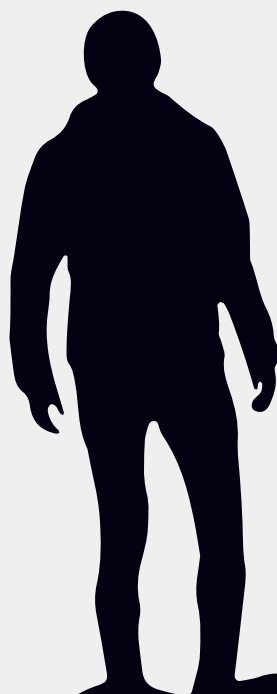


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#GJSD. Sharing today. Shaping tomorrow.

SUBMIT

Dear Reader,

It is a pleasure to introduce Volume 6, No. 2 of the GILE Journal of Skills Development. This issue brings together fourteen contributions that look at skills from different angles – from education, digitalisation and employability to entrepreneurship, wellbeing and microcredentials, and, I hope, that they offer readers plenty to reflect on. As I read through the contributions gathered for this issue, I was struck by how naturally they connect with one another, despite addressing very different settings and contexts.

The issue begins with a deceptively simple question: what counts as a skill? The examination of eight major skills taxonomies provides an excellent starting point, reminding us that before we can develop, assess or communicate skills, we need some clarity about what we mean by the concept itself. From there, the research papers explore a range of contemporary challenges, from the competencies required of the Accountant 4.0 to the opportunities and barriers women face in benefiting from digitalisation.

A strong theme running through the issue is the transition between education and working life. Several papers explore how students and future professionals build the knowledge, confidence, networks and experience they need to navigate these transitions. The studies of creative arts students, female business students and aspiring school leaders show that skills development is about much more than acquiring competences: mentoring, reflection, identity, relationships, wellbeing and authentic experience all play a role in becoming ready for a changing professional world.

The entrepreneurship papers add another dimension, examining how curriculum and pedagogy can support entrepreneurial development while also addressing wellbeing, resilience and purpose. The final research paper brings the discussion into the workplace, exploring the challenges faced by SMMEs in South Africa and their implications for youth skills development and workforce pathways. Together, these studies reinforce an idea that I find particularly important: skills development does not happen in isolation. It depends on the interaction between individuals, educational institutions, employers and the wider environments in which people learn and work.

The two Review Papers extend this perspective by looking beyond conventional skills lists towards broader approaches to career preparation and by considering frugal innovation as a pathway for youth skills development in resource-constrained environments.

Our Food for Thought section opens the door to some bigger questions: What is the value of education beyond basic literacy? What makes a microcredential a trustworthy signal of competence? And could microcredentials gradually change the place of the traditional university degree? These papers invite us to question established assumptions and consider where education and skills development may be heading.

Taken as a whole, this issue takes us on a journey from defining skills, through developing and applying them, to asking how they are recognised and valued. I hope this coherence will encourage readers not only to explore individual papers, but also to make connections between them.

As always, I am grateful to all our authors, reviewers and editors for their contribution to the journal. I hope you enjoy this issue and find in its diverse perspectives some ideas that stay with you. For me, that is one of the most rewarding aspects of putting an issue like this together: seeing how different studies, perspectives and contexts can come together to tell a broader story about skills and their place in our lives.

Warm regards,

Dr habil. Judit Beke

Dr habil. Judit Beke is the Editor-in-Chief at GJSD



GILE Journal of Skills Development

What counts as a skill? Comparing eight major skills taxonomies

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Abstract

Over the past decade, multiple major skills taxonomies have been developed or revamped, each presented by its developers as a ‘common language’ for skills. Despite this shared purpose, the taxonomies differ at two levels: in what each defines a skill to be, and in which skills each contains and how they are described. The result adds to the confusion rather than alleviating it. This impacts young people, who are asked to name their skills to employers yet struggle to do so. This study profiles eight major skills frameworks to identify how skill is defined within the documents, and which core skills are identified. Document analysis of the released files and method documents for eight skill taxonomies against a template covering purpose, method, structure, coverage, and definition, combined with reflexive thematic analysis of the core skills named within the taxonomies. The frameworks use common sources and share a dual-layer structure separating core from technical skills; construction methods combine expert, industry, and AI/ML approaches, and method shapes the hierarchy. At the level of the concept, the frameworks differ in whether and how each defines skill, and in where each places attributes and attitudes. At the level of the named skills, they largely agree: the same 12 core skills recur, described in similar terms under different titles. Skills taxonomies hold potential to improve access to, and clarity over, the labour market. Using familiar language for skills, sharing descriptions with other taxonomies, and allowing individuals to see and choose from alternative titles could improve usability.

Keywords: skills taxonomies, skill frameworks, core skills, technical skills

1. Introduction

To understand which skills benefit young people as they transition into the workplace, it is essential to first investigate which skills are recognised within formal skill development frameworks, how they are described and classified, and how they could be applied in educational and employment contexts. With the advent of multiple national skills taxonomies, the answers now arrive pre-packaged: some person (or machine) in a central office has already decided which skills count, sorted them into categories, and given them names. The impact of this is significant; young people are entering an uncertain labour market, disrupted by a global pandemic and an artificial intelligence (AI) revolution, which has reduced the number of entry-level opportunities for school leavers and graduates (Atkins et al., 2020; Mann et al., 2020), traditional tools and pedagogies may no longer be sufficient to prepare them (Shtaltovna, 2026), and some suggest the remedy lies outside qualifications, in the acquisition and demonstration of skills (OECD, 2026).

Skills are currently described and classified in a multitude of ways; for example, in higher education the discourse centres on employability skills that prepare graduates to leave work-ready (Cheng et al., 2022), some not-for-profit organisations develop skill frameworks to aid in development initiatives (World Economic Forum, 2021), and national bodies develop complex hierarchical taxonomies to assist in workforce analysis (Elias et al., 2023). Eight of these frameworks and taxonomies form the corpus for the present study: O*NET, the European Skills, Competences, Qualifications and Occupations (ESCO), the United Kingdom's Standard Skills Classification (SSC), Canada's Skills and Competencies Taxonomy (SCT), the now defunct Australian Skills Classification (ASC), SkillsFuture Singapore, the World Economic Forum (WEF) Global Skills Taxonomy (GST), and the International Labour Organization (ILO) Global Framework on Core Skills (Table 1).

Despite differences in definition and categorisation, all eight taxonomies in the corpus claim within their official documentation to have developed a 'common language' for skills for the purposes of improving transferability of skills across the labour market. This study compares the taxonomies and investigates how each conceptualises and defines skill and identifies their lineage, methodology, and governance. Two findings emerged from the analysis: that taxonomies agree on substance but disagree on nomenclature, and that early, and often-undocumented, choices of definition and method lead to inconsistencies and duplication within the taxonomies. From this, practical considerations are suggested that educators, careers practitioners, and system designers could use to evaluate any taxonomy before adopting it for work with young people.

2. Literature Review

The question of 'which skills count' is not an abstract one for young people, who often struggle to identify and articulate their own skill sets; within the graduate employability literature the skills gap has been recharacterised not simply as a 'skills' gap but as an 'articulation' of skills gap (Tomasson Goodwin et al., 2019). In a quasi-experimental study of 3,398 Canadian undergraduates, less than a third could connect one of their identified skills to a future situation, and neither a year of study nor work placements made any improvement (Tomasson Goodwin et al., 2019). Australian students similarly report persistent difficulty articulating their achievements and capabilities (Jackson & Edgar, 2019), and students rate soft skills lower than

the employers who will assess them (Succi & Canovi, 2020). Articulation depends on language, and for most young people the language available is what the official taxonomies supply; what they name, and what they leave unnamed, matters. The difficulty may begin further upstream, in the construct itself. A review of the soft skills for employability literature found clear agreement that employability and career preparedness "cannot be simply defined, quantified, or put into practice" (Villegas, 2024, p. 200), while a review of 119 business and management studies found no consensus on the definitions of soft skills or competencies, the two terms used interchangeably (Marin-Zapata et al., 2022). Where skills are defined in the literature, they are often considered through a narrow, individualistic lens; in a systematic scoping review, Hvalby et al. (2024) identified that studies were silent on collectivist perspectives.

Efforts to resolve this disagreement have tended to produce further frameworks rather than consensus. One line of work has built taxonomies computationally from labour market texts, so the taxonomy need not be agreed in advance (Djumaieva et al., 2018; Gallagher et al., 2022; Khaouja et al., 2019), while institutions continue to declare common languages from above; in Australia, Jobs and Skills Australia is currently consulting on a National Skills Taxonomy intended to "establish a common language through which all Australians can meaningfully discuss skills" (Jobs and Skills Australia, 2026), less than a decade after the Australian Skills Classification was built with the same stated purpose. The proliferation of taxonomies and their rapid turnover, have been linked to limited engagement and slow uptake in higher education, with gaps growing between educators, students, industry, and government (Doherty & Zhang, 2025, p. 1).

The taxonomies themselves have begun to attract study. Commissioned reviews have catalogued them, typically starting from O*NET as "an obvious starting choice" (Popov et al., 2022, p. 6). Albert and Weko (2025, p. 12) compared a set of skill related taxonomies on their purpose, scale, granularity and governance, describing four broad models by which they are constructed. While this work examines how taxonomies are made and maintained, it does not explore their lineage, whether they are structurally the same kind of object, or what each means by 'skill'. That is the gap this review addresses.

3. Method

This study employs document analysis (Bowen, 2009) to investigate eight recently developed, large-scale skill frameworks (Table 1), including their published rationale and methodology, online instructional materials, and the taxonomy files themselves. Frameworks were included if they were official national or supranational instruments; developed through a research-backed and open method, with methodology and validation accessible; adopted within their jurisdiction; carrying definitions and sufficient detail to determine their definition of skill; and covering the breadth of the workforce rather than a single industry. Frameworks falling outside these criteria include three national taxonomies that are not publicly available: Chile's catalogue of competencies (Comisión del Sistema Nacional de Certificación de Competencias Laborales, 2026), Japan's O*NET-based occupational information network (Kamakura et al., 2020), and China's occupational classification (Xu et al., 2020).

TABLE 1. EIGHT FRAMEWORKS AND VERSIONS

Framework	Jurisdiction	Developer	Released	Version	Licence
O*NET Content Model	United States	US Department of Labor; National Center for O*NET Development	1998	Database 30.3 (May 2026)	CC BY 4.0
ESCO skills pillar	European Union	European Commission	2017 (v1)	v1.2.1 (December 2025)	CC BY 4.0
UK Standard Skills Classification (SSC)	United Kingdom	Skills England, with the Institute for Employment Research	2023 (design); 2026 (v1.0)	v1.0.0	Open Government Licence v3.0
Skills and Competencies Taxonomy (SCT)	Canada	Employment and Social Development Canada	2019	2025 release, v6.0	Open Government Licence (Canada)
Australian Skills Classification (ASC)	Australia	National Skills Commission, then Jobs and Skills Australia	2021	v3.0 (December 2023); retired	CC BY 4.0
SkillsFuture (TSC and CCS)	Singapore	SkillsFuture Singapore, with sector partners	2015	2026 dataset (updates to April 2026)	Government terms: attribution required
Global Skills Taxonomy (GST)	Global	World Economic Forum	2021	No version – current August 2026	CC BY-NC-ND 4.0
Global framework on core skills	Global	International Labour Organization	2021	v1	ILO publication rights

Source: own compilation

Taxonomies which focus on one sector in isolation were also excluded, such as the European Union's DigComp (Cosgrove & Cachia, 2025) or the OECD Learning Compass (OECD, 2018), as were non-state frameworks such as the VIA classification of character strengths (Littman-Ovadia et al., 2021), as they answer to their own governance rather than to a jurisdiction and were not built to describe a whole workforce. The two international frameworks retained, the ILO's and the WEF's, are issued by an intergovernmental agency and an international organisation respectively; the WEF is the edge case, included for its documented derivation from O*NET and ESCO and its adoption, through Singapore, into a national system. Each was analysed at its most current release in August 2026 (Table 1).

The ASC is no longer maintained but is still available for research. Each framework was read against a single template covering purpose, methodology, validation, governance, structure and composition, coverage, and definition. Purpose, methodology, validation, and governance were identified in each framework's own documentation, and recorded as unclear where the documents were silent; Albert and Weko's (2025) four methods of taxonomy development were used as a lens for understanding methodology: expert survey or field research, AI/ML analysis of large-scale occupational data, collaboration with industry associations, and adaptation of

existing taxonomies. Structure and composition were identified from the taxonomy itself and its files, rather than taken as described in the official documentation, and where there is a discrepancy, it has been noted. The lineage of each taxonomy was identified through the statements of sources, while the overall definition of skill and descriptions of individual skills were extracted verbatim; where no definition is given, the absence is recorded as a finding.

Coverage was examined by thematic analysis of the core, essential, or transferable skills each framework names (Braun & Clarke, 2021). Taking the first skill layer in each framework, along with the adjacent person-descriptor categories (O*NET's Work Styles and Abilities; the SCT's Personal Attributes and Abilities), and setting aside knowledge items, I compared the named skills across the eight taxonomies, grouping those that name the same concept under different labels, and recording where a concept sits outside the core list and where it is absent. The themes and the frameworks' own titles under each are reported in the findings. The structural and definitional material was then read for recurring patterns, identified and named by me rather than counted from a codebook. In the findings section below, for brevity, quoted skill titles and descriptions are attributed by framework abbreviation (SSC, SCT) and come from the framework's released files at the version in Table 1, with full citations in the reference list.

4. Findings

4.1. Purpose

All eight frameworks share a common purpose: to provide a 'common language' of skills present in the labour market. The SSC aimed to provide "a coherent framework and common language for describing the skills, tasks, and knowledge required across the labour market" (Bachelor et al., 2026, p. 5). ESCO and the SCT frame the same aim as a common language that "can be used by different stakeholders" (European Commission, 2025b, para. 2), a "common competency dictionary" (Employment and Social Development Canada, 2025a, para. 1). The WEF, more ambitiously, wanted to create "a 'universal adapter' for existing taxonomies" as the "first step toward making skills the currency of the labour market" (World Economic Forum, 2021, pp. 2, 6). The ILO states the same problem from the other side: "there is currently no framework that adequately addresses the impact of global drivers of transformative changes... there is also a lack of coherence in the definition and categorization of core skills," and it frames access to a common language as a human right, enshrined in international law (International Labour Organization, 2021, p. 17). Most of the taxonomies hold back from critiquing their fellow developers, but the WEF does not, observing that few have "considered the practical functionality for end users such as job seekers, employers and learning providers" (World Economic Forum, 2021, p. 17), at odds with the other seven frameworks' stated purposes.

4.2. Methodology and Validation

Each taxonomy was developed through its own methodology, though approaches recur, and Albert and Weko's (2025) four methods of taxonomy development (survey, AI, collaboration, adaptation) are clearly visible in the corpus.

TABLE 2. FRAMEWORK METHOD AND VALIDATION

Framework	Method	Validation
O*NET	Survey (incumbents, supervisors, analysts; expert review at revisions)	Validity of the descriptor system reported at development; trained analysts; scheduled data collection
ESCO	Adaptation (EURES; O*NET IWAs; Canadian glossary; ISCED-F) + Collaboration (reference groups) + AI analysis from 2024	v0 piloted 2013 to v1; ongoing evaluation in use
UK SSC	AI analysis (embeddings, clustering over statement libraries and vacancy data) + Adaptation (O*NET DWAs, ESCO level 4, NCS libraries), with expert review	Expert review; checks against vacancy-extracted skills; planned CV-library validation abandoned as too costly
Canada SCT	Adaptation (internal products, O*NET, other capability frameworks) + consultation with stakeholders	None reported; continuing consultation
ASC	AI analysis (clustering for specialist tasks) + Adaptation (O*NET DWAs; VET Employability Skills Framework), with human refinement	Employer surveys, job-ad data and course documentation; expert review
SkillsFuture	Collaboration (government with employers, unions, and professional bodies, sector by sector) + AI extraction to unify sector frameworks	Extraction evaluated on course and job-posting datasets; expert validation planned
WEF GST	Collaboration (CLOs, CHROs, providers, data experts) + Adaptation (O*NET, ESCO, members' frameworks)	Expert review and user testing
ILO	Adaptation (literature review of core-skills frameworks) + Collaboration (academia, experts, UN agencies, national authorities)	Expert review and user testing; usage guides and toolkit; users adapt to context

Source: own compilation

Within this corpus (Table 2), O*NET is the only taxonomy that has utilised (and continues to utilise) survey or field-based research methods, which may contribute to its reputation as the taxonomy to ‘borrow’. AI and data-driven approaches are popular with the most recent taxonomies: the SSC drew statements from several datasets, with AI models used “to generate embeddings, cluster concepts, and propose labels, while manual reviews ensured accuracy, reliability, and UK relevance” (Bachelor et al., 2026, p. 5), and the ASC was built “using a mix of machine learning and human judgement,” its specialist tasks clustered by three algorithms and its core competencies taken from the vocational sector’s Employability Skills Framework (Jobs and Skills Australia, 2023, p. 13).

Both Canada and Singapore took a more collaborative approach: Canada combined existing Canadian source documents with O*NET’s structure and consultation with industry experts (Employment and Social Development Canada, 2025b), while Singapore’s frameworks were “developed for the Singapore workforce by the government in partnership with employers, industry associations, unions, and professional bodies” (Skills & Workforce Development Agency, Singapore, 2026b, “Skills Frameworks” section), sector by sector, recently unified into one skills list by AI extraction and semantic mapping (Tan et al., 2025). The WEF and ILO combined consultation with expert review: the WEF consulted chief learning and human-resource officers, learning providers, and data experts (World Economic Forum, 2021, p. 17), while the ILO distilled its 19 skills from “a thorough literature review of international and

national core skills frameworks” and consultations with academia, UN agencies, and national authorities (International Labour Organization, 2021, p. 26).

Validation across the corpus is uneven and thinly reported. O*NET set the course with validity standards recorded in its founding report (Peterson et al., 1997), while the ESCO, ASC, and SSC document pilot programs and user feedback. Barriers were most often time and cost; the SSC's report records that “the initial design report included a step to validate the classification against a large CV library but licensing this, or an up-to-date equivalent, proved prohibitively complex and expensive” (Bachelor et al., 2026, p. 30). For the SCT, WEF, and ILO, validation sat inside the development process itself, through consultation, expert review, and user testing, with no separate validation reported.

4.3. Governance

Ongoing maintenance, review, and governance was generally robust: most are actively maintained and reviewed to a schedule, with documentation produced for each review. Most of the developers consider these ‘living’ taxonomies, expected to change shape with the labour market. ESCO and SkillsFuture have incorporated AI/ML into the maintenance processes (European Commission, 2025c; Tan et al., 2025) while O*NET outsources occupation changes to expert analysts (Green & Allen, 2020). The WEF reviews its taxonomy biennially with one of its key reports but publishes no version numbers or update documents, and I could find no evidence of updates or reviews for the ILO taxonomy. The ASC was retired within a few years, with consultations on its successor under way (Jobs and Skills Australia, 2026).

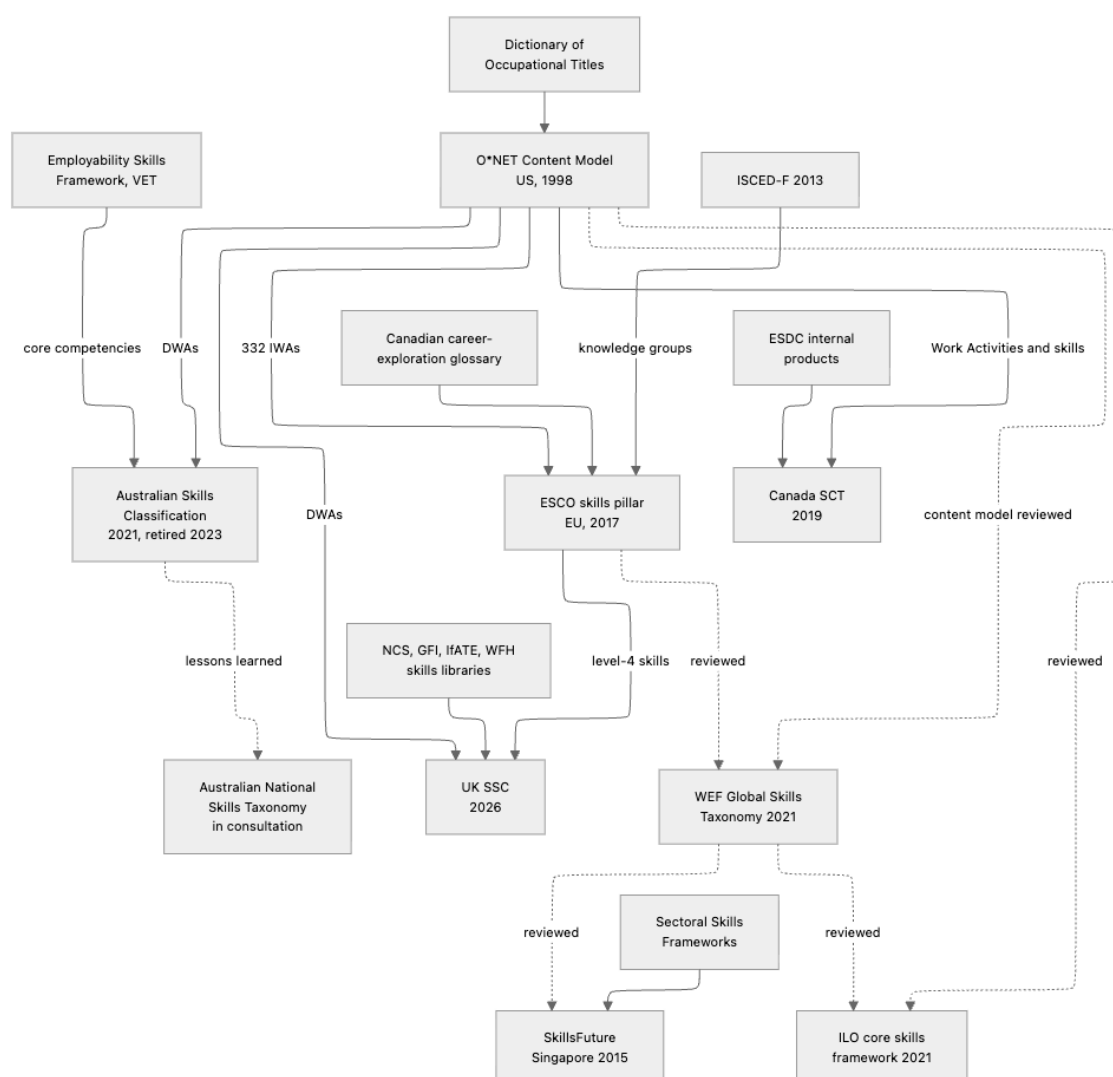
4.4. Lineage

On the surface the taxonomies appear unconnected, each organising and naming its hierarchy differently, yet the sources behind each reveal connections (Figure 1); five explicitly name O*NET among their key sources (ESCO, SCT, SSC, ASC, WEF).

