship systems, with an emphasis on building on existing apprenticeships, improving the quality of training, and improving labour market prospects of young people.

Social dialogue and apprenticeship governance

Both countries have used existing national social dialogue mechanisms to advance apprenticeship reforms, leading to the adoption of regulations that introduce strengthened and better structured apprenticeship systems, apprenticeship contracts, financial compensation, end of apprenticeship qualifications (Trade certificates called CQM and Vocational certificates CQP), and dual training approaches in both countries. These established formal mechanisms have been complemented by additional dialogue spaces, including some that were less inclusive of key actors. However, in line with theories on industrial relations and pluralism, social dialogue is judged not merely on the existence and inclusiveness of consultations and negotiations among stakeholders with divergent interests, but on their capacity to modify rules and practices, and reach compromise between the state, employer organizations, trade unions, chambers of commerce, professional sectors, technical and financial partners, as well as stakeholders from the craft sector and the informal economy.

The situation of social dialogue in reforms in Benin

In Benin, the reform took place within a relatively structured institutional framework, incorporating formal tripartite consultation forums like the National Social Dialogue Council. Social partners and in particular trade associations were involved at various stages of the process, particularly in the drafting of strategic texts and certification mechanisms. Nevertheless, the analysis reveals that while trade associations actively contribute to the process, the power of initiative remains with public actors. The capacity for effective influence depends largely on their national organizations' technical and organizational resources, their ability to produce independent sector-specific expertise, and the ability of their members—craftspeople offering apprenticeships—to formalize their relationship with apprentices to be recognized as legitimate stakeholders. Although participation is institutionalized, it remains asymmetrical, with public administrations and technical and financial partners retaining a strong control over the reform agenda and expertise. Social dialogue has helped to strengthen the legitimacy and social acceptability of reforms, but its impact on certain structural choices remains limited (Bankolé *et al.*, 2020; Davodoun, 2019).

The situation of social dialogue in reforms in Côte d'Ivoire

In the case of Côte d'Ivoire, the apprenticeship reform follows the general characteristics and framework for social dialogue (CIPC, CCT, and CNDS) and on a training-to-employment public-private partnership pathway initiated by the 2009 Framework Agreement and consolidated through a Joint Steering Committee in 2016 (Republic of Côte d'Ivoire, 2009). The 2019 decree on apprenticeships with a new Technical Apprenticeship Committee (CTA) with

"tripartite plus" composition bringing together government, employers, chambers of commerce, professional sectors, and unions has refined this framework (Republic of Côte d'Ivoire, 2019). In this context, social dialogue is not limited to a consultative role; it constitutes a mechanism for governing and regulating relations among stakeholders in the apprenticeship system. This structure demonstrates that social dialogue has become an institutional reality in apprenticeship reform and has contributed to the development of several normative and technical instruments—standard contracts, pre-remuneration, competency frameworks, CQP/CQM certification, and recognition of prior learning. However, its functioning remains marked by significant asymmetries in power and resources: The State retains the power of final arbitration and control over the regulatory framework; employers strongly influence the reform through their control of apprenticeship positions and training capacity; while trade unions and craft sector representatives have more limited technical, organizational, and informational resources. Consequently, while social dialogue has indeed influenced the legal and institutional formalization of the reform, its impact appears weaker on the operational aspects of funding, monitoring, regional implementation, and quality control of work-study programs (Kouakou, 2020; N'depo, 2026).

Comparative analysis

In both countries, the study highlights a gap between the formal architecture of social dialogue and its actual capacity to produce inclusive and sustainable outcomes in the context of apprenticeship reforms. This gap is particularly evident in the varied influence of the social partners on structural choices and the redistribution of resources within skills systems. The involvement of key stakeholders varies by stage, level of organization, and whether consultations are broad or ad hoc. In some cases, operational progress on joint definition of skills and training standards, the training of workplace trainers, or the arrangements for certification has been achieved. Social dialogue has in these cases been more effective at the technical level than at the overall strategic level. In Côte d'Ivoire, the reform has not yet reached scale.

ILO standards on tripartite consultation and freedom of association provide a relevant frame of reference, but their operational implementation depends heavily on the capacities of the actors involved, the institutional culture of dialogue, the structure of professional organizations, and existing power relations. Social dialogue has generally contributed to improving the social acceptability of reforms, but its role as a lever for structural transformation of apprenticeship systems, particularly in their articulation with the informal sector, remains only partially realized.

CONCLUSION

To conclude, apprenticeship reforms in Benin and Côte d'Ivoire have greatly benefitted from social dialogue as a

coordination mechanism to balance divergent interests and find common ground in a complex skills ecosystem. The analysis showed, however, that social dialogue cannot be viewed as either a mere institutional facade or a fully consolidated mechanism of co-governance. In both countries, it has contributed to the formalization and legitimization of reforms through the development of legal frameworks, governance mechanisms, and technical tools related to apprenticeship, particularly regarding certification, harmonization of standards, and dual programs. However, the findings also highlight a persistent gap between institutional participation and effective influence on strategic decisions and operational implementation. Resource asymmetries, the central role of the state, the limited capacities of workers' organizations and partly of trade and professional organizations, as well as weak monitoring mechanisms, financing mechanisms that remain dependent on external resources, and limited involvement of local levels, limit the transformative impact of social dialogue.

These findings suggest several implications for public policy to turn wishful thinking into reality: Strengthening the technical and organizational capacities of social partners, further decentralizing governance mechanisms, improving funding and monitoring-evaluation mechanisms, and more systematically incorporating the voices of apprentices, master craftspersons, and instructors. For professional practices, the challenge is to move from a primarily consultative approach to more effective forms of co-regulation of apprenticeship systems.

Finally, for research, this study highlights the value of comparative and multi-stakeholder approaches that allow for the analysis not only of formal structures of social dialogue, but also of power relations, concrete negotiation practices, and the gaps between prescribed reforms and actual implementation.

DECLARATION

Article version statement

This article has been reviewed and preliminarily edited. It is intended solely for use at the 10th Research Conference of the International Network for Innovative Apprenticeship (INAP). The final version will be published in *Vocation, Technology & Education* (https://www.vtejournal.com).

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VTE VOCATION, TECHNOLOGY & EDUCATION

RESEARCH PAPER

A private investment or a societal good? Apprenticeship costs, governance and institutional coordination in England, Germany and Austria

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ABSTRACT

This paper examines how institutional governance arrangements shape the costs borne by employers in apprenticeship systems in Germany, Austria and England. Drawing on a matched plant study of European Qualification Framework (EQF) level 4 apprenticeships for heating, ventilation and air-conditioning (HVAC) engineers and chefs, the analysis applies the Federal Institute for Vocational Education and Training (BIBB) cost-benefit methodology to compare employer costs across comparable firms. Apprenticeships in Germany and Austria impose relatively low net costs on employers. England emerges as a clear outlier with significantly higher net costs even after standardising for program duration. The paper argues that these differences are driven less by occupational training content than by institutional coordination, the role of intermediary organisations, and the allocation of governance responsibilities. The findings highlight how demand-led apprenticeship systems may increase the financial risk faced by employers. It may also help explain why apprenticeships in England have been increasingly associated with the delivery of continuing rather than initial vocational education and training.

Key words: apprenticeships, institutional governance, employer costs, vocational education and training

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INTRODUCTION

Across Europe apprenticeships are frequently positioned as a policy solution to problems related to the school-to-work transition, skill mismatches, and the labour market integration of young people. This has generated sustained interest in policy transfer, particularly from countries with long-established dual systems to those seeking to expand apprenticeship provision. Apprenticeships, however, are not institutionally neutral instruments. Their scale, character and sustainability depend on how costs, benefits, responsibilities and risks are distributed across employers, vocational education providers, intermediary organisations, individuals, and the state.

This paper examines how institutional and governance arrangements shape the costs borne by employers in apprenticeship systems in Germany, Austria and England. It presents findings from a matched plant study that compared the net costs and benefits of delivering the same apprenticeships in matched workplaces across the three countries. The analysis focuses on two European Qualification Framework (EQF) level 4 apprenticeships: (1) Heating, ventilation and air-conditioning (HVAC) engineers, and (2) chefs.

Using a common methodology based on the German Federal Institute for Vocational Education and Training (BIBB) cost-benefit survey framework (Schönfeld *et al.*, 2020), the paper demonstrates substantial cross-national variation in employer costs despite broad similarities in occupational content and training level. In both occupations, apprenticeships in Germany and Austria impose relatively low net costs on employers and, in the Austrian case, may generate a net financial benefit over the formal training period. England emerges as a markedly different case, with substantially higher net costs even after standardising for program duration. The paper suggests that these differences are not primarily attributable to occupational content or curriculum design. Rather, they reflect differences in institutional coordination, the allocation of governance responsibilities, the role of intermediary organisations and the status of apprentices within firms. The number of cases is necessarily limited and the findings indicative rather than representative. Nevertheless, by comparing closely matched firms delivering equivalent apprenticeships across three national systems, the study isolates how institutional arrangements shape employer cost structures independent of occupational content or sectoral variation (Erickson *et al.*, 2025).

Apprenticeships as socio-institutional arrangements

Employers invest in apprenticeship for different reasons. In some cases, apprenticeships are expected to meet immediate production needs and employers seek to recover training costs during the formal training period. In other cases, apprenticeships are treated as a longer-term workforce development strategy and an

investment in future skill supply. These orientations are shaped by firm-level strategy, labor market institutions and governance arrangements (Acemoglu & Pischke, 1999; Erickson *et al.*, 2025; Muehlemann *et al.*, 2010).

Research on apprenticeship systems has highlighted the importance of institutional coordination, often interpreted through the varieties of capitalism lens, in sustaining employer investment in training (Acemoglu & Pischke, 1999; Thelen, 2004). In coordinated market economies such as Germany and Austria, intermediary institutions reduce uncertainty and help mitigate free-rider problems. Chambers, collective agreements, and nationally standardised occupational frameworks distribute responsibilities for curriculum design, assessment, and quality assurance across the system, rather than concentrating them at the firm level. In more liberal labour market systems, such as England, employers face greater uncertainty regarding post-training retention (Muehlemann *et al.*, 2010), and are more exposed to the direct cost of coordination and assessment. This potentially increases the pressure to prioritise apprenticeships that generate short-term returns or that are directed towards existing employees whose productivity is already established.

This distinction is reflected in the differing purposes apprenticeships serve across the three countries. In Germany and Austria, apprenticeships remain primary forms of initial vocational education and training linked to labour market entry. In England, apprenticeships have increasingly become associated with continuing vocational education and training and are often used to accredit the skills of existing workers (Erickson & Hogarth, 2026).

Methodology

The paper draws on a matched plant study undertaken in Germany, Austria and England. The study applied a common methodology based on the BIBB cost-benefit survey to estimate the net costs and benefits to employers of delivering apprenticeships. Six case study workplaces participated in the research: One HVAC firm and one hotel (employer of chefs) in each country. Workplaces were matched according to size, sector and market orientation in order to minimise confounding variation and facilitate like-for-like comparison. In the case of the hotel, all three case sites belonged to the same corporate brand, further ensuring comparability.

Data were collected through qualitative interviews and detailed financial information provided by employers. Interviews involved managing directors, human resource staff, financial personnel and occupational supervisors such as executive chefs or qualified HVAC engineers. The analysis examined apprentice wages, supervision costs, administrative costs, training expenditures, and the productive contribution of apprentices during the training period. The productive contribution of an apprentice was calculated by combining the time spent on skilled and auxiliary tasks, their relative productivity

compared to fully qualified workers, and the corresponding labour costs. A full breakdown of year-by-year costs and benefits in each case is available in Erickson *et al.* (2025).

Findings

Employer costs and net investment

The findings reveal substantial differences in the net costs borne by employers across the three countries (Table 1) (Erickson *et al.*, 2025).

Table 1: Cost-benefit of apprenticeships (£)

Item	Germany	Austria	England
HVAC apprenticeships	14,232	-7976	40,579
Chef apprenticeships	4963	-2385	22,182

Source: Erickson *et al.*, 2025. HVAC, heating, ventilation and air-conditioning.

In the HVAC cases, the Austrian employer recorded a net financial benefit of approximately £ 8000 over the training period while the German employer incurred a relatively modest net cost of around £ 14,000. The HVAC employer in England, by contrast, faced a net cost exceeding £ 40,000 over the training period. Even after standardising program duration, the English apprenticeship remained substantially more expensive than the German and Austrian cases. A similar pattern emerged in the chef apprentice cases. The Austrian hotel recorded a small net benefit, the German hotel a relatively limited net cost, and the English Hotel a substantially higher net cost. After standardising for program duration, the estimated net cost for the English chef apprenticeship exceeded £ 33,000 (Erickson *et al.*, 2025).

Across both occupations, apprentice wage costs constituted the largest single cost element. Wage costs in England were significantly higher than in Germany and Austria, even where apprentices were newly recruited rather than existing employees. In Germany and Austria, apprentice pay was more clearly structured as part of a vocational education pathway and embedded within collective arrangements governing training and wages (Erickson *et al.*, 2025).

At the same time, differences in net costs were not solely attributable to wages. Employers in England also reported higher administrative and supervisory costs associated with coordinating training delivery, managing relationships with providers and supporting assessment processes. The findings further indicate that apprenticeships in England were often highly productive during training. In the case of chefs in England, apprentices were reported to perform at nearly fully qualified productivity levels because the apprenticeship is frequently used to certify existing workers rather than onboard new recruits. This was explained by managers at the hotel in England as partly in response to the desire to recoup levy costs. Regardless, higher productivity levels did not offset the high costs faced by the employer. Apprentices in the England cases appeared to occupy a status close to

regular employee undertaking accredited workforce development whereas apprentices in Germany and Austria were more consistently positioned as learners within Initial Vocational Education and Training (IVET) pathways (Erickson *et al.*, 2025).

Governance arrangements and institutional coordination

The study suggests that differences in governance arrangements play a central role in shaping employer costs. In Germany and Austria, intermediary institutions such as Chambers coordinate key elements of apprenticeship delivery. Chambers oversee assessment, support curriculum implementation, provide training infrastructure and act as guarantors of occupational standards. Assessment processes are nationally standardised and conducted independently of individual firms through examination boards which are composed of employer, employee and vocational education representatives. This structure externalises many administrative and coordination functions that would otherwise fall upon employers. Across both occupations studied, employers in the Germany and Austria cases employers reported relatively high levels of confidence in the consistency and credibility of apprenticeship standards and assessment outcomes. The role of Chambers in the delivery system functions to reduce transaction costs for employers by externalising functions that would otherwise need to be coordinated at the firm level (Erickson *et al.*, 2025).

In England, by contrast, apprenticeship governance relies more heavily on bilateral coordination between employers and colleges or training providers, supplemented by external assessment organisations. Assessment processes remain formally independent but are embedded within workplace practice. Employers are responsible for supporting an apprentice to meet a set of gateway requirements before facilitating the assessment arrangements and ensuring that sufficient workplace evidence of learning can be generated. The absence of a strong intermediary institution places greater administrative and coordination demands on employers in England. The cases in England reported higher supervision and administration costs associated with monitoring the apprentice's progress, managing relationships with training providers, and navigating assessment requirements and processes (Erickson *et al.*, 2025).

The governance differences also shape employer perceptions of occupational competence. In the German and Austrian systems, standardised external assessment reinforced trust in occupational certification. While in the English case, particularly the chef apprenticeship, the employer expressed concern that workplace-based assessment could become tied to firm specific production processes rather than broad occupational competence.

DISCUSSION

The analysis demonstrates that apprenticeship costs are shaped not simply by content or duration of training but by the institutional arrangements within

which apprenticeships are embedded. The case of England demonstrates a governance paradox within a demand-led apprenticeship system. Policies designed to increase employer influence and flexibility may simultaneously increase the costs and risks borne by employers, particularly in a labour market where post-training retention is uncertain. While governance responsibilities for coordination, assessment and quality assurance are individualised, employer participation may become selective and contingent upon short-term returns. This appears to be reflected in the tendency for apprenticeships in England to be concentrated at either higher qualification levels or among existing employees whose productivity and commitment to the firm is already established.

By contrast, the cases in Germany and Austria demonstrate how shared governance arrangements and intermediary institutions can sustain employer engagement even where immediate financial returns are relatively modest. Apprenticeships continue to function primarily as forms of initial vocational education and training—linked to labour market entry and growth of occupational talent pipelines.

The findings suggest, therefore, that debates surrounding apprenticeship reform should not exclusively focus on employer control, funding mechanisms or curriculum responsiveness and proactiveness. They should consider how institutional arrangements distribute governance responsibilities, transaction costs, and risks across the apprenticeship ecosystem. Assessment regimes provide a particularly clear illustration of this issue. In Germany and Austria, standardised external assessment supports confidence in the transferability and credibility of occupational qualifications. In England, the reliance on workplace-embedded assessment may increase risks of qualification reflecting firm-specific practice rather than broad occupational competence. This, in turn, increases the monopsony power of the employer, even if they are paying a relatively high price for it.

Together, the evidence from this matched plant study indicates that expanding apprenticeship provision without a strong coordinating institution may inadvertently narrow the scope of apprenticeship engagement rather than broaden it. In liberal labour market contexts, apprenticeships may shift towards a form of continuing vocational education rather than initial labour market entry.

CONCLUSION

This paper has compared the net costs and benefits of apprenticeship training in Germany, Austria and England through a matched plant study of HVAC and chef apprenticeships. Using a common cost-benefit methodology, the analysis demonstrates that employers in England face substantially higher net costs than comparable firms in Germany and Austria. The findings suggest that differences arise not from curriculum content

or productive contributions of apprentices, but from the institutional architecture of apprenticeship systems in each country. In Germany and Austria, intermediary institutions reduce uncertainty, externalise coordination costs and support trust in occupational standards. In England, governance responsibilities are individualised increasing the burdens and risks to employers. While the study is limited in scale, it highlights the importance of examining apprenticeship systems not only as training mechanisms but as socio-institutional arrangements shaped by governance structures, labour market regulations and institutional coordination.

DECLARATION

Article version statement

This article has been reviewed and preliminarily edited. It is intended solely for use at the 10th Research Conference of the International Network for Innovative Apprenticeship (INAP). The final version will be published in *Vocation, Technology & Education* (https://www.vtejournal.com).

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VTE VOCATION, TECHNOLOGY & EDUCATION

RESEARCH PAPER

Government supports for apprentices in Australia

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ABSTRACT

This paper reports on the supports which Federal and State governments, and other bodies, offer for people undertaking apprenticeships in Australia. The following categories were examined: Income support, other financial supports, study supports and welfare supports. Data were obtained from government and institutional websites, informed by conversations with key actors in the system at all levels. The research found a wide range of available supports. They were, however, not well promulgated, and they varied among different States and Territories. Apprentice intermediary bodies are therefore important, and not always reliable, interpreters of the system. The paper explains that international transferability of the findings varies with the nature of countries' apprenticeship systems.

Key words: support for apprentices, financial incentives for apprenticeships

INTRODUCTION

The paper needs to be understood in the context of the Australian system. Unlike some other countries, Australian apprenticeships are undertaken post-school, although there are a small number of "school based" apprentices in upper secondary schools. "Traditional" apprenticeships, which are typically, but not only, in construction and engineering trades, normally last for three years, and newer "traineeships" (in non-trade areas) for one year to 18 months. In this paper, the term "apprentices" covers both trade apprentices and trainees, although the two categories are often treated differently in government policies. In most countries apprentices are generally for young people, although a few countries do make provision for adult apprenticeship (Smith & Brennan Kemmis,

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2013); but in Australia, in 2013 for example, 40.1% of apprentice commencers were aged 25 or above (Hargreaves & Blomberg, 2015).

The Australian system has two sets of intermediary bodies: Group Training Organisations, long standing institutions which act as the official employer of between 5% and 10% of apprentices (the proportion varies over time) and provide additional support (Smith, 2019); and apprentice contracting agencies, at the time of the study known as "Apprentice Support Network" providers, which are for-profit organizations managing apprentice contracting; in the last decade, their contracts have included certain types of support provision as well. The role of the intermediaries is complex, and as Unwin noted in relation to the UK system, which also has intermediaries, even those in the apprenticeship system are often not fully aware of the functions of the different providers (Unwin, 2012).

There are many differences among countries' apprenticeship systems (*e.g.* Smith, Tuck, & Chatani, 2018) so that it is difficult, if not impossible, to compare provisions. For example, in many countries, including the DACH countries (Germany, Australia and Switzerland) since apprenticeships are part of upper secondary schooling, support provisions for both employers and apprentices are based on that premise. Apprentices are not paid in many countries, receiving only a "stipend", or only a very low wage. Moreover the very term "apprenticeship" could be, and is, contested (Markowitsch & Wittig, 2022).

This paper provides some answers to the question "What supports do Federal and State governments, and other bodies, offer for people undertaking apprenticeships in Australia?" Since Australian apprentices are always employed as workers (generally full time, but occasionally part time), the answers may be of more or less relevance for other countries, depending on their systems.

METHODS AND RESEARCH DESIGN

The research was carried out in 2024 in a research project commissioned by the Australian Federal government comparing the supports available for apprentices with those available for university students; this paper reports only on the former. It was one of several projects which the government commissioned to inform a major review of apprenticeship supports. The following categories of apprentice support were examined: Income support, other financial supports, study supports, welfare supports, special provisions for specific "equity" groups, and minor supports such as travel costs and tools allowances. For this paper, the provisions for equity groups are not analysed.

Two main sources of information were used: Analysis of Federal and State government and training provider web sites, and discussions with relevant actors in the apprenticeship system. These discussions were held primarily to inform the desk research, and

comprised: Apprentice support staff in TAFE (the public training provider), State and Federal government personnel, trade union representatives, and managers in both types of apprentice intermediary groups. Minor discussions were carried out in 2026 to update some details.

RESULTS

While many apprentices, like many university students, are mature people, most supports are aimed at young people.

Financial support

The wages which apprentices receive are determined by industry specific "awards" or "enterprise agreements" registered with the Fair Work Commission and rise with age, with year of study, and sometimes with level of school qualification. Australia has high rates of pay for apprentices compared with other countries, comparable to the UK situation (Ryan, Backes-Gellner, Teuber, & Wagner, 2013). Few apprentices therefore get direct income support from the federal government, as their income from their employers often exceeds, or quickly reaches, the threshold that disqualifies people from receiving Youth Allowance or equivalent adult income support payments. There are instances of underpayment of apprentices, and the Fair Work Ombudsman provides both general and industry specific advice, such as for Building and Construction (https://www2.vrqa.vic.gov.au/make-sure-youre-getting-paid-right).

The Australian system has, for many decades, paid modest incentives to employers who take on apprentices, but no special payments for apprentices themselves, except for apprentices in particular equity groups. This changed with COVID where, from 2020 to 2022, there were wage subsidies for employers of apprentices and direct payments for apprentices; such measures were common across the world to maintain employment (Smith, 2024). This has had a legacy in regard to both employer payments and apprentice payments. The new direct payments to apprentices have varied quite considerably over the past four years; an example at the time of the study was "clean energy" jobs, and more recently, construction industry apprenticeships have been added. In these industry areas, apprentices receive $10,000 ($7246 USD) stepped over the life of the apprenticeship. Both employer and apprentice incentives are weighted towards male dominated occupations (Smith, 2025).

In addition, apprentices in a broader range of industry areas are entitled to access an Apprenticeship Support Loan, similar to a higher education loan, capped at AUD $24,492 AUD ($17,719 USD) in 2024, which has to be repaid to the government. It can be spent on anything. Some apprentices qualify for a "Living Away from Home Allowance" if they have to move from their family home for the first time to undertake an apprenticeship.

Some TAFE institutes (TAFE is the public provider of VET) provide

hardship grants and scholarships for certain apprentices and/or target groups. Employers generally pay the tuition fees for apprentices' off the job training. While there is currently a "Free TAFE" initiative across Australia (the "Fee-Free TAFE Skills Agreement"), states are given authority to determine which TAFE courses are free and are not required to disaggregate and report on enrolments by apprentices. Finally, some TAFE Institutes provide accommodation for study block periods.

Study and welfare support

TAFE Institutes provide learning support including language, literacy and numeracy support, counselling, welfare support, scholarships, social activities and so on, although to a lesser extent than universities. (Private training providers were not examined in the study, as each may differ, and there are thousands of such providers). Apprentices have the added benefit of support from their employer, although employers' support varies a great deal, since Australia puts few formal requirements onto apprentice employers, unlike other countries. Some employers have special indigenous apprentice schemes.

Australia is a federated country, and apprentices are registered by each of the eight States and Territories. Hence some supports are particular to a jurisdiction. Data were obtained from government sources for differing types of support (with one State not providing information) and are summarised as follows. (1) Travel and accommodation for RTO training: Mentioned by 6; (2) Help when an apprentice loses employment: Mentioned by 3; (3) General financial/hardship support: Mentioned by 2; (4) Fee-free tuition: Mentioned by 2; (5) Free pre-apprenticeships: Mentioned by 2; (6) Workwear or tools allowances: Mentioned by 2; (7) Vehicle registration concessions: Mentioned by 2; (8) Apprenticeship support offices: Mentioned by 2. Mentioned by one jurisdiction only: Extra supports for indigenous apprentices, completion payment, transport concessions.

In interpreting the examples below, $100 AUD equals approximately $71 USD and €61 EUR. Each entry has some explanatory notes.

Some examples of travel supports, the most-often mentioned support, are: (1) Northern Territory—Subsidised funding for eligible apprentices/trainees required to travel intrastate or interstate to undertake off the job training. Limits are set. Travel can be road, bus or air. Can get before travel. Accommodation $100 per day. (2) Tasmania—Travel and accommodation allowances of up to $8000 per calendar year for any apprentice or trainee who is required to travel further than 21 kilometers from their home either in Tasmania or interstate to attend training at their nominated registered training organisation. Has to be submitted by RTO. $55 for overnight accommodation if distance is more than 40 km.

Examples of other types of support are as follows.

(1) New South Wales "Bert Evans" Apprentice Scholarships designed to assist apprentices who are experiencing hardship and to assist them to complete their apprenticeship. Up to $5000 p.a. to each apprentice for up to three years.

(2) Australian Capital Territory: Apprentice and trainee completion payment, $300 for each qualification.

(3) Victoria: Apprenticeship Support Officers (ASOs)—29 ASOs work out of 13 sites, providing a local service in Melbourne and in regional Victoria. They provide advice (personal and on workplace issues), support and referrals to all apprentices, but particularly those aged 15 to 24 years in their first year of an apprenticeship.

(4) Queensland: Free Tools for First Years—Available to first year apprentices who are registered in an eligible construction, plumbing or electrical apprenticeship, commenced after 1 January 2024, have completed probation and are continuing in the apprenticeship, and who purchased tools for the apprenticeship, and retained proof of purchase.

(5) Western Australia: A Subsidised Traineeship and Apprenticeship List (STAL), as part of the wider Subsidised Training List reduces the tuition costs. Some apprenticeships/traineeships are at half price. Includes some interstate apprenticeships and traineeships.

(6) Tasmania: Workforce Training Consultancy service to support apprentices, trainees and employers to maximise employer retention and apprenticeships and traineeship completions. Four officers, with geographic coverage.

It is likely that some jurisdictions may make additional provisions that they did not submit to the government data collection. Also, if apprentices are formally employed by an intermediary body, *i.e.* a "Group Training Organisation", they have an additional layer of support; and all have an Apprentice Support Network provider. And, of course, federal government provisions apply to all.

CONCLUSION

In general, the supports offered to apprentices are disparate, being offered by differing levels of government and other bodies. The Federal and State government web sites are very hard to navigate, with the Federal government guidelines (Department of Employment and Workplace, 2026) almost impenetrable. It is a continuously changing policy area as governments seek to increase apprentice numbers; school careers officers are primarily focused on advice about universities (Economic, Education & Jobs and Skills Committee, 2018), and are unlikely to be able to keep abreast of these changes. Apprentices are therefore heavily dependent on their apprenticeship support provider for guidance; some of these are notoriously less professional than others.

The topic of apprentice supports has been little researched in the scholarly

literature, compared with supports for higher education students. Moreover the large proportion of apprentices who are mature aged means that some available provisions are irrelevant to many of the apprentices, as are the assumptions behind the provisions. The little literature that does exist on apprentice experiences tends to assume a young age group (Corney & Du Plessis, 2011).

Internationally, Chankseliani and Anuar (2019) and Kuczera (2017) have attempted to compare incentives (for both apprentices and their employers) in different countries, but each study notes the differences among systems and the difficulty in interpreting and comparing results. As Chankseliani and Anuar (2019) note, incentives may vary with the differing views of the purpose of apprenticeships. Accordingly, the results in the study reported in this paper will have differing levels of applicability for different countries and will have most relevance for countries where apprentices are formally employed.

DECLARATION

Article version statement

This article has been reviewed and preliminarily edited. It is intended solely for use at the 10th Research Conference of the International Network for Innovative Apprenticeship (INAP). The final version will be published in *Vocation, Technology & Education* (https://www.vtejournal.com).

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Topic 4: Apprenticeship curriculum, standards and delivery

VTE VOCATION, TECHNOLOGY & EDUCATION

RESEARCH PAPER

Apprenticeship pathways: Progression within the vocational track

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ABSTRACT

This paper examines the transformation of apprenticeships in England, focusing on the growth of higher and degree apprenticeships that integrate vocational and higher education. It argues that these hybrid qualifications blur traditional system boundaries and offer new opportunities for progression, particularly for learners from disadvantaged backgrounds. Critically engaging with the concept of permeability, the paper highlights how bridging approaches between vocational and academic pathways may inadvertently reinforce inequality and deficit narratives. Instead, it proposes "apprenticeship-only pathways" as an alternative model of vertical progression within vocational education, enabling seamless advancement from lower to higher levels, including degree qualifications. While these pathways demonstrate the potential for parity of esteem between vocational and academic routes, challenges remain, including limited availability, competition with academically qualified learners, and structural inequalities within the higher education sector. The paper calls for a shift from analysing single apprenticeship participation to understanding long-term learner trajectories, emphasising progression as central to equitable education systems.

Key words: apprenticeship pathways, permeability, progression, social mobility

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INTRODUCTION

Apprenticeships in England have been transformed in the past decade, with a shift towards higher level apprenticeships (Department for Education & Department for Work and Pensions, 2026). This creates opportunities to gain up to a full master's qualification as part of an apprenticeship complementing existing hybrid qualifications on the upper secondary level enabling to access universities (Deissinger *et al.*, 2013). Hybrid qualifications at the intersection of vocational and higher education potentially soften the institutional boundaries and, in principle, generate possibilities for upward educational mobility. Frommberger and Schmees (2019) define two types of hybrid qualifications on the tertiary level: (1) Higher education combined with work-based vocational education; (2) higher education combined with school-based vocational education. By and large, English higher and degree apprenticeships fall under the first category where training in the workplace is combined with university education. Apprenticeships can be taken one after another, starting from an apprenticeship at upper secondary level. Therefore, the architecture of the English apprenticeship system bears the potential of seamless pathways to higher qualifications for the vocationally qualified.

In this paper, we focus on apprenticeship-only pathways to support progression for young people from Level 2 (the standard for qualifications taken aged 16 in England) or Level 3 (the qualification achieved by the majority of young people by age 19) in order to make three interrelated theoretical contributions, focusing on progression as the lens: Firstly, the paper questions whether ostensibly permeable systems might perpetuate inequality; secondly, apprenticeship-only pathways are proposed as a model for understanding vocational mobility; and thirdly, the research challenges analyses centred on participation in only one apprenticeship and instead argues for structures that enable longer-term trajectories. This analysis is rooted in a more flexible labour market than many European systems (Pullen, 2025) yet posits that clearer progression pathways may be more effective in all labour markets.

RISKING PERPETUATION THROUGH PERMEABILITY

In order to overcome structural barriers between vocational and higher education, the concept of permeability is often utilised to allow transitions between the two educational sub-sectors at the level of upper secondary education (Deissinger *et al.*, 2013) or tertiary education (Frommberger, 2019). Thereby, we can define permeability first and foremost as access for vocationally qualified towards higher education.

Often, the access from vocational to higher education is constructed as an add-on to existing education systems. In this regard, bridging courses or other specialised routes for the vocationally

qualified are designed to acquire formal and informal requirements to enter academic education (Esmond, 2019; Schmees *et al.*, 2025). Bridging, however, is based on notions that counteract its own underlying premise at least in three ways. Firstly, the idea of bridging reaffirms and perpetuates the gap between vocational and higher education that needs to be bridged suggesting that no organisational overlaps exist. Secondly, the narrative of bridging programmes supports the idea that the vocationally qualified learner is lacking certain competences and/or specific formal qualifications. This reinforces a deficit model surrounding vocationally qualified learners by imposing additional burdens on pathways that are already more demanding than conventional academic progression routes. Thirdly, and as a consequence of the two preceding aspects, the concept of bridging reproduces the hierarchical vocational-academic divide and its associated narratives, while simultaneously presenting bridging programmes as a means of overcoming this divide.

This rather critical perspective can be supported by recent national and cross-national studies where the number of successful transitions through those particular pathways are very limited (Schmees *et al.*, 2025). From an individual perspective, these programmes are often complex to navigate, as access criteria can be unclear and/or vary considerably. In addition, the length of the programme extends the duration of study for vocational learners, as they typically enter later than students following conventional academic progression routes, creating issues where vocational learners have other responsibilities associated with being older, *e.g.* financial or caring responsibilities.

From a theoretical point of view, one central problem of bridging programmes lies in their sole focus on access, which omits more comprehensive definitions of permeability such as recognising of prior learning, and organisational overlaps between vocational and academic education (Bernhard, 2017). A more expansive approach could assess the quality of different educational pathways, from vocational education to higher education qualifications. In this sense, bridging programmes fall short because prior learning is devalued, organisational overlaps are prevented by the very existence of such programmes, and universities are relieved of the responsibility to adapt, as they can instead refer students to bridging programmes.

ESTABLISHING VERTICAL PATHWAYS WITHIN VOCATIONAL EDUCATION

While studies on permeability usually discuss progression from vocational to higher education, more extensive frameworks (Hemkes, 2018; Hemkes & Wilbers, 2019) suggest a form of vertical permeability, where the vocationally qualified can progress within the vocational education and training system. In principle, this is possible via a work-based and a classroom-based option (as argued by Frommberger & Schmees, 2022).

In England, higher apprenticeships offer the opportunity of work-based learning for higher qualifications whereas higher education provision within Further Education (FE) colleges would account for classroom-based alternatives. However, both types of English higher vocational qualifications encounter a fundamental problem. While higher apprenticeships offer qualifications at degree level, higher education provision within FE colleges mostly only reaches to sub-bachelor levels that can eventually be recognised towards a bachelor's degree at a university (note: While the vast majority of Further Education Colleges cannot award degrees, a small number do have degree awarding powers. For the purposes of this paper, we consider that in general, Further Education Colleges award higher education qualifications at Levels 4 and 5 but not at Level 6, degree level). This fine distinction, sometimes referred to as "equivalent, not the same" (Eckelt, 2016), perpetuates non-transitions as, for example, a qualification equivalent to a master's qualification is not a master's qualification and therefore does not meet the requirement to pursue doctoral studies. This very fact undermines the claim of equivalence already.

One way to omit those risks would be the possibility to reach degree level qualifications within the vocational track. This has been implemented in the most recent changes to the English apprenticeship system, specifically through the introduction of the degree apprenticeship. Degree apprenticeships offer a work-based route to bachelor's and master's qualifications, usually delivered by an employer and a training provider in the form of a university. These programmes are part of the English apprenticeship system and allow access through apprenticeship qualifications on lower levels. After completion, the academic qualifications reached count as any academic qualification and are therefore sufficient to progress to postgraduate studies (for those with a bachelor's degree apprenticeship) or doctoral studies (for those with a master's degree apprenticeship). Additionally, the fees for the programmes are covered by employers and the state, while the employer pays the wage of the apprentice during the programme, as is common for all English apprenticeships.

Inevitably, however, this programme, as it is added to the existing system, also carries the vocational-academic divide in at least two respects. Firstly, universities offering degree apprenticeships are usually positioned at the lower end of the hierarchical British university system. Consequently, it is mostly post-92 universities, and therefore former polytechnics, offering those qualifications prolonging and reaffirming the gap in the university system. Secondly, the attractiveness of the offer leads to competition as degree apprenticeships are very limited in numbers still. Therefore, apprenticeship graduates compete with academic qualified for the rare degree apprenticeship opportunities.

REPLACING PARTICIPATION WITH PROGRESSION

Finally, the research challenges analyses

centred on participation in only one apprenticeship and instead argues for structures that enable longer-term trajectories.

In England, there is limited quantitative analysis of apprenticeship pathways. Most quantitative research (Speckesser & Xu, 2022) assumes that individuals take only one apprenticeship, in part because this kind of analysis fits within a broader literature of income returns to a particular level of qualification (McIntosh & Morris, 2021). Isolating the returns to one specific qualification (or apprenticeship) as compared to those with a lower qualification allows for causal analysis. It aligns with the concept of individuals investing in their own general education as set out in human capital theory (Becker, 1993), by enabling individuals to better understand the impact of selecting different programmes of study.

However, this does not always reflect how learners engage with study, particularly in relation to apprenticeships. Apprentices often report their own pathways in press reports and webinars (Hill, 2025), and there is some work on understanding pathways that are either academic or vocational in specific cohorts (Dickerson *et al.*, 2022). Recent reports based on data up to the early 2020s have found evidence of progression for small numbers of apprentices but have not explored this phenomenon further (Cavaglia *et al.*, 2022; IFF Research, 2024). Similarly, the move from apprenticeship frameworks to standards during the 2010s corresponds with an increase in apprenticeship progression rates from 2% of completers on frameworks to 10% of completers on standards (Bocock *et al.*, 2026), although more detailed analysis has not yet taken place. Mapping of occupational pathways has been developed by Skills England (n.d.), but the pathways have not been tested empirically.

A further challenge to progression is the concept of "existing staff" undertaking apprenticeships. The regular Department of Education survey of apprentices (IFF Research, 2024) has reported that around two-thirds of apprentices have been "existing staff" for several years, but makes no distinction between individuals who may, for example, have had a Saturday job at a hairdresser then, when they leave school at 16, become an apprentice at that same hairdresser, and those individuals who may have worked at the same employer for a number of years and then opted to undertake an apprenticeship to enable them to progress at work. This variation means that young people who begin with a Level 2 apprenticeship, complete that and then take on a Level 3 apprenticeship are also seen as "existing staff".

For the past 15 years, the English apprenticeship system has had no age restrictions, beyond an individual having to be aged at least 16. Policy analysis of the system considers it is currently more suited to adults than young people (Pullen, 2024). The effect of this has been an increase in older workers undertaking apprenticeships, often but not exclusively at higher levels, while there

has been a large drop in the number of lower level apprenticeships available for young people (Department for Education & Department for Work and Pensions, 2026). In some sectors, for example social care, it is an explicit part of the workforce strategy (Skills for Care, 2025) to enable adults to progress through apprenticeships in order to plug staffing gaps. Although in many cases, the adults studying for apprenticeships are more likely to come from a home where higher education was not the norm (Pullen *et al.*, 2024), changing perceptions of widening participation mean that adults and existing staff are often seen as taking the places of young people.

The negative perception of "existing staff" undertaking apprenticeships has in part let to recent changes to restrict the funding for Level 7 apprenticeships, equivalent to a master's degree, only to learners aged under 22 when they begin their apprenticeship (Department for Education, 2025). This is part of an attempted rebalance of the system towards young people, including the development of Foundation Apprenticeships (Mitchell, 2025), which are explicitly designed to enable young people completing them to progress to another apprenticeship. These are distinct specifically because they are designed for progression, although the narrative is focused on supporting young people, especially those not currently in education, employment or training. This suggests a move towards considering learner pathways through apprenticeships.

CONCLUSION

Enabling learners to progress, entirely through apprenticeships, from lower to higher vocational learning, ultimately gaining a higher or degree level qualification entirely equivalent in education terms and status to a standard academic degree, exemplifies parity of esteem between academic and vocational education. This pathway does not require deviation to incorporate a bridging qualification, and it is demand from individuals across the socio-economic spectrum, suggesting that degree apprenticeships especially are highly regarded and sought-after qualifications.

Apprenticeship pathways are not without their problems, as individuals can enter at different points, meaning those with strong academic attainment can displace vocational learners already on the pathway to obtain high-status degree apprenticeships. There is currently limited empirical work on how learners move through and navigate these pathways, although research is ongoing. However, the existence of apprenticeship pathways, even in theory, provides an example of unequivocal parity between academic and vocational pathways, and a model for others to consider.

DECLARATION

Article version statement

This article has been reviewed and preliminarily edited. It is intended solely

for use at the 10th Research Conference of the International Network for Innovative Apprenticeship (INAP). The final version will be published in *Vocation, Technology & Education* (https://www.vtejournal.com).

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VTE VOCATION, TECHNOLOGY & EDUCATION

RESEARCH PAPER

Aligning apprenticeship curriculum with industry practice: Standards, assessment, and quality in Zambia's construction sector

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ABSTRACT

This paper examines how apprenticeship curriculum, assessment, and quality assurance align with industry skill demands in Zambia's construction sector. Based on 64 interviews and 15 focus groups (n = 142) across four provinces, it highlights ongoing curriculum-workplace misalignment. Despite existing competency frameworks, implementation is fragmented: Core skills are learned informally on-site rather than through structured progression. Assessment credibility is weak, with logbooks often signed off without verification, and workplace performance is often absent from certificates. Quality assurance varies, joint supervision is rare, and safety practices are inconsistent. Women and people with disabilities face systemic barriers. The study offers lessons for Global South countries reforming apprenticeship programs in informal, rapidly evolving construction markets.

Key words: apprenticeship curriculum, work-based learning, assessment, construction, Zambia

INTRODUCTION

Apprenticeships and work-based learning (WBL) are increasingly promoted to bridge formal education and labour market demands, particularly in low- and middle-income countries (Billett, 2021; ILO, 2024). Their effect-

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iveness depends on aligning curriculum, standards, and assessment with the competencies actually required in workplaces (Allais, 2020; Cedefop, 2015). In many contexts, competency-based frameworks exist on paper but fail to translate into consistent, high-quality workplace learning.

The literature identifies three persistent systemic weaknesses. First, curricula in many African Technical and Vocational Education and Training (TVET) systems lag behind industry evolution and underemphasise safety and soft skills (Allais, 2020; Bray-Collins *et al.*, 2022). Second, WBL assessment combines institutional examinations with workplace evidence such as logbooks and supervisor reports, yet validity and fairness remain contested (Walther, 2015). Third, quality assurance must span both training institutions and worksites; without joint oversight, learner protection and certification credibility weaken (Billett, 2021). A skills-ecosystem lens (Grainger & Spours, 2018) frames curriculum as a dynamic artefact negotiated among providers, employers, and regulators, rather than a static document.

Zambia's construction sector offers a compelling case. It contributes roughly 10% of gross domestic product (GDP) (Cheelo & Liebenthal, 2020) and employs 188, 232 workers, 87.5% of them informally (Zambia Statistics Agency, 2024), with female participation at only 3.4% National unemployment stands at 12.9% and youth unemployment at 18.4% (Zambia Statistics Agency, 2024). Critically, the Government is transitioning from the 1964 Apprenticeship Act to a modern WBL Act (World Bank, 2024).

Three apprenticeship models predominate in Zambia: (1) Technical Education, Vocational and Entrepreneurship Training Authority (TEVETA)-accredited industrial attachments—three-month site placements assessed via logbooks (TEVETA, 2019); (2) NGO-led structured WBL, such as Build It International's Training-in-Work programme, combining centre-based training with supervised site exposure and post-placement follow-up; and (3) informal site-based apprenticeships, where a master artisan trains a young person through observation and task repetition, without formal certification (Walther, 2015). This paper focuses on the first two, while acknowledging that the third dominates many youth pathways.

Drawing on a study commissioned by Build It International with TEVETA and funded by the Government of Liechtenstein, we asked: To what extent do apprenticeship curriculum design, standards, and assessment align with industry skill demands in Zambia's construction sector? The findings surface gaps between formal frameworks and workplace realities and distil lessons for other Southern countries.

METHODS AND RESEARCH DESIGN

This qualitative, exploratory study was conducted between October 2025 and January 2026 in four Zambian provinces:

Lusaka, Central, Copperbelt, and Southern. These were selected to capture variation in construction activity, institutional density, and labour-market context. Data collection involved 64 in-depth interviews (IDIs) and 15 focus group discussions (FGDs). IDI participants included policymakers (n = 24), training-institution representatives (n = 13), industry actors from formal firms and informal contractors (n = 17), and youth trainees or graduates (n = 10). The 15 FGDs involved 78 youth (32% women), comprising current WBL participants, WBL graduates, and youth without WBL experience for comparison. The total sample was 142 respondents. Participants were purposively sampled to ensure diversity in gender, geography, role, and WBL exposure. Data were analysed using inductive-deductive thematic analysis, with source triangulation across actor groups. Analysis was guided by an integrated framework combining the International Labour Organization (ILO) WBL Continuum (ILO, 2024), skills-ecosystem theory (Grainger & Spours, 2018), and a Gender Equality, Disability and Social Inclusion (GEDSI) lens (FAO, 2023). Ethical approval was obtained from the University of Zambia (Ref. HSSREC: 2025DEC013).

RESULTS

Three interrelated themes emerged consistently across actor groups.

Curriculum-workplace misalignment

Across all stakeholder groups, core technical competencies are learned predominantly on the job, not through formal training. An industry supervisor explained: "*Graduates are very conversant with theory but not practical work… we have to assign a foreman to work with them hand in hand to teach practical tasks*" (IDI 13, Industry, Lusaka, Female).

A training instructor confirmed the problem institutionally: "*Training curricula should be regularly updated to reflect materials, tools, and technologies currently used… otherwise trainees are taught outdated content*" (IDI 16, Training, Lusaka, Male).

Soft skills—discipline, punctuality, following instructions, teamwork—were also repeatedly flagged by industry actors as missing from graduate profiles, reinforcing perceptions of certificate-holders as unprepared for site realities. Workshop conditions compound this gap. A young trainee from Copperbelt noted: "*In our workshops there is a shortage of equipment, so during practicals many students have to share or teach each other, and some are left behind*" (IDI 09, Youth Trainee, Copperbelt, Male).

On-the-job learning thus functions as the de facto curriculum, structured by project stages and supervisor discretion. This shifts the training burden onto already stretched site supervisors and produces highly uneven outcomes.

Assessment credibility and certification gaps

Assessment was widely criticised for lacking credibility. In principle, it combines institutional examinations with workplace evaluations (logbooks, super-

visor reports). In practice, logbooks are signed off without verification of actual task performance. An industry respondent, herself a former trainee, recalled: "*Assessment was mainly based on my report and the supervisor ticking the logbook… whether tasks were actually done was another matter*" (IDI 19, Industry, Lusaka, Female).

A training manager confirmed that the problem is systemic: "*It doesn't appear on the certificates… it's not graded like other subjects, meaning you can qualify even without the attachment*" (IDI 07, Training, Copperbelt, Male).

Employers prioritise candidates with attachment experience, yet certificates carry no signal about the quality of that workplace learning. Gendered and disability-related biases further distort assessment: Young women reported that assumptions about physical capacity limit their task exposure, while persons with disabilities are often excluded by risk narratives rather than offered adaptive assessment.

Fragmented quality assurance and supervision

Quality assurance is weak at the institution-worksite interface. Joint monitoring—institutional staff observing trainees alongside company supervisors—is rare due to resource constraints. A trainer described the current reality: "*We arrange it ourselves; curriculum gaps mean it's not fully aligned nationally… afterwards we have an arrangement where they go for internship for three months and then graduate*" (IDI 10, Training, Lusaka, Male).

A female industry supervisor called for shared responsibility: "*There should be joint supervision. Institution supervisors should be present to verify whether trainees followed safety procedures… rather than blaming companies afterward*" (IDI 18, Industry, Lusaka, Female).

Safety protocols and personal protective equipment (PPE) provision vary dramatically across sites, with women and persons with disabilities facing compounded risks. Policy actors also flagged that data on WBL participation, outcomes, and labour market impact remains thin, limiting evidence-based oversight.

IMPLICATIONS FOR POLICY AND PRACTICE

Zambia's upcoming WBL Act presents a significant policy opportunity; however, legislative change alone will not suffice. To maximize its impact, three key priorities must be addressed. First, establish ongoing, industry-led curriculum updates by making sector skills committees mandatory, similar to Kenya's National Industrial Training Authority (NITA) or South Africa's Sector Education and Training Authorities (SETAs). These committees should review curricula every two to three years to incorporate new materials, tools, and standards, ensuring at least 50% practical content. Employer feedback should inform revisions to maintain relevance.

Second, improve assessment credibility by replacing informal sign-offs with

standardized, competency-based workplace tools. Performance should be verified by staff and supervisors, graded, and recorded on certificates, ensuring assessments reflect actual workplace competence. Third, develop a comprehensive quality assurance framework that includes joint supervision, inclusion measures, and enforceable safety standards. These should encompass PPE, insurance, and induction procedures, supported by safeguards such as accessible facilities, adaptive equipment, and training, all legislated as essential. Inclusion should be integrated into assessment tools and safety protocols from the outset.

Two lessons stand out for other Global South countries. First, legislative reform is insufficient without enforceable quality standards, joint supervision, and incentives for employers—especially Micro, Small and Medium Enterprises (MSMEs)—to host trainees (Cedefop, 2025; ILO, 2024). Second, informal pathways should be formalised incrementally, not eliminated: Where 87.5% of construction workers are informal, reform must actively engage informal contractors and master artisans through recognition of prior learning, modular assessments, and credentialed pathways (Billett, 2021; Walther, 2015).

CONCLUSION

Although competency-based standards exist in Zambia's apprenticeship system, implementation remains fragmented. Core skills are acquired informally on-site; assessment lacks credibility; quality assurance is uneven; and women and persons with disabilities face systematic barriers. These issues reflect a system with limited feedback among training providers, industry, and regulators (Grainger & Spours, 2018), similar to broader trends in Sub-Saharan Africa (Allais, 2020; World Bank, 2024). However, with enforceable standards, joint supervision, and inclusive assessment tools, Zambia's upcoming Work-Based Learning Act could transform this fragmented system into a model of equitable, industry-responsive skills development.

DECLARATION

Article version statement

This article has been reviewed and preliminarily edited. It is intended solely for use at the 10th Research Conference of the International Network for Innovative Apprenticeship (INAP). The final version will be published in *Vocation, Technology & Education* (https://www.vtejournal.com).

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VTE VOCATION, TECHNOLOGY & EDUCATION

RESEARCH PAPER

Skills, holistic vocational competences and capabilities in apprenticeship curricula: Comparing two occupations across two countries, Germany and Norway

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ABSTRACT

This paper developed out of research that compares how German and Norwegian curricula represent task-specific skills, holistic vocational competences and broader capabilities. It examines two occupational programmes: Plant mechanic for sanitary, heating, ventilation and air conditioning systems (HVAC) and child and youth care work. The findings show that holistic vocational competence is the dominant curricular orientation across the cases, while skills remain a stable but subordinate dimension. Capability-oriented content varies most strongly: It is particularly visible in child and youth care curricula, where participation, inclusion, ethical judgement and professional self-reflection are central. In the technical programme, capabilities are mainly embedded through sustainability, responsibility, customer advice and system-related judgement. The paper argues that curricular configurations cannot be explained by national systems or occupational profiles alone, but emerge at their intersection. It concludes that capabilities are mostly embedded within competence-oriented curricular architectures rather than formulated as separate learning outcomes.