The SSC lists O*NET Detailed Work Activities beside ESCO level four skills, National Careers Service skills, and several UK standards libraries (Bachelor et al., 2026, p. 27); ESCO's developers “mapped the 332 Intermediate Work Activities (IWA) specified in US O*NET to the second level of the hierarchy” and took upper-layer groups from a Canadian career exploration glossary (European Commission, 2025a, “Structure of the skills pillar” section); and a WEF-published account reports that Singapore's skills taxonomy was developed with the Forum from the sectoral skills frameworks (World Economic Forum, 2025). Only the ILO states no parent, having arrived there by reviewing everyone else's frameworks; its ‘nil’ lineage is about adoption rather than influence.

Each framework developed its own set of core or transferable skills, most beginning with skills from the sources, commonly O*NET's 35 Essential and Transferable skills, refined using local references such as the ASC's vocational sector Employability Skills Framework (Jobs and Skills Australia, 2023). For the technical skills, each took a level of the O*NET Work Activities as a seed: Canada the Generalized Work Activities almost verbatim (Employment and Social Development Canada, 2025b), ESCO the Intermediate Work Activities for its third level (European Commission, 2025a), and the SSC and ASC the Detailed Work Activities as a starting place for their own technical skills and tasks (Bachelor et al., 2026; Jobs and Skills Australia, 2023).

FIGURE 1. TAXONOMY LINEAGE CHART



Source: own composition

4.5. Structure and Composition

Whatever their differences in method, the eight frameworks converge on one structural habit: they separate a short list of core, transferable, or critical skills from a much larger body of technical or occupational skills, and the two layers are named, sourced, and maintained differently (Table 3). The exceptions are the two international frameworks: the ILO's 19 skills and the WEF's 81 sit in one flat list each, mixing basic digital and green skills with social, emotional, and cognitive ones (International Labour Organization, 2021), and around a third of the WEF's leaves are technical items sitting beside creative thinking and empathy (World Economic Forum, 2021). They are, in effect, core layers without a framework around them, and this paper's comparison concerns the six national taxonomies.

TABLE 3. STRUCTURE OF SKILL TAXONOMIES

Framework	Core Layer	Technical Layer	Layer Connections
O*NET	Essential and Transferable Skills (35); dispositions separate as Work Styles (21)	Work Activities: generalized, intermediate, detailed (2,087)	Crosswalks from each skill to GWAs only; 39 of 41 covered; nothing at detailed level
ESCO	Transversal skills and competences (97)	Skills (10,338); knowledge (3,145) and language (359) separate	60 skill-to-skill relations touch transversal concepts; otherwise via occupation profiles
UK SSC	Core Skills (13)	Occupational Skills (3,350), with 22,583 tasks and 5,056 knowledge concepts	Every occupational skill scored 1 to 5 on all 13 core skills; a weighted many-to-many profile
Canada SCT	Skills (43), with Personal Attributes (32) and Abilities (56) beside them	Work Activities (44, at O*NET's generalised grain)	Siblings in one tree; no crosswalk; connected via occupation profiles
ASC	Core competencies (10)	Specialist tasks (1,686); technology tools (94)	No task-competency mapping; both attach to occupations; competencies scored per occupation on a 10-point scale
SkillsFuture	Critical Core Skills (16)	Technical Skills and Competencies (2,300)	None; only 75 of 2,001 job roles list any Critical Core Skill
WEF, ILO	The whole framework (81; 19)	none	not applicable

Source: own compilation

The core layers differ most in what their builders decided a short list may contain. ESCO's transversal concepts each carry a description and alternative labels, and the SSC writes levelled proficiency descriptors under each Core Skill (Bachelor et al., 2026); the ASC's core competencies carry a one-line description and nothing else (Jobs and Skills Australia, 2023). The sharper split, though, is over what counts as a skill at all. O*NET files creativity, adaptability, and stress tolerance under Work Styles, "personality tendencies exhibited at work" (National Center for O*NET Development, n.d., "Worker Characteristics" section), and the SCT copies the split with its Personal Attributes and Abilities (Employment and Social Development Canada, 2025b). ESCO draws the same line by exclusion, admitting attitudes and values into the transversal layer "only to the extent that they can be learned and developed" (Hart et al., 2021, p. 3). The SSC, the ASC, and SkillsFuture make no such separation, publishing one short core list in which adapting and self-management sit beside numeracy as skills of the same kind. As the next section argues, the split aligns with each framework's definition: where the definition of skill includes how it is acquired, the framework needs somewhere to put the things a person has but did not learn, and where the definition speaks only of use, one list is enough.

The technical layers are more alike; all six are hierarchical, and all connect, usually at the lowest level, to the jurisdiction's standard occupational classification. They vary at the higher levels: O*NET categorises by subject of activity, and the SCT inherits this structure; the ASC, the SSC, and SkillsFuture organise by sector, with trees that read as industries; ESCO sits between the two. This structure makes sense given their lineage, as O*NET and the SCT share

methodology, and the sector-based trees belong to the frameworks that clustered their statements from occupational and industry text.

The level of detail at the statement level is broadly common: most technical skills carry a title and a one- or two-line definition; ESCO adds alternative labels, scope notes, and collections that cut across its hierarchy (European Commission, 2025a). SkillsFuture differs in register, naming many of its Technical Skills and Competencies as noun phrases rather than actions. In general, though, the technical skills take one grammatical form: a verb applied to a subject, occasionally qualified by an outcome or domain (“monitor equipment operation to ensure proper functioning”), which is precisely the shape their occupational-task parentage would predict.

4.6. Definition

Each taxonomy phrases its definition of ‘skill’ differently, but the elements repeat. Every taxonomy describes skills in relation to their application, meaning how they are used in a job, task, or occupation: O*NET to “work performance,” the SCT to “a job, role, function, task, or duty,” the ILO to transfer between occupations. None of the eight defines a skill as a property of a person independent of employment, and three fail to define ‘skill’ as an independent concept at all; the ASC describes its core competencies as “skills that are common to all jobs” without actually defining skill (Jobs and Skills Australia, 2023, p. 7), SkillsFuture likewise defines the skills without defining ‘skill’ itself or distinguishing it from competency (Skills & Workforce Development Agency, Singapore, 2026a), and the WEF separates ‘skills, knowledge, and abilities’ from ‘attitudes’ at the top level of its taxonomy without defining either (World Economic Forum, 2021).

Beyond that, the taxonomies split into two traditions – one which includes method of acquisition or development, and one which concentrates solely on use of the skill. The three which reference skill development, O*NET, SCT, and ESCO, separate acquired skill from “innate and developed aptitudes” and personal attributes (Employment and Social Development Canada, 2025b, “Note on the nuance” section) and house qualities they consider valued but not learned in adjacent categories, such as O*NET’s Work Styles or the SCT’s Personal Attributes and Abilities. The taxonomies which define skill by application alone, the SSC and ILO, have no need to separate out attributes or attitudes.

Even where a definition exists, there is confusion within the taxonomies about how skill should be defined. The SCT’s own pages acknowledge the skills-and-competencies debate and concede that “the title of the Taxonomy is not accurate” (Employment and Social Development Canada, 2025b, “Note on the nuance” section); ESCO defines skills and competences as different and then records “no distinction between skills and competences” in the pillar itself (European Commission, 2025a, “Knowledge, skills and competences” section); and the ILO’s founding rationale for adding an eighth framework to the seven was “a lack of coherence in the definition and categorization of core skills” (International Labour Organization, 2021, p. 17). A young person using any of these taxonomies will first have to navigate duplications and overlap, then determine whether their skills are transferable skills, attributes, attitudes, values, work styles, or work activities before they can begin to search for meaning.

4.7. Thematic Coverage: The Twelve Named Core Skills

Each taxonomy contains a grouping of core skills which is both shorter and usually flatter than the group of technical skills. While the titles and structure of these groups differ, the same common skills appear across them when analysed thematically. By grouping the 294 items from the highest skill layers (and their adjacent categories) by concept, rather than by name, and setting aside concepts named by fewer than half of the frameworks, this leaves 12 concepts present in at least half of the taxonomies (Table 4). What was discarded is itself informative: environmental and civic skills appear only in the international instruments, career management only in the ILO and ESCO, and a handful survive only inside others (decision making inside problem solving, conflict resolution inside leadership, emotional intelligence inside teamwork). None of the surviving concepts is technical, and the shared core of thinking, communicating, organising, and self-management has the least consistent definitional patterns.

TABLE 4. TWELVE CORE SKILL CONCEPTS

Concept	Named in	Adjacent category (if so)	Absent from
Literacy (reading and writing)	7 of 8	–	SkillsFuture
Numeracy	7 of 8	–	SkillsFuture
Communication	8 of 8	–	–
Problem solving (incl. decision making)	8 of 8	–	–
Learning	8 of 8	partly Work Styles (O*NET) and Personal Attributes (SCT)	–
Teamwork	8 of 8	partly Work Styles (O*NET) and Personal Attributes (SCT)	–
Planning and organising	8 of 8	–	–
Creativity and innovation	8 of 8	Work Styles (O*NET); Personal Attributes (SCT)	–
Digital Literacy	8 of 8	Software Skills, a tools list (O*NET)	–
Adaptability and initiative	7 of 8	Work Styles (O*NET); Personal Attributes (SCT)	ASC (initiative only, adaptability absent)
Leadership and Developing Others	7 of 8	partly Work Styles (O*NET); Personal Attributes (SCT)	ASC
Critical and analytical thinking	6 of 8	Personal Attributes, in part (SCT)	UK SSC (inside problem solving), ASC

Source: own compilation

Read across the frameworks, the concepts converge in meaning while diverging in title. Literacy and numeracy appear as a pair everywhere except SkillsFuture, which treats them in a separate part of its framework (Skills & Workforce Development Agency, Singapore, 2026c), and both are defined as applied (‘apply mathematical techniques’, SSC). Communication is read as oral and interpersonal, echoing the literature (see Hargie & Dickson, 2004), with an implied or explicit ‘other’ in every definition. Problem solving, named identically in all eight, is the closest the corpus gets to a universal skill and usually carries decision making inside it; its descriptions follow one pattern of identifying, analysing, evaluating, and implementing. Learning shows the widest spread of titles, ‘active learning’, ‘willingness to learn’, ‘learning agility’, ‘self-reflection and learning to learn’, over essentially one meaning. Teamwork descriptions carry an undercurrent of harmony, “a tendency to be pleasant, helpful, and willing

to assist others at work” (O*NET). Creativity, adaptability, initiative, and learning are reframed as personal qualities in O*NET’s Work Styles and the SCT’s Personal Attributes, exactly the frameworks whose definitions of skill include acquisition. Digital literacy reads more task-like than the rest; critical and analytical thinking splits most, one named skill in some frameworks and seven in the SCT; and leadership travels with persuasion, negotiation, and developing others, which leans towards teaching rather than directing.

Three themes emerged from the grouping of the core skills. First, the way the taxonomy defines ‘skill’ as an overarching concept dictates where self-directed skills (such as creativity, initiative, and resilience) are placed within the taxonomy’s categories; where a taxonomy specifies that ‘skill’ is something that can be developed, self-directed skills are pulled out of core skills and into adjacent categories, such as O*NET’s Work Styles. Where the taxonomy does not mention how ‘skill’ is developed in the concept definition, all core skills are grouped within the same single list. Second, the meaning of the 12 core skill concepts is stable between the taxonomies, while the titles used for these concepts are not: for example, the ASC kept O*NET’s description verbatim, but chose new names, with no rationale for the variation within the methodology. This suggests that there is commonality between the concepts, if not the labels. Third, as the core skill groups are flat with little or no internal structure, this hides granularity that is present in a closer reading of the descriptions. Using a taxonomic or hierarchical internal structure within the core skill groups could allow each high-level concept to be split into its components, and may be more useful than a flat list which places all skills at the same level.

5. Discussion

Two arguments follow: the first concerns the commonality of the taxonomies, the second the descriptions underneath them. The eight taxonomies were built using different methods in different decades, yet they arrive at substantially the same place: they state the same purpose, draw on a small shared pool of sources, converge on a dual-layer structure, and name the same 12 core concepts, with descriptions that differ far less than the titles above them.

Should the response therefore be a single taxonomy for everyone? Each taxonomy is fitted to its own jurisdiction and occupational classification, yet retains its own unique linguistic structure and nomenclature, and the real difference between them could turn out not to be the skills included, or their descriptions, but rather the names each skill is assigned. Existing approaches to classifying and studying skills have focused on individualistic interpretations (Hvalby et al., 2024), which limit the scope of the conversation to impacts on the individual and fail to consider the surrounding ecosystem (Donald et al., 2024), and a socially just approach could lie in providing access to multiple frameworks and the critical consciousness to choose between them (Sattler, 2025). If so, interoperability may matter more than exact agreement on names, and ESCO already has a working mechanism: one canonical title per concept, with alternative labels recording synonyms in common use.

The second argument concerns definition. Three of the eight taxonomies (the ASC, SkillsFuture, and the WEF) never defined skill at the outset, and where a definition exists, its content shaped the taxonomy: definitions that specify how a skill is acquired produced side categories for attributes and attitudes, somewhere to put the qualities a person *has* but did not *learn*, while definitions which only specified application of skill led to a single list of core skills. The method of construction also constrained what could count as a skill: clustering occupational

text can only surface skills already named in it, while expert authoring and consultation produced person-centred categories the clustered taxonomies lack. In several taxonomies, what counts as a skill was decided by the construction method itself, and the inconsistencies between the eight follow from those early, largely undocumented choices.

For young people, the consequence returns to the articulation gap described in the literature review. Tomasson Goodwin et al. (2019) found that few students could articulate their own skills without explicit teaching; the workplaces they are entering no longer offer traditional vertical career paths, and they will need to understand how their skills transfer to navigate a path for themselves (Sabra & Chan, 2025). If a school leaver asked to name their skills reaches for resilience, they will find it named as a skill by the WEF and ESCO, treated as a personality trait by O*NET and the SCT, and not listed at all by the SSC or the ASC; whether the system reading their application recognises resilience as a skill depends on which taxonomy sits behind it. Each of the eight taxonomies was built to resolve this confusion, but the lack of coherence the ILO identified in the field (International Labour Organization, 2021) appears within the taxonomies themselves.

6. Conclusion

Read against one template, the eight taxonomies share a stated purpose, a dual-layer structure, and a largely common set of core concepts; they differ in how they were built, and in whether and how each defines skill, and what each allows to count as a skill follows from that choice.

For educators, careers practitioners, and system designers, five questions could be put to a taxonomy before adopting it for work with young people:

1. How it was constructed, and what shape the method has given it;
2. What it means by skill, and where it places the qualities its definition excludes;
3. Whether its core and technical layers connect;
4. What alternative titles exist for the skills in the taxonomy; and
5. Whether it is maintained and current.

For those who commission and build taxonomies, four design lessons follow: a definition of skill settled at the outset, which determines where the qualities outside the definition are placed; a core layer with internal structure and full descriptions rather than a short, bare list; interoperability mechanisms, such as alternative labels and published crosswalks, that let national taxonomies stay fitted to their own systems while remaining mutually readable; and, open publication of the files and methodology, which facilitates comparison and translation between systems. This matters for the shift toward skills-based hiring, intended partly to improve outcomes for marginalised young people (OECD, 2026), where the skill a candidate names must be understood by whichever system is reading it.

This analysis was conducted from a stated position: I am a researcher working with young people and often refer to both formal and informal skill taxonomies in that work. My main concerns are validity and usability, and it is from that position that I approached this study. The study reads the taxonomies as released and documented; it did not consult their developers or users, and the corpus is limited to open, official taxonomies. Future work could examine the language used within the descriptions of skill, the impacts of the methods in terms of which

skills are included and which are absent, and the relevance of machine learning and large-scale data sets for the identification and organisation of skill.

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AI Use

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Ethics Statement

The analysis involved no human participants and required no ethics approval. The author confirms that the study adhered to applicable ethical guidelines.

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Shaping the Future of Accounting Education: A Literature Review of Accountant 4.0 Competencies

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Abstract

The rapid development of digital technologies is transforming the accounting profession and the competencies required to practise it. Consequently, higher education institutions face increasing pressure to prepare students and graduates for evolving professional roles and to align accounting curricula with changing labour market expectations. Identifying the competencies required in a technology-enabled accounting profession is therefore particularly relevant to the preparation and professional development of future and early-career accounting professionals. This study identifies the competencies associated with the Accountant 4.0 and examines how frequently they are identified in academic and professional literature. A structured literature review was conducted, including 47 academic publications and documentary sources associated with 14 professional accounting organisations. The findings reveal differences in the frequency with which competencies are identified across the two bodies of literature. Academic publications most frequently identify general technological skills and understanding, problem-solving, communication, and teamwork. The professional corpus covers a broader range of competencies, with technical accounting competencies, general

technological skills and understanding, data analytics, ethics, integrity and professionalism, and analytical reasoning among the most frequently identified. Communication and teamwork are among the competencies frequently identified across both academic and professional sources. By integrating and systematically comparing academic and professional perspectives, this study provides a consolidated overview of Accountant 4.0 competencies and identifies areas of convergence and divergence between the two bodies of literature. The findings provide a basis for reflecting on how accounting education can support the competency development of students, graduates, and early-career professionals as they prepare for a profession increasingly shaped by digital transformation.

Keywords: accounting education, accounting competencies, digital transformation, accounting graduates, accountant 4.0

1. Introduction

The growing use of digital technologies and Artificial Intelligence (AI) is automating repetitive tasks and transforming how people work and interact with technology (OECD, 2019). These developments are associated with the Fourth Industrial Revolution or Industry 4.0 (Németh et al., 2021). While automation may allow workers to focus on higher value-added activities requiring cognitive skills and human expertise, routine jobs remain particularly exposed (Elo, 2025; Kee, 2024).

These transformations have important implications for skills development. Forecasts suggest that approximately 39% of workers' existing skill sets are expected to change or become outdated between 2025 and 2030, while AI and big data are among the fastest-growing skills in demand (World Economic Forum, 2025). Changes in required skill sets can contribute to what is commonly referred to as a "skill gap," understood as a discrepancy between the competencies possessed by workers and those required by employers (Bui & Porter, 2010; Edeigba, 2022; Elo, 2025; Jackling & De Lange, 2009). Skills gaps are identified by 63% of employers as a major barrier to business transformation, making them the most frequently reported barrier to organisational change (World Economic Forum, 2025).

Accounting is particularly affected because many routine accounting tasks are susceptible to automation (Elo, 2025). Digitalisation is expected to shift the accountant's traditional role towards more strategic activities involving decision-making and information systems management (Elo, 2025). Existing research suggests that required competencies in the accounting field are becoming more complex, encompassing not only data analysis and the use of new technologies, but also social and cognitive competencies (Elo, 2025; García & de los Ríos, 2021; Handoyo, 2024; Razali et al., 2022; Rosi & Mahyuni, 2021).

Drawing on this literature, the term "Accountant 4.0" refers in this study to an accounting professional who combines technical accounting expertise with the digital, intellectual, interpersonal, and other professional competencies required to operate in a technology-enabled environment (Razali et al., 2022; Stancheva-Todorova, 2020). Identifying these competencies more precisely provides higher education institutions with a basis for examining how they are represented in accounting curricula and which may warrant greater attention. It may also help students and graduates reflect on the competencies they need to strengthen when transitioning

into professional practice (Crosta et al., 2023; Soproni, 2023), and support continued development as professional requirements evolve.

Academic research and professional competency frameworks provide complementary perspectives on the competencies required of future accounting professionals. Academic publications examine how these competencies are conceptualised and investigated, whereas professional frameworks reflect expectations associated with accounting practice (Elo et al., 2023; García & de los Ríos, 2021; Handoyo, 2024; Rosi & Mahyuni, 2021).

Accordingly, this study identifies the competencies associated with the Accountant 4.0 and compares their frequency in academic publications and across professional accounting organisations. A structured literature review integrates 47 academic publications and sources associated with 14 professional organisations within a common classification. By comparing patterns of coverage without treating frequency as a measure of importance, the study provides a consolidated overview and a basis for considering how accounting education can support competency development and the transition to professional practice.

2. Literature Review

2.1. From Industry 4.0 to Accountant 4.0

Industry 4.0 emerged from a German high-technology strategy aimed at promoting the computerisation of production. It now refers more broadly to the integration of intelligent digital technologies, including the Internet of Things, artificial intelligence, big data, and robotics. It encompasses the digital integration of value chains, the digitalisation of products and services, and the development of innovative digital business models (Dašić & Anufrijev, 2025). Its implications therefore extend beyond the adoption of technological tools, as it also transforms organisational processes, workforce competencies, and education (Németh et al., 2021).

Applied to accounting, Industry 4.0 is associated with a transition from conventional accounting practices towards increasingly automated and systematic processes. Although technologies can organise and process financial data, accountants remain responsible for evaluating the information produced and contributing to activities requiring human judgement, resulting in new forms of human–technology collaboration (Razali et al., 2022). The Accountant 4.0 is described as a hybrid professional combining accounting expertise with interdisciplinary knowledge and diversified competencies encompassing digital technologies, big data and data analytics, robotics and artificial intelligence, cybersecurity, taxation, and legal and statutory requirements (Stancheva-Todorova, 2020). More broadly, the literature emphasises the need to combine technical and ethical competence with digital, analytical, communication, leadership, and adaptability skills (Razali et al., 2022).

The term “Accountant 4.0” therefore denotes a multidimensional competency profile rather than a distinct occupational title. In this study, it encompasses the technical, digital, intellectual, interpersonal, and other professional competencies that allow accounting professionals to use technological tools, interpret their outputs, exercise professional judgement, and contribute to organisational decision-making.

2.2. Definition of Competency

Competency can be defined as an individual's ability to mobilise and combine resources, such as knowledge and skills, to deal with a specific professional situation within a particular context. Individuals must adapt to respond to the constraints and requirements of the situation (Le Boterf, 2010; Mulder, 2014). It extends beyond the possession of knowledge to its appropriate application in context (El Asame & Wakrim, 2018; Le Boterf, 2010; Mulder, 2014). Competency also involves initiative and adaptation in response to professional demands (Zarifian, 2001). It develops through experience and reflection and cannot be reduced to knowledge or assessed solely through observable performance (Charlier & Deschryver, 2011).

2.3. Competency Gaps and Competency Frameworks

Higher education institutions are expected to prepare graduates whose competencies align with professional expectations (Elo, 2025; Kee, 2024). Insufficient alignment may create competency gaps, also described as skill gaps or expectation–performance gaps (Bui & Porter, 2010; Edeigba, 2022; Elo et al., 2023; Jackling & De Lange, 2009; Razali et al., 2022). Although digital transformation has renewed attention to this issue, discrepancies between accounting education and professional expectations have long been documented (Bui & Porter, 2010; Jackling & De Lange, 2009).