Key words: apprenticeship curricula, capability approach, comparative vocational education and training, curricular embedding

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INTRODUCTION

Against the backdrop of digital, ecological and demographic change, vocational education and training (VET) is increasingly expected to prepare learners not only for task-specific performance but also for adaptive, reflective and socially responsible participation in work and society (Cedefop, 2023). The question how this can be achieved was among those investigated in the project Skills2Capabilities. This project, funded under the EU's Horizon Europe programme, brought together research institutions from eight European countries and ran from 2023 to 2025.

Do contemporary apprenticeship curricula remain oriented towards discrete skills, or do they also articulate holistic vocational competences and broader capabilities related to agency, lifelong learning and democratic participation? This paper examines how these three dimensions are represented and balanced in current intended apprenticeship curricula.

The analysis compares two occupational programmes with different occupational logics and institutional forms: Plant mechanic for sanitary, heating, ventilation and air conditioning (HVAC) systems and child and youth care worker (CYCW). These are examined in Germany and Norway, two VET systems with distinct curricular architectures. The two occupations were selected in order to cover variation between countries as well as within countries. In Germany, the HVAC programme is a three-year dual apprenticeship, whereas the CYCW programme is mainly school-based with practical phases. In Norway, both follow the 2 + 2 model of school-based VET followed by apprenticeship (Deissinger, 2015; Hiim, 2017). This design allows comparison across occupations, across countries, and across both dimensions together. The guiding question is how German and Norwegian curricula articulate task-specific skills, holistic vocational competences and broader capabilities. More specifically, the paper asks what similarities and differences emerge across occupational programmes and national contexts in the representation and relative weight of these three dimensions. The analysis extends what has been carried out in the context of the project and extends the analysis to a second occupation. While this extension was already carried out for Germany and Norway, it is not yet finalized for England, which was also part of the initial analysis (Chen *et al.*, 2025).

THEORETICAL FRAMEWORK

The study combines the capability approach with comparative VET curriculum research (Cedefop, 2023). Developed by Sen (1999) and Nussbaum (2011), the capability approach shifts attention from what individuals achieve to the real opportunities they have to act, choose and participate in ways they value. Applied to VET, it broadens analysis beyond human-capital formation

and highlights agency, practical judgement, lifelong learning and social participation (Billett, 2011; Chiappero-Martinetti & Sabadash, 2014).

On this basis, three analytical levels of curricular aims and contents are distinguished. Skills (S) are observable, task-specific actions or knowledge tied to tools, routines or delimited tasks. Holistic vocational competence (HVC) refers to integrated professional action in complex work processes, including planning, implementation, evaluation, documentation, communication and situated judgement. Capabilities (C) refer to broader forms of agency beyond immediate task performance, such as autonomy, ethical judgement, democratic participation, inclusion, sustainability and lifelong learning (Forcher-Mayr & Mahlknecht, 2019; Robeyns & Byskov, 2020).

METHODS AND RESEARCH DESIGN

The study uses a comparative qualitative design based on qualitative content analysis (Kuckartz, 2019). The corpus comprises current German and Norwegian curricular documents for the HVAC and CYCW programmes that represent the body of curricular provisions on the systems level. For Germany, this includes the federal training regulation (14 pages, 5144 words) and KMK framework curriculum (40 p., 9905 w.) for HVAC, and the KMK framework curriculum for CYCW (44 p., 11,614 w.). For Norway, the analysis covers the curricula for both programmes across the four years of the programme (HVAC: 25 p., 5736 w.; CYCW 19 p., 5746 w.). Each of the Norwegian programmes is separated into a curriculum for year one and for year two and a third curriculum integrating practical and school-based instruction in year three and four.

Coding distinguished three analytical dimensions: Task-specific skills (S), HVC and broader capabilities (C). Each category was defined by coding rules and anchor examples. Because curricular statements often combine professional action with reflection, responsibility or wider social purposes, overlap codes such as HVC + C and HVC + S were also used. Figure 1 shows anchor examples from the respective curricular documents in HVAC in Norway and Germany (Chen *et al.*, 2025).

RESULTS

The results map how skills, holistic vocational competences and capabilities are distributed across the four curricula. The percentages do not indicate curricular quality, but relative visibility within each document.

Overview: How the three dimensions are distributed across the four cases

Figure 2 provides an overview of the relative frequency distribution of the three categories across countries and occupational programmes. Given the different length of documents, we show

Code	Category	Germany – anchor example (*Rahmenlehrplan*)	Norway – anchor example (*Læreplaner*)
S	**Skills**	Manufacture components according to design, technological and quality specifications; select suitable tools and carry out machining work under health and safety regulations.	Install and commission a refrigeration and heat pump system and assess the energy efficiency of the installation.
HVC	**Holistic vocational competence**	Create material lists, check interfaces with other trades; present the finished equipment to the customer, explain how to operate it and provide care instructions.	Carry out systematic troubleshooting; find solutions in co-operation with others and manage differences of opinion.
C	**Capability development**	To develop learning techniques and learning strategies and to use these for lifelong learning.	Express what they feel they have mastered and reflect on their own professional development.

Figure 1. Anchor examples for coding HVAC content. HVAC, heating, ventilation and air conditioning.

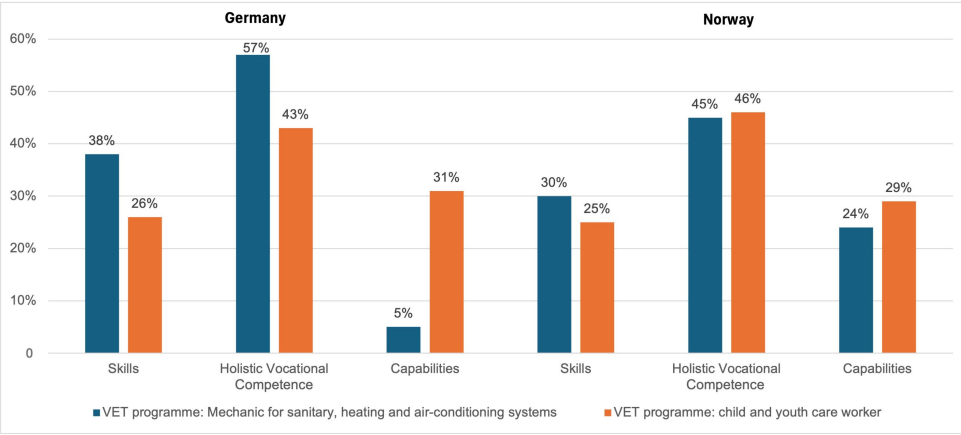


Figure 2. Frequency distribution of the codes in percentage terms. VET, vocational education and training.

the relative share of the codes of all the coding per occupation.

Across all four cases, holistic vocational competence is the dominant category. In Germany, the HVAC curriculum shows the strongest HVC orientation (57%) and the lowest separate capability share (5%), whereas German CYCW gives capabilities greater weight (31%). In Norway, both curricula are more balanced: HVAC combines HVC (45%),

skills (30%) and capabilities (24%), while CYCW shows the highest capability share overall (29%) alongside strong HVC (46%).

Cross-occupational patterns within national systems

Within Germany, the contrast between the dual HVAC programme and the mainly school-based CYCW programme is pronounced. HVAC embeds skills in complete technical work processes, which supports a strong HVC profile, while capabilities remain more implicit in the broader educational mandate. In CYCW, by contrast, participation, inclusion, professional identity and reflection are integral to the occupational profile itself, making capabilities more visible.

In Norway, the two programmes are closer in profile. Both curricula combine practical action with reflection, assessment and broader social aims. The main difference lies in occupational content: HVAC links technical execution to sustainability and responsibility, whereas CYCW links care and pedagogy to participation, inclusion and professional ethics.

Cross-national patterns within occupational programmes

Cross-nationally, the HVAC curricula differ more strongly than the CYCW curricula. The German HVAC curriculum is more strongly organised around Handlungskompetenz and integrated work-process orientation, whereas the Norwegian curriculum makes capabilities more explicit through competence aims, assessment criteria and cross-curricular themes such as reflection and sustainable development.

The German and Norwegian CYCW curricula are more similar. Both combine high levels of HVC with comparatively strong capabilities, but differ in textual architecture: The German curriculum differentiates dimensions more explicitly, whereas the Norwegian curriculum formulates them as integrated competence aims.

Cross-cutting key findings

Four main findings emerge from the comparison. First, holistic vocational competence is the dominant curricular orientation across all cases. Second, skills form a stable but secondary share in every curriculum. Third, capabilities vary most strongly and therefore seem to best reveal cross-national and cross-occupational differences. Fourth, occupation and country interact asymmetrically: The German cases differ strongly by programme type, because we have deliberately chosen two different subsystems of VET, whereas the Norwegian cases are more similar; conversely, CYCW is relatively similar across countries, while HVAC differs more clearly.

DISCUSSION

The findings of the comparative analysis suggest that the question of how skills, holistic vocational competences and capabilities are embedded in apprenticeship curricula cannot be answered

with reference to country or to occupation alone; the curricular configuration emerges at the intersection of both. The analysed documents show different forms of curricular embedding. In the German cases, the central integrative mechanism is Handlungskompetenz. It has been demonstrated that this approach integrates skills into comprehensive work processes and situates more extensive educational objectives within a competence and Bildung-oriented framework. In the Norwegian cases, integration is achieved through competence aims, cross-curricular themes and assessment formulations that repeatedly connect practical action with reflection, critical thinking, cooperation and responsibility.

The occupational comparison is crucial for avoiding an overly system-centred interpretation. The higher capability share in the CYCW programmes is not only a national effect; it is also grounded in the nature of socio-pedagogical work. This field requires professionals to support participation, inclusion, identity formation, care, conflict management and ethical judgement. By contrast, the curricula for the HVAC programme articulate capabilities mainly through technical responsibility, sustainability, customer advice, resource efficiency and safe system operation. Thus, capabilities are not a uniform category. They take occupation-specific forms and are mediated by the knowledge base, work object and social responsibility of each occupational field.

For comparative VET research, the results show that code distributions are useful as an entry point, but they require qualitative interpretation. A low value for pure capabilities does not necessarily mean that capability orientation is weak. It may indicate that capabilities are embedded within holistic vocational competences rather than formulated as separate curricular aims. Conversely, a higher capability share indicates greater textual visibility, but not necessarily stronger pedagogical implementation. The present analysis is limited to the intended curriculum. It does not allow conclusions about how teachers, trainers or learners interpret and enact these curricular expectations in practice.

CONCLUSION

This paper has argued that a capability-oriented coding grid renders visible how apprenticeship curricula in German and Norwegian cases represent, combine and balance task-specific skills, holistic vocational competences and broader capabilities. Despite divergent institutional traditions, both countries integrate the three dimensions at the level of the intended curriculum, with a clear dominance of holistic vocational competence. Skills function as necessary resources for professional action, while capabilities are mainly embedded in broader expectations of responsibility, reflection, participation and agency. The most relevant differences are not simply national differences, but intersections between national curricular architecture and occupational profile. The curricula for the CYCW programmes in both

countries articulate capabilities more explicitly than the curricula for the HVAC programme, reflecting the relational, societal and pedagogical scope of the occupation. A capability-informed understanding of apprenticeship curricula should therefore inquire not about the extent to which curricula have evolved beyond skills inventories, but rather the manner in which competencies and capabilities are institutionally and occupationally inscribed into the intended curricula and standards that govern apprenticeship delivery.

DECLARATIONS

Article version statement

This article has been reviewed and preliminarily edited. It is intended solely for use at the 10th Research Conference of the International Network for Innovative Apprenticeship (INAP). The final version will be published in *Vocation, Technology & Education* (https://www.vtejournal.com).

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VTE VOCATION, TECHNOLOGY & EDUCATION

RESEARCH PAPER

A validity study of assessment methods for work-based learning outcomes

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ABSTRACT

Scientifically valid assessment methods of work-based learning outcomes are essential for ensuring the quality of talent cultivation and training. Grounded in theory, this study employed the Delphi method to construct a validity framework for such assessment methods. Using this framework, five assessment methods of work-based learning outcomes were selected, and a meta-evaluation of their validity was conducted using the Toulmin model of argumentation. The results show no significant overall difference in validity among the five methods, but notable differences exist in the validity of test scores and their interpretation.

Key words: work-based learning, evaluation methods, validity

INTRODUCTION

In recent years, researchers have developed various assessment methods of work-based learning outcomes, providing important tools for such evaluations. Examples include professional qualification examinations, skills competitions, the "cultural literacy + vocational skills" vocational college entrance examination (Sun, 2020), vocational education graduation examinations, Structure of the Observed Learning Outcome (SOLO) (Liu & Chen, 2018), Competence Measurement (COMET) (Zhao & Rauner, 2018), Technology-based Assessment of Skills and Competences in VET (ASCOT) (BMBF-ASCOT, 2012; Zhou & Zhao, 2015), Qualipass, Learning Potential Assessment Centre (LP-AC), Job Analysis Competence Method (JACM), and aptitude tests (Erpenbeck & von Rosenstiel, 2007). To some extent, these

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methods provide useful information for diagnosing work-based learning outcomes. However, some methods lack technical scrutiny of validity. For instance, studies have found that higher vocational entrance examinations, especially vocational skills tests, cannot guarantee discrimination, reliability, or validity (Chen & Niu, 2026; Shao *et al.*, 2017); assessment criteria are unclear, scoring is arbitrary, and results lack objectivity and fairness (Lei, 2016; Sun & Wu, 2024). Although methods such as SOLO, COMET, and ASCOT have begun to address validity issues (*e.g.*, reliability, validity, discrimination, difficulty), existing research focuses on single methods. In the vocational education field, there is a lack of meta-evaluation research on work-based learning outcome assessment methods, and no unified validity framework has been established.

Scientifically sound assessment methods are crucial for meaningful results. Only when methods meet educational measurement quality standards can they be considered trustworthy and robust. Assessment processes lacking guidance from measurement theory (*e.g.*, validity, reliability) cannot ensure credibility (Yang *et al.*, 2021; Zhang & Liu, 2007). Therefore, this study focuses on the quality of assessment methods of work-based learning outcomes and systematically addresses two questions: (1) What constitutes a valid assessment method of work-based learning outcomes? (2) How valid are existing assessment methods of work-based learning outcomes?

METHODS AND RESEARCH DESIGN

Research subjects

Five assessment methods of work-based learning outcomes were selected for meta-evaluation according to different occupational categories. Methods J and D are used in technical occupations; G and Z are used in occupations where technology serves clients; and S is used in service occupations.

Evaluation instrument

Guided by design-oriented vocational education theory (Rauner, 1988) and based on reliability theory, the unitary view of validity (Messick, 1989), constructivism, and situated learning theory (Lave & Wenger, 1991), this study drew on the Assessment Use Argument (AUA) framework (Bachman & Palmer, 2022) to construct a validity argument framework for work-based learning outcome assessment methods. The Delphi technique was used to determine the framework's indicators. The framework comprises four aspects of validity (test scores, interpretation of test scores, use of test results, and impact of test use), with 11 secondary indicators and 33 tertiary indicators. Based on this framework, a meta-evaluation evidence checklist, a rating scale, an interview protocol, and an observation form were developed. The rating scale used graded scoring. The calculation of indicator achievement and grade classification followed Stufflebeam's (1974) meta-evaluation checklist. Each indicator was scored out of 100: 93-100 (very high

achievement), 68.0-92.9 (high), 50.0-67.9 (medium), 25.0-49.9 (low), 0-24.9 (very low).

Evaluation procedures

Evidence was collected through document analysis, interviews, observation, and expert judgment. Textual materials and information were analysed. Interviews were conducted with 31 stakeholders: Four assessment designers, 11 raters, and 16 test takers. Non-participant observation was used to collect examination process data. One or two professional or industry experts were invited to judge the assessment standards and content. Evidence was organised into evidence lists for each method. The Toulmin model of argumentation was used to argue the sufficiency of the evidence and assign grades. Based on the grade assignments, the level of support from evidence (tertiary indicators) for warrants (secondary indicators) and claims (primary indicators) was calculated, yielding achievement scores for each indicator, and radar charts were drawn.

RESULTS

The meta-evaluation showed no large overall difference in validity among the five methods; all scored below 50 points. At the primary indicator level, all five methods scored below 50 on "I-1 Test scores" (Figure 1), with notable variation: Z and S scored significantly higher than the other three. On "I-2 Interpretation of test scores", there was considerable variation: G showed relatively strong evidence (high achievement), J and D medium, and S and Z low. On "I-3 Use of test results" and "I-4 Impact of test use", all five scored below 50, indicating that evidence did not strongly support the claims.

At the secondary indicator level (Figure 1), variation existed in "II-1 Scoring consistency". Z and S scored 68.75, while G, D, and J scored 43.75, 43.75, and 37.50 respectively, indicating better performance by Z and S. No evidence was found for "II-2 Consistency of test instruments", suggesting insufficient attention to test score validity and test instrument consistency. All five methods scored 75-90 on "II-4 Unbiasedness of test interpretation" (high achievement). Large differences were found on "II-3 Meaningful interpretation" and "II-5 Applicability of interpretation": G scored 75 on both (high). On "II-6 Relevance of interpretation", all scored 50 (medium). No evidence was collected for "II-7 Sufficiency of interpretation" or "II-8 Value sensitivity of test use". On "II-9 Fairness of test use", achievement was very low, although the tertiary indicator "III-27 Equal opportunity to acquire target competences" performed well, likely due to training organised by assessment providers. On "II-10 Beneficial impact of testing", all achieved at least medium, with G scoring high, indicating that while long-term impacts are not yet visible, test takers and vocational colleges hold positive views.

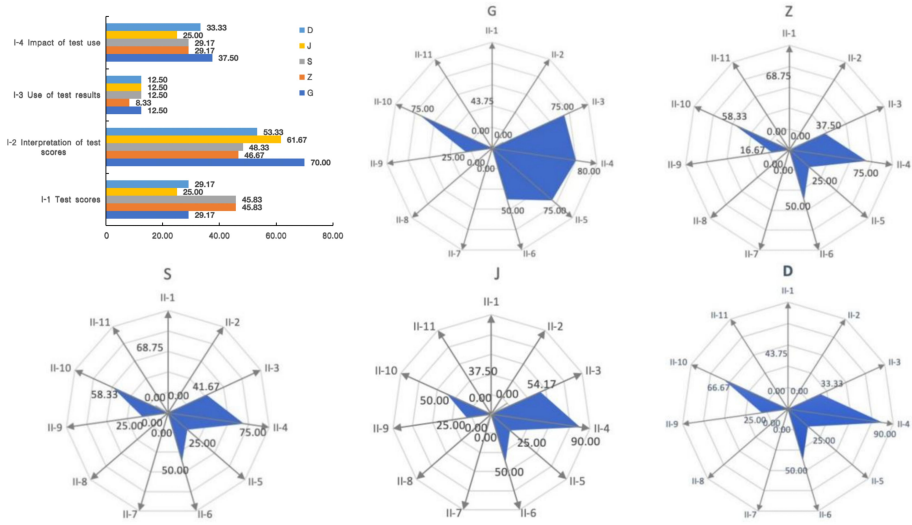


Figure 1. Achievement of primary and secondary indicators for the five assessment methods.

CONCLUSION

This study constructed a validity framework for assessment methods of work-based learning outcomes and conducted a meta-evaluation of five such methods. The findings show that a valid assessment method should cover four dimensions—test scores, score interpretation, use of results, and impact of use—ensuring reliability, validity, fairness, and beneficial consequences. However, the five methods exhibited no significant overall difference in validity and generally performed poorly (all below 50 points), with differences mainly found in test scores and their interpretation. Major problems include a lack of sound theoretical basis (*e.g.*, absence of reliability/validity concepts), methodologically immature standard-setting, de-contextualised test items, and outcome-oriented scoring that fails to assess occupational cognitive competences. Theoretically, this study emphasises that validity in such assessments requires integration of score accuracy, contextualised task design, and process-oriented evaluation. Practically, assessment developers should move beyond purely outcome-oriented scoring and adopt more context-rich test items and process-oriented strategies, especially for higher-order cognitive competences. Several limitations should be acknowledged. First, the sample size is limited. Future research should expand the sample to compare validity characteristics across different occupational types, thereby providing guidance for method design. In addition, further evidence on "use of test results" and "impact of test use" should be collected to enrich the

meta-evaluation.

DECLARATION

Article version statement

This article has been reviewed and preliminarily edited. It is intended solely for use at the 10th Research Conference of the International Network for Innovative Apprenticeship (INAP). The final version will be published in *Vocation, Technology & Education* (https://www.vtejournal.com).

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VTE VOCATION, TECHNOLOGY & EDUCATION

RESEARCH PAPER

Analysing the content validity of TEVET level 1 test items for the fundamental paper in electrical installation and electronics in relation to the teaching syllabus

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ABSTRACT

This study analysed the content validity of TEVET Level 1 test items for the Fundamental Paper in Electrical Installation and Electronics, assessing their alignment with the teaching syllabus between 2018 and 2022. Employing quantitative methods, item analysis, and correlation techniques, Subject Matter Experts (SMEs) matched test items to syllabus content areas. Results revealed strong representation of Numeracy, Science, and Communication Graphics across all five years. However, certain topics—including Calculating Quantities, Conducting Tests in Electrical Circuits, and Drawing Regular Shapes—were overexamined, while others received comparatively less emphasis. Overall, the test items reflected the intended learning outcomes and syllabus content.

Key words: content areas, content validity, Items, subject matter experts

INTRODUCTION

Education is fundamental to individual and societal development (Gezahegn, 2007). In Malawi, technical education has gained prominence through policy frameworks such as Malawi 2063, which emphasise technology integration, innovation, and industry-aligned curricula aimed at producing a skilled workforce and aligning educational outcomes with labour market demands. Reliable, valid, and unbiased assessment is critical to achieving these objectives (American Educational Research Association *et al.*, 2014). This study analyses the content

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validity of TEVET's Electrical Installation and Electronics Level 1 Fundamental Paper, with the aim of enhancing data validity, syllabus coverage, instructional quality, and assessment fairness.

The Fundamental Paper is a two-hour examination comprising two sections: Section A contains twenty multiple-choice questions worth 40 marks, while Section B includes structured responses and short essay items totaling 60 marks, for a combined score of 100. The exam assesses three modules—Science, Numeracy, and Communication Graphics—designed to foster critical thinking, data analysis, and informed decision-making. Examination formulation follows a systematic process overseen by the Assessment and Certification Unit (ACU), involving objective setting, blueprint development, expert question creation, and rigorous validation to ensure content validity, though the paper remains notably challenging for students.

The purpose of this study is to analyse the content validity of TEVET's Level 1 Fundamental Paper items in Electrical Installation and Electronics in relation to the teaching syllabus.

Research questions

How do the TEVET Fundamental Paper items for Electrical Installation and Electronics Level 1 adequately and representatively sample the syllabus? How statistically significant is the difference in content representation across the years 2018, 2019, 2020, 2021, and 2022?

Messick (1989) defines validity as the extent to which empirical evidence and theoretical rationale support score-based inferences, emphasising that validation applies to interpretations, not the test itself. Content validity (McMillan & Schumacher, 2014) concerns the relevance and representativeness of assessment items relative to the targeted construct. Content representativeness requires clear domain definitions (Drummond, 1996). Content validity is essential for syllabus-assessment alignment (Wiggins & McTighe, 2005), student outcomes, clearly defined objectives, teacher training (Guskey, 2000), and curriculum review (Marzano, 2006). The study's theoretical framework integrates Content Validity Theory and Curriculum Alignment Theory, focusing on alignment with learning objectives and stakeholder feedback.

METHODS AND RESEARCH DESIGN

This research employed a quantitative approach to facilitate generalisation of findings to a larger population (Johnson *et al.*, 2007). The positivist paradigm was adopted to ensure objectivity and to identify universal laws through empirical observations (Bryman, 2016). The study involved seven instructors and five years of examination papers drawn from the TEVET curriculum. Systematic sampling was used to identify technical colleges for instructor recruitment, while purposive sampling selected participants based on specific characteristics aligned with the study's objectives.

A pilot test was conducted with two experienced science instructors from technical colleges. Feedback on clarity and usability revealed critical issues affecting the research process—notably unclear evaluation criteria among Subject Matter Experts (SMEs), which impacted data reliability. This underscored the need for well-defined standards and additional training for SMEs.

Data collection

Content validity evidence was gathered by matching SME responses following analysis of the question papers against the syllabus. Seven experienced SMEs evaluated the Fundamentals paper for Electrical Installation and Electronics for the years 2018-2022, following rigorous training on content validity assessment.

Data analysis encompassed assigning items to content areas, evaluating their relevance, assessing statistical significance in content representation across years, and employing *chi-square* tests to analyse correlations between the Fundamental paper and the teaching syllabus.

Subject Matter Experts categorised items in the question paper by content area, requiring agreement from at least four of the seven SMEs to definitively assign an item. Items lacking consensus were marked as ambiguous. This categorisation was conducted across all five years (2018-2022), and summarised in a table detailing the assignment of items to the syllabus topics of the Level One Fundamental Paper in Electronics and Electrical Installation.

Correlation of the fundamental paper against the teaching syllabus

This analysis investigated the correlation between test items for the Fundamental paper and the prescribed teaching syllabus. To assess this correlation, the Statistical Package for Social Sciences (SPSS) version 20 and spreadsheet software were used to compute correlation coefficients. Understanding the correlation coefficient is essential, as it quantifies the degree of relationship between the test items and the teaching syllabus, ranging from –1 to +1.

Correlation coefficients quantify the strength and direction of a relationship between two variables. A coefficient of 1 denotes a perfect positive correlation, wherein an increase in one variable is accompanied by a corresponding increase in the other. Conversely, a coefficient of –1 indicates a perfect negative correlation, meaning that as one variable rises, the other falls. A coefficient of 0 reflects no correlation whatsoever. Values between 0 and 1 represent varying degrees of positive correlation, while those between –1 and 0 capture differing intensities of negative correlation (Field, 2013).

Content representation analysis

In conjunction with correlation analysis, the researcher evaluated content representation within the test items. Each test item was assigned to specific content areas based on SME assessments. To evaluate the adequacy of content representation specifically for categories such

as Science, Numeracy, and Technical Drawing, a *chi-square* goodness-of-fit test was performed. This test compares expected frequencies (derived from a table of specifications) with observed frequencies (based on SME evaluations).

The *chi-square* goodness-of-fit test determines whether a significant difference exists between the expected and actual frequencies of categorical data. The operational formula for the *chi-square* statistic is

$$\chi^2 = \frac{\sum(O - E)^2}{E}$$

where χ^2 is the *chi-square* statistic, O represents the observed frequencies, and E denotes the expected frequencies.

A significance level of 0.05 was adopted, whereby results with a *P*-value greater than 0.05 ($P > 0.05$) were deemed statistically non-significant. This implies that any observed differences in frequencies are likely attributable to random chance rather than systematic discrepancies. When the *P*-value exceeds 0.05, the null hypothesis—that there is no statistically significant difference between observed and expected frequencies—cannot be rejected (Cohen, 1988).

Ethical considerations

The study adhered to the ethical guidelines of the University of Malawi Research and Ethics Committee, ensuring voluntary participation and informed consent, prioritising privacy, and evaluating potential risks for participants. Participants retained the right to withdraw at any time, with measures implemented to minimise potential harm (Kitchin, 2017).

RESULTS

Assignment of items to content areas

SMEs assigned items to content areas across all five administrations (2018-2022) Content representativeness was examined across three dimensions: How items sample syllabus content, the specific concepts measured, and differences in content representation across years. Results indicated that all five administrations sampled syllabus content adequately, as the same table of specifications was consistently used to produce equivalent tests. Chakwera (2004) similarly noted that test specifications ensure test equivalence.

Determining how the fundamental paper sampled syllabus content

A *chi-square* goodness-of-fit test was conducted for all five administrations using a significance level of 0.05 (Table 1). Results showed non-significant *chi-square* values for all years: 2018 ($P = 0.243$), 2019 ($P = 0.229$), 2020 ($P = 0.243$), 2021 ($P = 0.243$), and 2022 ($P = 0.258$). These findings indicate adequate content sampling relative to the table of specifications. However, certain concepts were over-examined at the expense of others, and the majority of items assessed lower-order cognitive

Table 1: *Chi-square* goodness of fit analysis summary

Analysis	2018	2019	2020	2021	2022
Chi-Square	48.000	56.000	48.000	48.000	40.000
df	42	49	42	42	35
P	0.243	0.229	0.243	0.243	0.258

skills.

The findings indicate noteworthy content representativeness across all administrations, with all three content areas adequately covered. As Thompson and Weiss (2017) highlight, adequate sampling enhances assessment credibility. However, the proportions of content assessed in 2018, 2019, 2021, and 2022 diverged from expected distributions. The omission of specific concepts—such as "Calculating Capacity of Electrical Machine" and "Producing Computer Aided Drawings" in 2020—underscores potential gaps in comprehensive curriculum assessment. This represents a threat to construct validity (Messick, 1989). Additionally, the overemphasis on topics including "Calculating Quantities in Electrical Circuits", "Conducting Tests in Electrical Circuits" and "Drawing Regular Shapes" aligns with Wiggins' (1990) call for balanced assessment practices. Such imbalances can distort learning experiences, leading students to prioritise overrepresented topics at the expense of a well-rounded understanding of the curriculum.

CONCLUSION

This analysis serves as a cornerstone for improving national productivity, workforce readiness, and sustainable socio-economic development. Anticipated benefits include improved graduate employability, strengthened quality assurance within TEVET examinations, increased stakeholder confidence, and enhanced regional and international recognition of TEVET qualifications.

Recommendations

The test specifications table should delineate not only mark allocation across content areas but also the distribution of marks among individual concepts within each area.

The ACU must emphasise strict adherence to the table of specifications during all assessment processes, enforcing compliance during both test development and moderation.

The ACU should facilitate workshops that actively engage educators in item development to enhance the relevance and validity of assessment items. Professional development initiatives aimed at improving educators' assessment literacy are also crucial.

Implementing these recommendations could significantly enrich understanding

of content validity's impact on vocational education assessments.

DECLARATION

Article version statement

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VTE VOCATION, TECHNOLOGY & EDUCATION

RESEARCH PAPER

Formalization of traditional apprenticeship content in Benin

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ABSTRACT

Apprenticeship is a form of vocational training based on an apprenticeship contract. This contract is an agreement whereby the owner of an industrial, commercial or agricultural enterprise, a craftsman, or a manufacturer undertakes to provide, or ensure the provision of systematic and comprehensive vocational training to an individual. In return, the apprentice agrees to follow instructions received and to carry out assigned tasks within the framework of his or her training. The master craftsman bears primary responsibility for the apprentice's training. As such, he determines training content and organizes the methods of transmitting professional know-how. In traditional apprenticeship, characterized by the absence of formalized pedagogical materials, training relies mainly on the professional skills of the master trainer. This leads to strong variability in training content from one trainer to another. The competencies acquired by the apprentice are therefore closely linked to the skill level of the master craftsman. Despite constraints linked to the unpredictability of productive activities, defining a common set of competencies to be transmitted is necessary. This aims to harmonize apprenticeship training content and ensure objective and fair assessment of apprentices, particularly in the craft sector. In this perspective, the competency matrix is used as a reference tool for developing curricula for apprenticeship training in crafts. It is developed using the Developing A Curriculum (DACUM) methodology, which is based on a participatory approach involving professional craftsmen in the analysis and description of their occupations. The development process includes a job analysis phase lasting approximately three days, followed by a validation phase of two days. These phases are not necessarily consecutive.

Key words: apprenticeship, craftsmanship, Benin, certification, curricula

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INTRODUCTION

In Benin, traditional apprenticeship remains a key pillar for the transmission of professional skills and the socio-economic integration of young people. Long based on informal knowledge transfer between master craftsmen and apprentices, it has contributed to the development of many artisanal trades but suffers from a lack of formalized standards, leading to disparities in training content and acquired competencies (Davodoun, 2011).

In a context of increasing demands for professionalization, certification, and recognition of qualifications, the formalization of apprenticeship has become a central issue within the Technical and Vocational Education and Training (TVET) system (Davodoun, 2016). In this regard, the DACUM methodology (Coffin, 1993) has been introduced to develop competency matrices serving as frameworks for training, assessment, and certification.

This paper analyzes this formalization process through the Certificate of Occupational Qualification (CQM) and highlights its foundations, stakeholders, and effects on the structuring of training and certification pathways.

METHODOLOGY AND RESEARCH QUESTION

This contribution examines the extent to which the formalization of training frameworks has improved the structuring of competencies in initial vocational training through apprenticeship. It addresses the following questions: How do competency matrices contribute to an objective structuring of skills required for artisanal occupations? How do these matrices influence training practices of master craftsmen and apprentices' learning pathways?

This paper adopts a descriptive and analytical approach to the formalization of traditional apprenticeship curricula in the artisanal sector in Benin. The analysis is based on the application of the DACUM methodology, which has been used to develop approximately sixty competency matrices covering a wide range of artisanal occupations. The data are drawn from occupational analyses conducted by master craftspersons with the support of trained facilitators, as well as from institutional documents, including decrees, ministerial orders, and policy frameworks related to the CQM.

This methodological approach makes it possible to examine competency matrices as key instruments for structuring apprenticeship training. The analysis shows that competency matrices help identify and organize the competencies required for occupational practice; facilitate the transfer of skills between master craftspersons and apprentices; support training needs assessment and capacity-building initiatives for artisans; provide a basis for the development of competency record books; contribute to determining the duration of apprenticeship programmes; and support the assessment and certification of apprentices' competencies, particularly within

the framework of the CQM.

RESULTS

The competency matrix makes it possible to identify the core competencies of an occupation and break them down into tasks and skills required for its practice. It serves as an assessment framework for apprentices at the end of training and allows for monitoring the progressive acquisition of competencies throughout the training process. It is also used to develop a competency report used by apprentices for self-assessment. In addition, competency matrices are used to design examination papers for the CQM, which are based on the competencies and tasks to be assessed (Davodoun & Alfa, 2017).

The CQM represents the first level of certification in the TVET system. It provides access to higher-level certifications, including the CQM, as well as other professional recognition schemes.

To date, around fifty trades have competency matrices, out of more than three hundred identified occupations (Chamber of Trades and Crafts of Benin, 2024a). These matrices are used for final assessment of apprentices mainly trained in artisanal enterprises. The contribution of training centers is limited to occasional participation of instructors as occupational experts. The organization of CQM examinations at local level is ensured by public technical training centers, whose managers are responsible for providing materials, deploying equipment, mobilizing artisans for examination panels, and processing results (Chamber of Trades and Crafts of Benin, 2024b, 2024c). The existing competency matrices have enabled the certification of approximately 104,615 apprentices between October 2023 and October 2025.

CURRICULUM DEVELOPMENT OF CQM-BASED APPRENTICESHIP

Normative and institutional foundations: DACUM was originally developed by howard clem and later refined by robert adams, who described it in 1975. the method is based on participatory principles centered on the learner, the training environment, assessment, and strategies that support learning progression. competency matrix design follows strict standards, including: Presentation on a single page, division into technical and managerial domains, vertical organization of core competencies, horizontal organization of tasks and skills, precise formulation of competency statements.

Competency matrix as a curricular tool: In Benin, competency matrices are a key tool for harmonizing training content and pedagogical practices. They provide an objective basis for training and assessment and significantly improve the internal efficiency of apprenticeship training, particularly in the craft sector. for master craftsmen, the matrix serves as: A dashboard of competencies to be transmitted, an assessment tool using competency reports, a guide for

managing the training process, a basis for curriculum development, a reference for determining training duration, a framework for designing CQM examinations. for apprentices, it serves as: A tool for tracking learning progress, a self-assessment instrument, a motivational tool for entering apprenticeship.

The competency report derived from the matrix also serves as a communication link between the master craftsman and the apprentice's parents or guardians.

Contributions and limitations of DACUM methodology: DACUM provides apprenticeship training with formalized training tools that define occupational competencies required for training and practice. It replaces informal knowledge transfer where the master's experience alone was dominant.

The methodology ensures strong involvement of professionals, enhancing the reliability and credibility of occupational analysis results.

STAKEHOLDERS' ROLES

Master craftsmen

Master craftsmen, considered occupational experts, play a central role in developing competency matrices using DACUM. They participate in both the three-day development phase and the two-day validation phase. They analyze their occupation by identifying key competencies, tasks, and skills. during validation, the initial group (8-12 experts) is reduced and partially replaced to review the draft matrix.

Chamber of Crafts and trades of the state

The Chamber of Crafts and trades of Benin is responsible for organizing the Certificate of occupational qualification and planning competency matrix development in the craft sector. the process involves craftsmen, facilitators, and observers when necessary.

Technical and financial partners

Technical and financial partners support the development, dissemination, printing, and capacity building of craftsmen in the use of competency matrices.

POSITIONING OF CQM IN THE NATIONAL CERTIFICATION FRAMEWORK

Place of CQM in TVET

The CQM is the first qualification in technical and vocational education and training. it is accessible after three years of training in enterprises or training centers. it mainly targets out-of-school youth. training may also take place in vocational training and apprenticeship centers (CFPA), leading to CQM or Certificate of professional qualification (CQP) (Davodoun, 2014).

Articulation with CQP and higher education

The TVET system is based on continuity, mobility, and recognition of competencies. pathways allow learners to progress from one qualification level to another, both in general education and TVET (Ministry of Secondary, Technical

and Vocational Education and Training, 2020).

CQP and Certificate of Vocational Aptitude (CAP) provide access to higher-level professional qualifications. The system also promotes lifelong access to training through the Attestation of Professional Qualification (AQP), enhancing employability and recognition of skills.

CONCLUSION

The formalization of traditional apprenticeship through competency matrices represents a major step in modernizing vocational training in Benin. Based on the DACUM methodology, this system harmonizes training content, strengthens pedagogical practices, and improves objectivity in assessment and certification.

Competency matrices are essential curricular tools for defining skills, monitoring learning, and designing CQM examinations, while enhancing recognition of qualifications within the national TVET system.

However, challenges remain, including expansion to all trades, dissemination, capacity building, and resource mobilization.

Strengthening this system requires coordination between the State, the Chamber of Crafts and Trades of Benin (CMA-Benin), professionals, and technical and financial partners to improve training quality and recognition of apprenticeship-based skills.

DECLARATION

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VTE VOCATION, TECHNOLOGY & EDUCATION

RESEARCH PAPER

Vocational education and training learning factory: An apprenticeship model in China

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ABSTRACT

The vocational education and training (VET) learning factory is a practical embodiment of modern apprenticeship developed from Chinese school-enterprise cooperation. It unifies production and learning systems, with the work process at their core. Drawing on a multi-case study of four types of VET learning factories, this paper explores how apprenticeship learning characteristics are embodied in this concept. The findings reveal three key characteristics: (1) the workplace is realized as either a real factory or a factory replica; (2) formal and informal learning are integrated; and (3) senior experts (engineers or teachers) work in and mentor students within the learning factory. Based on best practices, this paper further discusses methods for promoting effective learning, including supporting mentors' identity formation and consensus-building on action-oriented learning, designing learning tasks with appropriate complexity, and adopting production organization modes that foster learner development.

Key words: vocational education and training learning factory, modern apprenticeship, school-enterprise cooperation

INTRODUCTION

The structural tension in China's vocational education system poses the core bottleneck for deep cooperation between schools and enterprises: Enterprises face the risk of brain drain and hesitate to invest resources in training students, while vocational schools are constrained by education regulations and struggle to meet enterprises' customized employment needs. Faced with this dilemma, modern apprenticeship, as an effective talent training model, is increasingly considered an important breakthrough in addressing the challenges of

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school-enterprise cooperation. In recent years, as a practice of modern apprenticeship in China, vocational education and training (VET) learning factories have seen meaningful attempts: Some VET learning factories dominated by vocational schools convert production tasks into learning projects and deliver the products to their industry partners for commercial market; some enterprises respond to the trend of manufacturing servitization by establishing VET learning factories, transforming their roles from "bystanders" into "active partners", and guiding students through the production of real products during learning factory operations. This research explores how the learning characteristics of apprenticeship are embodied in the VET learning factory concept through a multi-case study of vocational education in China, and discusses methods for promoting effective learning within this model.

METHODS AND RESEARCH DESIGN

The research adopts a qualitative approach. A multi-case analysis is applied to gain insight into the learning characteristics of modern apprenticeship in VET learning factories.

Classification model

After a comprehensive review of best practices in VET learning factories, a classification model was generated based on the relationship between vocational schools and enterprises as the key factor. The model comprises four types of VET learning factories (Table 1), with a typical case identified for each type.

The production department of Baike Company is selected as a Type E case. It is characterized by an internship program consisting of real work tasks with varying levels of difficulty, with senior employees offering mentorship to the interns. At the car repair and maintenance shop-floor of Changzhi School (Type S), students observe or experience the work under the guidance of the technicians. Both Jingdiao Institute and Zhuoyue Class are examples of school-enterprise cooperation projects. Due to the difference in the dominant party, they are classified as Type SE-I and Type SE-II, respectively. At Jingdiao Institute, Jingdiao Company cooperates with Changjidian School and dominates the learning factory operation. The company has constructed production facilities at Changjidian School and dispatches engineers to guide students through actual customer orders. Zhuoyue Class is established by the Department of Mechatronics Engineering at Changchun Vocational School as a collaborative project with Demahe Company. The school dominates the production organization. The learning tasks are jointly developed by teachers and engineers based on real production orders from Demahe Company, and the products resulting from these learning tasks are delivered to the company for sale.

Fieldwork and analysis

The fieldwork for each case lasted between one and three weeks. The

Table 1: Relationship between the vocational school and the enterprise in VET learning factory

Type	Description	Position/role of vocational school	Position/role of enterprise
E	Single entity, operated by an enterprise	-	Operator
S	Single entity, operated by a vocational school	Operator	Imbedded within school
SE-I	Double entities for school-enterprise cooperation, with the enterprise as leading operator	Supporter	Dominant Operator
SE-II	Double entities for school-enterprise cooperation, with the vocational school as leading operator	Dominant Operator	Supporter

VET, vocational education and training.

primary research methods were observation and interview. The researcher observed students' learning activities and their interactions with others in the workplace while also conducting in-depth interviews with learners, mentors, and other relevant personnel to understand each learning factory's operation and learning processes.

The analysis applied the theories of Psychological Regulation of Action and Community of Practice (CoP). Learning characteristics were analysed based on complete learning action (Hacker, 1998)—a criterion for effective learning—and were linked to apprenticeship characteristics. Situating learners' learning processes within the CoP framework (Wenger, 1998), the research explained how the CoP facilitated learners' development from the periphery to the center.

RESULTS

VET learning factory concept

The VET learning factory is a practical embodiment of modern apprenticeship, developed from Chinese VET school-enterprise cooperation practices. It builds upon the earlier six-dimensional learning factory concept (Abele *et al.*, 2015) by reinterpreting the "Didactics" dimension as a "learning system", thereby emphasizing that learning features should be equivalent to production features. As a unity of production and learning systems, the VET learning factory comprises: (1) A production system consisting of production organization mode, production process, work process, and sustainable solutions; and (2) a learning system consisting of formal and informal learning. The two systems intersect, with the work process at their core (Li, 2025).

Apprenticeship characteristics

The apprenticeship characteristics of the VET learning factory are first evident in its workplace setting, which takes the form of either an actual factory or a factory replica. Type E learning factories are directly situated in real factories,

whereas the other three types are designed and built based on authentic factory prototypes. A real factory or prototype ensures the validity of the work process, rendering learning activities meaningful. However, not all real factory work tasks possess learning value—tasks on assembly lines organized under Taylorism, for instance, offer little learning potential. Accordingly, learning factories identify work tasks with adequate complexity during the design phase to guarantee the effectiveness of apprenticeship learning.

VET learning factories combine Work-Integrated Learning and Work-Oriented Learning (Dehnbostel & Schröder, 2017) and present both formal and informal learning characteristics, which can effectively promote competence development. By establishing a real workplace and production process, learning factories enable learners to take responsibility for manufacturing products in practice, thereby maximizing Work-Integrated Learning. This approach compensates for the shortcomings of traditional school education models in China and provides basic conditions for effective informal learning. During informal learning in learning factories, learners not only learn through practical experience but also engage in implicit learning when collaborating with peers and mentors.

Senior experts (engineers or teachers) mentor students and work together with them. In Type E and Type SE-I learning factories, due to the enterprise's dominant role in operations, engineers from the enterprise participate in production and guide students directly. In Type S and Type SE-II learning factories, vocational schools recruit experts (usually enterprise engineers) to mentor students. Those who serve as mentors in learning factories are senior experts in production; otherwise, production activities would be difficult to carry out. Compared with traditional vocational schools in China, these mentors can be considered the most prominent advantage and most valuable resource of learning factories, as many teachers in Chinese vocational schools lack the practical competence to guide students in actual production. The professional competence of mentors largely determines the upper limit of students' learning outcomes. An engineer at Jingdiao Institute stated during an interview that when faced with unknown work tasks, he dares to lead students to explore new machining processes. Consequently, the space for students to explore and develop higher-level competence is expanded.

Methods to promote effective learning

Most mentors in learning factories have dual identities—either employee-mentor or teacher-producer—entailing dual responsibilities. Conflict between these two responsibilities can weaken the mentor's identity. Therefore, VET learning factories should promote mentors' identity recognition through appropriate incentives. In addition, it is also necessary to assist mentors in reaching agreement on action-oriented

learning. The German "Ausbildereignungsverordnung" (AEVO) can serve as a reference for training VET learning factory mentors.

Learners develop competence by completing work tasks in apprenticeship programs, which closely aligns with the learning process in VET learning factories. Real work tasks present multi-dimensional challenges. The learning tasks in learning factories are selected and transformed from work tasks. Mentors should comprehensively consider the difficulty dimensions, thoroughly negotiate with the enterprise partner, carefully determine the sequence of learning tasks, provide necessary "scaffolding" and generate teaching plans according to the rules of competence development (Zhao, 2021).

Vocational education research emphasizes choosing a production organization mode that promotes human development and strongly opposes using mass production work processes for teaching, as this approach fundamentally fails to provide valuable production tasks that can serve as learning tasks. In learning factories, production organization should be suitable for producing small batches of products with diverse types, low repetition frequency, and flexible delivery times. In practice, both single-piece production and lean production organization can be observed.

CONCLUSION

From a learning perspective, the VET learning factory is closely related to modern apprenticeship: In both approaches, students learn by completing work tasks in a real work environment. However, unlike traditional apprenticeship, the VET learning factory can realize a real working environment either through an actual factory or through a workplace created via school-enterprise cooperation based on authentic production processes. As such, VET learning factories have effectively expanded the scope of modern apprenticeship practice in China.

DECLARATION

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VTE VOCATION, TECHNOLOGY & EDUCATION

RESEARCH PAPER

Palace carpenters' (miya-daiku) vocational education and training in Japan

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ABSTRACT

This paper examines the vocational education and training of Japanese palace carpenters (miya-daiku), focusing on Kongō-gumi, the world's oldest continuously operating company. It analyzes how the transmission of tacit knowledge through the traditional apprenticeship system emerged and persisted within hereditary and familial organizational structures. The study further investigates how modernization, the collapse of the traditional apprenticeship system, and postwar industrial rationalization transformed the organization and training of miya-daiku. The paper concludes that modern craft schools now serve not only technological and labor-market needs, but also institutional demands for certified professional competence.

Key words: miya-daiku, tacit knowledge, Kongō-gumi, rationalization of production

INTRODUCTION: ESTABLISHING THE RESEARCH FRAMEWORK

The *miya-daiku*, more precisely *dō miya-daiku*, examined in this study are craftsmen specializing in the construction and restoration of traditional wooden architecture, particularly Shintō shrines and Buddhist temples (*shaji kenchiku*). Whereas ordinary carpenters (*ya-daiku*) primarily build common residential houses, the principal task of *miya-daiku* is to preserve buildings intended to endure for centuries by employing highly advanced traditional techniques (Kanisawa, 2024).

The first historical appearance of *miya-*

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daiku dates to the late sixth and early seventh centuries. This period constituted a major turning point in Japanese history, during which Japan transformed from a "confederation of powerful clans" into a centralized state centered on the Tennō (emperor). In addition to the transition of the political system from hereditary succession to one based on merit and official office, the symbolic center of power also shifted from "tombs" to "temples", signifying a transformation in the spiritual center of society.

A symbolic event representing this transformation was the construction of the Shitennō-ji and Hōryū-ji temples by Prince Shōtoku (574-622). In order to pacify domestic political conflict and establish an imperial system aimed at national stability and modernization through the power of Buddhism, Prince Shōtoku initiated the construction of Shitennō-ji in Osaka as Japan's first state-sponsored temple.

At the beginning of the construction project, Prince Shōtoku invited three master craftsmen from the Korean kingdom of Baekje, with which Japan had maintained close diplomatic relations since approximately the fourth century. Baekje had rapidly adopted the culture of contemporary southern China and possessed highly advanced architectural technologies. One of these three craftsmen, a man bearing the name Kongō, became the first head of the Kongō-gumi enterprise: Shigemitsu Kongō. Even after the completion of Shitennō-ji in 593, while the other two craftsmen were assigned to different regions, Shigemitsu Kongō was ordered by Prince Shōtoku to "protect Shitennō-ji for eternity", Through this appointment, the Kongō family effectively established its position as hereditary temple carpenters attached to Shitennō-ji. Kongō-gumi is often regarded as the world's oldest continuously operating company (Waraku Web Editorial Department, 2026).

At that time, *miya-daiku* and ordinary carpenters had not yet become clearly differentiated into specialized professions. Beginning around the Muromachi period (1336-1573), the work of carpenters became increasingly specialized, leading to the emergence of occupational categories such as *miya-daiku* and *tategu-daiku* (carpenters specializing in fittings and interior woodwork) (Nakazawa, 2020).

RESEARCH QUESTION AND METHOD

This presentation focuses particularly on the transformation of the training and organizational systems of Kongō-gumi—the world's oldest company—in the context of overcoming the stagnation and eventual dissolution of Japan's traditional apprenticeship system. It addresses the following two questions.

(1) Under what social conditions did the transmission of "tacit knowledge" (*anmokuchi*), first conceptualized by Michael Polanyi (1891-1976) and

regarded as a core objective of vocational education for *miya-daiku*, emerge and continue to be sustained? Polanyi emphasized that human beings "know more than we can tell". A typical example of tacit knowledge is the intuition of skilled craftsmen: Asensory capability developed through long experience, such as perceiving mechanical malfunctions solely through sound or tactile sensation, even though such knowledge cannot easily be verbalized.