Existing reviews identify professional, soft, digital, and strategic competencies, persistent differences between employer expectations and graduate competencies, and curriculum reform and work-integrated learning as possible responses (Nie & Mastor, 2024). An earlier meta-synthesis similarly highlighted technological change and the evolving mix of competencies required in accounting work (Rosi & Mahyuni, 2021).

These concerns have encouraged professional bodies to broaden their competency frameworks. The need for such developments is illustrated by the limited curriculum coverage of data analytics, cybersecurity, IT auditing and governance, digital acumen, and control systems identified across 317 universities (AICPA & NASBA, 2021a, 2021b).

Professional standards, competency frameworks, and qualification syllabi increasingly present professional competence as multidimensional. Technical accounting knowledge remains central but is combined with intellectual, interpersonal, communication, ethical, leadership, employability, and digital competencies. This broader conception is reflected in the International Education Standards (IESs) issued by the International Federation of Accountants (IFAC), which address technical competence, professional skills, and professional values, ethics, and attitudes (IFAC, 2025a, 2025b, 2025c). It is also apparent in the integration of professional judgement, information interpretation, communication, employability, and technology within the Strategic Business Reporting syllabus, and in the organisation of professional competence into Technical, Business, People, Leadership, and Digital Skills (ACCA, 2024; AICPA & CIMA, 2023). Despite differences in terminology and purpose, these documents therefore converge towards a conception of professional competence that extends beyond technical accounting knowledge.

From an academic perspective, accounting students' perceptions of the future importance of 31 competencies and their development during their studies were examined by Elo et al. (2023). The competencies were organised into five categories: technical skills and knowledge;

computer, information technology, and data processing skills; intellectual skills; interpersonal, social and communication skills; and other professional skills. Expectation–performance gaps were identified for most competencies, particularly in technological and data-processing areas. This study therefore provides both a comprehensive classification and an educational perspective on competencies requiring further development.

These categories extend beyond technical and digital expertise. Communication, teamwork, problem-solving, and other transferable competencies also contribute to accounting graduate employability and career readiness (de Lange et al., 2023; Imjai et al., 2025; Nesbit et al., 2023).

In the absence of a universally accepted classification, the five categories proposed by Elo et al. (2023) are retained as the organising structure for the present study and are complemented with the more detailed, practice-oriented competencies included in the AICPA & CIMA (2023) framework. The present study does not replicate the original assessment of expected importance and perceived development. Instead, it aims to apply this five-category organising structure to an expanded set of competency entries and to compare how frequently they are identified across academic publications and professional accounting organisations.

3. Methodology

3.1. Research Objective and Review Approach

This study addresses the following research questions:

1. What competencies are associated with the Accountant 4.0 in academic publications and professional accounting documents?
2. How often are these competencies identified in academic publications and across professional accounting organisations?

A structured literature review and documentary analysis were used to compare academic and practice-oriented perspectives without collecting primary data. The academic search was restricted to publications issued between January 2023 and August 2025 to capture recent competency requirements in a professional environment increasingly shaped by generative AI and digital transformation since the end of 2022 (World Economic Forum, 2023).

3.2. Literature Search and Selection Process

Google Scholar was selected for its broad multidisciplinary coverage across accounting, education, technology, and employability, an approach also used by Rosi and Mahyuni (2021). Predefined eligibility criteria and sequential screening from titles to abstracts and full texts drew on Nie and Mastor (2024).

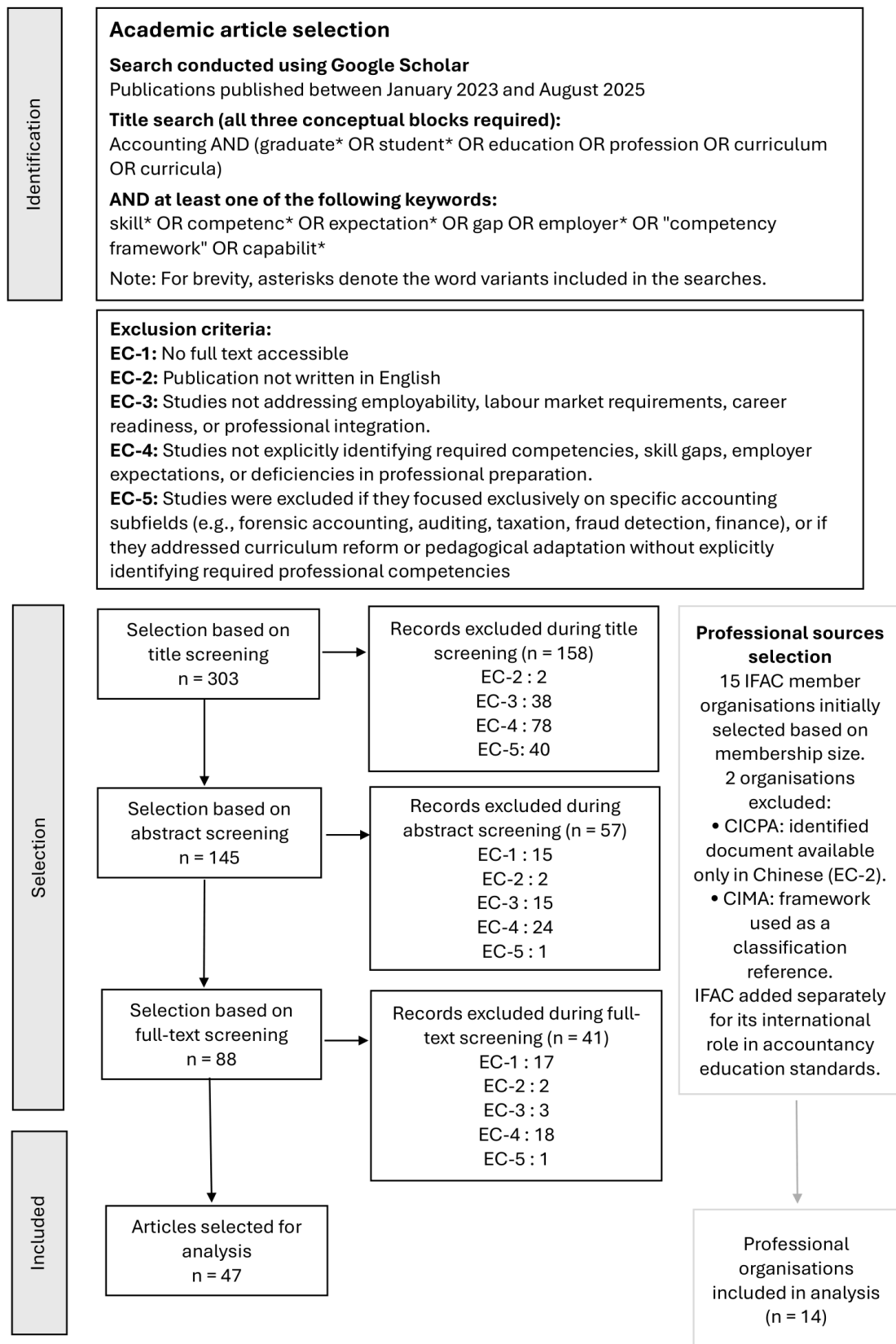
The search string was developed by the first author with one co-author to reflect terminology used across accounting education and professional literature. It comprised three conceptual blocks: accounting; the educational or professional context (graduates, students, education, profession, or curricula); and competency requirements (skills, competencies, expectations, gaps, employers, frameworks, or capabilities). Synonyms were connected by OR and truncated terms captured variants, while AND required all three blocks. The title restriction ensured that competency requirements were an explicit focus. Figure 1 presents the complete string and exclusion criteria.

Records were screened sequentially using predefined criteria. The title search focused on publications explicitly addressing accounting competencies, education, graduates, or professional skill requirements. Records were initially classified as eligible, ineligible, or uncertain, with uncertain records retained for abstract assessment. The remaining full texts were then examined to determine final inclusion. Screening decisions and exclusion criteria were documented in a structured spreadsheet.

The search yielded 303 initial records, of which 47 academic publications ultimately met the eligibility criteria. Despite the focused search strategy and short publication window, this corpus is comparable in size to the reviews of Rosi and Mahyuni (2021) and Nie and Mastor (2024), which retained 40 and 45 publications, respectively.

Professional sources were included to complement academic perspectives on accounting competencies. Fifteen of the largest IFAC member organisations were initially selected by comparing reported membership figures. CICPA was excluded because the identified document was available only in Chinese. The AICPA & CIMA (2023) framework and the study by Elo et al. (2023) were used as reference sources to construct the 53-entry classification. To avoid coding these sources against a classification they had helped define, CIMA was not counted among the professional organisations analysed, and Elo et al. (2023) was not included among the 47 academic publications. IFAC was added as a separate organisational unit because of its international role in accountancy education standards, resulting in a final corpus of 14 professional organisations. The jointly authored Singaporean framework, which includes ISCA, is cited as SkillsFuture Singapore et al. (2020). Selection was based on membership size rather than geography, although the final corpus covers several world regions.

FIGURE 1. ARTICLE SEARCH AND SELECTION PROCESS



Source: created by the authors

The 47 academic publications and the documentary sources associated with the 14 professional organisations are presented in Table 1.

TABLE 1. ACADEMIC AND PROFESSIONAL SOURCES USED IN THE REVIEW

Academic sources	Professional sources
(Abdalla, 2023; Abubaker et al., 2024; Afni et al., 2024; Alia & Lestari, 2025; Askary & Askarany, 2024; Awang et al., 2023; Blasco Burriel et al., 2023; Bunea & Guinea, 2023; Calumpiano, 2023; Chandler, 2024; Dašić & Anufrijević, 2025; Davies & Sparkes, 2024; de Lange et al., 2023; Duong et al., 2023; Ghani et al., 2024; Giang, 2024; Gyekye & Amo, 2024; Haidar & Al-Shorafa, 2023; Hussin et al., 2023; Ikpeama et al., 2025; Imjai et al., 2025; Januszewski et al., 2024; Koko & Ajinwo, 2023; Koko & Elekwachi, 2023; Kotze & Miller, 2023; Lima & de Lima, 2025; Lkhagvasuren et al., 2023; Lleshaj & Çika, 2023; Manira & Effendy, 2024; Micallef et al., 2023; Moran, 2025; Muliati & Indriani, 2024; Nesbit et al., 2023; Nwalado et al., 2024; Nwaogazie et al., 2024; Ordu & Adama, 2025; Puriboriboon, 2025; Rhodes, 2023; Rkein et al., 2024; Taib et al., 2023; Thi & Ngoc, 2024; Tiron-Tudor et al., 2025; Twyford & Dean, 2024; Ugwunwoti et al., 2025; van den Berg & Rothmann, 2024; Yunos et al., 2023; Zhang et al., 2025)	(ACCA, 2024; AICPA & NASBA, 2021a, 2021b; CA ANZ, 2024; CPA Australia, n.d.-a, n.d.-b; CPA Canada, 2022; HKICPA, 2019; ICAEW, 2025; ICAI, n.d.-a, n.d.-b, n.d.-c; ICAS, 2024, 2025; IFAC, 2025a, 2025b, 2025c; IMA, 2022; IPA, n.d.; SkillsFuture Singapore et al., 2020; SAICA, 2022, 2023)

Source: created by the authors

3.3. Classification of Competencies

The competencies were classified using Elo et al. (2023) and AICPA & CIMA (2023). The five categories proposed by Elo et al. provided the organising structure, complemented by the more detailed practice-oriented content of the professional framework. The first author and one co-author independently mapped the two sources and resolved differences concerning equivalence, grouping, and classification through discussion.

The resulting classification comprises 53 entries across five categories: technical (20); technological and data-processing (11); intellectual (5); interpersonal, social, and communication (7); and other professional competencies (10). Entries include both specific competencies and broader competency categories. In particular, “Strategy” and “Business relations” retain the original AICPA & CIMA (2023) labels and represent categories encompassing individual capabilities described in that framework. The categories are used as descriptive organisational tools rather than rigid analytical divisions (Charlier & Deschryver, 2011).

Overarching entries are shown in bold and marked with an asterisk in Table 2. Broad references such as “accounting skills” were classified under “Financial administration/accounting skills and theoretical understanding”. More specific references were classified under the relevant sub-competency and also counted within the overarching entry. Partial references such as “reporting” were assigned to the corresponding broader competency.

Each academic publication constituted one unit of analysis. Professional documents associated with the same organisation were consolidated so that each organisation also constituted one unit. A competency was counted once per publication or organisation, regardless of repeated mentions or the number of associated documents. Table 2 provides the competency identifiers (No.) used in the heatmaps, while the complete source-by-competency coding matrix is available as Supplementary Material.

TABLE 2. CLASSIFICATION OF ACCOUNTANT 4.0 COMPETENCIES

No.	Competency	No.	Competency
Technical skills and knowledge		Technical skills and knowledge	
1	Financial administration / accounting skills and theoretical understanding*	12	Process management
2	Financial accounting and reporting	13	Project management
3	Cost accounting and management	14	Macroeconomic analysis
4	Business planning	15	Market and regulatory environment
5	Management reporting and analysis	16	Business relations
6	Corporate finance and treasury management	17	Business ecosystems management
7	Risk management and internal control		Other technical skills and knowledge
8	Tax strategy, planning and compliance	18	Juridical knowledge
9	Knowledge of different fields, understanding the big picture. Business skills*	19	Foreign languages
10	Strategy	20	Research methodology and statistics
11	Business models		
Computer, IT and data processing skills		Intellectual skills	
21	Knowledge related to robotics and artificial intelligence	32	Analytical reasoning
22	Different IT systems	33	Decision making
23	Accounting information systems	34	Critical thinking
24	General technological skills and understanding	35	Problem solving
25	Programming	36	Logical and mathematical reasoning
26	Digital content creation		
27	Information and digital literacy		
28	Data processing*		
29	Data strategy and planning		
30	Data visualisation		
31	Data analytics		
Interpersonal, social and communication skills		Other professional skills	
37	Communication (oral and writing)	44	Innovation skills and innovativeness
38	Active listening	45	General leadership skills (coaching, mentoring, motivating and inspiring)
39	Networking, collaboration and partnering	46	Media literacy and criticism
40	Emotional intelligence and influence	47	Self-improvement and learning
41	Teamworking/building and interaction skills	48	Driving performance, self-management
42	Negotiation	49	Working under pressure
43	Customer service	50	Adaptability and flexibility
		51	Initiative skills
		52	Ethics, integrity and professionalism
		53	Change management

Source: authors' classification based on Elo et al. (2023) and AICPA & CIMA (2023)

Note: Numbers correspond to the competency identifiers in the heatmaps. Asterisks indicate overarching entries encompassing items 2–8, 10–17, and 29–31, respectively.

3.4. Visualisation of Competencies

Two heatmaps visualise competency coverage across the corpora (Figures 2 and 3). Colours distinguish the five categories, while filled cells indicate the presence of a competency in each source. Following the visualisation approach of Hangyál et al. (2026), frequencies of 75–100% are highlighted in green and those of 50–74% in yellow.

4. Results

4.1. Competencies Identified in Academic Publications

The academic publications displayed relatively selective competency coverage. Only four competencies appeared in at least half of the corpus: communication (No. 37; 74%), teamworking/building and interaction skills (No. 41; 60%), problem-solving (No. 35; 55%), and general technological skills and understanding (No. 24; 51%).

Technical accounting competencies were less frequent. The overarching entry covering financial administration, accounting skills, and theoretical understanding (No. 1) appeared in 45% of the publications, while individual technical entries generally appeared in fewer than 30%. Driving performance and self-management (No. 48) was the most frequent other professional competency at 45%.

	Other professional skills	Interpersonal social and communication skills	Intellectual skills	Computer /IT / data processing	Technical skills and knowledge	Academic Authors
						Abdalla
						Abubaker et al.
						Afini et al.
						Alia & Lestari
						Askary & Askarany
						Awang et al.
						Biasco Burriel et al.
						Bunea & Guinea
						Calumpiano
						Chandler
						Dašić & Anufrijev
						Davies & Sparkes
						de Lange et al.
						Duong et al.
						Ghani et al.
						Giang
						Gyekye & Amo
						Haidar & Al-Shorafa
						Hussin et al.
						Ikpeama et al.
						Jinjai et al.
						Januszewski et al.
						Koko & Ajinwo
						Koko & Elekwachi
						Kotze & Miller
						Lima de Lima
						Likhtyansuren et al.
						Lleshai & Cika
						Mamira & Effendy
						Micallef et al.
						Moran
						Muliati & Indriani
						Nesbit et al.
						Nwalado et al.
						Nwaogazie et al.
						Ordu & Adama
						Purhoriboon
						Rhodes
						Rkein et al.
						Taib et al.
						Thi & Ngoc
						Tiron-Fudor et al.
						Twford & Dean
						Ugwunwoti et al.
						van den Berg & Rothmann
						Yunos et al.
						Zhang et al.
Competency number						
Frequency, %						
1						45
2						26
3						15
4						11
5						21
6						17
7						17
8						13
9						28
10						6
11						0
12						0
13						6
14						2
15						4
16						0
17						0
18						15
19						15
20						19
21						26
22						45
23						40
24						51
25						21
26						6
27						47
28						28
29						11
30						21
31						23
32						26
33						28
34						40
35						55
36						11
37						74
38						15
39						11
40						32
41						60
42						17
43						15
44						11
45						34
46						9
47						34
48						45
49						11
50						34
51						17
52						34
53						21

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4.2. Competencies Identified by Professional Organisations

Professional organisations covered a broader range of competencies, with 13 of the 20 technical entries appearing in at least half of the corpus. Financial administration and accounting skills (No. 1), financial accounting and reporting (No. 2), management reporting and analysis (No. 5), and tax strategy, planning and compliance (No. 8) appeared in all organisations.

Digital and intellectual competencies were also prominent. Data processing (No. 28) appeared in all organisations, while general technological skills and understanding (No. 24), information and digital literacy (No. 27), analytical reasoning (No. 32), and problem-solving (No. 35) each reached 93%. Communication (No. 37) reached 93%, teamworking/building and interaction skills (No. 41) reached 71%, and ethics, integrity and professionalism (No. 52) appeared in all organisations.

FIGURE 3. HEATMAP OF COMPETENCIES IDENTIFIED BY PROFESSIONAL ORGANISATIONS

Professional institutes	Technical skills and knowledge	Computer / IT / data processing	Intellectual skills	Interpersonal social and communication skills	Other professional skills	Competency number		Frequency, %
						1	2	
ACCA								100
								100
								93
								36
								100
								79
								86
								100
								86
								86
								43
								14
								21
								57
								79
								21
								0
								71
								0
	AICPA & NASBA							
								64
								64
								43
								93
								29
								7
								93
								100
								43
								57
CA ANZ								86
								93
								21
								93
								21
								93
								21
								93
								21
								93
								21
CPA Australia								93
								21
								93
								21
								93
								21
								93
								21
								93
								21
								93
CPA Canada								93
								21
								93
								21
								93
								21
								93
								21
								93
								21
								93
HKICPA								93
								21
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ICAEW								93
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ICAI								93
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ICAS								93
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IFAC								93
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								93
SkillsFuture Singapore								93
								21
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								93
SAICA								93
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Competency number								93
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								21
								93

Source: created by the authors

4.3. Comparison of Academic and Professional Sources

Communication (No. 37), teamworking/building and interaction skills (No. 41), general technological skills and understanding (No. 24), and problem-solving (No. 35) represent the clearest areas of convergence, as they appeared in a majority of both corpora. Important differences nevertheless emerged. Data processing (No. 28) appeared in all professional organisations but in only 28% of academic publications, while ethics, integrity and professionalism (No. 52) appeared in all organisations but in 34% of academic publications. Overall, professional organisations covered broader competency profiles, whereas academic publications generally focused on narrower sets.

5. Discussion

The findings support the multidimensional conception of the Accountant 4.0 identified in previous research. Rather than replacing traditional accounting expertise, the profile combines technical knowledge with technological literacy, analytical capabilities, interpersonal competencies, ethics, and professional judgement. This is consistent with descriptions of the Accountant 4.0 as a hybrid professional requiring diversified and interdisciplinary competencies (Razali et al., 2022; Stancheva-Todorova, 2020).

The broader coverage observed among professional organisations may reflect the comprehensive purpose of professional competency frameworks and qualification documents, which are generally intended to define profiles applicable across multiple accounting roles. Their emphasis on technical accounting, data-related competencies, analytical reasoning, and ethics is consistent with previous research highlighting the continued importance of accounting expertise alongside digital, analytical, and ethical competencies (Razali et al., 2022; Stancheva-Todorova, 2020). Academic publications, by contrast, generally examine more specific competency areas. Their stronger focus on general technological skills, communication, teamwork, and problem-solving is consistent with previous Industry 4.0 and accounting employability research combining digital capabilities with decision-making, adaptability, communication, teamwork, and continuous learning (Dašić & Anufrijev, 2025; de Lange et al., 2023; Imjai et al., 2025; Nesbit et al., 2023; Nie & Mastor, 2024).

Communication, teamwork, problem-solving, and general technological skills represent the clearest areas of convergence. This suggests that evolving accounting work requires technological capabilities alongside competencies dependent on human interaction and judgement. However, differences in frequency may reflect the scope and purpose of the documents rather than the importance assigned to individual competencies.

These findings also complement those of Elo et al. (2023), who reported high expected importance for general technological skills, critical thinking, and problem-solving, together with expectation–performance gaps across most competencies, particularly in technological and data-processing areas. Whereas their study compared students’ perceptions of expected importance and perceived development, the present study examines the frequency with which competencies are identified across academic and professional sources. The two approaches therefore provide complementary perspectives on competencies that may warrant attention in accounting education.

By integrating academic and professional perspectives within a common classification, the study provides a broader view of Accountant 4.0 competencies than either corpus considered separately. However, it does not demonstrate a gap between accounting education and professional expectations because academic publications do not directly represent curricula and professional sources do not necessarily reflect individual employers' requirements.

5.1. Practical Implications

The classification provides higher education institutions and accounting educators with a basis for examining how the identified competencies are represented in curricula. Curriculum mapping could identify competencies that are already developed, could be reinforced, or may require greater attention. The findings particularly support combining communication, teamwork, and problem-solving with technical accounting and digital competencies.

The classification may also help students and graduates identify competencies to strengthen when entering professional practice. Nevertheless, it does not prescribe a universal curriculum, as competency requirements, professional roles, and educational structures vary across contexts.

6. Conclusion

This study integrated 47 academic publications and sources associated with 14 professional accounting organisations to classify 53 Accountant 4.0 competencies and compare their frequency. Professional sources generally covered broader competency profiles, whereas academic publications addressed narrower sets. Their convergence on technological, problem-solving, communication, and teamwork competencies provides a basis for curriculum reflection, without demonstrating a direct gap between accounting education and professional expectations.