(2) When the traditional apprenticeship system collapsed, *miya-daiku* communities transformed into modern organizations grounded in long-standing familialism. In this process, how was the rationalization of production implemented?

The discussion first examines the conditions under which the transmission of tacit knowledge emerged within the framework of traditional familialism and the apprenticeship system, and how this structure persisted until the period following the end of the Second World War in 1945. The Research is based on the analysis of documents and on an interview with a master in carpentry.

THE TRADITIONAL APPRENTICESHIP SYSTEM OF PALACE CARPENTERS

During the period in which the political system was still based on hereditary succession, the foundation for the training and organization of specialized craftsmen consisted of lineages or clans that transmitted particular technical skills across generations. Within these families, technical knowledge was instilled from early childhood. The transmission of tacit knowledge was maintained in a relatively closed manner centered on blood relations, thereby deepening technical specialization.

As the political system shifted in the late sixth and early seventh centuries from hereditary succession to one based on merit and official office, these groups of craftsmen were incorporated into the state apparatus as official bureaus responsible for the construction of temples, shrines, and court buildings. Social rank came to be determined not by lineage but by individual talent and achievement, symbolized through a hierarchy of differently colored court caps. The technical specialists affiliated with these institutions participated in large-scale state projects under official supervision and acquired knowledge of organized systems of labor division—such as architectural design, timber procurement, and wood processing—through practical experience (Ancient Capital Asuka Preservation Foundation, 2026).

The transmission of tacit knowledge was carried out through a thoroughly practice-oriented approach. The pedagogical method commonly described as "learning by watching the master's back" (*senaka o mite oboeru*) expanded beyond biological father-son relationships into a more abstract relationship between master and apprentice (QON Inc, 2017). The apprenticeship system, in which

"technique"(*waza*) and "intuition" (*kan*) were transmitted through long-term communal living and shared labor, formed the foundation of vocational training. Craftsmen also maintained distinctive religious beliefs in order to preserve and protect their techniques as sacred knowledge, and Kongō-gumi still reveres Prince Shōtoku as the patron saint of carpenters (Wasabi, 2014).

The training and organizational systems of carpenters that developed in this manner began to weaken during the Meiji period (1868-1912), when Japan transformed from a warrior government into an imperial state centered on Tennō ideology and State Shintō.

THE COLLAPSE OF THE APPRENTICESHIP SYSTEM IN JAPAN: THE IMPERIAL STATE OF THE MEIJI PERIOD AND POSTWAR CONCRETE CONSTRUCTION

During the Meiji period, the government promulgated the *shinbutsu bunri-rei* (Edict for the Separation of Shintō and Buddhism), as a result of which Shitennō-ji lost the income derived from its extensive temple estates. Consequently, Kongō-gumi also lost its position as the hereditary temple carpenters attached to Shitennō-ji, leading to economic decline. From this point onward, Kongō-gumi increasingly undertook projects outside Shitennō-ji. Whereas before the Meiji period nearly 100 percent of its work had been connected to the temple, the proportion gradually declined thereafter and today accounts for only approximately 10-15 percent of total business activity. By expanding into broader fields of operation, the company was able to overcome these difficulties (Nakazawa, 2020).

After the Second World War (particularly from the late 1950s into the 1960s), reinforced concrete construction methods came to be adopted in the reconstruction of temples and shrines because of their advantages in fire prevention, disaster resistance, and economic efficiency. Reinforced concrete construction was also considered during the reconstruction of Shitennō-ji. The development of this construction method prompted Kongō-gumi to expand into unfamiliar sectors of general architecture, which ultimately led to mounting debt and a severe management crisis.

In 2006, the original Kongō-gumi, led by the Kongō family, transferred its business rights to a newly established Kongō-gumi founded by Takamatsu Construction Co., Ltd. The overwhelming majority of employees and *miya-daiku* transferred directly into the new organization. With the Kongō family—continuing in its forty-first generation and tracing its history back 1445 years—serving as a symbolic center, the management supported by Takamatsu Construction and the exclusive groups of *miya-daiku* traditionally attached to the Kongō family together form an integrated structure

oriented toward the next century (Furuichi, 2023).

Among these exclusive groups of *miya-daiku*, one member of the Kongō family is still present. Although not directly involved in management, this family member remains symbolically indispensable both to Kongō-gumi and to its relationship with Shitennō-ji. While contracts are formally commissioned by Kongō-gumi, strong bonds continue to exist between the craftsmen and the Kongō family, which functions as a traditional master lineage (Nakazawa, 2020).

The reform strategy implemented by Takamatsu Construction on the basis of the traditional family system focused particularly on specializing Kongō-gumi's activities in shrine and temple architecture—the field in which the company retained its traditional strength through its exclusive *miya-daiku*. At present, there are six groups in Osaka and two in Tokyo, for a total of eight groups comprising approximately 110 craftsmen. Each group consists of between three and twenty members. The existence of multiple groups fostered a sense of competition that contributed to the enhancement of technical skills. At the same time, because all eight groups collaborate on work sites, the exchange of techniques has naturally progressed (Nakazawa, 2020).

In the field of vocational training, there is currently growing interest among young people in becoming *miya-daiku*, particularly because of the opportunity to employ traditional techniques such as wood joinery without relying on metal fasteners or nails. Once a master accepts an apprentice, it is generally understood that the master will support the apprentice throughout his lifetime, thereby creating exceptionally strong personal bonds. Technical skills are usually transmitted orally from master to apprentice within the framework of the apprenticeship system. This somewhat closed form of tacit knowledge transmission continues even today. Within Kongō-gumi, the inheritance of superior technical skills remains, even after more than one thousand years, the most important foundation of vocational education. In this respect, the company continues to preserve traditional methods (Furuichi, 2023).

The acquisition of the techniques necessary for the restoration of cultural properties—the principal work of *miya-daiku*—and the corresponding tacit knowledge still fundamentally depends on the traditional apprenticeship system. Recently, however, attempts have increasingly been made to analyze the techniques of *miya-daiku* through "structural calculations" and "3D scanning" in order to scientifically demonstrate the earthquake resistance of traditional architecture within the framework of managerial rationalization.

I was able to observe this new process of digitalization during an interview conducted in April of this year at the workshops of master carpenter Takahiro Matsumoto in Kamakura, the *miya-daiku*

attached to famous Engaku-ji in Kita-Kamakura, originally constructed in 1282. He and his wife explained that, for the rationalization of architectural production, pre-cut materials are now sometimes employed depending on the specific application. Since approximately the 2010s, craft schools (*shokunin gakkō*) have begun to emerge as institutions for acquiring these new technologies.

CONCLUSION: NEW DEVELOPMENTS IN THE VOCATIONAL TRAINING OF MIYA-DAIKU—THE ESTABLISHMENT OF CRAFT SCHOOLS

In addition to teaching new technologies, craft schools also play an important role in addressing the severe shortage of young workers in the industry.

One of the principal causes of this shortage is the increasing distancing of Japanese society from Buddhist temples. Japan traditionally possessed systems through which donations were widely collected for the construction and repair of shrines and temples. Particularly significant among these was the *danka* system, established during the Edo period as an effective means of suppressing Christianity by requiring all citizens to belong to a Buddhist temple.

Under this system, temple affiliation was organized on a household basis. Family graves were located within the temple precincts, and children and grandchildren were expected to inherit both the graves and temple affiliation. In recent years, however, declining birthrates have resulted in increasing numbers of cases in which there are no descendants to maintain family graves. Furthermore, marriages between only children often result in the abandonment of one side's ancestral graves. As Japanese society ages, it also becomes increasingly difficult for elderly individuals to travel to distant hometown gravesites. Consequently, many people are dissolving their relationships with distant temples and relocating cremated remains to maintenance-free forms of burial such as "tree burials" (*jumokusō*) or perpetual memorial graves (*eitai kuyōbo*). According to statistics from the Ministry of Health, Labor and Welfare, the number of grave relocations (*kaisō*) reached a record high of approximately 166,000 cases in fiscal year 2023.

As a result, the sustainable maintenance cycle that had long supported the work of *miya-daiku* is collapsing. Because the *danka* system is disintegrating, temples are increasingly unable to accumulate funds for repairs, and damaged temple buildings are sometimes left unrepaired. Since temples can no longer guarantee continuous commissions, master carpenters are unable to assure apprentices of stable long-term employment and wages. Consequently, they can no longer confidently recruit apprentices or undertake the long-term training processes—often spanning a decade—that were once characteristic of the profession.

Under such conditions, there is insufficient temporal and economic capacity for careful on-site apprenticeship training. Therefore, it has become necessary to provide intensive foundational training through school-based systems in which either the trainees themselves bear the educational costs (through tuition payments) or the state provides financial support (Sasaki, 1974).

Kongō-gumi likewise recognizes the training of successors and the transmission of technical skills as urgent tasks and established the "Takumi Ikusei Juku" (Craftsman Training Institute) in 2021. In 2022, five trainees were scheduled to enroll and, after six months of instruction, were expected to become the next generation of *miya-daiku*. Furthermore, in order to maintain the technical proficiency of its craftsmen, Kongō-gumi has actively sought commissions for the restoration of historically designated cultural properties (100-Year Company Online, 2022).

The conditions governing restoration work on designated historical buildings have also changed in recent years. Since the "Traditional Architectural Craftsmanship Techniques" (*dentō kenchiku kōshō no waza*) of *miya-daiku* were inscribed by UNESCO, these techniques have been redefined not merely as "individual skills" but as "treasures that the state must protect", thereby requiring public preservation measures. Systems have consequently been established through which state subsidies are granted to particular master craftsmen designated as "Holders of Selected Conservation Techniques" (*sentai hozon gijutsu hojisha*), accompanied by the institutionalization of qualification systems.

Today, the restoration of cultural properties is increasingly carried out through public bidding systems and government-subsidized projects. In connection with this development, the "visualization" of technical skills through qualifications and certificates of completion has become increasingly important. Completion of an official curriculum at a craft school has thus begun to function as evidence guaranteeing professional reliability and competence.

For these reasons, the establishment of craft schools is becoming increasingly important not only as a site for acquiring new technologies necessary for managerial rationalization and as a response to labor shortages in the construction sector, but also, thirdly, because diplomas from such institutions are increasingly required as formal proof of technical competence.

DECLARATION

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Topic 5: Apprenticeship delivery and teaching/training issues

VTE VOCATION, TECHNOLOGY & EDUCATION

RESEARCH PAPER

What apprentices learn abroad: Informal learning, self-efficacy and learning processes in international mobility—A comparative analysis

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ABSTRACT

International mobility is a key instrument in European vocational education and training policy. This paper analyses learning processes and outcomes of international mobility in a comparison between school-based and dual vocational education and training (VET) systems. The study combines the analysis of European Union (EU) participant reports (n = 903) with a standardized pre-post survey (target sample approximately 250 participants). The findings show that international mobility primarily strengthens transversal competences such as self-efficacy, language skills and social interaction. In contrast, vocational learning outcomes vary significantly and are not systematically guaranteed. The comparison highlights different functions: While mobility mainly supports personal development and orientation for students, it represents a potential extension of work-based learning for apprentices, depending on the quality of workplace integration. The results suggest understanding international mobility as a context-dependent learning environment that requires deliberate pedagogical design.

Key words: international mobility, vocational education and training, self-efficacy, work-based learning

INTRODUCTION

International mobility has become a central instrument in European vocational education and training (VET) policy and is particularly promoted within the Erasmus+ program to strengthen competences and employability (Bliem *et al.*, 2020; European Commission, 2022). Empirical studies

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consistently show that mobility primarily contributes to the development of transversal competences, including independence, motivation and intercultural skills (Cedefop, 2019; Netz, 2015; Petanovitsch & Fibi, 2021; Schmid *et al.*, 2021).

At the same time, it remains insufficiently understood how these learning processes emerge in detail and how they relate to different forms of vocational education. In particular, research rarely differentiates between school-based VET and dual training systems, although these differ fundamentally in their learning logic. While school-based VET is organised within institutional settings and follows structured curricula, dual systems are based on work-based learning, where competence development takes place directly within real workplace environments (Busemeyer & Trampusch, 2012).

This structural difference suggests that international mobility may fulfil different functions depending on the educational context. For students, mobility may primarily serve as a space for exploration and personal development, whereas for apprentices it may potentially extend existing work-based learning processes.

Against this background, the present study analyses learning processes in international mobility by comparing students in vocational schools and apprentices in dual training systems. Particular attention is given to changes in self-efficacy, career orientation and learning processes.

The central research question is: Which learning processes are triggered by international mobility, and how do they differ between school-based and dual VET?

THEORETICAL FRAMEWORK

International mobility in VET can only be adequately understood if learning is not viewed solely as the result of formal education. The concept of informal learning emphasizes that a substantial part of competence development occurs outside structured learning environments and is closely linked to concrete situations (Eraut, 2004). In such contexts, learning is often implicit and emerges through action, experience and reflection. International mobility creates precisely these conditions, as learners are required to deal with unfamiliar environments, new social structures and different working practices.

The concept of situated learning further highlights that learning is embedded in social practice and occurs through participation in real-world activities (Lave & Wenger, 1991). Knowledge is not acquired in isolation but develops through interaction within specific communities of practice. International mobility exposes learners to new social and professional environments, thereby creating opportunities for learning that differ significantly from classroom-based settings.

Finally, self-efficacy theory provides an important perspective for understanding

individual development processes (Bandura, 1997). Self-efficacy develops particularly through successfully overcoming challenging situations. Mobility contexts are characterised by uncertainty, autonomy and the need to solve problems independently. These conditions make them especially relevant for the development of confidence in one's own abilities and for strengthening personal agency.

METHODOLOGY

The study applies a combined research design that captures learning processes both retrospectively and longitudinally, allowing for a more comprehensive analysis of mobility outcomes.

The first data source consists of European Union (EU) participant reports collected between 2022 and 2025. A total of 903 reports were analysed, including 733 from students and 170 from apprentices. These reports include both structured assessments and open responses covering learning experiences, personal development, language skills and overall satisfaction. They provide valuable insights into participants' subjective perceptions of their mobility experience. However, due to their retrospective nature, they only capture development processes indirectly and may be influenced by recall bias.

To address these limitations, the study incorporates a second data source: A standardised pre-post survey. This survey is designed identically for both target groups and measures changes in key competence dimensions before and after mobility. Originally, qualitative interviews were planned to deepen the analysis. However, these were replaced by a standardized approach in order to ensure larger sample sizes, comparability between groups and more systematic data collection. The survey is currently ongoing, with a target sample of approximately 250 participants by the end of the year. All data originate from projects funded under Erasmus+ KA1 within the "Young Styrians GO Europe" initiative, which are implemented by the Styrian Association for Education and Economics under its VET accreditation.

The analysis is structured along seven dimensions: Vocational learning, informal learning, self-efficacy, language skills, social interaction, career orientation and learning environment.

While this design allows for a differentiated analysis of learning processes, it is subject to certain limitations. The reliance on self-reported data may introduce biases, and the longitudinal dataset is still under development. In addition, differences in participants' ability to reflect—particularly between students and apprentices—must be taken into account when interpreting the results.

RESULTS

The results show a differentiated picture of learning processes in international mobility. Overall, it becomes evident that mobility is primarily effective in transversal competence areas, while

vocational learning outcomes are significantly more variable and less consistent.

To structure the results, the analysis follows the seven analytical dimensions, taking into account differences between students and apprentices.

Overview of key learning dimensions

Table 1 summarises the central patterns observed across both target groups. Across all dimensions, a consistent pattern emerges: Transversal competences are strongly developed in both groups, whereas vocational learning shows considerable variation and depends heavily on contextual factors.

Transversal competences

The strongest effects are found in the areas of self-efficacy, language skills and social interaction. Both students and apprentices report increased confidence in dealing with new situations, improved problem-solving ability and greater independence. These assessments are supported by pre-post data, which show significant increases in self-efficacy, particularly among apprentices.

It is notable that apprentices perceive mobility more strongly as a developmental step, while students often already report high initial levels. In the area of language skills, both groups report clear improvements, although language is used more in social contexts by students and more in work-related contexts by apprentices.

Social interaction represents the most prominent dimension. Encounters, collaboration and intercultural experiences are consistently described as central learning moments.

Informal learning as the dominant learning mode

A central finding is the dominant role of informal learning. Learning processes arise primarily in a situational and experience-based manner.

Participants describe learning as a response to new challenges, for example in dealing with language, everyday situations or social contexts. While students locate informal learning mainly in social environments, it is more strongly embedded in workplace processes for apprentices and occurs through observation and participation.

Mobility thus functions primarily as an experiential learning environment in which learning is not driven by curricula.

Vocational learning: High variability and context dependency

In the area of vocational competences, a significantly less consistent picture emerges. Although students are also enrolled in vocational schools, the learning logics differ fundamentally. School-based vocational education takes place primarily in institutional settings, whereas dual training is based on work-based learning. This difference also shapes mobility experiences.

Students usually experience occupational

Table 1: Learning outcomes by dimension and target group

Dimension	Students	Apprentices	Key finding
Vocational learning	Low	Variable	Context-dependent
Informal learning	High	High	Dominant learning mode
Self-efficacy	High	Clearly increasing	Stable effect
Language skills	Very high	Very high	Consistent
Social interaction	Very strong	Very strong	Central
Career orientation	Strong	Moderate	Differs by group
Learning environment	Relatively stable	Highly variable	Quality-dependent

activities as insights. Apprentices, on the other hand, are generally oriented towards active participation. However, the analysis shows that this integration is not consistently achieved. While some report relevant activities, others describe tasks with only limited occupational relevance.

Accordingly, the pre-post data do not show a consistent pattern. Vocational learning is therefore highly context-dependent and not systematically ensured.

Career orientation: Different functions of mobility

Mobility fulfils different functions in relation to career orientation. Students often report an intensive engagement with occupational possibilities and new perspectives. These experiences are frequently perceived as direction-setting. Apprentices, in contrast, expand existing perspectives within their occupational field without fundamental reorientation.

Learning environment as a key factor

The quality of the learning environment proves to be a central influencing factor.

While student experiences are relatively uniform, apprentices show considerable differences in tasks, integration and supervision. Active participation in work processes leads to more intensive learning, whereas a lack of integration results in experiences limited to observation.

These findings indicate that the potential of work-based learning in international mobility can only be realized when appropriate conditions are ensured.

CONCLUSION

The results of this study show that international mobility in vocational education primarily functions as a learning environment for transversal competences. The strongest effects are found in the areas of self-efficacy, language skills and social interaction. These competences arise mainly in situations in which learners are confronted with new challenges and are required to act independently.

At the same time, it becomes evident that learning processes in international mobility are predominantly informal. They arise not through structured instruction, but through experience, interaction and situational adaptation. Mobility thus differs fundamentally from traditional curriculum-based learning settings.

In the area of vocational competences, a more differentiated picture emerges. Particularly in the context of apprenticeships, the quality of vocational learning depends strongly on the specific design of mobility. A decisive factor is the extent to which learners are actually integrated into workplace processes. The results show that the potential of work-based learning is only realized when learners are actively involved.

The comparison between students and apprentices also shows that international mobility fulfils different functions. While it primarily acts as a space for development and orientation for students, it represents an extension of existing professional practice for apprentices. These differences are rooted in the respective starting conditions and underline the importance of context-specific design.

From a methodological perspective, the study demonstrates the added value of a combined research design. The integration of participant reports and pre-post surveys allows for a differentiated analysis of learning processes and their development. At the same time, the results must be interpreted cautiously due to the sample and the still developing longitudinal data.

The findings point to clear implications for the design of international mobility. Transversal competences should be systematically recognized as a central outcome. At the same time, the promotion of vocational competences requires stronger alignment between training content and host organizations, as well as deliberate design of learning environments.

International mobility should therefore not be understood as a standardized instrument of vocational qualification, but as a context-dependent learning environment whose effectiveness depends fundamentally on its concrete design.

DECLARATION

Article version statement

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VTE VOCATION, TECHNOLOGY & EDUCATION

RESEARCH PAPER

Beyond survival: Ensuring legal apprentices are achieving and striving—A discussion of the impact of the skills coach on the achievement and attainment of legal apprentices

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ABSTRACT

This paper analyses the effectiveness of a structured colleague development and mentoring system for skills coaches implemented at the University of Law between 2018 and 2025, and its impact on outcomes for legal apprentices. Existing measures of success within legal apprenticeships often focus narrowly on end-point assessment outcomes, most notably performance in the Solicitors Qualifying Examination. While these measures remain important, they provide only a partial view of apprentice success. This case study therefore adopts a broader conceptualisation, examining how the structured recruitment, development, and ongoing reflective practice of skills coaches contribute to wider indicators of achievement, including learner confidence, persistence, professional identity formation, and wellbeing. The paper argues that investment in the capability and motivation of skills coaches—underpinned by principles of self-determination theory—has a measurable and meaningful impact on apprentice outcomes.

Key words: coaching, impact, reflection

INTRODUCTION

Skills coaches at the University of Law can be understood as Higher Education Tripartite Practitioners (HETPs) (Power-Mason & Charlton, 2024), an emerging professional group operating across academic, vocational, and professional domains. This tripartite positioning is particularly significant in the context of legal apprenticeships, where effective delivery requires integ-

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ration between employer expectations, regulatory requirements, and academic provision.

Skills coaches are recruited from a diverse range of legal practice and academic backgrounds. This diversity enriches the apprenticeship experience, enabling coaches to contextualise learning within real-world legal practice. As highlighted by Nawaz and Edifor (2024), such practitioner-informed provision is central to strengthening the tripartite relationship between employer, training provider, and apprentice.

However, professional expertise alone does not guarantee effective coaching. As Whitmore (2009) emphasises, successful coaching requires deliberate development of specific skills, behaviours, and reflective practices. This paper therefore explores how a strategically managed coaching model can enhance both coach effectiveness and apprentice outcomes.

Monitoring of apprenticeship delivery in England is a complex picture. Training providers are inspected and assessed by the Office for Standards in Education Children's Services and Skills (Ofsted). Additionally, University training providers are subject to the scrutiny of the Office for Students, the independent regulator of Higher Education.

The Department for Education requires compliance with rules on the use of the government funds for apprenticeship training. Skills England (now subsumed into the Department for Work and Pensions) is responsible for setting occupational and apprenticeship standards.

The University of Law delivers apprenticeship training across multiple pathways, including Level 3 Paralegal, Level 5 Advanced Paralegal, and Level 7 Solicitor Apprenticeships.

Since the inception of the apprenticeship provision in 2016, learner numbers have grown from three apprentices to over 2000. This expansion necessitated a rapid scaling of the skills coach function, increasing from a single coach to a workforce of 52.

While this growth reflects sector demand and institutional success, it also introduced significant challenges in maintaining quality, consistency, and staff wellbeing. Early pressures related to workload, variability in coaching practice, and differing levels of experience highlighted the need for a structured and scalable model of workforce development.

In response, the University implemented a coordinated strategy encompassing recruitment, onboarding, professional development, and ongoing support for skills coaches.

METHODS AND RESEARCH DESIGN

As a piece of critical action research, we sought to understand the impact of the abovementioned strategy through the lens of self-determination theory. Using

the framework from Arnold and Norton (2018) we reviewed the strategy implemented to date.

RESULTS

Managerial practices within the apprenticeship team have been shaped by self-determination theory (Deci *et al.*, 2017), which identifies autonomy, competence, and relatedness as key drivers of motivation and performance.

Autonomy

Within the highly regulated apprenticeship environment, complete autonomy is neither feasible nor desirable. Skills coaches must operate within clear compliance frameworks, including the requirement to conduct progress reviews at least every 12 weeks (DfE Funding Rules 2025/26).

However, structured autonomy has been deliberately embedded within these constraints. Workload allocation is based on a defined ratio of 1 : 11 apprentices per working day, providing clarity and consistency. A staged onboarding model allows new skills coaches to gradually build caseloads over a six-month period, supporting both competence development and wellbeing.

This approach has addressed previously identified challenges relating to workload pressure (Hogben, 2026), while enabling skills coaches to exercise meaningful control over diary management and prioritisation. The impact of this can be seen in compliance performance, with 97% of progress reviews completed within the required 12-week timeframe.

Importantly, this balance between structure and flexibility enables coaches to tailor their interactions to individual apprentice needs, supporting personalised learning journeys while maintaining regulatory compliance.

Competence

To address variation in experience across the expanding workforce, the University implemented a comprehensive professional development strategy. Central to this was a bespoke 10-module skills coaching programme, covering coaching theory, apprenticeship pedagogy, learner analytics, and reflective practice.

This programme is embedded within both onboarding and continuing professional development, ensuring consistent baseline capability across the team. It also supports the development of a shared professional identity, mitigating the risks identified by Hogben (Hogben, 2026) regarding fragmentation in emerging practitioner roles.

A key feature of this approach is the integration of data-informed practice. Skills coaches are trained to use learner analytics to identify risk, monitor progress, and support evidence-based discussions during reviews. This enhances the quality of feedback provided to apprentices and enables more proactive intervention where required.

Monthly development sessions, co-created by senior leaders and skills

coaches, ensure that training remains responsive to emerging apprentice needs. This continuous improvement model supports both individual competence and collective expertise within the team.

Relatedness

Relatedness has been fostered through a deliberate emphasis on collaboration, mentoring, and community-building.

A structured buddy system supports the integration of new skills coaches, providing opportunities for observation, reflection, and feedback (Nigah *et al.*, 2012). These relationships, while informal, play a critical role in establishing professional confidence and shared standards of practice.

More broadly, the team operates as a community of practice, with regular opportunities for peer engagement. Monthly "drop-in" sessions, held without senior leader facilitation, create a psychologically safe space for open discussion, problem-solving, and shared learning.

Formal professional development pathways, including participation in the PGCHE and Advance HE Fellowship, further reinforce this sense of professional belonging and progression.