6.1. Limitations and Future Research

Several limitations should be considered. The different purposes of academic and professional sources may have influenced the observed frequencies. Google Scholar's dynamic indexing and less standardised search functions may limit reproducibility or omit relevant publications, while the academic search covered only January 2023 to August 2025. Professional sources were restricted to English and organisations selected according to IFAC membership and membership size rather than geographical balance. Screening and coding were conducted by the first author, although the two reference classifications were mapped with one co-author. Finally, frequency measures how widely a competency was identified but not its importance, required proficiency level, or presence in accounting curricula.

Future research could use structured databases such as Scopus and Web of Science, extend the publication period, include additional languages, and involve multiple researchers in screening and coding. Empirical studies could examine curricula, competencies developed by students and graduates, and proficiency levels expected by employers to determine whether the patterns identified correspond to actual gaps between education and professional requirements.

Overall, the study provides a consolidated view of Accountant 4.0 competencies and a foundation for curriculum reflection, competency development, and further research on the transition from accounting education to professional practice.

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Data Availability

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AI Use

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Ethics Statement

This study is based exclusively on published academic literature and publicly available professional sources and did not involve human participants or personal data. Ethical approval was therefore not required. The authors confirm that the study adhered to applicable ethical guidelines.

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Creating Avenues for Women to Benefit from Digitalisation – What Is Needed?

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Abstract

There is a rapid transformation in digital technologies worldwide, and digitalisation is now part of all major economic sectors, thereby impacting labour markets. However, women still lag behind men and are not fully benefiting from the opportunities that come with digitalisation. This paper aims to unpack what is needed for women to benefit from digitalisation. The PRISMA protocol was used to perform a comprehensive search across EBSCO, ProQuest, Web of Science, ScienceDirect, Scopus, JSTOR, Emerald, and Google Scholar, from which 60 papers were retained after screening. Articles were analysed in-depth using a thematic approach. Findings reveal the need for governments to design initiatives to raise awareness, increase access, and promote the usage of digital technologies, tools, and devices at affordable prices. Supporting digital infrastructure, partnerships, household conditions and a legal framework are vital. Together with educational institutions, governments should also develop strategies to boost education and digital skills development, mentorship, and networks to empower women to leverage digital opportunities. There is also a need to ensure social and work-life balance support to help women leverage digitalisation. Hence, governments, educational institutions, private entities, civil society groups, and women need to collaborate to implement tangible actions that ensure meaningful access to technology and the benefits of digitalisation. By synthesising dispersed evidence from 60 studies, this study integrates conditions, capabilities, and support systems needed for women to benefit from digitalisation and provides actionable initiatives at multiple levels. This paper highlights the relevance of access to technology, and the need for pathways, capability enhancement, and enabling conditions that make digital skills available for the entry of young women into the labour market and for their career progression in a digital era. These findings can reduce the digital gender divide, improve women's labour market participation, or inform policy and practice.

Keywords: digital literacy, digital skills, employment, entrepreneurship, gender, economic activities

1. Introduction

The world has experienced a rapid transformation of digital technologies in recent years, and digitalisation is now part of major industry segments (Massa et al., 2023). The rise of technology has greatly impacted labour markets, as technological tools perform several cognitive tasks traditionally performed by humans (Cazzaniga et al., 2025). Fan (2025) agrees that digital development offers women additional opportunities for flexible employment and entrepreneurship, reduces gender disadvantages in the labour market, enhances women's value in the labour market, and provides new employment openings and fields for practitioners. Hence, the rapid development of the digital economy has brought significant changes thereby reshaping workforce requirements and skills and enhancing women's participation in economic activities such as formal employment and entrepreneurship (Yang et al., 2025).

The recent development of digital infrastructure has increased the number of digital jobs, which are essential for digital transformation (Aly, 2022). Previous research confirms a positive link between female employment and the digital economy (Banga & Faith, 2021; Riaz, 2024; Salman et al., 2023; Yang et al., 2025). There is evidence that digital literacy can help women secure profitable non-agricultural employment (Zhou et al., 2024), hence helping them achieve economic independence. Digital literacy promotes the transition of women into employment through digitally mediated information that creates sustainable learning opportunities and shapes their career decisions (Martínez-Nicolás et al., 2025; Wang et al., 2024). Digital literacy can also help rural women balance family and work responsibilities and shifts families from traditional “male breadwinner” models to more equitable partnerships to break existing cycles of poverty and promote gender equality (Tamang et al., 2025).

Also, the digital space has created opportunities for entrepreneurship, and digital entrepreneurs need necessary skills and knowledge to capitalise on new opportunities arising from shifts in digital transactions, communication, and marketing channels (Ashfaq & Farhan, 2025). Digital skills can help women entrepreneurs obtain finance (Irwin et al., 2025), create resilience and build sustainable businesses (Razzaq et al., 2024; Yin et al., 2026) and promote entrepreneurial innovation (Fan, 2025). Thus, digital transformation in the digital economy has created a need for female labourers to adapt to new work requirements by developing digital skills to increase their human capital (He, 2024). This has become mandatory for them to leverage existing opportunities.

1.1. Women Leveraging Digitalisation Opportunities

Prior research ascertains that while creating awareness about digital technologies is vital (Guerrero-Romera et al., 2025; Seman et al., 2024; Woźniak-Jęchorek et al., 2023), it is important to facilitate access to digital technologies and devices (Chohan & Hu, 2022; Lopez-Sintas et al., 2020) at affordable prices (Banga & Faith, 2021; Wignall et al., 2024), and promote the adoption of digital tools (Perifanou & Anastasios, 2020; World Bank, 2021). Foundational education is critical for digitalisation (Juwita et al., 2024; Seman et al., 2024; Wignall et al., 2024) because it provides the base on which relevant digital skills can be built (Fitong Ketchiwou & Ngulube, 2025; Gondo et al., 2023; Vuorikari et al., 2022). Also, mentors (Mahayosnand et al., 2025; Riaz, 2024; Wignall et al., 2024), together with the right networks (Juwita et al., 2024; Perifanou & Anastasios, 2020), can help women to use digital tools and leverage opportunities of the digital age.

Furthermore, financial inclusion provides women with access to digital financial services and products (Irwin et al., 2025; Sharma et al., 2025) that can help them achieve economic independence. Gender inclusivity (Naveed et al., 2026; Riaz, 2024) and gender equality (Auclair-Ouellet et al., 2022; Picatoste et al., 2023; Sánchez-Canut et al., 2023) can empower them to leverage opportunities in the digital age (Fan, 2025; Guerrero-Romera et al., 2025). Digitalisation provides women with access to employment opportunities with better employment conditions (Salman et al., 2023; Zhou et al., 2024). Digital transformation enables women to fully benefit from digitalisation (Makowska-Tłomak et al., 2026). This will require policies around digital transformation (Naveed et al., 2026; Riaz, 2024), and relevant legislation (Banga & Faith, 2021; Gondo et al., 2023; Massa et al., 2023), with appropriate monitoring and evaluation mechanisms (Guitert et al., 2021; Wajcman et al., 2020). It is equally important to develop digital infrastructure to facilitate access to the digital resources (Aly, 2022; Wignall et al., 2024; World Bank, 2021), collaborate with different stakeholders (Guerrero-Romera et al., 2025; Juwita et al., 2024), and ensure government support (Irwin et al., 2025; Riaz, 2024).

Moreover, workplace enablers (Seman et al., 2024; Wignall et al., 2024), supportive preparation that shape professional interaction with digital tools (Shreyas & Shtaltovna, 2026) and support for work-life balance (Fan, 2025; Tamang et al., 2025) can influence the extent to which women can benefit from technological advancements. Also, social support for women's participation in the digital space (Hietajärvi et al., 2025; Wignall et al., 2024) and family dynamics (Garín-Muñoz et al., 2022; UNICEF, 2023) can further facilitate women's access to relevant technological competencies, tools, services, and related opportunities. The above notwithstanding, women's willingness and ability to leverage opportunities of the digital age are essential (Debbarma & Chinnadurai, 2023; Long et al., 2023; Sharma et al., 2025).

1.2. Research Problem, Gap and Objective

Despite interventions, gender inequalities in the labour market, such as restricted participation, wage disparities, and disparities in STEM (Science, Technology, Engineering, and Mathematics) persist (Rani et al., 2022). Women need high-quality and full-time employment to successfully play their role in the digital economy (Fan, 2025). Digitalisation can create an environment in which diversity is celebrated and gender parity is achieved (He, 2024). Yet, women are more vulnerable to job losses than men as they perform unskilled tasks that are now being automated (Jeche, 2023). Women are more susceptible to a double digital and social divide that hinders their full social inclusion and equality (Guerrero-Romera et al., 2025). Hence, technology can mitigate or exacerbate gender disparities (He, 2024).

Despite growing interest in how digitalisation impacts on aggregate employment, significant knowledge gaps remain concerning how digitalisation affects women, particularly in terms of skill disparities, job displacement risks, and access to reskilling opportunities (Cazzaniga et al., 2025). There is a negative stereotype about women's deficiency in technology skills associated with digital transformation stress (Makowska-Tłomak et al., 2026). More boys than girls are likely to be highly skilled in information navigation and processing and content creation (Hietajärvi et al., 2025). Also, women and older job seekers face a greater risk of lacking digital skills (Wunsch et al., 2025). Awang et al. (2023) found no differences in technology readiness and technology knowledge by gender. Seman et al. (2024) reveal no significant difference between practicing digital skills of male and female students; however, they agree that students need digital upskilling

to meet the current demands of the workplace. The unequal allocation of household resources and limited access to mobile devices restrict young females' access to education and other vital services that impact their well-being (Asongu et al., 2021; UNICEF, 2023; United Nations, 2025). The probability of using the internet on a daily basis depends on gender; women use less eCommerce, eBanking, eMail, eGovernment, eNews and iCloud services and use more use more Chat, eHealth, eLearning, eTourism, Social networks, and VoIP (Voice over Internet Protocol) (Garín-Muñoz et al., 2022). This could point to their advanced interest in health and social issues rather than the economic benefits of digitalisation. In this digital economy, there is a need for efforts to protect women's legitimate rights and interests, promote their equal participation, and ensure that they benefit from technological development equally (Fan, 2025). There is also a need to carefully consider the emergence of new technologies with regard to their possible implications for vulnerable groups, including women (Picatoste et al., 2023). Hence, the purpose of this systematic review is to synthesise fragmented findings and examine strategies for creating avenues for women in the digital world. The research question is therefore the following: What is needed to create avenues for women to benefit from digitalisation?

Picatoste et al. (2023) argue that the gender gap exists in all countries and achieving more egalitarian societies, specifically by closing digital gender gaps has become a priority for leading national and international organisations. The same authors argue that although the gender digital divide gap is decreasing, the reduction is slower than anticipated. The United Nations 2030 SDGs prioritises gender equality (Goal 5), decent work for sustainable employment (Goal 8), and reduced inequalities (Goal 10) (United Nations, 2025). The continuation of this research is critically required to address gender disparities, mitigate job displacement risks, and advance gender-responsive digital labour policies and institutional responses, thereby contributing to an understanding of gendered labour market transformations and inclusive workforce development strategies.

2. Theoretical Underpinning

The human capital theory promulgated by Schultz (1961) highlight that investments in people generate personal and national economic benefits. Improving education, work experience, skills, and work levels will increase human capital, which will in turn promote employment and increase labour productivity (Mincer, 1974). Digitally mediated information creates sustained learning opportunities and shapes career decisions (Martínez-Nicolás et al., 2025; Wang et al., 2024) and the transformation of digital literacy into business and practical skills enhances women's employment resilience and future sustainability (Razzaq et al., 2024). Individual capabilities relevant to the digital space can influence women's transition to employment by helping them overcome immediate employment obstacles and gain independence, autonomy, and sustainability. Hence, creating avenues for capacity building can secure women's employment, increase their competitiveness, and their careers in the current digital economy.

3. Methodology

The Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) (Page et al., 2021) was used in the selection of articles. This is a time and cost-efficient approach to conduct in-depth synthesis of articles with rigor, unbiasedness, and transparency in a replicable manner to answer research questions that cannot be answered by single studies (Fan et al., 2022; Page et al., 2021; Snyder, 2019).

A comprehensive search was conducted across multiple academic databases, including EBSCO, ProQuest, Web of Science, ScienceDirect, Scopus, JSTOR, Emerald, and Google Scholar. The search was conducted using such specific search terms as ‘Digital’; ‘women’ or ‘gender’; and ‘necessities’, ‘prerequisites’ or ‘recommendations’. The focus on publications from the last five years (2020-2025) was to ensure timeliness and contemporary relevance of the findings. The inclusion and exclusion criteria that guided the search as advised in the protocol proposed in Page et al. (2021) are presented in Table 1.

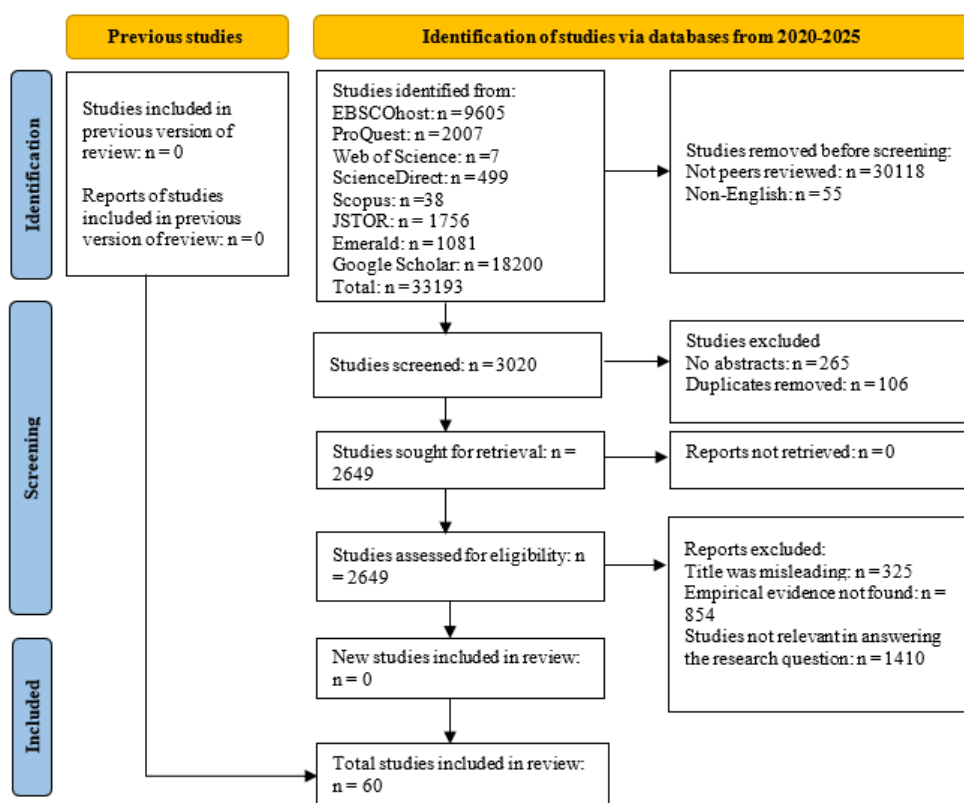
TABLE 1. INCLUSION AND EXCLUSION CRITERIA

Criteria	Inclusion	Exclusion
Language	English	Non-English
Type of publication	Empirical, peer-reviewed articles	Reviews, grey literature, opinion papers, and editorials
Year of publication	2020-2025	Pre 2020 and post 2026
Subject area	Women + digital	Subjects outside women + digital

Source: Own compilation based on inclusion and exclusion criteria set in the study

Documents that are not peer-reviewed and those in languages other than English were excluded, and the researcher used the Cadima web tool to screen 3020 articles to identify duplicated articles and articles without abstracts, resulting in 2649 articles from which irrelevant, non-empirical ones were removed. After using the Mixed Methods Appraisal Tool proposed by Hong et al. (2018) to assess the quality of the article, bias, and the soundness of the methodology employed, 60 articles were retained for in-depth analysis (Refer to Figure 1). The supplementary file provides full details of articles reviewed (Supplementary file, 2026).

FIGURE 1. PRISMA PROTOCOL FOR THE STUDY



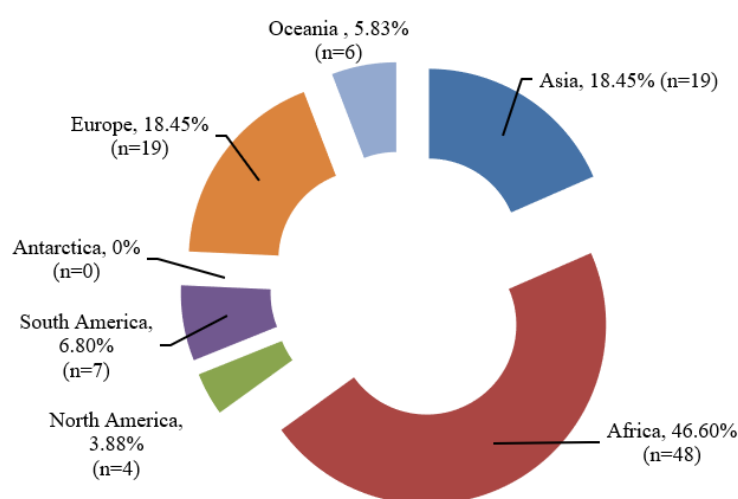
Source: PRISMA protocol adapted from Page et al. (2021, p.5)

A thematic approach was used to identify and synthesise similarities in the 60 articles reviewed. This approach is appropriate to organise large volumes of text by into meaningful conceptual categories (Fan et al., 2022; Snyder, 2019). First, each article was read in depth, data extracted and consolidated into a Microsoft Excel spreadsheet. After this, a coding sheet was designed. Then the color-coding function, available in Microsoft Excel, was used to code data. Axial coding was performed to refine the categories obtained during the open coding process. The analysis was performed and reviewed to form themes from logical patterns and ensure consistency. Refer to the Table 2 for codes and themes generated. The process was systematic to guarantee credible, accurate, and reliable interpretations (Fan et al., 2022; Snyder, 2019).

4. Findings

The studies were mainly conducted in several countries in different continents as presented in Figure 2 below.

FIGURE 2. DISTRIBUTION OF STUDIES REVIEWED ACROSS CONTINENTS



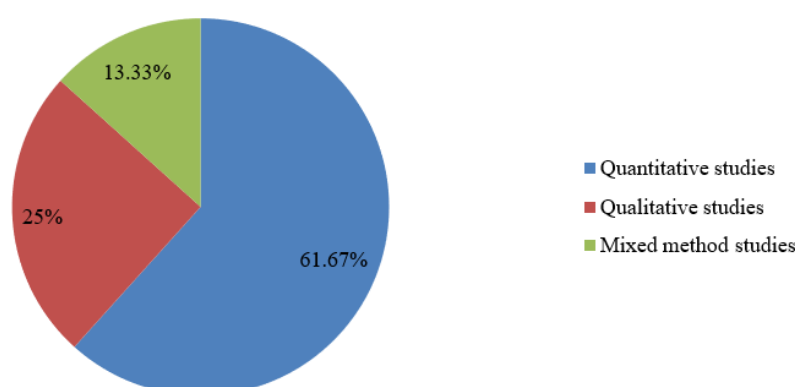
Source: Author, 2026

A majority of the studies reviewed were conducted in Africa (46.60%, n=48), followed by Europe and Asia (18.45%, n=19). No study was conducted in Antarctica (See the details of countries in the Supplementary file in the reference list (Supplementary file, 2026).

These studies spanned small and medium businesses, digital banking, digital financial services, digital technology, gig economy, education, tourism, domestic services, agriculture, manufacturing, Information and communication technologies, digital marketing, financial services, artisan, real estate, and textile and fashion businesses.

Eight (8) of the 60 articles reviewed used a mixed research approach, while 15 used a qualitative approach and 37 used a quantitative methodology (See Figure 3). Hence, most studies used an objective approach with measurable and statistically reliable results.

FIGURE 3. METHODOLOGIES EMPLOYED IN STUDIES REVIEWED



Source: Author, 2026

TABLE 2. FINDINGS: THEMES AND SUB-THEMES

Codes	Sub-themes	References	Reference counts
Theme 1. Awareness, use, and access to affordable digital tools and services			
Create awareness, popularise digital technologies and services, digital awareness, awareness campaigns, new media campaign, raise awareness of digital technologies	Create awareness	Adewale, 2025; Al-Alawi et al., 2023; Alateeg & Al-Ayed, 2024; Mousa et al., 2024; Mutesi et al., 2025; Ndjokou et al., 2024; Sarker, 2024; Tunçsiper, 2025	8
Promote the use of ICT technologies, use digital technologies, tools and digital platforms, encourage and enhance the use of digital tools, adopt digital technologies, digital technology usage, ownership of digital and technological devices (mobile or smartphones), digital engagement of technology, early exposure	Promote the use of digital tools	Alam et al., 2022; Altinay et al., 2024; Amber & Chichaibelu, 2023; Azeema & Rubab, 2025; Hua & Zhichao, 2023; Jain et al., 2024; Khoo et al., 2024; Latiep et al., 2025; Makkar et al., 2024; Maon et al., 2021; Mouraz & Nobre, 2024; Sarker, 2024; Yates & Plagnol, 2022	13
Improve access to technology and technological devices and tools, access to digital technologies, access to digital technologies and the internet, improve digital access, access to ICT, access to technology hub, internet connectivity, ensure reliable internet connectivity	Provide access to digital technologies and devices	Abubakari et al., 2023; Amber & Chichaibelu, 2023; Avanesian et al., 2025; Azeema & Rubab, 2025; Bhagat & Banerji, 2025; Cobo & Levano, 2023; Javed, 2025; Makkar et al., 2024; Mouraz & Nobre, 2024; Sarker, 2024; Scott et al., 2021; Thompson & Paul, 2020; Tunçsiper, 2025	13
Affordable digital tools and services, affordable gadgets and internet connections, offer price value for digital tools and services, affordable broadband access, low prices, free or low	Provide affordable digital tools and services	Amah et al., 2024; Amber & Chichaibelu, 2023; Ethné et al., 2022; Gupta & Ravi, 2024; Imran et al., 2025; Jain et al., 2024; Kodithuwakku & De Silva, 2025; McAdam et al., 2020; Merhi,	13

cost access to internet and mobile devices, digital technology affordances		2020; Mukherjee et al., 2024; Parthiban et al., 2025; Pillai et al., 2025; Sarker, 2024	
Theme 2. Education and digital skills development			
Increase number in ICT education, promote education of girls to higher educational levels, promote gender equity and inclusivity in pedagogical practices and feminist education pedagogy	Encourage education	Abubakari et al., 2023; Alateeg & Al-Ayed, 2024; Altinay et al., 2024; Amber & Chichaibelu, 2023; Bradić-Martinović et al., 2024; Ethné et al., 2022; Hamdan et al., 2024; Krchová & Švejnová Höesová, 2021; Mouraz & Nobre, 2024; Mutesi et al., 2025; Pillai et al., 2025; Yates & Plagnol, 2022	12
Train on cyber security and privacy, promote digital learning and digital skill and competencies, have comprehensive and inclusive digital educational training programmes and centers, digital entrepreneurship training programmes, tailored training, upskill women to close the gender digital divide, train women to use new/emerging technologies, offer online and offline training of digital skills, promote digital literacy and capabilities, skilling in digital technologies	Develop digital skills/proficiency	Abubakari et al., 2023; Adewale, 2025; Al-Alawi et al., 2023; Alam et al., 2022; Altinay et al., 2024; Amber & Chichaibelu, 2023; Azeema & Rubab, 2025; Bai & Yang, 2025; Bradić-Martinović et al., 2024; Bueno-Baquero et al., 2025; Cobo & Levano, 2023; Imran et al., 2025; Jain et al., 2024; Javed, 2025; Jevtić, 2023; Khoo et al., 2024; Kodithuwakku & De Silva, 2025; Latiep et al., 2025; Li & Chen, 2025; Makkar et al., 2024; Maon et al., 2021; Mouraz & Nobre, 2024; Mousa et al., 2024; Mukherjee et al., 2024; Mutesi et al., 2025; Oggero et al., 2020; Parthiban et al., 2025; Peng & Feng, 2025; Pillai et al., 2025; Saakha & Discetti, 2024; Sarker, 2024; Srebro et al., 2023; Su & Xihao, 2025; Sun & Li, 2025; Thompson & Paul, 2020; Tunçsiper, 2025; Wang et al., 2023; Wang et al., 2024; Wiig et al., 2024	39
Theme 3. Digital infrastructure and transformation			
Improve digital infrastructure, enhance technology infrastructure, develop digital economy, construct digital network, promote digital development, enhance regional development levels	Develop digital infrastructure	Avanesian et al., 2025; Jevtić, 2023; Li & Chen, 2025; Makkar et al., 2024; Peng & Feng, 2025; Pillai et al., 2025; Sarker, 2024; Sun & Li, 2025; Tunçsiper, 2025; Wang et al., 2024	10
Promote the rapid expansion /transformation on digital technologies, digital culture transformation, technological culture	Enhance digital transformation	Alam et al., 2022; Cobo & Levano, 2023; Latiep et al., 2025	3

Theme 4. Adequate support opportunities

Mentoring, mentorship initiatives	Ensure mentoring	Adewale, 2025; Alateeg & Al-Ayed, 2024; Azeema & Rubab, 2025; Ethné et al., 2022; Imran et al., 2025	5
Social network platforms to share experiences and resources, women's networks for mutual support, networking programmes	Establish Networks	Alam et al., 2022; Alateeg & Al-Ayed, 2024; Imran et al., 2025; Khoo et al., 2024; Su & Xihao, 2025; Thompson & Paul, 2020	6
Support the economic empowerment of women, financial empowerment of women by promoting access to technology, implement empowerment strategies	Empower women	Bai & Yang, 2025; Javed, 2025; Latiep et al., 2025; Wiig et al., 2024	4
Promote digital transformation of households, improve socioeconomic levels of households, wealthier households, shape family and norms, increase household income, family support to women, increase, household economic resources	Improve household/family conditions	Amber & Chichaibelu, 2023; Avanesian et al., 2025; Bai & Yang, 2025; Imran et al., 2025; Oggero et al., 2020; Peng & Feng, 2025; Su & Xihao, 2025; Ye & Cai, 2024	8
Community awareness campaigns to encourage women to engage in the digital and break stereotypes among rural women, shape social influence- People who made it seem possible, challenge traditional and societal norms, promote social support	Ensure social support	Alateeg & Al-Ayed, 2024; Gupta & Ravi, 2024; Javed, 2025; Makkar et al., 2024; Mashapure, 2024; Oggero et al., 2020; Peng & Feng, 2025; Su & Xihao, 2025; Thompson & Paul, 2020; Yates & Plagnol, 2022	10

Theme 5. Economic enablers

Promote financial inclusion, and entrepreneurship to foster economic growth	Ensure financial inclusion	Alateeg & Al-Ayed, 2024; Javed, 2025	2
Provide better employment conditions, increase access to employment, increase average wage, increase women participation in labour market, enhancing labour force quality, provide inclusive employment, expand employment opportunities through digitalisation to reduce unemployment, integrate digital technologies in employment	Improve employment access and employment conditions	Amber & Chichaibelu, 2023; Kerras et al., 2022; Krchová & Švejnová Höesová, 2021; Sarker, 2024; Sun & Li, 2025; Wang et al., 2024; Ye & Cai, 2024	7

Theme 6. Legislation, policy framework and government

Legislation against cyberbullying, legislation that supports digital safety and rights, legal mechanisms, legislation that support the development of advanced digital skills for women	Design and implement the right legislation	Bradić-Martinović et al., 2024; Imran et al., 2025; Javed, 2025	3
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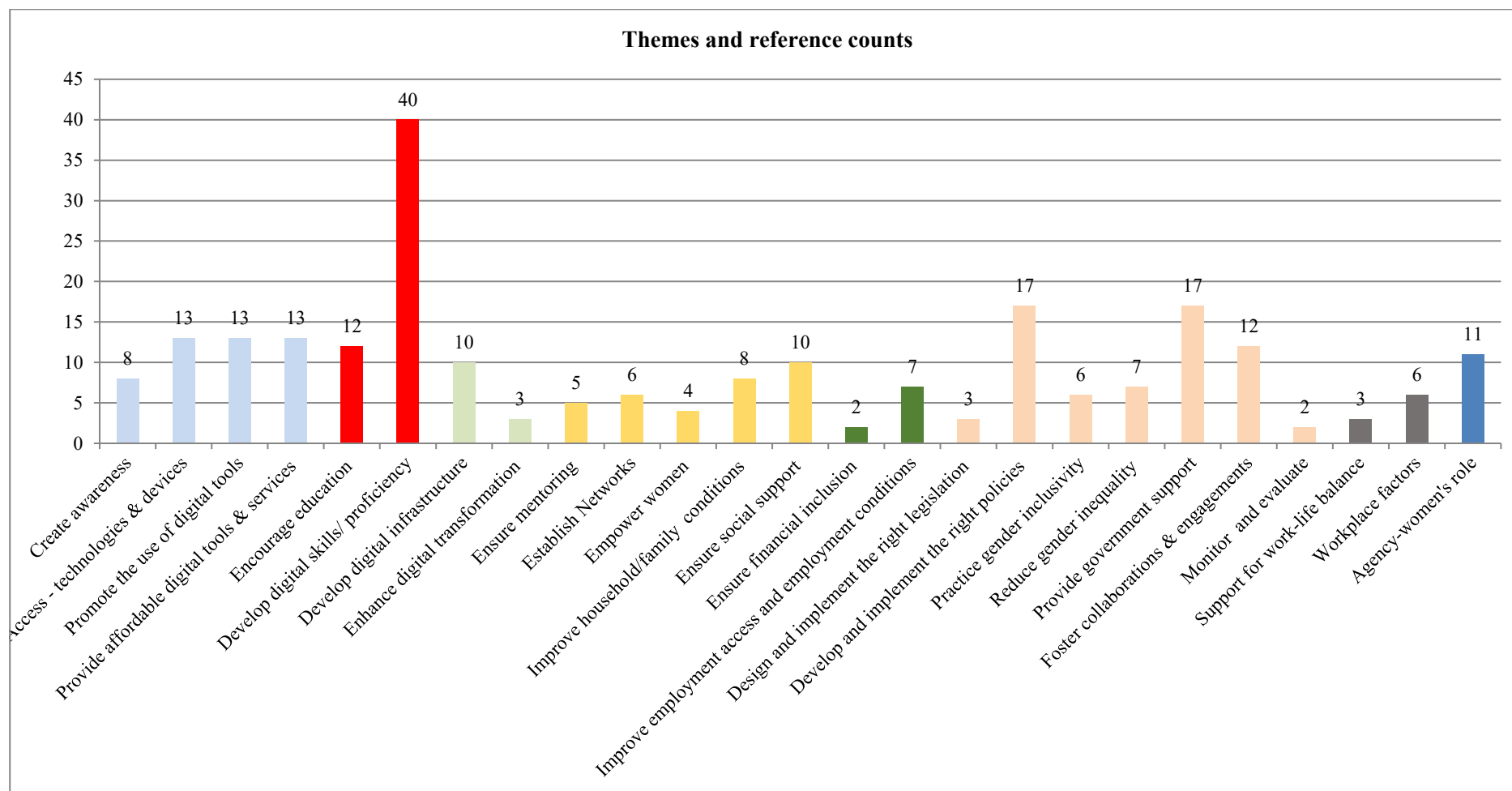
Policies around gender composition and digital literacy, policies to prepare the workforce for technological shifts and, policy to reduce gender bias and gender gaps in digital skills, policies that support the development of advanced digital skills among women, policy-level interventions, policy for women to pursue various fields, inclusive policies as regulatory structures, policies to promote and protect women in the digital space, policies on education, gender-neutral employment policies	Develop and implement the right policies	Abdelwahed et al., 2025; Alam et al., 2022; Avanesian et al., 2025; Azeema & Rubab, 2025; Bai & Yang, 2025; Bradić-Martinović et al., 2024; Imran et al., 2025; Javed, 2025; Khoo et al., 2024; Kodithuwakku & De Silva, 2025; Li & Chen, 2025; Peng & Feng, 2025; Pillai et al., 2025; Srebro et al., 2023; Su & Xihao, 2025; Tunçsiper, 2025; Wang et al., 2023	17
Ensure digital inclusion and gender inclusivity, bridge and reduce the digital divide, encourage gender diversity and inclusion, address gender disparities through the creation of inclusive environments	Practice gender inclusivity	Javed, 2025; Jevtić, 2023; Khoo et al., 2024; Kodithuwakku & De Silva, 2025; Ndjokou et al., 2024; Sarker, 2024	6
Reduce gender gaps and inequalities (at work and homes), promote gender equity and equality, promote gender equality, eradicate gender gaps in digital settings, promote gender equality through grants and incentives that encourage the development of technical-skill for women	Reduce gender inequality	Bradić-Martinović et al., 2024; Kerras et al., 2022; Krchová & Švejnová Höesová, 2021; Makkar et al., 2024; Sánchez-Rivero et al., 2023; Sarker, 2024; Sun & Li, 2025	7
Increasing GDP in the ICT sector, provide government support, promote female-oriented tech development spaces, technology orientation of country, promote the development of emerging industries, government support programmes and facilitating conditions, develop supportive ecosystems, social protection for female workers, targeted support system, promote all round development (rural or urban)	Provide government support	Abdelwahed et al., 2025; Alateeg & Al-Ayed, 2024; Altinay et al., 2024; Amah et al., 2024; Azeema & Rubab, 2025; Gupta & Ravi, 2024; Hua & Zhichao, 2023; Imran et al., 2025; Jevtić, 2023; Krchová & Švejnová Höesová, 2021; Mousa et al., 2024; Peng & Feng, 2025; Rohatgi et al., 2024; Saakha & Discetti, 2024; Srebro et al., 2023; Sun & Li, 2025; Thompson & Paul, 2020	17
Bottom up collaborative approach, insights and research and collaborations to inform Gender-sensitive policies, Collaborative to eradicate barriers to digital empowerment, collaborations among stakeholders, engagements and collaborations	Foster collaborations and engagements	Adewale, 2025; Al-Alawi et al., 2023; Alateeg & Al-Ayed, 2024; Hamdan et al., 2024; Imran et al., 2025; Jain et al., 2024; Khoo et al., 2024; Makkar et al., 2024; Parthiban et al., 2025; Peng & Feng, 2025; Su & Xihao, 2025; Thompson & Paul, 2020	12

Policy monitoring, monitoring and evaluation system	Monitor and evaluate	Li & Chen, 2025; Peng & Feng, 2025	2
Theme 7. Workplace enablers			
Promote work-life balance, promote flexible working time and space for women, provide equal sharing responsibilities and caregiving at home, support work-life balance	Support for work-life balance	Al-Alawi et al., 2023; Bhagat & Banerji, 2025; Krchová & Švejnová Höesová, 2021	3
Establish digitalisation as a workplace culture, continuing professional development especially in digital skills, promote women's progression in skilled occupation, promote gender-sensitive workplace policies/cultures, workplace support, organise workplace training	Workplace factors	Alam et al, 2022; Bhagat & Banerji, 2025; Jevtić, 2023; Khoo et al., 2024; Kodithuwakku & De Silva, 2025; Liu et al., 2025	6
Theme 8. Agency			
Intention to learn, seize learning opportunities, digital skills readiness, self-efficacy, personal characteristics, effort expectancy digital technologies, performance expectancy of the technology and its tools, self-directed learning and skills improvement, desire to learn technology for free, perceive prospect of higher income, motivation, habit, personal innovativeness	Agency-women's role	Alateeg & Al-Ayed, 2024; Altinay et al., 2024; Amah et al., 2024; Bai & Yang, 2025; Gupta & Ravi, 2024; Mashapure, 2024; Merhi, 2020; Sarker, 2024; Wang et al., 2023; Yates & Plagnol, 2022	10

Source: Own compilation based on data in the supplementary file, 2026

Sub- themes in colour coded themes are presented in Figure 4 below.

FIGURE 4. SUB-THEMES AND REFERENCE COUNTS



Source: Author, 2026

LEGEND

Themes	Colour code	Themes	Colour code
Awareness, use, and access to affordable digital tools and services		Economic enablers	
Education and digital skills development		Government, legal and policy framework	
Digital infrastructure and transformation		Workplace enablers	
Adequate support opportunities		Agency – women’s role	

5. Discussions

This section discusses emerging themes and subthemes that highlight changes necessary for women to fully benefit from digitalisation presented in Figure 4, and how these findings are linked to previous research.

5.1. Awareness, Use, and Access to Affordable Digital Tools and Services

Findings reveal that raising awareness of digital tools and promoting affordable access to and use of digital technologies and devices are prerequisites for women to benefit from digitalisation. These findings are presented in tandem with prior scholarship affirming the importance of women's awareness of digital tools and their benefits (Guerrero-Romera et al., 2025; Seman et al., 2024; Woźniak-Jęchorek et al., 2023). Previous research also confirms that access to digital technologies remains a challenge for many women, especially in informal markets and rural areas, thereby limiting their access to education, employment, and other essential services relevant for their well-being (Irwin et al., 2025; Rani et al., 2022; UNICEF, 2023). Access to digital technologies is also a key driver to eradicate gender gaps in digital skills (Lopez-Sintas et al., 2020), in attaining digital competency (Chohan & Hu, 2022), as well as economic and social empowerment, and inclusivity (Picatoste et al., 2023; World Bank, 2021) across geographic and economic contexts (Riaz, 2024). Other studies confirm the importance of affordability of digital services and tools (Banga & Faith, 2021; Perifanou & Anastasios, 2020; Wignall et al., 2024). Moreover, past research highlights the need to encourage women to use digital tools, arguing that digital tools can increase women’s earnings, reduce gender wage gaps, and reduce the digital divide (Perifanou & Anastasios, 2020; Picatoste et al., 2023; World Bank, 2021). Media campaigns can dismantle existing gender biases and create awareness of digital tools. Early exposure, affordable access, and ownership of mobile phones, computers, laptops, tablets, internet connectivity, Wi-Fi, smart devices, and user-friendly digital platforms can also increase the desire, use, and usage frequency of digital technologies and devices for poor, vulnerable, or disadvantaged women experiencing digital barriers in rural areas and underdeveloped regions.

5.2. Education and Digital Skills Development

The review also revealed that encouraging education and digital skills development will increase women’s ability to leverage digitalisation. Digital skills development has the highest reference count (40) which indicated its importance. Garín-Muñoz et al. (2022) confirm that the probability of using the internet daily depends on education and digital skills. Picatoste et al. (2023) argue that the education level significantly affects the digital divide and the digital gender gap. Yet, gender limitations, the gender digital divide, affordability and financial

barriers, and limited digital training in schools impede the development of digital skills women need for employment (UNICEF, 2023; Wignall et al., 2024). Fitong Ketchiwou and Ngulube (2025) ascertain the need for women to possess digital skills in the contemporary society, while Irwin et al. (2025) affirm that female entrepreneurs require new digital skills to operate in the digital space. Gondo et al. (2023) propose skills required for the workforce to interact with technological devices and to engage with emerging technologies, artificial intelligence, and big data. These include critical thinking, cognitive skills, and advanced skills. Vuorikari et al. (2022) further argue that training on digital competencies should include safety, problem-solving, information and data literacy, communication and collaboration, and digital content creation. Auclair-Ouellet et al. (2022) add that digital training should be aligned to the modern labour market and address barriers to gender equity and inclusion for women. Thus, it is essential for educational institutions to prioritise digital competencies through well-designed teaching and learning materials (Seman et al., 2024) within a safe and supportive learning environment for girls (Wignall et al., 2024). Reducing technophobia and gender stereotypes through educational institutions, curricula, teachers, mass media, opinion leaders, pedagogy, and initiatives can dismantle ingrained biases against women and attract young girls to technology fields and artificial intelligence (Garín-Muñoz et al., 2022). Hence, there is a need for inclusive, customised, accessible, and outcome-oriented digital training, digital training centres, and digital hubs (e.g., social media platforms, YouTube) to educate women on digital technologies and their implications.

5.3. Digital Infrastructure and Transformation

Findings also reveal that digital infrastructure and digital transformation facilitate digital access for all (especially women experiencing the digital divide), thereby enabling them to benefit from digitalisation. Past research deplores the lack of meaningful access to ICT infrastructure which impedes women's access to basic digital skills (Wignall et al., 2024) and highlight the relevance of digital infrastructure in fighting gender discrimination (Perifanou and Anastasios, 2020) while more scholars advocate for government investments in digital infrastructure to encourage fair access to technology and facilitate women's employment (Aly, 2022; Riaz, 2024; World Bank, 2021). Similarly, Fan (2025) and Makowska-Tłomak et al. (2026) argue in favour of digital transformation, while Guerrero-Romera et al. (2025) add that digital transformation should be used to build more inclusive societies by prioritising digital rights and principles, protecting human rights, and improving lives. Digital infrastructure serves as the backbone of the digital economy, driving internet access, digital services, and businesses, and includes 5G networks, fibre-optic cables, cloud computing, and data centres that enable data transmission, storage, and connectivity, which are vital for women to access, engage, and fully benefit from digitalisation.

5.4. Adequate Support Opportunities

The review reveals that empowerment initiatives, such as mentors who can guide women within the digital space and help them take advantage of opportunities, and networks that facilitate access to digital opportunities, can increase women's ability to maximise opportunities. Also, household or family conditions determine women's/girls' access to relevant competencies, technological tools and services. In addition, social support is relevant for women's participation in the digital space. Previous studies confirm this finding and

advocate for women's technological empowerment to enable them to leverage existing opportunities and be more autonomous (Fan, 2025; Guerrero-Romera et al., 2025; Juwita et al., 2024;). Wignall et al. (2024) also argue that female mentors and role models who work in the technology field can guide, inspire, and motivate other women. Riaz (2024) adds that mentorship for female entrepreneurs can address gender-specific hurdles to digital skills. Likewise, previous studies confirm the relevance of networks for women to benefit from the digital age (Juwita et al., 2024; Perifanou & Anastasios, 2020). Some authors acknowledge that family expectations and priorities can act as barriers to basic digital skills for employment (Wignall et al., 2024), and the unequal distribution of resources within households restricts young females' ability to access essential services, including education and employment (UNICEF, 2023). Other scholars go further, confirming the role of societal and cultural norms (Riaz, 2024) and social expectations and priorities (Hietajärvi et al., 2025; Wignall et al., 2024) in girls' access to digital skills development and job opportunities. Empowerment and support mechanisms such as mentorship and networking are vital for women and girls who may encounter technophobia and digital challenges related to knowledge, access, and use. This can help women overcome barriers such as gender stereotypes, gender bias, family/child responsibilities, age, background, and others.

5.5. Economic Enablers

Ensuring the financial inclusion of women through access to financial products and services, as well as employment opportunities, can boost their ability to leverage digital resources. Past research affirms that one avenue to promoting entrepreneurship in the digital era is to reduce ethnic or gender biases in entrepreneurial funding (Irwin et al., 2025). For women entrepreneurs, access to digital financial services can help them access opportunities for greater financial autonomy, thereby balancing their professional and personal lives (Sharma et al., 2025). Similarly, past scholars affirm that the probability of using the internet daily depends on employment status (Garín-Muñoz et al., 2022), digital literacy positively impacts rural women's employment and increases their employment probability (Salman et al., 2023; Zhou et al., 2024) and investing in female entrepreneurs' digital skills can promote technical innovation and increase economic productivity and competitiveness within the digital economy (Riaz, 2024). Hence, equitable access to funding, digitalisation, and better employment are critical for gender-inclusive economic growth, and resources can enhance women's opportunities for development, long-term decent employment, and career advancement in the digital space. Some initiatives could include digital employment incubation centres and entrepreneurship incubation centres to ensure that labour demand matches supply.

5.6. Legislation, Policy Framework and Government

Legal and policy frameworks, including guidelines, rules, and plans, together with other government support initiatives, can facilitate women's adoption and use of technology in an equal and inclusive manner. Together with these, there should be initiatives to foster stakeholder collaboration and engagement, as well as monitoring and evaluation to ensure women's participation in the digital world. Past scholars agree on the need for relevant laws to promote and guide digitalisation, increase participation, and protect women within the digital space (Banga & Faith, 2021; Gondo et al., 2023; Massa et al., 2023). Previous research also confirm that policy documents are active agents that shape social realities to inform

digital equality, inclusivity, and contextual relevance (Naveed et al., 2026). Governments should implement gender-sensitive policy interventions that encourage fair access and participation and prioritise the development of digital infrastructure, particularly for women in left-out areas (Riaz, 2024). Likewise, previous studies highlight the need for a gender-inclusive digital economy reflected in policy (Fan, 2025; Naveed et al., 2026; Riaz, 2024). Similarly, past scholars deplore gender bias in educational resources and practices that create barriers to basic digital skills for women (Wignall et al., 2024), arguing that gender skills gaps are usually the result of systemic inequities (Auclair-Ouellet, 2022). Again, government digital investment opportunities can help female entrepreneurs (Irwin et al., 2025), and rural-urban government regulations can influence the relationship between female employment and the digital economy (Riaz, 2024). Guerrero-Romera et al. (2025) and Juwita et al. (2024) agree that much is not possible without alliances between diverse stakeholders. In addition, Guitert et al. (2021) also confirm the need for a holistic evaluation of implemented programmes, while Wajcman et al. (2020) recommend periodic auditing and monitoring.