Together, these initiatives contribute to a strong organisational culture in which skills coaches feel supported, valued, and connected—factors that are essential to sustained performance.

Impact—apprentices are achieving and striving

This study adopts the definition of academic success as multidimensional, encompassing achievement, skill acquisition, satisfaction, persistence, and post-completion outcomes (York *et al.*, 2015). Using this framework, alongside the four dimensions of skills coach impact (Smith *et al.*, 2023), the following outcomes are observed.

Personal and professional growth

Apprentices demonstrate increasing ability to reflect on their development, set meaningful goals, and engage proactively in their learning. The structured use of learner analytics and evidence-based review discussions has strengthened apprentices' understanding of progress and next steps. This has particularly supported the development of professional identity, enabling apprentices to link academic learning with workplace practice more effectively.

Sense of achievement

Regular progress reviews and structured feedback create clear milestones, helping apprentices to recognise and celebrate progress beyond formal assessment points. This incremental recognition of achievement contributes to sustained motivation, particularly in the context of long-duration programmes such as the Level 7 Solicitor Apprenticeship.

Increased confidence

Skills coaches play a critical role in building apprentice confidence through supportive challenge and personalised

feedback. Evidence from internal quality assurance and external inspection feedback (including Ofsted) indicates that apprentices are increasingly able to articulate their learning, demonstrate professional behaviours, and engage confidently with both academic and workplace expectations. This confidence is particularly evident in apprentices preparing for high-stakes assessments such as the Solicitors Qualifying Examination.

Balancing challenges and wellbeing

The coaching model recognises that apprentices operate within complex environments, balancing work, study, and personal commitments (Cook *et al.*, 2024). Skills coaches act as a key point of support in managing these competing demands, identifying risks early and signposting appropriate interventions. This includes safeguarding considerations, wellbeing support, and workload management. By embedding wellbeing within progress review discussions, the model contributes to reduced attrition and more sustainable engagement across the apprenticeship journey.

CONCLUSION

This case study demonstrates that the effectiveness of legal apprenticeship provision is closely linked to the development and support of skills coaches. By applying principles of self-determination theory to workforce design, the University of Law has created a model that balances regulatory compliance with staff autonomy, builds capability through structured development, and fosters a strong sense of professional community. The resulting impact extends beyond traditional measures of success, contributing to more confident, resilient, and professionally capable apprentices. These findings suggest that investment in the skills coach role is not simply an operational requirement, but a strategic driver of apprentice achievement and long-term programme quality.

DECLARATION

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VTE VOCATION, TECHNOLOGY & EDUCATION

RESEARCH PAPER

The limits and potential of financial knowledge within financial literacy: Empirical evidence from Austria

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ABSTRACT

Many definitions of financial literacy take a comprehensive approach, encompassing not only knowledge, but also awareness, behaviour and attitudes towards financial matters. Empirical evidence clearly shows that knowledge alone does not guarantee sound financial decision-making. Despite achieving a high score for financial knowledge in the OECD/INFE 2023 survey, the Austrian population has experienced mounting debt issues, escalating financial fraud, and inadequate long-term planning. Drawing on Austrian studies, this article explores how financial knowledge influences attitudes, behaviours and intentions in various areas, including tax compliance, fraud recognition and loan decision-making. The results consistently demonstrate that knowledge meaningfully contributes to prudent financial behaviour. Crucially, confidence in one's own knowledge also matters. Effective financial education must therefore foster competence and self-efficacy, particularly among young people such as apprentices, who face real financial responsibilities early in life.

Key words: financial literacy, financial knowledge, financial competence, financial well-being

PROBLEM STATEMENT AND OBJECTIVE OF THE PAPER

Research into and promotion of financial literacy and education have gained remarkable importance worldwide over the last two decades. Although there is no universal definition of "financial

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literacy", all approaches share one key feature: A focus on financial knowledge. A comprehensive definition, such as that used by the OECD, also encompasses components such as awareness of financial issues, behaviour and attitudes. Both financial knowledge and an understanding of financial matters are crucial components of financial literacy (Greimel-Fuhrmann, 2025; OECD, 2023).

However, it is clear that knowledge alone is not sufficient for sound financial decision-making. Even in countries where the level of financial knowledge is high, there are still many problems when it comes to dealing with money and making financial decisions. In Austria, for instance, respondents to the OECD/INFE 2023 International Survey of Adult Financial Literacy demonstrated an impressive level of financial knowledge (OECD, 2023; Voith & Zieser, 2024). Nevertheless, there has recently been a growing number of people with debt problems, victims of financial fraud, and individuals with no overview of their finances or long-term financial planning. Against this backdrop, important questions arise regarding the role of knowledge in financial decision-making and the effects that may be expected from promoting financial knowledge. Financial literacy promotion that focuses exclusively on knowledge transmission therefore risks overstating the degree to which information alone can change behaviour and contribute to achieving financial well-being. This article analyses the importance of financial knowledge for various aspects of financial literacy, particularly attitudes, behaviours and intentions, by examining recent Austrian financial literacy research findings. Implications for the design of financial education are drawn from the results.

THE EFFECTS OF FINANCIAL KNOWLEDGE IN VARIOUS ASPECTS OF FINANCIAL LITERACY AND WELL-BEING

While the foregoing observations caution against an over-reliance on knowledge-based approaches, recent empirical research from Austria also provides substantial evidence that financial knowledge does make a meaningful and measurable contribution to prudent financial attitudes, intentions, and behaviour. Several studies shed light on this relationship across different domains of financial literacy.

Financial knowledge, attitudes, behaviour, and well-being

The analysis of OECD/INFE 2023 data for Austria confirms that financial knowledge is positively associated with higher levels of financial well-being (Greimel-Fuhrmann *et al.*, 2024). The OECD measures financial well-being through a combination of objective economic indicators, such as whether an individual's income consistently covers necessary living expenses, and how long a person or household could cover living expenses using savings if they lost their main source of income, as well as subjective assessments of financial well-being, such as perceived financial stress

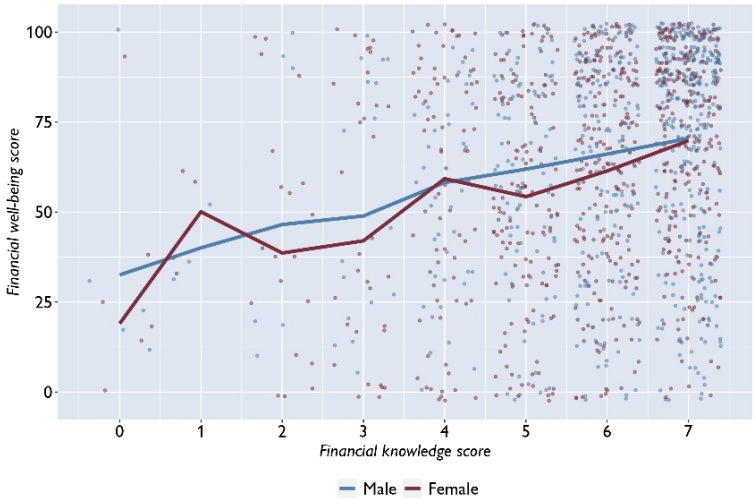


Figure 1. Relationship between financial knowledge and financial well-being (Greimel-Fuhrmann *et al.*, 2024).

(Voith & Zieser, 2024).

As Figure 1 clearly shows, there is a strong positive overall correlation between financial knowledge and financial well-being for both genders. Focusing on the majority of respondents to this study who answered correctly between 5 and 7 out of 7 financial knowledge questions, the gender gap in financial knowledge narrows from 5 to 6 points before finally disappearing among those who achieve a score of 7 out of 7. Interestingly, there is no gender gap in financial well-being among those with the highest level of financial knowledge. This result indicates that knowledge makes a difference. And the following sub-areas of financial education research highlight the contribution that knowledge can make.

Tax knowledge and tax compliance

Posch (2022) examined the relationship between tax knowledge and both interest in taxation and tax compliance behaviour among Austrian respondents. The findings indicate that individuals with better knowledge of tax-related matters show greater interest in taxation as a topic and a higher disposition towards compliant behaviour. This finding reveals that knowledge interventions in the field of taxation can influence the motivational and attitudinal preconditions for law-abiding financial conduct, extending beyond mere information acquisition.

Education about financial fraud and fraud recognition

Floh-Weninger (2023) investigated whether providing information about

forms of financial fraud improves individuals' ability to identify fraudulent offers and schemes. The study found that specific knowledge about fraud tactics significantly enhances recognition competence—a finding with direct practical relevance given the steady increase in reported cases of investment fraud and digital financial scams. Knowledge about how fraud works and which "red flags" often appear makes individuals better equipped to detect these warning signs, be cautious and act accordingly (Greimel-Fuhrmann, 2024).

Loan knowledge and borrowing intentions

Dunkl (2024) analysed how debt related knowledge (about loans, credit and related cost) influences behavioural intentions regarding borrowing for different purposes, including both investment and consumption. The study also specifically considered apprentices as a target group—young people who, despite their age, already earn an income and are confronted with real financial decisions at an early stage in life, but have a significantly lower level of knowledge about debt and loans. The results show that higher knowledge levels are associated with a lower tendency to borrow money for mere consumption purposes such as financing a holiday with friends. This finding suggests that knowledge can have a preventive effect against potentially problematic over-indebtedness.

Self-confidence in one's own knowledge

A further important dimension is highlighted by Greimel-Fuhrmann and Riess (2025), who find that it is not (only) actual knowledge but primarily confidence in one's own knowledge that plays a significant role in financial decision-making. Individuals who are confident about their knowledge about investments are more likely to invest in securities. Their actual knowledge is not a relevant explanatory factor in the regression model explaining the decision to invest and the amount of money that has been invested. Consequently, those who do not consider their knowledge sufficient and doubt their own abilities may remain passive even when they possess sufficient knowledge to make informed decisions independently. This distinction between "objective" financial knowledge and people's self-assessed knowledge and—consequently—their self-efficacy may be crucial for understanding why knowledge interventions sometimes fail to lead to the expected behavioural changes.

CONCLUSION

Taken together, the empirical findings reviewed above carry important implications for the design and delivery of financial education programmes. From a business education perspective, several conclusions stand out.

Financial education must continue to prioritise the clear and accessible transmission of relevant financial concepts and their practical applications. Without adequate knowledge, neither sound judgement nor confident action is possible. The research evidence confirms

that knowledge contributes meaningfully to better financial attitudes, intentions, and behaviours. At the same time, knowledge-only curricula are unlikely to produce sustained behavioural change on their own.

The finding that confidence in one's own knowledge matters independently of actual knowledge levels has direct pedagogical implications. Learning environments should be designed not only to convey information but also to create opportunities for learners to experience competence—to practise applying their knowledge successfully and to develop trust in their own problem-solving abilities. This is particularly important for young people, including apprentices, who are already managing real financial responsibilities and may feel ill-equipped to do so.

Because the relationship between knowledge and behaviour is mediated by attitudes, self-efficacy, and emotional dispositions, effective financial education needs to go beyond information transfer and actively engage with these dimensions. This might include structured reflection on one's own financial values and habits, exposure to realistic financial decision scenarios, and discussion of the psychological mechanisms—such as present bias or social pressure—that can undermine even well-informed decisions.

The inclusion of apprentices as a specific focus of recent Austrian research reflects a broader insight: Different populations face different financial challenges, possess different knowledge deficits, and are at different life stages that shape the relevance of financial topics. Programmes for young adults entering working life must address the specific decisions they face—understanding their payslip, managing a first household budget, evaluating credit offers—in ways that are immediately meaningful and applicable.

The studies on tax knowledge, fraud recognition, and debt literacy all point to the value of targeted, domain-specific financial education. Rather than relying solely on broad and basic financial literacy training, there is a strong case for complementing general programmes with focused interventions that address particular financial challenges and risks that require decisions that are based on the application of knowledge and understanding. Such interventions that use realistic problems and contexts are more likely to produce measurable changes in recognition, attitudes, and intentions precisely because their content is directly applicable to the decisions learners actually face.

The Austrian evidence presents a nuanced picture: Financial knowledge has real and demonstrable value, but its effects depend on many other factors. The objective for financial education should therefore not only focus on filling knowledge gaps because that cannot guarantee financially literate behaviour and decision-making. The overarching objective of financial education must be on fostering competences that enable individuals—especially young people at the very beginning of their financial

lives—to use their knowledge and abilities to make sound and responsible financial decisions and to reflect on these decisions and their impact on others.

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VTE VOCATION, TECHNOLOGY & EDUCATION

RESEARCH PAPER

From studio production to platform streaming: Independent music as micro-apprenticeship

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ABSTRACT

The study examined how independent music production operates as a micro-apprenticeship in the digital era. The study showed that digital platforms have the roles in shaping how individuals gain experience, visibility, and professional growth. The results revealed that learning occurs through short, project-based cycles involving creation, collaboration, and platform engagement. Independent music production helps artists to create, manage, and distribute music autonomously using digital tools and platforms to reach global audience. The shift from studio production to platform streaming reflects the transformation of music creation from traditional, label-driven systems to independent, digital, and globally accessible practices. The results illuminated the fact that apprenticeship is becoming flexible, decentralised and digital platform-driven. The research has indicated that it is necessary to revise the apprenticeship models to incorporate digital and creative practices. It also highlighted the relevance of life experience and life-long learning towards professional competences in contemporary creative professions.

Key words: independent music production, micro-apprenticeship, digital platforms, creative learning

INTRODUCTION

The shift from studio production to platform streaming has transformed the global music industry. Earlier, music was produced in physical studios and

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distributed through record labels. Today, digital platforms allow artists to effectively create and share music independently. Therefore, this change has created new learning systems where skills develop through practice and real-world engagement. Independent artists now manage songwriting, recording, collaboration, and distribution themselves. Therefore, this process represents a new form of learning known as micro-apprenticeship. In this learning method, knowledge grows through repeated project work and market interaction. Globally, music consumption has rapidly moved to digital platforms. Approximately 837 million users use music streaming services globally, and streaming contributes nearly 70% of the global music industry revenue (Fourreau, 2026). Global audio streams reached around 4.8 trillion in 2024, which showed the massive scale of digital listening (Stassen, 2025). Therefore, these figures demonstrate the way platform streaming has become crucial to music production, distribution, and learning.

An apprenticeship can be defined as a structured learning process where individuals can gain skills through hands-on experience under guidance. As stated by Groth (2024), apprenticeship focuses on learning by doing in real-world settings. In the digital age, this concept has been applied outside formal educational institutions. Digital music production in this context focuses on music creation, recording, and distribution without the involvement of major record labels. It is made possible by online cooperation, self-governance, and worldwide distribution through digital media platforms. In the context of content creation, digital production is the use of computerized processes to produce content. According to Ayeni (2025), digital production involves software-based recording, mixing, mastering, and sharing through streaming platforms in music. The traditional process of using the studio has been replaced by the digital process, which is more convenient. Walsh Shanahan and Doyle-Kent (2024) noted that micro-apprenticeship, which is a short and project-oriented learning process, focuses on skill development through repeated tasks and real-world participation. This suggests that each music project is a learning task for an individual artist who learns through trial and error as opposed to formal instruction.

Walzer (2023) stated that independent digital music production involves the creation of music by artists without depending on major record labels or large companies. This involves the songwriting, recording, editing, and publishing of music through online platforms. Besides, artists often collaborate remotely with producers, engineers, and other musicians. Therefore, this form of production also allows individuals to control their creative work, as well as reach global audiences directly.

The transition from studio production to platform streaming has a powerful impact on skill development. Firstly, it decentralises learning, and artists no

longer depend on institutions. Secondly, it increases global access. As stated by Frenneaux (2023), independent musicians can reach global audiences instantly. Thirdly, it also creates continuous learning cycles. Every release gives feedback through the responses of the audience, streams, and analytics. But this shift also creates challenges. Recognition is determined by the platform metrics rather than formal certification. The competition is high because of the vast number of tracks that have been uploaded. However, despite the intense competition, digital music production creates a practical learning environment. It shows how apprenticeship is evolving into smaller, dynamic, and platform-based forms in the digital economy.

RESEARCH QUESTIONS

How can independent original music production be interpreted as a form of micro-apprenticeship in the digital era? More particularly, what insights does this practice provide about the changing nature of apprenticeship models within the platform-driven creative economies?

METHODS AND RESEARCH DESIGN

The research adopted a qualitative and interdisciplinary approach to explore learning practices in the context of independent music creation. It has examined how knowledge and skills were developed with the help of real-life creative engagement instead of structured training systems. Danford (2023) noted that qualitative inquiry supported the interpretation of social actions and everyday experiences. It involved theories related to apprenticeships, vocational education and training, literature on firm-based training, TVET systems, and the papers on the digital labor market. This makes it appropriate for exploring creative work in the digital space. Therefore, this methodological approach was useful to enable a deeper understanding of informal and practice-based learning processes.

The study engaged multiple academic domains to strengthen the analysis. Along with that, it drew from apprenticeship studies, vocational education literature, and research on organisational skill development systems. These perspectives provided an insight into the way training had traditionally been conducted through the institution. However, learning had also occurred through engagement in activities. Okolie *et al.* (2022) claimed that skill acquisition happened through engagement in work activities. The approach justified the concept that independent music production helps learning by the continuous involvement in creative tasks.

The research further considered scholarship on digital labour and platform-based economies. These studies have explained how digital systems have reshaped work structures and professional development. Besides that, the creative individuals worked in relaxed and decentralized settings where learning was directed by projects. Gruszka and Böhm (2022) stated that platform-based systems shaped the organisation and

valuation of labor in terms of data and visibility. This viewpoint assisted in explaining how musicians could gain their skills by collaborating online, through streaming feedback, and by interacting with the audience.

Moreover, the study incorporated a reflective practitioner perspective to give contextual depth. The analysis was shaped by the researcher's dual professional position. The researcher worked as an Assistant Professor of English in the Department of Humanities and Social Sciences at GKCIET, teaching communication skills to Higher Secondary vocational learners across multiple technical fields. At the same time, the researcher engaged as an independent singer-songwriter, composer, and executive producer, with internationally released work developed through collaborations in the UK, USA, New Zealand, and Sweden. The professional status of the researcher in the area of both education and music practice provided a good understanding of both formal and informal systems of learning. This dual involvement also supported the relationship between theory and lived experience. Cornish *et al.* (2023) described that professional knowledge is developed through reflection on action. Therefore, this concept guided the meaning of experiences within both teaching and creative production contexts.

The study integrated them as a mixed source of evidence instead of separating these professional roles. Personal experience was regarded as the situated knowledge in order to comprehend the new types of skill development. This method assisted in investigating the way learning was taking place outside the employer-based training organisation. Overall, the methodology provided a comprehensive framework to analyse micro-apprenticeship as a decentralised and practice-oriented learning model in digital creative industries.

RESULTS

From studio production to platform streaming

The shift from studio production to platform streaming changed the way music was created and shared. Previously, artists had to rely on professional labels and studios. At this point, independent musicians are able to create music at home due to digital tools. As David Walzer (2023) explained, creativity in independent production developed through flexible and self-managed processes. The streaming sites also transformed the revenue models and audience reach. According to Mirolimov *et al.* (2025), streaming created both financial opportunities and challenges. The research highlighted that independent musicians now access 80% of the global music market through streaming. They average only $0.003-$0.005 per stream, which requires millions of plays to offset high studio production costs. Therefore, this shift improves access, but also increases high competition within music markets across the world (Figure 1).

Independent music production as micro-apprenticeship

Independent music production

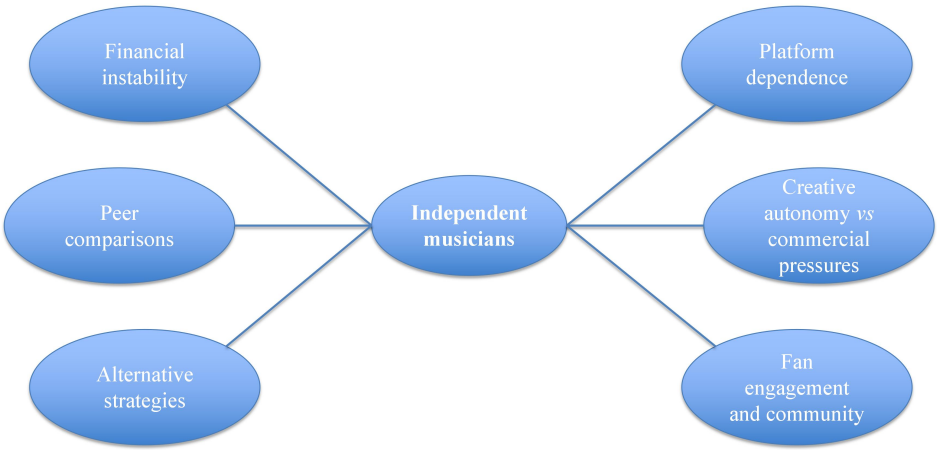


Figure 1. Relation between independent musicians and streaming economies.

functioned as a form of micro-apprenticeship through practice-based and self-directed learning. The traditional music training is also a master-apprentice format where the trainees learn skills through the guidance of the expert. According to Sherwood (2023), the traditional model was developed into more student-oriented learning, in which people developed skills actively by engaging and reflecting. In self-production, artists also underwent the same process of learning through production, experimentation, and polishing through projects.

Innovation and practicality in music production were also highlighted in music production pedagogy. Anthony *et al.* (2025) highlighted that modern production education integrated creative practice with technical learning. This supported the concept that skills are being acquired in a cycle of projects rather than a set of classroom training. Independent musicians do the same process and are involved in recording, editing, and distributing music themselves. Additionally, modern "entry-level" production roles function as micro-apprenticeships, and in this case, junior producers often work for 5-10 years before reaching senior executive status (Bouchrika, 2026). About 80% of the learning now occurs in home studios or via digital cloud platforms like Splice. This learning is also facilitated by the use of digital technologies. Han (2022) demonstrated that virtual tools improved experiential learning in music education. This has led to a shift of the industry towards portfolio-based credibility, and

success is determined by real-time troubleshooting and networking in global digital ecosystems instead of degrees.

Hybridised apprenticeship models

Hybridised apprenticeship models integrate formal education, informal education, and digital learning practices. In the digital age, skill training is not limited to classrooms and institutional training. Peng (2025) emphasized that online space offered flexible jobs and learning to music students. Similarly, Zulu (2026) demonstrated that the education of music gradually shifted from the traditional environment to more practical and real-world experiences. This integration of structured and independent learning allowed people to acquire skills in both guided teaching and self-directed creative practice within the dynamic settings. Galeati and Vasapolli (2025) analysed the Music4D Laboratory, which is a virtual performance ecosystem. This research highlighted how 3D virtual rooms and spatial audio modelling overcome physical barriers in music production. The integration of real-time feedback and AR interfaces is also important to international master classes. Therefore, it effectively reduces the impact of latency and enhances reflective learning through asynchronous performance analysis.

Project-based skill development structure

Independent music production organises learning around small and clear creative projects. Each music release works as the complete learning stage, and it includes songwriting, recording, editing, and final production. It also entailed distribution planning and response to the audience. These activities assist artists in acquiring both creative and technical skills. Each project serves as a practical learning experience. As opined by Guo *et al.* (2024), in the case of independent music production, composers improve by composing real songs rather than simply learning theory. During the production, they are taught about coordination, time management, and decision-making. They also learn how to handle releases and feedback from the listeners. With time, the cycles of the projects develop professional competencies. Yu *et al.* (2023) discussed that the process of music learning is done step by step through constant practice. The artists can practice by exposure to actual audiences and actual markets. This also renders learning realistic and more effective compared to classroom-based exercises.

Gap between curriculum and digital practice

Experience within a state-affiliated vocational system shows a clear gap between formal curriculum and digital creative practice. As suggested by Mishra (2024), higher secondary vocational programs in India mainly focus on industrial and technical skills. On the other hand, digital music production and platform-based creative work exist outside of these structured systems. These practices are not included in recognised apprenticeship categories.

Learning in digital environments mainly follows flexible and decentralised processes. Furthermore, students do not receive formal training in platform-based production, distribution, or audience engagement. Therefore, this creates a disconnection between education and real-world creative work.

Rethinking apprenticeship in platform-based systems

Digital systems create new ways to recognise skills and performance. Jirasanyansakul *et al.* (2025) stated that streaming platforms, global distribution channels, and analytics act as the public measures of reach and engagement. Thus, these indicators increase visibility across countries, as well as connect creators to global labour networks. But such recognition is unstable and not formally regulated within apprenticeship systems. Digital labour mainly focuses on platform-based work and flexible careers, while TVET systems are structured and certification-driven. This loophole indicates that micro-apprenticeship models need to be developed. Platform-based validation, global exposure, and data-driven learning need to be included in the current apprenticeship models.

CONCLUSION

This research demonstrated that independent music production works as an effective form of micro-apprenticeship in the digital era. Knowledge is cultivated through projects, practice, and platform engagement. Apprenticeship is decentralised and made flexible, but these changes are not fully realised in formal systems. This has important policy implications. Digital and creative practices should be incorporated into music education systems, particularly TVET. The system of apprenticeships must be extended to incorporate platform-based learning. Additionally, the learners should be motivated to apply to real projects. Further studies should explore similar patterns in other digital industries, along with examining the way platform economies reshape learning, work, and professional recognition in independent music production. The main limitation of this research is that in this research design the researcher has not been identified as the main object of the research and the focus has only been on micro-apprenticeship of independent music. A more self-observation based study could have shed light on the researcher's perspective and experience of micro-apprenticeship in independent music which can be done in future research works. In addition, an ethnographic study in relation to micro-apprenticeship of independent music has also not been done and only a general overview of the research based on previous research papers has been presented here which can be rectified in future research by focussing on micro-apprenticeship of independent music in the case of different ethnic groups.