Designing and implementing the right legislation provides the bedrock on which countries can increase inclusive participation of women in the digital world. This should be supported by policies, regulations, and support strategies that protect people in the digital space, regulate digital employment benefits (especially for women), and support the development of the digital ecosystem. A gender-inclusive environment can curb gender inequalities and gender exclusion within the workplace since women tend to perform most of the routine functions that are now being automated. Government grants, incentives, workshops, training programmes, campaigns, funding mechanisms, relevant platforms, and other support initiatives can help women leverage digital opportunities. Governments need to spearhead stakeholder engagement and collaborations with relevant social, media, educational, and civil groups at different levels within the ecosystem. These should be accompanied by monitoring and evaluation structures to track periodic, evidence-based progress with digital indicators and quality performance evaluation metrics that inform strategy refinement.

5.7. Workplace Enablers

Findings further reveal that workplace dynamics and support for work-life balance facilitate women's ability to maximise the benefits of technological advancements. Seman et al. (2024) agree that the workplace can be an enabler of digital skills development, highlighting that businesses should upskill future and existing employees with digital competencies and bridge gender gaps in digital skills, while Makowska-Tłomak et al. (2026) suggest that organisations should develop online participatory workshops or interventions to cope with stress related to digital transformation. Fan (2025) and Tamang et al. (2025) also confirm that support for work-life balance can enhance women's ability to leverage digital opportunities. Women often shoulder several family responsibilities that limit their participation in developmental and economic activities (Fitong Ketchiwou et al., 2022). Hence, workplace and work-life balance support play a pivotal role in digital inclusion and are essential for women to leverage digitalisation. Such support could include training female staff in the digital skills needed for their career advancement (especially junior employees) and investing in relevant digital tools and infrastructure. Organisations also need the right work-life balance policies and a digital gender-friendly culture that support digitalisation.

5.8. Agency – Women’s Role

Women also have a role to play in leveraging opportunities of digitalisation. Prior studies agree with this and highlight that a lack of ownership hinders women’s development of digital skills, while interest in digital skills is vital for building digital confidence (Long et al., 2023; Wignall et al., 2024). Other studies also show that self-efficacy (Debbarma & Chinnadurai, 2023; Hietajärvi et al., 2025) and readiness and proactive behaviour (Sharma et al., 2025) are vital for developing digital skills. Women should embrace the digital society and actively engage to improve their skills and benefit from digitalisation.

6. Implications of the Study

This paper not only highlights the relevance of access to technology, but also the need for capabilities, pathways, and enabling conditions that make digital skills available for entry into the labour market and for career progression in a digital era.

As industries move to full digitalisation, there is a need for a digitally skilled labour force globally. Young women often experience challenges when transitioning from unemployment to securing a first job. By acquiring and applying digital competencies, young women (between 18 and 35 years) can access employment opportunities in different sectors of the economy. Skills development, work experience, career support, networks, role models, and mentorship can reduce early-career risks and enhance women’s digital readiness for work pathways. Women can compete in the labour market and have sustainable careers if they are equipped to leverage opportunities of the digital age through ongoing learning, adaptability, structural and supportive ecosystems, infrastructure, legislation and policy frameworks, and enabling workplace practice. Women’s ability to translate digital opportunities into employment depends on early exposure and awareness, affordable access to digital tools and devices, relevant education and skills development, and ongoing support from government, business, and educational institutions. If adequately prepared for digitalisation, women can convert digital skills into employment, thereby matching the demand and supply skills relevant for the contemporary labour market. Also, women who continuously improve on their digital skills stand a better chance of progressing in their careers as they now qualify for a wider range of jobs.

These findings provide practical levers for improving job readiness, strengthening adaptability to changing digital work, and supporting sustained career participation for young women. Employers and educational institutions can use findings from this paper to design digitalisation and employability initiatives for the next generation of young professional women in rapidly evolving workplaces. The themes found in this review could help support empowerment and training initiatives for young women.

7. Originality, Contribution and Novelty

The review synthesises dispersed evidence and requirements for digitalisation from 60 studies to translate into benefits for women, thereby providing an integrated synthesis of what conditions, capabilities, and support systems are needed for women to benefit from digitalisation. It structures the literature into a set of actionable initiatives at multiple levels (individual, workplace, institutional, and policy), unpacking how they function together to enable women to benefit from digitalisation. Compared to prior studies, this review suggests

an integrated set of system-level and capability requirements for policymakers and practitioners to help women realise the benefits of digitalisation from the Human Capital Theory perspective.

8. Conclusion

This paper aimed to use a systematic approach to identify requirements for women to benefit from digitalisation, using human capital theory as a theoretical anchor. Findings reveal that for women to benefit from digitalisation, the government, educational institutions, private entities, civil society groups, and women themselves need to play their part and collaborate to ensure women engage meaningfully in the digital space. These key role players need to ensure that digital technologies, tools, and devices are affordable for women to access and use. Education and digital skills development, alongside proper mentoring and networking, are needed to empower women to leverage digital opportunities. Governments should develop adequate digital infrastructure, gender-inclusive and equality legislation and policies with appropriate monitoring and evaluation mechanisms, improve household conditions, and engage diverse stakeholders to ensure that women are benefiting from the opportunities that come with digitalisation and can access employment with better working conditions. While social and workplace support initiatives can further enhance women's ability to leverage digitalisation, women need to take steps to capitalise on avenues created for them to benefit from the digital age.

While digitalisation comes with several opportunities, investment in digital infrastructure, restructuring the digital space, optimising the employment environment, providing mechanisms for flexible employment, eliminating existing gender bias, providing gender sensitive digital literacy training, and offering talent development services and career guidance in Information and Communication Technology (ICT) fields, providing family-friendly support could improve entrepreneurship and employment opportunities for women in the digital era. Female-led companies within the digital, e-commerce, robotics, and automation spaces should receive customised support to help them grow (e.g., access to finance). Collaboration between government agencies, policymakers, civil society groups, and the private sector should empower and support women in the digital economy at all levels. These practical initiatives can enable female entrepreneurs and workers to move up in the digital value chain.

9. Limitations and Recommendations for Further Studies

The methodological, theoretical, and interpretive choices shaped the analysis and conclusions in this review. Although the methodological approach was rigorous, the search terms and keywords used during the literature search could have limited access to other relevant articles. There could be other broader limitations related to publication bias, database and language restrictions, heterogeneity of the evidence, generalisability, the quality of included studies, and the interpretive nature of thematic analysis. Further studies could implement the suggested approaches needed for women to benefit from digitalisation found in this study and assess their effectiveness in eliminating gender inequality in the labour market in the digital era. Other scholars can also examine the long-term impacts of implementing suggested initiatives across diverse sociocultural contexts.

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Data supporting the conclusions of this study can be made available online (Figshare) (Supplementary file, 2026)

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This review did not require ethical approval, the author confirms that the study adhered to applicable ethical guidelines.

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Framing the Future: A Photovoice Study of Student Perspectives on Creative Education Transitions

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Abstract

The creative industries continue to expand globally; however, students pursuing creative degrees often encounter fragmented and non-linear pathways into employment. Limited research explores how creative students interpret and navigate this transition at the beginning of their final year. The study addresses this gap by exploring how this cohort conceptualises employability at a pivotal stage using a participatory, visual methodology. This study examines the perceived employability capital of nine final-year creative arts students and how this evolves through structured reflection. A photovoice methodology was employed, underpinned by the Employability Capital Growth Model. Participants captured and discussed images in response to guided prompts, collaboratively generating themes and presenting their work through a public exhibition. Data were analysed using reflexive thematic analysis, alongside pre- and post-intervention Likert-scale measures. Four interconnected themes were identified, capturing how students make sense of transition and uncertainty: *juxtaposition*, reflecting tensions between expectations and lived realities; *movement*, representing transitional identities and trajectories; *fluidity*, emphasising openness to emergent opportunities; and *people*, highlighting the role of social networks in building resilience. Qualitative and quantitative findings indicated an increase in perceived employability capital following the intervention. The study recommends embedding tailored employability support across the student lifecycle, strengthening cross-departmental collaboration, and recognising diverse graduate outcomes. Peer learning and interdisciplinary engagement are identified as key mechanisms for enhancing social capital and career confidence. This research contributes to skills development by demonstrating how participatory, reflective approaches can enhance students' capacity to articulate and mobilise employability capital within complex career ecosystems. It highlights the importance of timely, inclusive interventions to support non-linear transitions and improve graduate outcomes across disciplines.

Keywords: photovoice, employability capital growth model, creative arts, creative industries, employability and skills, graduate transitions

1. Introduction

The creative industries in the UK contribute an estimated £124 billion to the economy per annum, support 2.4 million jobs, and has shown consistent growth of 6% annually since 2019 (Connell, 2025; Department for Culture, Media and Sport (DCMS), 2025). The UK government's Creative Industry Sector Plan underscores a strong commitment to advancing the sector, setting out long-term, sustainable strategies extending through to 2035 (DCMS, 2025). The four pillars of action aim to support sectors including creative communications (advertising, marketing, publishing), culture and recreation (museums, music), digital media (film, TV, radio) and art and design (architecture, photography, performing and visual arts), establishing creative clusters and supporting emerging CreaTech expertise (Ruparel et al., 2025).

Central to the sustainability of the creative industries are the graduates preparing to take their place within them. Despite the promised governmental support, there are few linear paths for aspirants to follow when looking for employment within this sector. Many start their career with project work and self-employment, relying on networking and self-perceived 'luck' (Carey et al., 2026). Students' awareness of entering a potentially unstable work pattern within creative fields has a direct impact on their final year at university, during a unique transition stage in their career development. While their formal identity is a 'student', there is an increasing consciousness of the finality of this year, that their time as a student is coming to an end. For individuals studying vocational courses aligned to a specific sector, this final year can be very structured – tasks are completed by sector regulator deadlines, giving a strong sense of progress and fulfilling requirements determined by a specific labour market. But for students studying non-vocational and creative subjects, who do not have a clear set of tasks to action, who are unsure of what they can do with their degree, and who may be approaching career development for the first time in their final year, this period can be a time of increased anxiety (Keane et al., 2021). For many within this group, graduation does not mark entry into a clearly defined career pathway, but rather the beginning of a period characterised by uncertainty and exploration, with career identities still being negotiated.

This study contributes to emerging research on how students conceptualise employability during the final stages of higher education, specifically supporting final year creative arts students to identify and critique their employability capital through the lens of photovoice. Using the Employability Capital Growth Model (Donald, 2025), students generated a series of images to reflect their perceived strengths and gaps during this liminal time of transition. Their reflections identified areas where increased support was needed, with specific support actions recommended.

2. Literature Review

In a rapidly evolving labour market, universities are under increasing pressure to effectively support student career development, leading to measurable graduate level jobs (Caballero et al., 2020). For students in creative disciplines – such as English, film, theatre, drama, music and broadcast production – this support becomes more complex with the prevalence of non-linear career pathways, portfolio and project work, and precarious employment. To understand these

students' transitions into professional life, research must examine not just 'what a graduate does' but how they make meaning of their emergent professional identities and build the resources, or capitals, that underpin employability (Tomlinson & Jackson, 2019).

Against this context, the participatory visual method of photovoice offers a powerful way to surface students lived experiences, reflections, and aspirations (Wass et al., 2019). By combining photovoice with the Employability Capital Growth Model (ECGM) (Donald, 2025) as a theoretical framework, the aim was to capture and map the perception of employability capitals during this time of transition. This literature review critically examines why creative students may struggle with career management, why the start of final year is a pivotal moment for identity and transition, and how the ECGM provides an appropriate theoretical framework in partnership with photovoice.

2.1. Creative Students, Labour Market Realities, and Non-linear Careers

Creative graduates frequently pursue non-linear career trajectories. Instead of entering stable employment pathways, they often develop protean careers involving freelance work, short-term contracts, self-initiated projects, and cross-sector mobility (Jackson & Bridgstock, 2021; Tarr & Gault, 2025). Qualitative and sectoral reports confirm that this group often experience turbulence in their early careers (Carey et al., 2026), reporting significant difficulty gaining stable employment in their chosen field and demonstrating 'consistently higher multiple employments than other graduates' to support their creative practice (Burtin & Halfin, 2025, p. 31).

Barriers can exist which make career management especially difficult for non-sector-specific students. Jackson and Bridgstock (2019) argue that creative work often resists standard employability metrics: unlike graduates in STEM or business who can cite internships or paid placements, many arts students rely on personal projects, exhibitions, or self-generated portfolios which may not readily translate to conventional CV formats or recruiter expectations. Hiring practices in creative industries may value symbolic capital (reputation, exhibitions, awards) over formal credentials (Kekezi, 2021), but these forms of capital can be difficult to articulate, both for the graduate to promote and for university career outcome metrics to record.

Brown et al. (2024) identified proactive career behaviours as key factors in increasing employability, and this is especially critical for creative students who must engage in self-promotion, network building, and entrepreneurial behaviours from an early stage in their academic journey to build employability capital. Networking is widely recognised as a crucial mechanism for accessing opportunities within creative industries: relationships with mentors, artists, curators, and clients can determine opportunity (Martin et al., 2023), and can be a significant barrier for students lacking such networks, or from under-resourced backgrounds. However, the ability to build and maintain relationships can be impacted by the need to continue paid employment in other sectors, or uncertainty regarding how to initiate professional networking (Clarke, 2017; McCafferty et al., 2024).

Additionally, Ashton (2021) highlighted the essential role that emotional labour plays when an individual is developing creative or entrepreneurial practice. These careers often entail uncertainty and identity negotiation, and this emotional labour can be felt even before graduation, with students doubting whether they 'belong' in a creative profession or feel tension between their artistic identity and commercial viability. This can lead to arts students

experiencing stress, imposter syndrome, and potential identity fragmentation more acutely than students in more structured professional pathways, where an identity and job role are more defined (James et al., 2020; Lennox, 2024).

Collectively, this literature suggests that traditional models of career support may be less effective for creative students. Workshops focused on securing a graduate job may be viewed as irrelevant when employment pathways are ambiguous, remuneration structures are non-traditional, and meaningful work is often self-initiated rather than employer-directed.

2.2. The Beginning of Final Year as a Critical Moment

Research on final-year university student transitions reveals a complex process of professional identity formation characterised by significant emotional and psychological challenges. Studies have been conducted within a variety of disciplines, including nursing (Darvill & Leigh, 2019), engineering (Smith et al., 2014), law (McNamara et al., 2011) and medicine (Van den Broek et al., 2020), highlighting that this boundary phase is characterised by heightened reflection, uncertainty, and anxiety, with individuals finding final year to be ‘emotionally demanding’ and students experiencing ‘perceived pressure without sufficient support’ (Keane et al., 2021, p. 2625). Much of the literature suggests that, by their final year, students begin to internalise professional identities, make concrete plans for post-graduation, and grapple with existential questions about their career trajectories.

Since this juncture is so formative, interventions early in the final year can have disproportionate impact. Career development literature suggests that supporting students at this stage - through supported reflection and experiential learning - can strengthen self-efficacy, clarify identity trajectories, and improve outcomes (Advance HE, 2019; Nabi et al., 2025; Soproni, 2023). Institutional practices such as embedding employability curricula, facilitating peer and alumni mentoring, and designing workshops around identity and transition have been shown to yield meaningful gains (McNamara et al., 2011; Smith et al., 2014). Van den Broeck et al. (2024) emphasises that late or one-off interventions (close to graduation) may be insufficiently timed; instead, scaffolded, timely, work-based engagement supports better long-term career management.

For creative students, the beginning of final year is particularly opportune: they often have substantial creative work underway, yet their professional identity may not be fully formed, and networks may still be nascent. Engaging them at this moment allows career services, educators, and researchers to help them reflect on their existing capital and plan for its growth. Despite this, creative disciplines remain comparatively underrepresented within research on final-year career development.

2.3. Theoretical Framing: Employability Capital Growth Model (ECGM)

The concept of employability capital incorporates career theory with aspects of psychology, business, education and management to identify key forms of ‘capital’ or resources that individuals accumulate and use as they navigate their careers. Rather than being static traits, employability capitals evolve through experience, reflection, and action (Nghia et al., 2020; Shtaltovna et al. 2024; Tomlinson, 2017).

Donald (2025) conducted a systemic literature review to propose a new Employability Capital Growth Model (ECGM). Findings identified nine forms of capital integral to employability:

social; cultural; psychological; personal identity; health; scholastic; market-value; career identity; and economic. The model situates these within a growth framework, considering external factors (for example institutional or economic) and personal outcomes (for example wellbeing and career satisfaction), and identifies how different actors (students, educators, career services, employers) can operationalise each form.

The ECGM is particularly relevant for understanding creative graduates' employability because it recognises the interaction between multiple forms of capital and external structural influences. Adopting a holistic perspective allows individuals to articulate their strengths outside of traditional employability metrics (Kekezi, 2021), focusing on growth and development as opposed to defining identity within a time frame. It makes allowances for the meso and macro level influences creative students navigate yet have little control over, as highlighted by Brown et al. (2024) and McCafferty et al. (2024). A systemic lens is vital when navigating networked and competitive creative fields. The ECGM also links theory and practice, advocating for pragmatic and tangible interventions where a specific employability capital requires support.

2.4. Photovoice as a Creative Method

Wang and Burris (1997) initially presented photovoice as a participatory qualitative method where participants take photographs to represent their perspectives, experiences, or concerns, then narrate and reflect on these images with researchers and peers. The process has three main goals: enabling participants to record and highlight their community's lived experiences; promoting dialogue around pivotal issues through group discussion of images; and communicating findings to key stakeholders, advocating for change.

Although photovoice has been more widely used in community health and social action contexts (Strack et al., 2022), its use in higher education is growing. Systematic reviews highlight photovoice as an underutilised but promising methodology in this sector, with Rodríguez et al. (2022) identifying strong potential for active learning, student empowerment, and reflexivity. Levett (2025) conducted a photovoice project with international students transitioning to employment in the UK, arguing that shared storytelling and visual representation can foster inclusion, agency, and relational engagement, while a model proposed by Lorenz and Bush (2022) highlighted how photovoice can foster both critical consciousness and creative thinking for participants. This is particularly relevant to creative students, whose process of meaning-making can be inherently imaginative and reflective.

Using photovoice in conjunction with the ECGM to examine the experiences of final year creative students provides several methodological advantages. Photographs and narratives can support students to identify and reflect on hidden capitals that may be missed in structured interviews, and group discussions can build a sense of community and shared experience. Participatory analysis between participants and researcher facilitates co-production of meaning. As the method is inherently participant-centred, it gives the final year students control over imagery, interpretation and dissemination. This agency aligns with the growth orientation of ECGM as participants conceptualise their personal employability capital.

Using the ECGM and photovoice, this study asked three research questions:

1. How do students at the beginning of their final year perceive their employability status in relation to strengths and gaps in their employability capital?

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2. How does participation in a photovoice-based career intervention influence students' perceptions of their employability capital?
 3. How do students reflect on how universities can support transitions from student to graduate?

3. Methodology

This section outlines the research design and theoretical framework, participants and sampling, the photovoice process, data collection procedures, analytical methods, and ethical considerations guiding the study.

3.1. Research Design and Theoretical Framework

This study adopted a qualitative, participatory research design, informed by an interpretivist–constructivist epistemology, recognising that individuals construct meaning through their lived experiences and social contexts. Understanding students' perceptions of employability therefore requires approaches that enable participants to articulate and interpret experiences in their own terms (Asaba et al., 2023).

Supporting this aim, the study employed photovoice, a community-based participatory research method that enables individuals to document and reflect upon aspects of lived experience through photography (Rodríguez et al., 2022). Photovoice has been widely used to explore complex or abstract phenomena by encouraging participants to represent experiences visually and narratively. Within the context of employability development, visual methods allow students to express perceptions of skills, opportunities, and challenges that may be difficult to articulate through conventional interviews alone.

The participatory nature of photovoice aligns with the study's objective of enabling students to actively interpret and communicate their own experiences. Participants were therefore involved not only in generating visual data, but also in interpreting the meaning of images and collaboratively identifying and constructing themes from the collective portfolio of photographs (Wass et al., 2019). This co-constructive process enabled the development of shared insights while maintaining the integrity of individual perspectives.

While primarily qualitative, a small quantitative component was incorporated through pre- and post-project Likert-scale questionnaires (Ferrando et al., 2025). These were used descriptively to capture participants' self-evaluations of employability capital at the beginning and end of the project, providing contextual insight into perceived development in employability awareness during the reflective process. The Likert scale responses were used as a general indicator of students' self-perceptions, rather than as statistically significant evidence, as the small sample size limits the generalisability and scientific validity of the findings.

3.2. Participants and Sampling

The study involved nine participants drawn from the School of Arts, English and Languages. Participants included undergraduate ($n = 5$), postgraduate taught ($n = 2$), and postgraduate research students ($n = 2$) who were at the beginning of their final year of study before graduation, enrolled in subjects including English, Drama, Music and Audio Production,

Translation, Media and Broadcast Production, Arts Management, Film Studies and Production, and Film and Theatre Making.

Participants were recruited through email invitations, social media, and announcements during classes. Recruitment followed a voluntary purposive sampling strategy targeting students in their final year and therefore actively engaging with questions of career transition and employability. The study took place in semester one (October to December) to ensure participants were at the correct stage of study.

The sample size is consistent with the methodological requirements of photovoice research, which prioritises depth of reflection and collaborative dialogue. Smaller participant groups facilitate richer discussion, deeper qualitative analysis and greater participant agency (Wang & Burris, 1997).

Prior to participation, all students received online training in photography, photovoice methodology, and ethical considerations relating to visual research to ensure they were prepared to engage with the method critically and responsibly.

3.3. Photovoice Process

The photovoice project was conducted in several stages. At the end of the online introductory training session, participants were given their prompt questions, and were invited to take photographs representing their perceptions of their employability capital, informed by the ECGM. A full list of the question prompts has been provided in Appendix 1. Images could represent either symbolic or literal interpretations of employability, enabling participants to express abstract concepts through visual metaphor and personal experience. The participants took photos of a wide variety of subjects within their everyday lives, including workspaces on campus, their accommodation and interiors, social and travel experiences, projects they were working on, and self-portraits of themselves engaged with their creative industry or part-time work. These images were represented throughout the nine photo prompt questions.

Participants subsequently selected images that they perceived as most strongly representative of their perspectives and discussed these during an online one-to-one semi-structured reflective interview with the researcher.

The final stage involved a collaborative group session when participants reviewed the full portfolio of images. Through discussion, participants organised photographs into thematic groupings, identifying and constructing central messages from the visual narratives. This process enabled participants to co-construct interpretive themes and determine how the images would be presented as part of a public exhibition.

3.4. Data Collection Methods

Data were collected at three points during the project.

3.4.1. Pre- and Post-Project Questionnaires

Participants completed short questionnaires at the beginning and end of the project containing Likert-scale items measuring self-evaluation of the nine employability capitals. Responses ranged from strongly agree to strongly disagree and were converted into numerical values for statistical analysis. A six-point scale was used to encourage participants to engage with the

questions and not default to a neutral answer (Kankaraš & Capecchi, 2025). These data provided an overview of changes in participants' perceptions of their employability development during the project, intended as a general indicator as generalisations cannot be drawn from a small sample size.

3.4.2. Individual Semi-Structured Interviews

Following the photography stage, participants completed individual semi-structured interviews online with the researcher. Participants discussed selected photographs and explained meanings they associated with each image. Interview prompts encouraged participants to reflect on why they chose a particular image, what it represented in relation to the employability capital they had chosen to represent, and how the image reflected perceived strengths, challenges, or aspirations. To limit the impact of the researcher's questions as directional, participants were consistently asked 'tell me about this image and why you chose to take it?' allowing the student to lead the conversation. Interviews were audio-recorded with participant consent and subsequently transcribed for analysis.

3.4.3. Collaborative Group Discussion

A final group discussion allowed participants to review all submitted images collectively. Participants examined the portfolio and organised photographs into thematic categories through dialogue and reflection. This collaborative interpretive stage is a central feature of photovoice methodology, ensuring that thematic interpretations remained grounded in participant perspectives.

3.5. Data Analysis

Qualitative data from interview transcripts were analysed using Braun and Clarke's (2021) six-phase approach to thematic analysis, involving familiarisation with the data, coding, theme development, theme review, definition, and reporting.

Coding was conducted iteratively, allowing themes to be constructed inductively from participant narratives while remaining informed by the broader concept of employability capital. The collaborative image-grouping activity also informed the analytical process, as themes proposed by participants provided additional insight into how students collectively interpreted their experiences.

Quantitative questionnaire data were analysed descriptively to identify patterns in participants' self-assessment of employability capital across the project lifespan. These findings were used as contextual indicators to support interpretation of the qualitative data.

3.6. Research Rigour

Participants received identical training and project instructions to ensure consistency in the photovoice process. Interview transcripts and accompanying explanatory text were reviewed with participants to confirm their perspectives had been accurately represented, incorporating an element of member checking.

The participatory nature of photovoice also strengthened analytical credibility, as participants contributed to the interpretation and organisation of images during the collaborative discussion

stage. This reduced the risk of researcher-imposed interpretations and ensured that findings remained grounded in participant perspectives.

3.7. Ethical Considerations

Ethical approval for the study was granted by the university research ethics committee. Participants received a detailed Participant Information Form and written informed consent was obtained via signed consent form prior to participation. All data was stored securely on password-protected university systems in accordance with institutional data protection policies, and participants were informed that they could withdraw from the study at any time.

Given the visual nature of photovoice research, particular attention was paid to photography ethics. Participants received guidance on ethical image capture and were advised not to photograph identifiable individuals without consent. Where images included identifiable individuals, written permission was obtained through a photography consent form prior to use within the exhibition or research outputs.

3.8. Researcher Positionality

The researcher acted as both facilitator and investigator throughout the project. In keeping with the participatory ethos of photovoice, this role involved supporting participants in reflecting on their experiences while enabling them to retain ownership of their narratives and visual representations.

Awareness of researcher positionality was maintained throughout the study, particularly when facilitating discussions and interpreting qualitative data. Participant perspectives remained central to the analytical process through collaborative interpretation and verification of explanatory text.

3.9. Limitations

The study involved a relatively small sample drawn from a single yet diverse academic school within one institution. Consequently, findings cannot be considered representative of all student experiences of employability development. However, the aim of photovoice research is not generalisability but the generation of rich, contextually-grounded insights.

Participation was voluntary, meaning students who chose to participate may have had a particular interest in employability or reflective practice. This may have influenced the perspectives represented within the dataset.

Finally, the findings are based on participants' interpretations of their own experiences and therefore reflect subjective perceptions rather than objective measures of employability outcomes. Nevertheless, these insights contribute to understanding how students conceptualise employability during the transition from higher education.

4. Findings

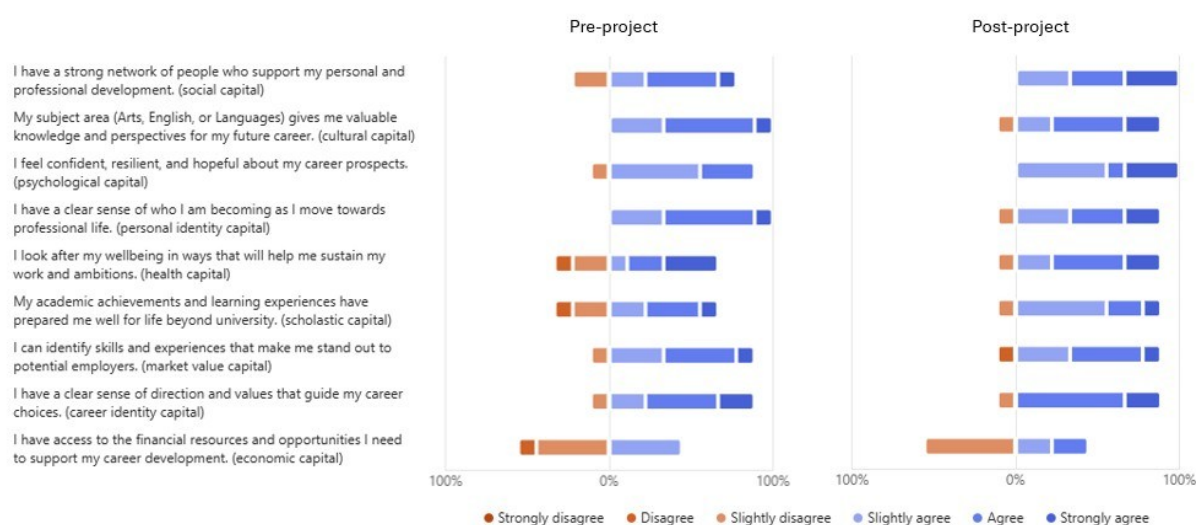
This section presents the findings of the study, examining how final-year creative arts students understand their employability through the lens of the nine employability capitals. Findings are organised around the three research questions: students' perceived employability capital

strengths and gaps; the impact of the photovoice intervention; and reflections on how universities can support creative students' transition into graduate life.

4.1. Perceived Employability Status, Identifying Strengths and Gaps

Students completed Likert scale questions before and after the project to assess initial perceived status, then distance travelled after completion. Questions were based on the nine employability capitals, with example questions including 'I can identify skills and experiences that make me stand out to potential employers (market value capital)' and 'I have a clear sense of direction and values that guide my career choices. (career identity capital)'. The answers are collated below:

FIGURE 1: PARTICIPANT LIKERT SCALE RESULTS PRE AND POST PROJECT



Source: Lead author's own compilation

Responses were assigned numerical values (1 = strongly disagree to 6 = strongly agree) for the purposes of statistical analysis. At the outset of the project, the highest perceived capitals were career identity (43), personal identity (43), and cultural capital (43). Mid-range scores were observed for market value (41), social (40), and health capital (40), while psychological (38) and scholastic capital (37) were rated slightly lower. Economic capital (30) was rated lowest across the students.

When asked 'What concerns do you have at the beginning of your final year at university?', qualitative responses revealed additional nuance across several capitals. Seven of the nine participants used deficit language when talking about starting their final year, with comments including 'anxiety', 'unsure and uncertain', 'without income', 'lack something', 'won't have figured out' and 'won't be able to get funding', indicating pressures associated with psychological capital. There were concerns around academic expectations/scholastic capital, with students highlighting 'final year counts for the majority of our performance in the degree' and concerns that 'I'll pass everything and graduate on time'. Comments reflected anxiety around decision making and career identity/personal identity capital, worries that 'I won't have figured out the specific area I want to focus on for my career before graduation', and 'wondering if I am on the right path, will I find a job that I'll love at the end of the year'. Participants demonstrated strong awareness of timing, with eight of the nine responses explicitly referencing

the pressures associated with final year. Economic capital was highlighted in references to ‘job hunting’, ‘state of the job market’ and ‘restrictive visa conditions’, alongside the mechanics of finding and applying for work. Answers also referenced social capital, for example, ‘making friends in my course’, ‘cultural integration’ and making connections.

When asked ‘What are you most looking forward to as you begin your final year at university?’ a prominent theme involved anticipation of post-university life, with four participant comments including ‘completing my studies and going out into the world’, ‘the break from being a student’ and ‘excited for the weight to be lifted off my shoulders once most of the thesis is written’. Scholastic capital was highlighted in comments including ‘I’m really excited to have more freedom intellectually’ and aiming for ‘excellent grades, passing exams’. There were two references to employability and market value capital, ‘discovering different fields of work and diversifying my skill set to be employable and adaptable’ and ‘using this final year time to develop my portfolio and skills’.

Participants selected the employability capitals they wished to represent through photographs, with the group submitting 85 in total. The most popular category was social capital ($n=15$), followed by cultural ($n=12$), personal identity ($n=10$) and market value ($n=10$). Career identity ($n=9$) was followed by psychological ($n=8$), scholastic ($n=8$) and health ($n=8$), then economic capital ($n=5$). The distribution of images suggests that participants were particularly attuned to relational and cultural dimensions of employability, while economic capital appeared less frequently represented.

4.2. Effectiveness of a Career Intervention at the Start of Final Year

The pre-project survey was repeated at the end of the project. Comparing results as a group reveals that only one capital remained the same (cultural (43 to 43)), while three capitals decreased by one point (social (40 to 39), personal identity (43 to 42), and market value (41 to 40)). Two increased by two points (scholastic (37 to 39) and career identity (43 to 45) capital) and two increased by three points (health (40 to 43) and economic (30 to 33) capital). The largest increase by five points was psychological capital (38 to 43). The group average increased from 39.4 to 40.8 after the project.

The students were asked, ‘what did participating in this photovoice project help you realise about yourself, your skills, or your career journey?’ Participant reflections broadly aligned with two themes. The first was students appreciating the opportunity to reflect, allowing a structured skills audit to give objectivity about their employability, with comments including ‘the photovoice project helped me really think critically about what I know about myself and what I still have yet to learn’ and ‘it has made me look at my college experience differently’. The second theme highlighted participant encouragement, that they had more capital than initially self-perceived; comments included feeling ‘more capable than I realised’, appreciating ‘being able to record my journey and show how I’ve changed’, and that ‘channelling that artistically gave me more confidence in having tangible evidence of the skills I’ve developed in my creative degree’. These reflections suggest that the photovoice process functioned as both a reflective exercise and a mechanism for recognising previously unacknowledged forms of employability capital.

4.3. How Can the University Best Support Creative Students in their Final Year

When deciding the structure for the exhibition, the participants collaboratively identified four overarching themes with two subgroups in each. These were the over-arching messages the students wanted visitors to know about their final year experience.

The first was the theme of ‘juxtaposition’, specifically balancing the expectation of what you thought your degree experience would be versus the reality, and also negotiating simultaneous feelings of anticipation and uncertainty of moving to the next stage. The second theme was ‘movement’, with students highlighting feeling between spaces and identities but also of trajectory with an unspecified destination. The third theme was ‘fluidity’, drawing attention to the role of random events and happenstance, experimenting and taking creative risks while gaining relevant experience. The fourth and final theme was ‘people’, the centrality of a supportive community and resilience. Together, these themes illustrate how students conceptualised the transition from university as both an emotional and identity-based process rather than a purely logistical move into employment.

Overall, these findings suggest that while students perceived strengths in identity-related capitals, uncertainty remained regarding economic and psychological dimensions of employability. Discussion around support interventions occurred during the group exhibition planning session. These insights informed the recommendations discussed in the following section.

5. Discussion

This collaborative project with final-year creative arts students identified several important considerations for both creative disciplines and final-year cohorts more broadly.

5.1. Supporting Creative Arts Students

Cultural capital was one of the highest-ranking questions at the beginning of the project, and the only one which ranked the same post-project. This demonstrates the strong relationship creative students report with their studies, supporting previous research that highlighted their subject was a foundational part of their identity (Lennox, 2023). Although personal identity capital was initially rated highly, it declined post-project. While initially strong, this capital is also fragile, with participants reassessing their positions throughout the project as they considered their ability to transition from student to professional. This fluctuation in personal identity capital reinforces the findings of Ashton (2021) and James et al. (2020), with participants questioning their place and role within the labour market. Five of the capitals decreased; this may reflect participants reassessing their resources more critically after engaging with the framework. Pre-project participants had an *opinion* of their capitals - through the project tasks they had to gather evidence to support their position, and this reflective process may have prompted participants to reconsider their initial self-assessments. Supporting students to assess their employability status against the ECGM has answered research question one, giving an insight into how this group perceive their current employability capital status.

Critically, the greatest increase post-project was psychological capital, with students identifying an increase of confidence and resilience moving to their next stage. Notably, this increase may be linked to the exhibition planning session, during which participants met to discuss their

images and collectively interpret their experiences. Previously working independently, these students realised they shared similar experiences, that final year creative arts students across all levels were experiencing the same challenges. Few participants reported having engaged in similar reflective group formats previously. Pressures on curriculum content and contact hours can push previously embedded communities of practice to the extra-curricular sphere which creates unequal access. The impact of group support within the creative subjects is fundamental to building multiple career capitals.

Overall, five capitals increased, supporting the findings of Nabi et al. (2025), that interventions at the start of final year can strengthen employability capitals, while also answering research question two assessing the influence of an employability intervention. With creative arts students, the key areas (scholastic, career identity, health, economic and psychological) are core skills needed in the creative industries, demonstrating the impact for this population at a critical time of transition.

5.2. Supporting Final Year Students as a Unique Group

The timing of this intervention appears to have been significant, with final year students being close enough to graduation to create a sense of urgency, but far enough from final deadlines to allow time for action. The students organised their exhibition photos into four themes, which transcend subject silos and could apply to all final year areas of study.

The first was ‘juxtaposition’, with students reflecting on their degree expectations compared to their lived experience, and also negotiating simultaneous feelings of anticipation and uncertainty regarding post-university transitions. Participants articulated the experience of processing multiple, sometimes opposite, emotions as they balance aspirations alongside navigating practicalities of gaining employment. Additionally, some students may reflect on less positive university experiences and will require extra transition support as they process feelings of disappointment or regret alongside starting a new life chapter.

The second theme of ‘movement’ highlighted the experience of occupying transitional spaces between identities (student and professional) and environments (university and workplace), and trajectory (moving forward but with no long term or ultimate goal). While this was particularly pertinent for creative students entering non-linear workspaces, this could also be applied to individuals choosing a specialism within their profession, or who have decided their previously preferred sector no longer appeals. When students have come to the end of a linear and performance-based education system, encountering the uncertainty of the labour market can be challenging yet inevitable; final year students need support with making career choices and having confidence in the decisions they make.

The third theme was ‘fluidity’, acknowledging the role of the unplanned and unplannable, but permitting themselves to try new things, risk experiences and recalibrate previous ideas of possibility. Final year is when students start to apply for positions and often realise they may lack sufficient experience to meet the requirements. A career intervention at the beginning of final year allows time for self-reflection, but also to address weaker employability capitals.

The fourth theme was ‘people’, identifying supportive networks from both inside and outside university. This resonates across all subjects and at all levels. With the prevalence of online learning, student part-time work, and pressures on timetables pushing group projects into

extracurricular time, students increasingly value opportunities for in-person collaboration and peer support. This supports the findings of Keane et al. (2021) who highlighted the additional emotional labour involved in final year. This is particularly relevant for creative arts students without the structure of a linear career path for guidance or measure of progress.

5.3. Recommendations

Five fundamental areas were highlighted for consideration, directly answering research question three around effective student support:

1. Students wanted discipline-specific career resources outlining potential pathways and practical steps, even within an uncertain sector.
2. Improved communication strategies, including greater visibility of career services within academic programmes, and utilising the student representative network.
3. Opportunities for cross-disciplinary peer discussion were valued for normalising uncertainty and sharing experiences.
4. Participants emphasised the importance of earlier and sustained career development support throughout their degree programmes to develop a portfolio of experience.
5. Participants also emphasised the need for greater institutional recognition of diverse creative career pathways, acknowledging that success differs by cohort and transcends traditional metrics.

5.4. Limitations and Future Research

Future research could replicate this study within individual creative disciplines, examining potential differences between specific subjects and how they perceive their employability capital. With the inclusion of final year as a factor, repeating this study with other non-creative arts subjects could enable comparisons between disciplines, and how other students conceptualise their employability at the start of final year. A longitudinal project following a population across multiple years of study could provide deeper insight into how perceptions of employability capital evolve over time, and how careers interventions could adapt. Further studies could also follow participants to assess the impact of any final year interventions on future career management.

6. Conclusion

This project facilitated final-year creative students' agency in communicating views regarding their degree, personal identity and employability status through the construction of photographs and accompanying narrative descriptions. In mapping the development of perceived or unrealised employability capitals using the ECGM, findings support the need for additional support at this transitional stage in university life. The quantitative and qualitative data collected pre- and post-project reveal an eagerness to enter post-graduate life, yet a simultaneous uncertainty in their worth, prospects and finances. A consistency in the prominence of social capital highlights the unity in this sector and the value of shared experiences; the noted strength in identity-based capitals reflects the emotional labour required to pursue a sometimes uncertain, demanding career path, which in turn may cause hesitation in their economic and/or psychological status. By recognising that a creative individual's identity is not necessarily congruent with traditional marketability metrics, this project underscores the

realities and influences that may otherwise be overlooked in the formation of personal meaning through a creative format.

Overall, fluctuations in perceptions of capitals indicate growth in the students' sense of employability and identity when supported to self-reflect and assess these factors within themselves, and collecting tangible evidence of their strengths, gaps and insights. This suggests the need for intervention at the start of the final year to give students ample time and involvement to develop essential components of their identity for the next steps in their professional life. The promotion of a rich interdisciplinary network, assistance services in navigating non-linear career pathways, and increased information on academic and practical opportunities available are suggestions posited to bolster the confidence and potential of this cohort. Implementing this support would require a school or faculty wide collaboration, bringing together key stakeholders to ensure this support was available at the right time, and that any career intervention was directly relevant to the current labour market needs. Extending this support to students before their career identity and sense of market worth are solidified encourages timely growth and development, which serves to collectively benefit individuals, educators, and the creative industries.

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Appendix

Students were asked to consider the following questions as their photovoice prompts based on the ECGM categories:

- Social capital - What images capture the people, communities, or networks that support you as you prepare for life beyond university?
- Cultural capital - What represents the knowledge, creativity, or perspectives from your subject that you feel are valuable for your future?
- Psychological capital - What do you see that reflects your confidence, resilience, or hope as you move into your next stage?
- Personal identity capital - What shows who you are becoming as you shift from student to professional?
- Health capital - What represents how you take care of your wellbeing so that you can sustain your work and future ambitions?
- Scholastic capital - What image shows how your academic learning or achievements have prepared you for what comes next?
- Market-value capital - What captures the skills, experiences, or accomplishments that you believe will make you stand out to employers?
- Career identity capital - What represents your sense of direction, values, or goals for your career?
- Economic capital - What do you see that reflects the resources, opportunities, or constraints that shape your transition into work?

Declaration Statements

Conflict of Interest

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Data Availability

No dataset is associated with this article.

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The authors affirm that all cited sources are real, accurately referenced, and have been verified by the authors. Full responsibility for the content and integrity of this article remains with the authors.

Ethics Statement

Ethical approval was received from the university AEL Ethics Committee (September 2026).

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Assessing the Value of Mentoring for Female Business Students

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Abstract

Industry-led mentoring is a strategic tool that can bridge the gap between academic knowledge and practical expertise, providing mentees with skills development opportunities that stretch beyond what can be learned via classroom-based educational approaches alone. Mentoring is now commonplace within organisational life, but is less common within UK university business schools. This suggests a knowledge gap in terms of understanding how mentoring can be embedded as a complementary tool to improve student skills development within business schools. The aim of this study was to explore the perceived value of industry mentorship from the perspective of the mentees, to develop a greater understanding of the potential benefits mentoring relationships at a university level can provide. Following the journey of mentees on a Women in Business mentoring programme, this study specifically explored the context of female university students. Mentees on the programme were female undergraduate and postgraduate students studying on courses within Sheffield Business School. Using a longitudinal study design, semi-structured interviews were conducted at three stages of a yearlong mentoring programme: 1. pre-mentoring, 2. during mentoring, and 3. post-mentoring. Interview transcripts were analysed thematically using Braun and Clarke's six-phase framework. The findings show the value of mentoring from a mentee perspective, most notably the notion of having someone in their corner, an ability to gain personalised guidance, and the opportunity to develop a professional network. The challenges of being mentored at this level were also expressed, drawing attention to the need for pre-mentoring education to support meaningful engagement with the process, and a requirement for a clear scheme structure to guide mentees. Guided by these findings, we offer key practical recommendations to programme designers so they can successfully utilise mentoring as part of their offer to students, thus supporting university business schools to further enhance their career and skills development offerings.

Keywords: mentoring, women in business, higher education, longitudinal research

1. Introduction

Despite a greater percentage of women than men graduating from a higher education institute, with the minimum of a bachelor's degree, women are still greatly underrepresented in leadership positions, with leadership positions across a variety of industries still disproportionately held by men (Cortland & Kinias, 2019). Even for those whose aspirations do not feature leadership, barriers to entry are present for a variety of roles and industries, signalling a clear disparity between qualified women and the opportunities they feel confident to engage with.

This inequality, however, does not begin in the workplace, with contributing factors and progress inhibitors present before individuals begin their careers. In higher education settings, lack of confidence and self-belief among female students is prevalent, despite female students often showing higher attainment levels than their male counterparts (Sander & de la Fuente, 2020). The fact that female students lack confidence in their abilities and prospects is not new; in fact, it has long been reported that female students underestimate future performance (Lenney, 1977), which in turn impacts confidence levels (Corbin et al., 1983). Importantly, perception of ability is often misaligned with actual ability, resulting in students that may not reach their full potential due to their own misconceptions. For business schools, this means that efforts to empower their students, especially those facing significant barriers, are vital, ensuring that entire cohorts of students are well-rounded and armed with the toolkit needed to forge a career in business.

Defined as the personal-professional relationships that formulate strategy to develop human capacity (Mullen & Klimaitis, 2021), mentoring has been seen as a useful tool for personal and professional development (Crisp & Cruz, 2009). As stated by Kram (1983), engaging with mentoring can significantly improve professional outcomes, especially for those who are early in their careers, facing the complexities of understanding one's abilities, competencies, and future goals. Mentoring can also offer development opportunities beyond what a typical classroom or training environment can provide (Barnett, 2008). Correspondingly, many professionals holding prominent positions have cited engagement with mentoring as a key contributor to their successes (Scandura, 1992), with the added value provided through being mentored found to surpass that gained through alternative means when considering advancement and promotion (Singh et al., 2009). Beyond the individual benefits, mentoring can also contribute positively to organisations and wider society; for the former, it can support productivity development, management capabilities, and strategic decision making, and for the latter, social integration, citizenship development, and community participation, to name a few (Alfred & Garvey, 2019).