DECLARATION

Article version statement

This article has been reviewed and

preliminarily edited. It is intended solely for use at the 10th Research Conference of the International Network for Innovative Apprenticeship (INAP). The final version will be published in *Vocation, Technology & Education* (https://www.vtejournal.com).

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VTE VOCATION, TECHNOLOGY & EDUCATION

RESEARCH PAPER

Learning and development processes of in-company vocational education and training staff

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ABSTRACT

Despite extensive research on the structural challenges faced by trainers, little is known about how they learn in practice and develop pedagogical skills, particularly during the transition from skilled worker to vocational education and training (VET) trainer. This paper presents findings from a career-biographical interview study (N = 22) with trainers from metal and electrical (M+E) professions. The results show that learning and development processes of VET staff are primarily shaped by informal, work-based learning, with collegial exchange as a central resource for organizing training activities and designing teaching-learning processes. Practical experience, induction by experienced colleagues, and, to a lesser extent, training, coaching, and external support contribute to professional development.

Key words: learning and development tasks, career biography, vocational education and training trainer

INTRODUCTION

The German vocational education and training (VET) system is characterized by the dual system, in which apprentices learn in vocational schools and through workplace-based training. VET trainers are responsible for delivering, guiding, and monitoring workplace-based training and for ensuring compliance with official training regulations, in cooperation with vocational schools (Bahl *et al.*, 2012). Access to in-company training is regulated by the German Training

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Aptitude Ordinance (German abbreviation: AEVO), which defines minimum pedagogical standards for VET trainers. However, research indicates that the AEVO primarily serves as a formal certification without providing substantial guidance for training practice (Bahl *et al.*, 2012; Bahl & Brünner, 2018). VET trainers are a key factor for the quality of VET training (Grollmann & Ulmer, 2019). In recent years, they have faced increased demands due to digitalisation, decarbonisation and demographic change. While these challenges are well documented, little is known about how VET trainers learn in practice and develop their pedagogical competences. The transition into training roles is associated with changes in job profiles, yet the learning and development tasks of newcomers remain underexplored (Bahl *et al.*, 2012; Pascoe, 2023; Pätzold, 2017). Moreover, the target group is highly heterogeneous, ranging from part-time VET trainers to full-time VET staff in training centres and VET managers with different responsibilities. Against this background, the question arises of how VET trainers develop their pedagogical competences. While some studies describe the demands placed on trainers (Bahl *et al.*, 2012; Wolff, 2023), little is known about their learning and development processes. From a qualifications research perspective, it is of interest which challenges they manage in a complex work environment and which strategies they draw upon in doing so. Initial insights are provided by Pascoe (2023).

The aim of this paper is therefore to examine the learning and development processes among VET staff in more detail. To address the question of "What do typical informal learning and development processes look like?" semi-structured, career biographical-based interviews ($N = 22$) were conducted with VET staff (VET managers, full-time VET staff in vocational training centres, part-time VET trainers) in the M+E occupations between July 2025 and February 2026.

METHODS AND RESEARCH DESIGN

This study is based on career biographical research (Schulze, 2006) with VET staff and focuses on the transition from a skilled worker to a vocational trainer as a biographical process within individual career trajectories. It adopts a reconstructive biographical approach to understand this transition as part of broader professional development paths. The aim of the study is to capture trainers' perspectives on this transition, particularly regarding the shift into a pedagogical role, as well as the associated challenges and coping strategies (Pascoe, 2023). The data were analysed using qualitative content analysis following Kuckartz and Rädiker (2022).

Research methodology and interview guide conceptualisation

The content and structure of the semi-structured interview guide were developed on the basis of the research

questions, the theoretical framework of professional competence among VET trainers (Meyer, 2023) and developmental tasks (Pascoe, 2023) as well as a systematic literature review (Müller *et al.*, 2026) on the learning and development processes of VET staff. The interview guide is divided into two main sections: *Professional background and identity* and *learning and development tasks*. The study examines how VET trainers interpret and cope with professional challenges, how biographical experiences influence their professional practice, and how individual learning and developmental paths unfold in practice.

The sample was selected to reflect this diversity in industry and the craft trades, whilst focusing on key differences in company size, sector and occupational roles (Table 1).

Table 1: Sample description by job profiles and industry/craft (*N* = 22)

Functional profile	∑	Industry	Craft
VET managers	10	6	4
full-time VET trainers	6	5	1
part-time VET trainers	6	3	3
∑	22	14	8

VET, vocational education and training.

RESULTS

The interview results provide differentiated insights into typical learning and development processes of VET staff across the different functional profiles. The cases show how individual experiences, challenging situations, and significant events shape the learning and development processes of the participants and are linked to the structural requirements of VET.

Overall, the analysis shows that informal learning among VET staff is primarily shaped by collegial exchange as well as non-formal through participation in external seminars and external coaching. These informal processes often take place parallel to, or instead of, formal training. Exchange with colleagues represents the central resource for organizing everyday training and for designing and delivering teaching and learning processes. The AEVO certification course is mainly perceived as a framework for networking and exchange. Rather than being a direct learning instrument, it functions as a legitimizing and orienting reference for legal matters in VET.

Across functional profiles, challenging situations also emerge that are addressed through different coping strategies. For example, a role conflict between the former role as a skilled worker and the new role as a VET trainer is described, which is primarily managed through collegial exchange and the deliberate strategy of stabilising one's trainer identity within the group of colleagues. Similarly, challenging situations in dealing with trainees' personal problems, such as heartbreak, bullying, psychological issues, or reading and spelling difficulties, are primarily addressed through direct communication with trainees as well as through exchange with

colleagues. In the following, the results are presented with reference to the different functional profiles.

In the interviews with VET managers, it became clear that they had already accumulated extensive experience in vocational education and training prior to their role as a VET manager. Against this background, further competence and role development emerges through an interplay of internal and external resources. As an important internal resource, regular participation in courses and continuing education programs on current and socially relevant topics such as Generation Z or Alpha was highlighted. In addition, external support structures play a central role. One VET manager reported relying on advisory services provided by the Chamber of Crafts in situations of uncertainty and clarification in order to gain orientation.

Informal learning processes among full-time VET trainers mainly involve continuous team-based exchange as well as learning on the job. Trainers often face a role conflict between maintaining professional distance and establishing personal closeness toward trainees. Authenticity, communication on equal terms, and an open approach to their own knowledge gaps help to build trust and foster trainees' motivation to learn. Experiences, practical advice, and proven approaches are directly shared and integrated into individual training practice. A key aspect of the transition is learning through the approaches of other colleagues and joint reflection within the team. The induction by experienced trainers is also an important part of informal learning, as knowledge is not only transmitted but also acquired situationally through practice. Furthermore, informal learning processes also emerge in relation to specific demands of evaluation and assessment as well as dynamic professional changes, for example in the context of digitalisation or artificial intelligence. Dealing with these challenges is likewise strongly shaped by experiential learning in everyday work practice.

While informal learning processes among full-time VET staff are primarily characterized by continuous collegial exchange as well as experience-based learning in everyday work practice, part-time VET staff exhibit a rather gradual, step-by-step process of taking on training-related responsibilities. Overall, two pathways can be distinguished: An informal, gradual entry and the formal integration of training responsibilities. In this regard, one part-time vocational trainer reported that, after obtaining the formal qualification through the master craftsman certificate, apprentices are assigned to him. The cases of part-time VET trainers thus show how formal qualifications and informal learning processes in the workplace interact in the gradual assumption of pedagogical responsibility as well as in the performance of general work tasks and the supervision of trainees, where trainees primarily learn on the job by working on real workplace tasks together with their trainers. In addition, informal learning processes can also be identified among part-time trainers in relation to

challenging situations. Issues related to the reliability of trainees are also mentioned, for example in the proper and consistent completion of the training logbook.

Limitations

The presented study has several limitations, including a non-representative sample with gender imbalance and regional focus around Aachen, Germany. Retrospective accounts and possible company pre-selection may also introduce bias.

CONCLUSION

The study shows that VET trainers develop their pedagogical competencies primarily through an interplay of informal, experience-based learning in everyday work, collegial exchange, and the handling of challenging situations. Across all functional profiles, learning is strongly embedded in daily practice and social interaction, while formal structures such as the AEVO mainly serve an orienting function rather than directly driving learning processes regarding pedagogical competences. Differences between functional profiles indicate varying resource constellations: VET managers build on prior vocational experience and external support structures, full-time trainers rely heavily on team-based exchange and reflective practice, and part-time trainers develop their competencies gradually. Overall, competence development emerges as a context-dependent and practice-driven process shaped by real work situations.

In the future, informal learning processes should be specifically promoted by systematically creating and strengthening opportunities for collegial exchange. At the same time, external support services should be further developed in order to provide orientation in increasingly complex contexts and professional requirements. For further research, it would also be interesting to examine and comparatively analyse informal learning in different occupational domains.

DECLARATION

Article version statement

This article has been reviewed and preliminarily edited. It is intended solely for use at the 10th Research Conference of the International Network for Innovative Apprenticeship (INAP). The final version will be published in *Vocation, Technology & Education* (https://www.vtejournal.com).

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VTE VOCATION, TECHNOLOGY & EDUCATION

RESEARCH PAPER

Negotiating work-based learning: Redesign and evaluation of apprenticeships in Dutch basic police education

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ABSTRACT

Organising work-based learning for initial vocational training is a matter of negotiation between education and work organisations. This paper reports the evaluation of the redesign of the apprenticeship model in the initial education of all-round police officers at the Dutch Police Academy. The Dutch Police Force and the Dutch Police Academy formed a common steering group for this endeavour. After two years of political debate and interactive design, a trial of a new outline of work-based education was executed with two groups of student officers. The results of the evaluation of this trial are summarised in the paper. The final design has been used as a common format for the new basic education for all-round officers for the Dutch police force. The paper ends with gained insights for theory on professional education as well as for the police practice and police policy in international perspective.

Key words: all-round police education, apprenticeship model, work-based learning, curriculum design and evaluation

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INTRODUCTION

Context: Redesigning police education

This paper examines the redesign of work-based learning trajectories within Dutch basic police education for all-round officers (BPO). The Dutch Police Academy, an autonomous body under the Ministry of Justice, provides initial and post-initial education for the national police. Initial programs span ISCED levels 4-7: All-round officers are trained at level 4, while specialist programs are offered at bachelor (levels 5-6) and master (level 7) levels.

Work-based learning is a core component of professional education, as students must engage in professional practice to develop a professional identity and apply skills in authentic contexts. At the same time, such practice environments can be contested (Nijhof & Nieuwenhuis, 2008), shaped by entrenched routines and informal "old-boys" networks. Shulman (2005) argues that to understand how professions evolve, one must examine their modes of preparation. He introduces the concept of signature pedagogies, which shape the culture of professional work and provide early socialization into professional values and practices. In this sense, educational approaches influence professional behavior in intellectual, technical, and moral domains (Benner, 2015).

The preparation of all-round police officers therefore requires its own signature pedagogy. BPO is grounded in a dual apprenticeship model that integrates workplace learning with academy-based instruction. This apprenticeship model is copied from the dual courses for vocational education and training (VET), under the Dutch Ministry of Education (De Bruijn *et al.*, 2017). Previously, the dual model in BPO took the form of a rigid "hop-on-hop-off" structure, where academy and practice periods alternated. This model increasingly faced criticism on both organizational and educational grounds. The newly developed Twofold Dual model seeks to address these shortcomings.

This paper reports on the redesign process and presents evaluation results from the first trial of Twofold Dual. In addition to outcomes, it highlights how stakeholders were involved in prototyping and refining the model. The trial was conducted during the COVID-19 pandemic, adding complexity to implementation.

Negotiation and collaboration towards a fine-grained model

Since 2002, Dutch police education has been organized as competence-based apprenticeships. The core design of BPO is a dual apprenticeship in which academy-based learning alternates with placements in police departments. After an initial term, each combination of academy and workplace learning leads to a partial qualification, reflecting integrated competences (intake, law enforcement, emergency assistance, investigation, and signaling and advising). Four such cycles—nine terms over three years—result in full qualification as an all-round police officer.

Over time, this dual model has faced growing criticism on both organizational and educational grounds. Organizationally, the rigid "hop-on-hop-off" structure limits the integration of student officers into daily police routines. Educationally, it constrains collaboration between academy teachers and police development officers (PDOs). Alongside the restructuring of the Dutch police force (2013-2018), the Police Academy initiated a reform of BPO, culminating in a redesign project (2018-2021).

In March 2018, a national steering board was established, consisting of chief officers from Amsterdam and Rotterdam and a Police Academy board member. This board appointed a design group of senior teachers, police officers, and a human resource (HR) specialist. The authors contributed as educational experts, supporting both the design process and the evaluation. The year 2018 was devoted to strategic debate, focusing on balancing the availability of student officers for immediate deployment with the long-term goal of high-quality training. In other words, tensions between short-term operational needs and long-term professional standards were central. The design group developed a prototype trajectory in which academy learning and workplace training are integrated. Over an eight-month period, the weekly share of academy time gradually decreases while participation in departmental work increases.

In January 2019, the steering board approved this prototype and commissioned further development into a fine-grained model for pilots in Amsterdam and Rotterdam. This phase involved adapting the model to local contexts and training teachers and PDOs. Both educational measures (curriculum, supervision, assessment) and operational aspects (personnel planning, equipment, and required training such as weapon certification and driving licenses) were addressed. An evaluation plan was developed and approved by the end of 2019, when the pilot became operational.

The pilot started in February 2020 with one group of student officers in each city and was planned for eight months. Shortly after, COVID-19 disrupted normal operations. Despite this, the steering board decided to continue, recognizing that the pilot could still provide valuable insights into the feasibility and potential of the Twofold Dual model.

METHODS AND EVALUATION DESIGN

Research questions

The evaluation of Twofold Dual is steered by two research questions serving both the organizational and the educational stake. (1) Does Twofold Dual lead to increased or earlier employability of student officers? (2) Does Twofold Dual enhance better or safer learning for student officers, through integrated mentoring and teaching?

Evaluation of a trial in the course of a design project has two main objectives:

A feasibility study and an impact study (McKenney & Reeves, 2025). A feasibility study monitors whether the pilot is doable for all involved professionals and which obstacles show up; an impact study sheds light on the expected and realized outcomes. In this paper we focused on the impact study. Although, when useful, aspects of the feasibility of Twofold Dual are presented.

Measurement moments and instruments

The evaluation study had three measurement moments: At the start of the pilot (T1 April 2020); halfway (T2 July 2020); at the end of the pilot (T3 October/November 2020). Each measurement moment consisted of a digital questionnaire for student officers, and group interviews with PDOs, career coaches, teachers, study coach, and a sample of student officers. The digital questionnaire comprised six subjects: (1) Employability; (2) professional development; (3) motivation and perceived study load; (4) self-regulation; (5) resilience; (6) guidance and support. Examples of propositions are: "The combination of working and learning in one and the same week suits me"; "I am satisfied with the supervision at the police department".

The group interviews contained the same subjects as the questionnaire. In addition, educators were asked whether the pilot asked for other and/or more time-consuming activities and routines. Due to COVID-19 most interviews had to be held online or by phone.

Respondents

Students in BPO have some peculiar characteristics: About 56% stem directly from secondary education (aged 18-19 [15%] and 20-24 [41%]), but also 44% choose policing as second-career choice (aged 25-35 [35%] and older [8%]). Their prior education is secondary vocational (67%) or high school (14%), but also pre-academic (2%) and higher education (18%). Among them, 35% are female, 65% are male (data retrieved from Monitor PO21-cohort 9; Police Academy).

Two locations (Amsterdam, Rotterdam) participated in the pilot. One class in the second year is selected by local mentor-teachers. This selection was rather at random. The student groups are well informed by their mentors on the trial. Individual students were not allowed to participate. At both locations, 4 student-officers decided to decline. Two student-officers dropped out due to individual circumstances. Table 1 shows response figures for Amsterdam and Rotterdam at three measurement moments.

RESULTS AND EVALUATION DESIGN

Twofold Dual fundamentally changes the rhythm of work-based learning by replacing the former "hop-on-hop-off" model. This shift affects both the design of educational content and the deployment of student officers in police departments. Implementation proved more successful in Rotterdam than in Amsterdam, largely due to stronger

Table 1: Response on different measurement moments

Location	Amsterdam			Rotterdam		
Measurement	**T1**	**T2**	**T3**	**T1**	**T2**	**T3**
Student police officers	17	14	13	18	18	18
PDOs	6	4	4	3	3	2
Career coaches	4	5	5	3	3	3
Teachers	6	3	-	4	3	-
Study coach/mentor	1	1	1	1	1	1

PDOs, police development officers.

preparation during the fine-grained design phase (Buijs & Nieuwenhuis, 2021).

Student deployment gradually increased over time, eventually becoming comparable to that of regular students (approximately 17.5 h per week over two terms). Student officers expressed critical views on the coordination between academy and departments but were positive about the flexibility of the model. Teachers and PDOs observed that students increasingly took ownership of their learning.

Across all stakeholder groups, Twofold Dual is perceived as a more flexible and effective learning pathway. Whether it also improves efficiency in terms of employability remains unclear. A key benefit is the strengthened connection between academy and practice: Weekly alternation enables students to immediately apply classroom learning and reflect on real-life experiences. This supports more self-directed and accelerated learning processes. For educators (teachers and PDO-officers), the model enhances cooperation and mutual recognition of expertise, leading to improved student guidance.

Based on these results, the Police Academy and the national police organization adopted Twofold Dual as the foundation for PO21, the current version of BPO. By 2024, after more than two years of implementation, both academy and departments continue to value the weekly integration of learning and work.

CONCLUSION

The design of Twofold Dual aligns with established insights on professional learning (*e.g.*, Boshuizen *et al.*, 2002). Professional education should not merely produce "job-ready" graduates but serve as a foundation for lifelong learning (Hoeve *et al.*, 2019).

Cordner, Shain and Bartkowiak-Théron present thematic issues on the changing landscape of police education and applied research in that field (Bartkowiak-Théron, 2019; Cordner &

Shain, 2011). The international landscape is still scattered: Education for all-round police officers varies from short inhouse training to semi-professional education. Since the 2002 reform, Dutch police education targets professional, competence-based apprenticeships. Student officers must therefore develop both professional competences and the capacity for self-regulated learning. In this context, Billett's concepts of agency and affordance are central: Learning outcomes depend on the interaction between workplace opportunities and individual engagement (Billett, 2001; Stabel *et al.*, 2022).

The findings show that the effectiveness of work-based learning depends on how it is embedded in both workplace and academy contexts. Weekly alternation is highly valued because it strengthens the integration of practice and reflection. Collaboration and mutual understanding between teachers and PDOs are crucial in supporting this process. Effective professional learning requires "boundary crossing" between education and practice (Akkerman & Bakker, 2012). At the same time, legitimate peripheral participation (Lave & Wenger, 1991) highlights potential risks. While immersion in professional communities supports learning, it may also lead to uncritical adoption of existing routines. Students may conform too quickly to established practices, limiting critical reflection. Guided learning trajectories must therefore balance participation with reflexivity. Twofold Dual offers improved opportunities for such safeguarding. The design of practice-based learning is not neutral: It must carefully balance socialization into existing cultures with the development of critical capacities.

A final lesson concerns the role of educators. Traditionally, professional knowledge is transmitted from experienced practitioners to novices. While this ensures continuity, it may also reinforce conservatism. In rapidly changing fields such as policing (Huisjes, 2021), this model becomes problematic. Teachers and PDOs must themselves engage in lifelong learning to remain responsive to new developments. Interactions at the boundary of education and practice should also stimulate reflection on future professional routines, supporting responsive curriculum development (Gessler & Howe, 2015). Shulman's concept of signature pedagogies (Shulman, 2005) underscores how professions educate their members shapes both professional identity and public value. The organization of police education prefigures the socialization of officers as reflective practitioners and reflects broader societal debates about the values and practices of policing.

DECLARATION

Article version statement

This article has been reviewed and preliminarily edited. It is intended solely for use at the 10th Research Conference of the International Network for Innovative Apprenticeship (INAP). The final version will be published in *Vocation, Technology & Education* (https://www.vtejournal.com).

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Topic 6: Apprenticeship and the "twin transition": digitalisation and sustainability

VTE VOCATION, TECHNOLOGY & EDUCATION

RESEARCH PAPER

The role of distance learning in apprenticeships in the context of digitalization

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ABSTRACT

Digital technologies have become a strategic asset for vocational education and training (VET), as they may facilitate access to learning and support work-life balance. Since the Covid-19 pandemic, all Italian Regions have been introducing measures allowing distance learning (DL) for professionalizing apprenticeships to ensure training continuity. Recurring to the framework of relational models of VET pedagogy, the study investigates the forms of DL adopted for off-the-job training, examining their evolution within VET digitalization and their potential to substitute in-person provision under specific regulatory conditions. Findings reveal strong regulatory convergence among the Regions and a generally positive assessment of DL expressed by providers. However, risks related to weakened relational dynamics were identified. The study concludes that DL should be integrated with other pedagogical methods to ensure engagement and preserve essential relational dimensions of learning.

Key words: apprenticeship, digitalization, vocational education and training, distance learning

INTRODUCTION

The digital innovation permeating contemporary societies makes unquestionable the transition towards a new digital educational paradigm—one in which teaching processes are based on active and collaborative learning methodologies designed to mobilize all learners' personal resources. Within such a paradigm, the integration of technological and digital tools enables students to participate actively in the co-construction and co-management of

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knowledge, "through a progressive, mediated appropriation of contents and structures of knowledge, as well as of cognitive functions and processes" (Proietti, 2023).

Relational models of vocational education and training (VET) pedagogy conceptualize learning as a socially situated and interaction-driven process in which knowledge develops through participation in communities of practice and meaningful exchanges among learners, teachers, and workplace actors (Hinsdale & Ljungblad, 2023). Relational pedagogy places the quality of educational relationships at the core of learning, emphasizing dialogue, trust, recognition and co-construction of knowledge (Aspelin & Persson, 2011). In VET contexts—particularly in apprenticeship systems—this relational dimension acquires further relevance, as learning occurs across hybrid environments that connect training providers and workplaces, requiring continuous coordination between multiple actors (Rintala *et al.*, 2026). Recent studies suggest that, when grounded in interactive and participatory instructional design—such as collaborative problem-solving, dialogic teaching and community-building practices, online and blended learning can sustain relational engagement and even extend opportunities for inclusion and flexibility (Gidlund, 2020; Siliņa-Jasjukeviča *et al.*, 2025). In this perspective, relational models of VET pedagogy provide a crucial theoretical framework for interpreting the transition towards digitally mediated apprenticeship.

In Italy, the diffusion of digital technologies within regional VET has long suffered from a cumulative delay, as an ISFOL survey on projects implemented between 1991 and 1994 already highlighted (ISFOL, 1995). Significant progress has been made since then, and most Regions have adopted procedures for accrediting training providers delivering distance learning (DL) and e-learning programs. Nevertheless, off-the-job training for apprentices employed under the type 2 scheme has mostly remained anchored to a classroom-based teaching model.

In Italy, apprenticeships are regulated through three schemes. The professionalizing apprenticeship (type 2) accounts for 97.7% of approximately 570,000 apprentices in 2022 (INAPP *et al.*, 2024). This type 2 apprenticeships differ from European dual models, resulting closer to adult apprenticeship schemes. Young adults aged at least 18, usually with at least an upper secondary school diploma, use this apprenticeship as a bridge to enter the labor market and acquire additional skills. Primary responsibility for training is on the enterprises in type 2 apprenticeships. Off-the-job learning is aimed at developing some cross-sectoral competences (such as labor legislation and contracts, health and safety, digital skills, teamworking, *etc.*) and is delivered by the Regions through courses of a maximum duration of 120 h. Although already stated in the 2014 Guidelines for the provision of off-the-job training, only during the Covid-19 pandemic the Regions actively promoted the use of DL to ensure continuity in the learning activities for apprentices.

A National Institute for Public Policy Analysis (INAPP) study (Gentilini & Filosa, 2023) examined the regulatory frameworks adopted by the Regions and the practices of DL for apprentices activated by VET providers. The main goal of the study was to identify the conditions and operational arrangements capable of ensuring effective and high-quality learning of basic and transversal competences, and to formulate policy recommendations for national and regional institutions. Once the pandemic emergency has come to an end, an additional review was carried out to assess the extent to which the regional regulations adopted in response to the health crisis were still in place.

METHODS AND RESEARCH DESIGN

The study was conducted through an interdisciplinary approach that combined a legal-normative analysis—grounded in the examination of regional regulatory frameworks—with a psycho-social and andragogical perspective, based on a review of the scientific literature and on empirical evidence gathered through interviews with key informants. The regulatory provisions governing the delivery of DL for apprentices adopted by three major Regions of Northern and Central Italy (Lombardy, Piedmont, and Lazio) were examined through an desk review. Following the conclusion of the pandemic emergency, a further assessment was undertaken to determine which of the regional measures introduced during the health crisis remained in effect.

The Regions were selected based on several criteria: Lombardy has the highest share of apprentices in Italy (18% in 2022); Piedmont boasts a well-established training provision for apprentices which stands out with regards to innovation and quality; Lazio is the leading Region in central Italy, accounting for 10% of overall apprentices. All these Regions adopted measures enabling the use of DL during the Covid 19-pandemic and have maintained it in the post-pandemic phase.

In the same regions, four semi-structured interviews were conducted with representatives of vocational training centers (VTC) and with an experienced VET teacher who had delivered distance-learning courses for apprentices during the emergency period. The aim was to explore the compliance of the training provision with the regulatory frameworks; the different options used in delivering the learning and the potential of technology-mediated learning within apprenticeship. The interview protocol was structured in different sections: After gathering general information on the VET provider, on the overall learning provision for apprentices and the use of DL prior to the Covid-19 pandemic, it focused on the interventions implemented during the pandemic. It analyzed the didactic strategies and methodologies adopted, with particular attention to those practices that proved most effective in promoting learners' engagement in the learning process.

RESULTS

The Covid-19 pandemic had a significant impact on regional VET systems and led to an acceleration in the digitalization of VET provision in order to ensure the continuity in learning activities (Frisanco & Oradini, 2021). Indeed, because of the national health emergency and following the State-Regions Agreement of 31 March 2020, all Italian Regions adopted measures enabling the use of 100% of DL in the off-the-job apprenticeship training in order to ensure continuity of training provision (INAPP *et al.*, 2022).

The legal analysis of regional regulatory frameworks of three Regions (Lombardy, Piedmont, and Lazio) revealed a strong "homogeneity" in the models of DL provision, in terms of procedures implemented and synchronous or asynchronous teaching methods (Gentilini & Filosa, 2023).

Two Regions (Lombardy and Lazio) authorized remote training exclusively in synchronous mode (videoconferencing) and required the use of online platforms capable of tracking participants attendance and releasing specific outputs.

In contrast the Piedmont Region, following the State-Regions Agreement of 31 March 2020, authorized remote training in professional apprenticeship both in "synchronous" and "asynchronous" transmission methods.

Regarding the methods for tracking and certifying training provision, all the Regions examined established that the e-learning platforms should include specific tools to ensure the traceability of user use (user ID, individual login, participant password) and the production of reports or evidence of student use of training. Lombardy and Piedmont Region established that DL should be documented through an "electronic register" signed by the teacher, including the list of participants, a description of the topics covered, and the date and time of the lesson (Filosa & Gentilini, 2023).

In the post pandemic phase (2021-2022), some Regions (Lombardy, Piedmont, Emilia-Romagna, Lazio, Abruzzo), following the national regulations regarding DL in VET provision, authorized the use of the "hybrid model" that combines traditional in person training with DL, in a percentage between 20% and 50% of VET provision, for the acquisition of key skills and transversal competences in professional apprenticeship (INAPP *et al.*, 2024).

The analysis of findings from interviews highlights how DL represented an unprecedented innovation in apprenticeships, introduced rapidly and under emergency conditions, without prior systematic training for teachers in the use of digital technologies. Teachers largely relied on experience gained in other areas of vocational education or engaged in self-learning to adapt to online platforms and tools.

The abrupt interruption of in-person training during lockdowns, combined

with the lack of time for proper instructional redesign, generated significant operational and pedagogical challenges. These included inadequate hardware and software, difficulties in accessing platforms, and burdensome requirements related to tracking attendance and reporting learning activities. Nevertheless, the process of overcoming these difficulties often became an opportunity for both teachers and apprentices to develop digital skills through "learning by doing". Over time, training providers progressively improved the organization of activities and the design of online exercises, moving beyond purely transmissive videoconferencing towards more interactive formats.

Interviewees stressed the importance of avoiding the simple replication of traditional classroom lectures in an online environment. Interactive strategies such as group work in breakout rooms, case study analysis based on real company situations, the use of digital whiteboards, multimedia materials and problem-solving laboratories were occasionally introduced, within the limits imposed by funding constraints and regulatory requirements. The qualitative evidence suggests that the effectiveness of DL depends less on the technological tool itself than on the trainer's ability to adapt methods to the characteristics, motivation and needs of learners.

Among the main advantages of DL, respondents consistently identified reduced costs (especially related to classroom rental), the elimination of travel time—particularly relevant in geographically disadvantaged areas—and greater flexibility in balancing work, learning and personal life. However, these benefits were accompanied by several critical issues. In some cases, companies exploited DL to keep apprentices working while they were formally attending training, undermining participation and learning quality. Distractions related to the domestic environment or multitasking during online sessions also emerged as recurring problems.

Relational aspects were identified as one of the weakest points of DL in apprenticeship. Teachers reported a loss of non-verbal communication, reduced empathy and fewer opportunities for informal interaction. Despite this, most interviewees agreed that learning outcomes in DL were not necessarily inferior to those achieved through in-person training. Rather, effectiveness was strongly linked to individual learner characteristics—such as curiosity, motivation and educational background—with DL tending to boost more highly skilled participants. To counteract disengagement, trainers adopted motivational strategies by linking training content to practical, everyday aspects of working life and by actively stimulating participation through dialogue and personalized questioning.

The study stresses that DL, if poorly designed, risks negatively affecting the relational dimension of learning, both at the individual level (through reduced teacher-learner empathy) and at the group level (through weaker peer interaction). Videoconferencing is particularly

ill-suited for experiential or practice-oriented content if not supported by interactive methodologies. Passive consumption of content, social isolation and limited dialogue are among the main risks identified.

Nevertheless, with careful instructional design based on participatory and interactive approaches, these weaknesses can be transformed into strengths.

CONCLUSION

The INAPP study revealed a strong "homogeneity" in the regional models for DL provision in apprenticeships, in terms of procedures, operating methods and training pathways tracking across the three different regional contexts studied (Lombardy, Piedmont, Lazio) (Gentilini & Filosa, 2023).

This suggests a shared understanding of the key factors required to ensure its quality. Professionals and representatives of training centers expressed a generally positive view of DL for delivering off-the-job training. Considering the average age and educational background of apprentices, the study shows that DL can effectively broaden access to training opportunities and promote a better balance between private life, work commitments, and learning activities.

However, several risks have also emerged, mainly related to a weakening of the relational dimension between apprentices, teachers, and trainers, as well as among apprentices themselves. If not properly managed through an appropriate teaching design, DL can negatively affect the relational dynamics underpinning learning processes, both at the individual and group levels. In terms of policy advice, the findings suggest that DL may be adopted as an effective and advantageous methodology for delivering training, offering significant benefits for apprentices as well. However, it should be combined with other teaching methods to sustain apprentices' engagement and motivation and to preserve the relational dimensions that are essential to the learning process.

After the emergency phase, the DL experimentation in apprenticeships takes on new challenges. For example, the digital transition and the introduction of other innovative techniques such as Artificial Intelligence (AI) learning. A shift from emergency remote provision to intentionally designed digital and blended apprenticeship curricula is needed. AI-enhanced learning environments may offer additional opportunities for personalization, timely feedback and more responsive curriculum updating. A recent systematic literature review on vocational education highlights that AI can support adaptive learning, automated assessment and curriculum alignment with changing labour-market needs, but also raises concerns about reduced human interaction, algorithmic bias and data privacy (Suparyati *et al.*, 2024). Italy has adopted the first domestic law in the European Union on the Use of Artificial Intelligence, drafted in compliance with the guidelines of EU Regulation no. 2024/1689 [the EU AI Act], governing the use of AI in different sectors (*e.g.,*

healthcare, employment, professional services, intellectual property).

These developments have direct implications for trainers' professional development. Future capacity-building should support sustained professional learning pathways in which trainers can experiment with digital and AI-supported methodologies, reflect on their effects on diverse learners, and strengthen their ability to combine personalization with inclusion.

At the regulatory level, greater flexibility should be accompanied by clearer quality assurance criteria for post-pandemic distance and hybrid learning in professionalizing apprenticeships. From this perspective, the future challenge is not simply to digitalize apprenticeship provision, but to build resilient, relational and ethically governed learning ecosystems able to respond to technological change while remaining centered on apprentices' developmental and professional needs.

DECLARATION

Article version statement

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Topic 7: Apprenticeship, gender and diversity

VTE VOCATION, TECHNOLOGY & EDUCATION

RESEARCH PAPER

"*My head's a bit foggy today*": Exploring the impact of menopausal symptoms among management degree apprenticeships

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ABSTRACT

As an apprenticeship and executive education provider, we are seeing more "upskills" (age 25+) joining programmers with Nottingham Business School, Nottingham Trent University. Due to both working and studying full time, we have found these students have more complex support needs. Contemporary research has investigated the impact of menopause in the workplace, but minimal research has examined the student perspective. Building on anecdotal experiences, our study examines the impact of menopausal symptoms on studying experiences in higher education (HE). Our findings highlight the significant impact of menopause on degree apprenticeship students, including physical symptoms, psychological effects, and challenges in managing work, as well as study commitments. Moreover, our research underscores the need for greater awareness, support, and accommodation within educational institutions to address the multifaceted needs of menopausal students.

Key words: work-based learners, menopause, supporting apprentices

INTRODUCTION

This paper investigates the often overlooked but significant issue of how menopause affects degree (apprentice) students. Menopause can be defined as the end of menstrual periods in those who were designated female at birth. This shift marks the termination of reproductive potential and is commonly referred to as "the last menstrual period". Menopause does not only affect women; transgender men, non-binary people, intersex people, and anyone with

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varying sex characteristics can also go through it (National Health Service, 2026). Despite its potential impact on education and career trajectories, there is a notable scarcity of literature addressing this intersection. There is a critical gap in scholarly discourse and societal awareness regarding the intersectionality of menopause in the journey of higher education (HE), reflecting broader systemic invisibility and marginalisation of menopausal experiences within society.

Despite menopause affecting approximately 51% of the population, as highlighted by GOV.UK (2022), there persists a significant lack of awareness and understanding, even among affected women themselves. Addressing the invisibility of menopause within society requires not only increased scholarly attention but also a broader cultural shift towards destigmatising aging and prioritising the well-being of all individuals throughout their life stages. To foster inclusivity and support, it's imperative for educational institutions to actively engage in destigmatising conversations, ensuring that all students feel valued and empowered to navigate this natural life transition without fear of judgement or marginalisation.

Research has been conducted into the impact of menopause in the workplace. Hardy *et al.* (2018) discuss the impact of menopausal symptoms on working women's lives, many of which could be applied to the impact on studying. For example, hot flushes can be problematic due to embarrassment and stigma when dealing with formal meetings, hot enclosed spaces or high visibility work such as presentations. This could be compared to the scenarios faced in a university setting. A cross-sectional study by Alzueta *et al.* (2024) identified that from 351 working women aged 40 to 65 in the United States, 77.7% reported work-related challenges due to the menopause. Also 51.2% of participants reported feeling concerns of being perceived as being less capable in the workplace due to themenopause. Beck and Brewis's (2024) work focuses on breaking the taboo, highlighting that menopause affects an aging workforce, and providing practical, intersectional strategies for employers to support staff. Minimal research has examined the student perspective, except for Galletly (2024), who recognised that at least 1% of female university students worldwide find that menopausal symptoms affect their studies, and ultimately affects their career progression.

METHODS AND RESEARCH DESIGN

Using interpretivist qualitative enquiries, we have gathered data through two primary methods. The first was survey data collection, in conjunction with Sociology students at NTU. The survey was sent to all apprentices studying at the University and consisted of both open and closed questions. This is followed by semi-structured interviews to enable key themes from the survey to be explored in more depth. In general, the questions were based on the impact

of the menopause on the apprenticeship experience, and as training providers, what we can do to support apprentices.

The survey's numerical data were tabulated and the narrative thematically analysed and presented using faction. The use of faction creates a multi-vocal vignette which both protects participants and ethically presents sensitive data, capturing lived and embodied experiences, whilst challenging dominant narratives of what it means to be a student in HE (Bruce, 2019). Narrative data gathered from the semi-structured interviews was subject to thematic analysis (Braun & Clark, 2021) to explore emerging themes with a view to bringing about change and supporting apprentices.

RESULTS

The distribution of symptoms experienced by apprentices aligns with those outlined by the National Health Service (National Health Service, 2026). We can use the data from the breadth of symptoms experienced to drill down to those that could have a direct impact on work-based learners. This would include (although not exclusively) changes in mood, memory and concentration issues, hot flashes and difficulty sleeping.

Below we present our faction narrative.

"*I'm anxious and I doubt myself.*

I'm overwhelmed when I have a hot flush, despite layering my clothing just in case.

I have brain fog, I can't concentrate, I can't remember their names, my thread of thought, degree level information, or my next sentence.

Teaching rooms are hot and stuffy, and long days trigger headaches and cramping back pain in uncomfortable chairs.

I don't feel confident in my uniform or undertaking physical duties on my apprenticeship. It's hard to cope with the pressures of work and study.

Overall, my physical and mental health has declined. I've had to take a break in learning, partly due to starting Hormone Replacement Therapy. Yet, I find it difficult to seek support as I don't want people to think I am weak.

It's difficult enough to get a degree, let alone with the disruption of menopause symptoms, but I shut up and hope I come out the other end ok".

The current stage of the research further expands the initial survey using semi-structured interviews. It is planned that they will be completed by July 2026, however initial thematic analysis has been carried out on the interviews carried out to date (Braun & Clark, 2021) and the following themes have been identified.

Menopause—a complex and heterogeneous experience

Across all interviews, menopause is consistently presented as non-uniform and highly individualised. This is illustrated by one participant minimising the impact and who experiences menopause as indistinct whilst two others describe the impact as severe with disruptive

symptoms affecting all aspects of life. The experience of the menopause varies significantly in terms of the onset which was noted as being sudden versus gradual. The severity ranges from minimal to debilitating and the individual interpretation of menopause as being normalised or distressing.

In addition, there is a tension between the visible symptoms such as sweating and fatigue which cause embarrassment and invisible symptoms, for example brain fog and anxiety experienced by all participants that were often misunderstood or dismissed.

Cognitive disruption

Cognitive changes emerge as one of the most consistent and impactful themes across cases, including the experience of brain fog, memory loss and retrieval difficulties, attention fragmentation and reduced focus. Again, there was variation in the impact of the cognitive disruption from severe to minimal. Cognitive disruption is a central mechanism through which menopause affects academic participation, particularly in independent learning, information processing and real-time performance (*e.g.* presentations).

Emotional impact: Anxiety, reactivity, and self-doubt

A strong cross-cutting theme is the emotional dimension of menopause, including anxiety, emotional reactivity and irritability resulting in fear of failure and judgement from others. In three participants these symptoms cause a high degree of emotional distress whilst two participants felt the emotional impact was controlled but noticeable.

Impact on academic performance and identity

Several participants describe menopause as directly affecting academic performance and self-perception. They noted symptoms reduced their ability to perform under pressure and in one case this manifested in a breakdown during an assessed presentation. Other participants noted that they felt their academic work was of a lower quality resulting in feelings of self-doubt and imposter syndrome.

Individual coping strategies

Participants commented on the increased need for self-management to manage menopausal symptoms using different strategies including time management systems, note-taking and repetition as well as the need for emotional regulation and regular breaks. The results of these strategies bring about significant hidden labour to maintain performance.

Disclosure and engagement with formal support systems

Half of the participants describe reluctance to disclose menopause due to fear of judgement and the perception of menopause as trivialised. Of those that were prepared to disclose their symptoms there was a lack of uptake of formal institutional support. This was characterised by factors such as being unaware of the support that can be

accessed and bureaucratic barriers including the requirement to evidence symptoms. Institutional structures often assume consistent performance and policies fail to accommodate fluctuating capacity because of fluctuating symptoms.

Need for flexibility, awareness, and cultural change

Across all interviews, participants suggest similar improvements to support those experiencing menopause symptoms. The key point was to increase awareness and normalise menopause. The need for flexible learning and assessment approaches was put forward as well as more effective support for individuals. When seeking support, reduced reliance on disclosure and proof would help in removing a potential barrier for support.

CONCLUSION

Menopause in apprenticeship contexts is best understood not simply as an individual health issue, but as a multidimensional disruptor, characterised by cognitive, emotional, and physical impacts that interact with workload and life stage. In response, training providers need to have policies that are sufficiently nuanced to support learners and can provide peer support for those experiencing symptoms. Crucially, this needs to be within an environment where trust and psychological safety make individual disclosure matters more than policy alone.

DECLARATION

Article version statement

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VTE VOCATION, TECHNOLOGY & EDUCATION

RESEARCH PAPER

Shaping vocational lives in comparative perspective: Insights from an international vocational biography database

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ABSTRACT

Against the backdrop of digitalisation, decarbonisation, demographic change, and discontinuous employment trajectories, this paper examines the German concept of "*Berufsbiografische Gestaltungskompetenz*", translated as "*biographical career agency*", within international technical vocational education and training (TVET) discourse. The paper compares this concept with English-language approaches such as career adaptability, life design, protean careers, and career readiness, focusing on how they conceptualise agency, institutional and structural conditions, and vocational continuity under labour market uncertainty. While these approaches share a concern with fragmented and non-linear career trajectories, they differ in their understanding of the relationship between individual agency and contextual conditions. The paper argues that biographical career agency offers a useful perspective for analysing vocational biographies as the outcome of interactions between individual, institutional, and structural factors. The conceptual discussion is illustrated using preliminary narrative-biographical material from the international project "BioDatabase".

Key words: vocational biographies, transitions in technical vocational education and training, international technical vocational education and training research, biographical career agency

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INTRODUCTION

Transitions into and beyond technical and vocational education and training (TVET) have long constituted a central concern within vocational education research (Brunetti & Corsini, 2019). However, research has predominantly focused on entry into employment, while the long-term shaping of vocational biographies has received comparatively limited attention. In the context of digitalisation, decarbonisation, demographic change, and increasingly discontinuous employment trajectories, individuals are confronted with repeated transitions and phases of vocational reorientation throughout their working lives (Cedefop, 2020; OECD, 2025). As a result, the capacity to actively shape one's vocational biography has become increasingly important (Elsholz & Kaiser, 2025). This development also increases the significance of lifelong learning pathways, including apprenticeships, adult learning, and upskilling and reskilling opportunities (ILO, 2022).

Against this background, the German concept of "*Berufsbiografische Gestaltungskompetenz*" has gained renewed relevance (Fischer, 2023; Munz & Rainer, 2012). In this paper, the concept is translated as "*biographical career agency*", as this term most adequately captures the interplay between individual agency, vocational development, and structural conditions inherent in the German discourse. While related debates in the English-speaking literature address issues such as career adaptability, career readiness, or life design, they differ in how the relationship between individual agency, employability, and contextual conditions is conceptualised. The German discourse places particular emphasis on the interaction between individual capacities, institutional arrangements, and structural conditions when examining vocational development. Comparative analyses between these perspectives nevertheless remain limited.

This conceptual paper examines how "*biographical career agency*" can be situated within an international framework. To illustrate the practical relevance of the conceptual discussion, the paper draws on preliminary material from a database of vocational biographies (BioDatabase). The guiding question is how comparable concepts in the English-speaking discourse relate to the German construct and to what extent they similarly address the interplay between agency and structural conditions in shaping vocational biographies. The comparison is guided by three analytical dimensions: (1) The conceptualisation of agency, (2) the role attributed to structural and institutional conditions, (3) the understanding of career continuity under conditions of labour market uncertainty. The paper provides a theoretically grounded comparative perspective that supports international dialogue within TVET researchby linking discussions on lifelong transitions and employability with institutionally grounded perspectives on vocational agency and career development.

CONCEPTUAL FRAMEWORK

The German concept of "Berufsbiografische Gestaltungskompetenz"

The concept of "*Berufsbiografische Gestaltungskompetenz*" refers to an individual's capacity to actively shape and sustain their vocational trajectory under changing social and labour market conditions. Drawing on Hendrich (2005) and Kaufhold (2009) conceptualises this competence as the ability to identify alternatives, recognise opportunities for further training and occupational mobility, and represent one's own interests in order to maintain career continuity. Individuals must be able to transfer existing knowledge and skillsinto new occupational contexts and navigate transitions between employment, unemployment, and (further) education and training.

The concept encompasses both internal capacities and external conditions (Munz & Rainer, 2012). Internal capacities include reflective judgement, strategic planning, adaptability, and the ability to make career-related decisions under conditions of uncertainty. Individuals are expected to assess their qualifications and employment histories to develop coherent vocational strategies. At the same time, competence development depends significantly on structural conditions such as vocational (workplace) learning opportunities, labour market regulations, and institutional support. Inflexible, restrictive vocational education and training (VET) programs as well as socio-structural factors like gender or income may hinder the development of such competence.

Fischer (2023) further emphasises that "*biographical career agency*" should not be understood as solely individual responsibility. Rather, vocational biographies emerge through the interaction between personal aspirations, educational pathways, and societal conditions. This interactionist perspective highlights that career development is embedded within institutional and socio-economic structures that enable and constrain agency. Consequently, the German concept differs from narrower employability-oriented approaches by explicitly integrating structural and societal dimensions into the understanding of vocational competence.

The concept conceptualises vocational biographies as socially embedded and institutionally mediated processes. This enables a more critical analysis of how agency is shaped, enabled, and constrained within specific TVET systems and labour market structures.

Concepts in the wider scientific discourse

Several English-language concepts address similar issues, although often from different theoretical perspectives and within less occupationally structured labour market systems. A key distinction concerns the institutional context: German TVET systems are closely linked to regulated occupations and publicly supported training pathways, whereas labour markets in many

English-speaking countries are comparatively flexible and individualised (Deissinger, 2004). Consequently, English-language approaches tend to emphasise adaptability, self-management, and risk navigation more strongly.

Theoretical approaches such as Giddens' structuration theory (1984) and Beck's risk society theory (1992) provide important foundations for understanding vocational biographies under conditions of uncertainty. While Giddens highlights the dynamic interplay between agency and social structure (Bilon, 2017), Beck emphasises increasing individual responsibility for navigating uncertain life courses despite persistent inequalities (Woodman, 2009). Together, these perspectives frame vocational biographies as emerging through the interaction of individual agency, institutional conditions, and social change.

More practice-oriented concepts include life design, the protean career, career readiness, and career decision-making approaches. Across these concepts, a common emphasis emerges on adaptability, reflexivity, self-directed career management, and navigating uncertain career trajectories. Life design theory conceptualises careers as dynamic, lifelong processes requiring adaptability, narratability, and intentionality (Savickas *et al.*, 2009). Similarly, the protean career concept (Hall, 2004) emphasises self-directedness, adaptability, and personal values as central "meta-competencies" for career development, while career readiness approaches focus on workplace exposure, informed decision-making, and reflective career planning.

More recently, international TVET research has increasingly discussed apprenticeships not only as pathways into initial employment but also as mechanisms for lifelong learning, adult upskilling, and occupational reskilling (ILO, 2022). In this context, apprenticeships are increasingly conceptualised as flexible and work-based learning arrangements that support non-linear career trajectories and occupational transitions through institutionally supported opportunities for vocational development. This development further highlights the importance of conceptual approaches that integrate individual agency with institutional and structural conditions (Cedefop, 2020).

Overall, the comparison demonstrates that international concepts increasingly acknowledge fragmented and uncertain career trajectories as a defining feature of contemporary working life. The German concept of "*biographical career agency*" complements these approaches by drawing particular attention to the interplay between individual agency, institutional arrangements, and structural conditions in shaping vocational biographies and lifelong transitions.

METHODS AND RESEARCH DESIGN

To illustrate the empirical relevance of the conceptual framework, the paper draws on "Bio Data Base", an emerging

international database of narrative vocational biographies currently under development as part of the collaborative project between the University of Applied Labour Studies (DE) and the University of Derby (UK). The database collects biographical narratives from different national TVET contexts to analyse how vocational transitions, institutional conditions, and career agency are experienced across the life course. Particular attention is paid to how individuals narratively construct vocational continuity, disruption, adaptation, and institutional support. The database aims to make visible the diversity and transformation dynamics of vocational biographies and open up new perspectives for comparative TVET research.

Narrative-biographical approaches are particularly suited to examining how individuals interpret vocational transitions, institutional opportunities, and structural constraints, thereby enabling comparative analyses of agency and structure across different TVET systems.

Preliminary narrative material collected through the biographical narrative interpretive method (BNIM), developed by Wengraf (2001), already illustrates how individuals interpret occupational transitions differently depending on institutional support structures. For example, narratives from adult learners engaging in up- or re-skilling pathways indicate how institutionally supported learning opportunities may contribute to renewed vocational orientation and perceptions of career continuity.

RESULTS

The preliminary material from the BioDatabase project illustrates the analytical relevance of biographical career agency as a conceptual lens for examining vocational transitions. The narrative data indicate that vocational development can be described as a process shaped through the interaction of personal aspirations, learning opportunities, institutional support, and labour market conditions.

Biographical narratives of adult learners, for example, suggest how training programmes, guidance services, and workplace learning opportunities influence occupational transitions and vocational continuity. At the same time, reflexivity, adaptability, and future-oriented planning emerge as important resources for navigating professional and personal changes.

While the current database is still under development and no systematic comparative analysis can yet be undertaken, the preliminary material demonstrates the potential of narrative-biographical approaches to capture the dynamic interplay between agency and structural conditions across different TVET contexts. The findings therefore provide illustrative empirical support for the conceptual framework developed in this paper.

CONCLUSION

This paper has examined the German

concept of "*Berufsbiografische Gestaltungskompetenz*", translated here as "*biographical career agency*", in relation to established concepts within the English-language career development discourse. While substantial overlaps exist regarding the importance of adaptability, reflexivity, and lifelong vocational development, the comparison suggests that the German concept places comparatively stronger emphasis on the interaction between individual agency and institutional as well as structural conditions.

Rather than proposing a superior conceptual approach, the analysis highlights the value of integrating individual and contextual perspectives when examining vocational biographies under conditions of uncertainty and social transformation. In this regard, biographical career agency offers a useful framework for analysing how vocational trajectories are shaped through the interplay of personal, institutional, and socio-economic factors.

The preliminary material from the BioDatabase project further illustrates the empirical relevance of this perspective and points towards the potential of comparative narrative-biographical research for understanding vocational transitions across different TVET systems. Future research based on the expanding database may contribute to a more systematic examination of how agency and structure shape vocational biographies across national contexts.

DECLARATION

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