At an industry level, mentoring is commonplace within many businesses worldwide, and while its specific form may differ; both formal and informal approaches can be seen (Siegel et al., 2011), it is widely used across a variety of industries to support career progression and business objectives alike. However, within UK business schools, it is largely absent, with most UK business schools offering little, or more often, no opportunity for their students to engage with a mentor (industry or otherwise). This disconnect therefore raises the question: Why aren't more business schools using this industry relevant approach? While it is accepted that the provision of beneficial mentoring can be a challenging undertaking (Stöger et al., 2021), requiring a certain level of understanding surrounding the nuances of mentoring relationships, access to appropriate mentors, and effective communication of opportunities offered, it should not be seen as an unattainable tool.

This paper will highlight the potential of mentoring to support the development of female students in business schools, addressing key challenges currently faced within the sector, and the ways in which mentoring can mitigate the impact of issues raised. To justify this perspective, the current mentoring landscape within UK business schools will be presented, with findings from a longitudinal study that followed female business students who were mentored as part of a university-based mentorship programme discussed. Following this, the authors will discuss the nature of mentoring in UK universities as uncovered within the study, providing recommendations to support the development of mentoring provisions in business schools.

2. Literature Review

2.1. Mentoring Overview

As Stokes, Monti and Larios (2025) state, mentoring is focused on how human agents – mentors and mentees – work together as part of a relationship so as to enable psycho-social support and/or career progression for the mentee (Kram, 1983). There are many different definitions of mentoring, each with a different emphasis or focus. Nevertheless, Sunderman & Orsini's definition (2023, p.41) contains elements that are common to many of those definitions:

“Mentoring is a developmental relationship often between a more experienced (e.g., older) mentor and a less experienced (e.g., younger) mentee. Mentoring relationships tend to serve a particular developmental purpose, such as leadership development, career development, or intercultural development”.

Garvey and Stokes (2022), in their earlier historical review of mentoring discourse, examine how mentoring has evolved over thousands of years into its modern form that mentors and mentees experience today. They explore how mentoring practice can be understood in terms of its modes, i.e. Group mentoring, peer mentoring, co-mentoring, e-mentoring, reverse mentoring and self-mentoring. Furthermore, as Haddock-Millar et al. (2024) have argued, mentoring discourse continues to evolve, with a contemporary and significant interest in the place of reciprocity within mentoring relationships. Nevertheless, in the main, mentoring still retains its focus on the dyadic relationship between mentor and mentee (Aris et al., 2024). Despite this broad consensus, Stokes et al. (2020) showed, in their comparative analysis of coaching & mentoring, there is still a need for a framework which can be used to explain why there are significant differences in emphasis and focus between mentoring definitions, programmes and initiatives. The main reason for these differences is due to the impact of the contexts in which different mentoring initiatives are located. The context that we are principally concerned with in this article is that of mentoring in UK institutions of higher education.

2.2. Mentoring in Higher Education

Although student mentoring is not widely used in UK business schools, there is still a significant amount of literature on mentoring in higher education more generally, across a wide range of areas of impact. For example, recent contributions include the following: Lyden's (2026) study of student mentoring on social mobility; Khan, Fang and Zeb's (2026) study, which recommends student mentoring to operationalise university social responsibility; and Werntz et al.'s (2026) study of a technology-enhanced mentoring programme. There are further examples of the depth and range of research into mentoring in higher education, particularly in the United States. For example, Taylor et al. (2025) looked at financial peer mentoring in US

colleges, Cherian and Francis (2021) compared academic enhancement mentoring programmes across two HEIs, and Antunes et al.'s (2024) study examined a similar, but smaller-scale intervention in one HEI. Findings were similar in terms of improving students' integration into the institution, increasing their sense of belonging and developing social and intercultural skills. There are also examples of mentoring at doctoral level within higher education, such as Amponsah and Agyekum's (2024) study in two culturally diverse universities. In addition, Gadson's (2025) critical autoethnography is an interesting and different example of how to conceptualise mentoring in higher education. In their systematic review of the literature on mentoring within higher education, Nabi et al. (2025) provide some useful critiques of the existing literature base. In summary, they make the following statement about the evidence base which supports the impact of mentoring in higher education:

“Notwithstanding an overall positive verdict on mentoring's career development potential, with particular emphasis on career choice and transitioning behaviour, the results are not always positive, and many nuances in the data are evident.” (Nabi et al., 2025, p.739)

They point to some inconsistencies in the types of mentoring being examined and compared e.g., peer mentoring with traditional dyadic mentoring. As Garvey and Stokes (2022) also point out, mentoring as an area of practice is often characterised by different modes of engagement, rather than coaching, which is characterised by different models of coaching practice. Hence, when critically examining mentoring research, it is important to be clear as to which mode is being engaged with. With this in mind, Nabi et al. (2025) make three main recommendations for future studies and practice. They encourage mentoring researchers to develop novel impact indicators related to emotion, such as career inspiration and passion; they suggest examining under-researched impact indicators related to non-traditional student careers (e.g. self-start-ups), and, what is particularly relevant to this paper, they suggest that greater attention be paid to the role of context and mentoring content. This is particularly important when it comes to gender and mentoring.

2.3. Gender and Mentoring

Serrano et al.'s (2023) examination of the gender gap regarding women in STEM careers in the University Complutense of Madrid (UCM, Spain) supports the view that lack of self-confidence, lack of ambition and a perceived lack of specialist knowledge are common inhibitors of female career progression. This complements earlier work done by Laukhuf and Malone (2015) in the United States, which asserts that female entrepreneurs benefit from mentoring support to help with their career progression. In Higher Education, Maguire, Anderson and Chavez's (2025, p.10) qualitative study, exploring mentoring for women in academia, concludes:

“In educational contexts, mentors can be a beacon of encouragement for women, utilizing supportive communication to offer invaluable insights and advice for navigating the complexities of their roles and opening doors for professional advancement.”

Taking a more gender-critical stance, Burgos-Lopez et al. (2025) point to some of the challenges to female advancement and progression within an HE context within Latin America, arguing that mentoring programs can significantly influence women's persistence in STEM career progression, especially when combining empowerment with inclusive male engagement.

Hence, there is significant support for mentoring women in HE contexts, as such initiatives are particularly useful in helping women to anticipate and seek to overcome barriers to entry into their chosen career path.

2.4. Research into Underrepresented Groups and Students

Mentoring as a field of inquiry is not underresearched, nor are the central arguments that posit mentoring as a positive career development tool lacking evidence; several studies have demonstrated the value that can be derived for both mentees and mentors, as well as the wider impact mentoring can offer at an organisational or broader societal level (Alred & Garvey, 2019). However, as initially identified by Jacobi (1991) and later recommended by Crisp and Cruz (2009), mentorship for those at the earliest stages of the careers, for example university students, requires greater exploration, especially where a focus on underrepresented groups within a particular field is the focus. This is further supported by more recent studies such as Read et al. (2020) that highlight the positive experiences of those who have engaged with mentoring but focus on women who have already begun their careers; crucially, the conceptualisation of mentoring experiences differs depending on career stage, therefore signalling a need for further insights into those at the beginning of their career journey – a contribution that will be made in this paper.

3. Context

3.1. The Mentoring Landscape at UK Universities

To assess the landscape of mentoring, a scoping exercise which analysed current mentorship provisions within UK universities was conducted, with a focus on the presence of mentorship for students, schemes specifically for business students, and schemes targeted at women (see Table 1). All universities listed by the Complete University Guide (2024) were included in this scoping exercise, resulting in 130 UK universities being considered. Data surrounding the provision of mentoring was gathered using university websites, student union websites, and university-owned social media accounts. While it was possible to gather data from 120 of the 130 universities listed, it is understood that some mentorship opportunities may not be publicly advertised; therefore, the following figures are provided as an informed estimate.

Of the universities that were assessed, we found that 111 offered at least 1 mentorship scheme to students, with the schemes ranging in focus (subject area or purpose), target group (gender, level of study, nationality, background) and leadership (university or student led; departmental or professional services based). Of the 111 universities providing mentorship opportunities, it was found that 29 offered schemes specifically for students on business or business-related courses. As there are currently 122 UK universities that offer business or business-related courses, this exercise demonstrates that less than a quarter of UK business schools currently provide targeted mentorship programmes for their students. Where mentorship schemes are offered for business students, they are often targeted at master's level (including MBA) students, with many provided by Careers and Employability services teams. For women specifically, only 6 universities offered mentorship schemes that were targeted at female students, with only 2 of these schemes focused on business- or business-related subjects.

TABLE 1. MENTORSHIP SCHEME OFFERING AT UK UNIVERSITIES

Offers Mentorship	Aimed at Business Students	Specifically for Female Students
111	29	6

Source: own compilation, based on Complete University Guide., 2024

3.2. Case Study Context

Recognising the potential of mentoring to reduce the inequalities felt by women and the absence of women focused mentorship schemes both internally at the university and across UK universities, the Women in Business steering group at Sheffield Hallam University (founded and led by the first author of this paper) developed a mentoring programme aimed at female undergraduate and postgraduate students which paired mentees with female industry-based senior leaders. The purpose of the scheme was to provide mentees with not only the skills that are required in the workplace, but also the increasingly vital networks that will support them as they leave the safe confines of the student status.

The resulting Women in Business mentorship scheme provided female Level 6 (final year undergraduate) and Level 7 (postgraduate) students on courses within Sheffield Business School the opportunity to be mentored by industry-based women in leadership positions who had volunteered to act as mentors for the programme. Participation in the scheme was voluntary and involved students submitting a short application form detailing their reasons for signing up for the scheme, what they hoped to gain from being mentored, and any other wishes/requirements. The mentors in the scheme also completed a short form that detailed their role, industry, and specific skills/knowledge they believed they could offer their mentee. In the studied iteration of the scheme, all students that signed up to the scheme were accepted and paired with a mentor. Mentees and mentors were matched by members of the Women in Business advisory group based primarily on the perceived alignment of the career path that the mentor had taken (e.g. financial services) and the career aspirations of the mentee (e.g. to work in financial services in the future). Mentoring pairs were not offered a choice during the matching process, as the data used by the group for matching was taken from the application/information forms that the participants had completed, as detailed above.

The structure of the mentorship scheme was developed to allow for full autonomy in meeting content and format on the part of each mentoring pair; this was done to respect the varying commitments of both mentors and mentees, to encourage meaningful relationships to be developed, and to place the onus on mentees to initiate contact and seek support as needed. As a result of this, the only requirement of the mentorship scheme was that each mentoring pair met at least three times over the course of the one-year scheme; this could take any form the pair agreed upon, including meeting in person, virtually via platforms such as Teams, or via phone. The academic team behind the steering group were available for contact for the duration of the scheme and regularly checked in with mentors and mentees via email to offer support if required.

4. Methods

The aim of the study was to explore the perceived value of industry mentorship from the perspective of the mentees to develop a greater understanding of the potential benefits mentoring relationships can provide, specifically in the context of female university students.

Additionally, this research sought to evaluate the process of mentorship schemes in business education, and using the knowledge gained, suggest guidance principles to support successful mentorship for use in educational settings.

All mentees involved in the mentorship programme were invited to take part in the study; however, participation was entirely voluntary and was not a requirement of the mentorship scheme itself. Out of the 25 mentees on the scheme, 5 volunteered to participate in the study, including both undergraduate and postgraduate students. The programme ran for 12 months, from February 2024 to January 2025, during which time participants were interviewed at three stages within the mentorship programme: 1. pre-mentoring, 2. during mentoring, and 3. post-mentoring. The interviews focused on the mentees' perceptions of their experiences of mentoring, exploring the personal and professional value they derived from the mentoring relationship, and identifying elements that contributed to its overall effectiveness. Of the 5 mentees that agreed to participate in the study, 5 completed stage 1 of the interviews, 4 completed stage 2, and 2 (1 undergraduate and 1 postgraduate) completed stage 3. This attrition over the course of the year will be further discussed in the limitations section of this paper.

Using an inductive approach, the data were analysed using Braun and Clarke's (2006) six-phase framework of thematic analysis. This approach allowed for themes to emerge from the data without the influence of pre-conceived ideas from the research team. As this was a longitudinal study with multiple stages, it was decided that each interview stage would first be analysed independently to identify emerging patterns and capture mentee perceptions at the present stage of the scheme. Codes were generated using a manual highlighting process that began with open coding, where any words or phrases relevant to the research aims were highlighted and added to a codebook that allowed the organisation and labelling of data. As an iterative process, the re-reading of data to ensure the same code was applied consistently to similar words/phrases was crucial. Following this, the codes were grouped into themes. After the completion of the three interview stages, and the analysis of each dataset, the initially generated themes were reviewed holistically and refined as needed to develop an insight into the overarching themes of the mentoring experience as a whole. To avoid bias, each stage of this approach was conducted by the individuals within the research team before being discussed collaboratively.

5. Results

The results indicate that mentees perceive mentoring positively, with clear benefits to being mentored cited, including having 'someone in my corner', access to industry insights, and opportunities to build a professional network. Among the themes that were revealed through thematic analysis, there were three key themes that emerged consistently across all three stages of data collection, indicating shared experiences among the mentees. While the personal views of each mentee shaped the expression of each theme, mentoring as a positive (1), factors that shape mentoring relationships (2) and lack of opportunity (3) were regularly highlighted.

5.1. Mentoring as a Positive

The most prominent theme that emerged across the three interview stages was the positive perception of being mentored. Participants explained that the support offered by their mentor was invaluable, providing them with a different perspective on challenges they were facing, made possible by the fact that they had 'done it all before'. One participant explained that while they had always felt generally supported by academic staff during their university course, mentoring provided access to support that typically goes beyond the remit of what teaching staff can offer. Additionally, the benefit of mentoring in a professional context was noted, with the positive experiences of those now in industry highlighted:

'...I had no idea what mentoring was, and now I've come into my job role I'm really grateful for that experience because a lot of the leaders that I've spoken to have talked about the importance of mentoring in their lives...'

As the participants gained further experience of being mentored, the factors that contributed to their positive perceptions became clear, with the benefits of always having someone who is there to support them referenced by all. Furthermore, due to the personal connections that developed, the mentees were able to receive tailored support that aligned with their individual goals, providing the targeted guidance participants needed but had not received through other means:

'...it was advice that no one else had given before. It wasn't like the cliché advice you get; it was quite personal'

Consequently, it was highlighted that mentoring is something that can be complementary to university studies, addressing gaps in the provision that may not be solved through academic or course-specific delivery.

This is not to say, however, that mentoring is without its challenges; uncertainty surrounding mentoring direction, mentor availability, and communication barriers can negatively impact the mentoring experience. Equally, one participant referred to feedback from fellow mentees who had not been able to develop a strong relationship with their mentor:

'I spoke to some of the people who are being mentored, and they [said that] after the first meeting they tried reaching out to them, but they are not getting them, and I'm sure it's the same for some of the mentors as well with the students.'

Based on this, discussions then moved on to exploring the factors that determine the success, or lack thereof, of a mentoring relationship.

5.2. Factors that Shape Mentoring Relationships

Overall, the results suggest that mentoring is perceived as highly beneficial by mentees, particularly where mentees have a sense of what they would like to achieve through engaging with mentoring. However, despite the importance of knowing what would ideally be gained from mentoring, factors such as communication, commitment, and mentee confidence in leading interactions were identified as the main factors that shape mentoring relationships. Interestingly, participants noted that the level of industry-specific expertise would hold less relevance, as a mentor who provides the opportunity for mentees to voice concerns and ask questions is far more valuable than a mentor that is at the top of their respective company/field.

5.2.1 Communication

When asked to explain the key features of mentoring that determine success, communication was the most mentioned requirement, with participants stating that regular, open communication was what they predicted to be the most fundamental aspect of a mentoring relationship. While the approach to meetings and other activities engaged with took place in different formats among each mentoring pair, participants stated the importance of both parties regularly checking in with each other; however, there were suggestions that fundamentally, the onus had to be on the mentees to lead.

5.2.2 Commitment

Directly aligned with the importance of communication was reference to commitment: for mentees, this centred on their commitment to their own professional development, and for mentors, it was focused on their commitment to supporting their mentee. Similar to communication, mentor commitment could be demonstrated through regularly being in contact and open to offering support; however, it also required more than just being available, as mentees cited that evidence of a clear desire to help that went beyond obligation was vital to enhance the relationship. While this is subjective in nature, mentees stated that care from their mentor could be expressed through a personalised approach to providing support that focused on the specific needs of the mentee, as opposed to generic advice that could be sought elsewhere.

5.2.3. Confidence

Acknowledging their responsibility for leading the mentoring relationship, mentees discussed the impact that confidence had on their ability to direct discussions and organise meetings. While confidence was gained through the mentoring process, participants noted hesitancy at the start of the scheme, and the negative impacts they believe this had on the progress they were able to make. Due to this, mentees suggested that self-confidence, which directly impacts the ability to take control of the relationship, is a core factor that can influence the value derived from the experience. Further to this, it was noted that confidence naturally developed through contact with the mentor; however, this is not something that mentees can develop prior to the experience.

5.3. Lack of Opportunity

The final common theme that emerged was a lack of opportunity, where participants stated that prior to engaging with this mentorship scheme, they had not had the opportunity to be mentored. In this specific context, participants noted that they had not heard of any other mentorship opportunities that were available to them at the university, but confirmed that if they had been provided with such an opportunity in the past, they would have engaged with it. Consequently, participants also stated that the absence of access to mentoring also contributed to their lack of prior understanding of what mentoring entails:

‘I definitely went into it [with no understanding of] what mentoring is. But it was one of those [cases in which] people would [say something] like, ‘Oh, it’s the best thing ever – get a mentor’, and I’d [come back with], ‘OK, [but] who, what, where and why? [Tell me], how do I do that?’

This, for many, led to a decision not to participate in the scheme, highlighting a clear barrier to engagement for students:

'People on my course didn't sign up to it because they were all saying, 'I don't know what mentoring is''

These findings suggest issues surrounding the current provision of mentoring for business school students, both from the perspective of education surrounding the use of mentoring as a tool for professional development and the opportunities provided for students to engage with such opportunities.

The findings of this study provide valuable insights into the perceptions of mentees, highlighting the sources of value derived, as well as useful feedback surrounding factors that influence the nature of a mentoring relationship from a personal and structural perspective. The following discussion and recommendations will explore what these findings mean for mentoring in business education, with a focus on how mentoring can form part of a university's approach to supporting the development of its students.

6. Discussion

The findings of this study highlight both the benefits of engaging with a mentoring scheme, from the mentee's perspective, and the challenges associated with meaningful engagement, much of which emulate the findings of previously conducted studies within the field. However, as a scheme with both mentors and mentees being female, and these mentees also being university business school students, this study provides an insight into a specific context that thus far has received little attention, despite calls to action within the literature.

For clarity, this discussion will be divided into two parts; the first, focusing on what our study tells us about mentoring, specifically for female university students, situating our findings within the context of skills development, and the second, evaluating the approach of this specific mentoring programme, highlighting successes and challenges, thus paving the way for recommendations for the future development of mentoring schemes.

6.1. What This Tells Us About Mentoring

As Haddock-Millar, Stokes and Dominguez (2023) point out, in their study of reciprocal mentoring, societal drivers and mentoring programme drivers are closely linked. In our study, it is therefore unsurprising to observe the female mentees seeing mentoring as being helpful in overcoming societal barriers to career progression, once they understood how it could help them. In other words, the more clearly that mentoring participants are able to see the connection between the aims of the mentoring programme and the broader societal issues that they are trying to address (e.g. access to influential professional networks and opportunities), the more likely they are to engage with the programme and recommend it to others. This does, however, require an understanding of what mentoring is or entails – an understanding that was highlighted as limited among participants. This suggests that mentees require support before and during the provision of mentoring to enable them to both engage with and benefit from being mentored.

Considering the factors shaping mentoring, Garvey and Stokes (2022), in their discussion of the 'skilled coachee', examine how it is common within both mentoring and coaching to place greater emphasis on the skills of the helper. Whilst the skills of the mentor were clearly important to the mentees in this study, the findings did indicate that the mentee tended to benefit more from that help when they had a stronger understanding of what they wanted from the

mentoring relationship and, crucially, were able to articulate that to their mentor. This skill in being able to frame the conversation in terms of their own needs, in turn, enabled the mentor to be able to tailor their help to address the specific needs of their mentee. The findings also confirmed that confidence, commitment and communication were all key to successful mentoring conversations and relationships. This resonates with the seminal work done on mentoring over 40 years ago by US academic, Kathy Kram. Kram (1983) argued that a key facet of mentoring was what she called the psycho-social function, including behaviours such as 'role-modelling', 'confirmation/acceptance', 'counselling' and 'friendship'. Our findings showed that this sort of support was important to the mentees, who mentioned the added value of personal, tailored help, which went beyond strategic, tactical, or technical advice about career progression. However, a mediating factor here was how confident a mentee felt in leading conversations and asking for specific help.

As Clutterbuck et al. (2017) have pointed out, most mentoring programmes result in increased personal confidence and agency for mentees. It is important to point out that this is usually an output of the mentoring process, rather than a necessary condition of engaging effectively with a mentor. In other words, mentees may have increased personal confidence as a goal for the mentoring, but, ironically, may feel the need to pre-acquire that confidence in order to make the mentoring happen, therefore, having sufficient confidence to follow up with mentors when booking sessions, and asking assertively for specific help. Some of the findings show that this dilemma about confidence was a factor in whether they engaged with the mentoring or not. Central to this engagement was the extent to which mentees were even aware of the opportunity to be mentored; the data indicates that mentees did not seem to have been aware that there were any opportunities at their university to engage with mentoring – this raises issues of communication, accessibility and visibility of mentoring programmes.

6.2. Programme Evaluation

Before providing recommendations for future provisions, it is important to first address aspects of the studied scheme that may have contributed to some challenges faced by mentors and mentees. From a reflective stance, this will primarily take the form of challenging assumptions about mentoring made by the steering group that developed and led the scheme. Within the findings of this study, three learnings emerged that point towards a requirement for approach evaluation, most notably, assumptions surrounding the seniority of the mentor, the scheme structure, and the prior knowledge and skills of mentees.

6.2.1 Seniority of Mentor

When seeking mentors, it is sometimes assumed that the higher up the career ladder an individual has climbed, the more they will have to offer a mentee: this assumption is supported by traditional, hierarchical models of mentoring. Equally, assumptions also exist surrounding the alignment or compatibility of mentor industry/role and mentee aspirations, positing that in order to derive value from the relationship, there must be a direct relationship between the two (Bush et al., 2018, p. 122; Holmes et al., 2018). It is clear from our findings, however, that this is not the case, and instead, it is the time and support the mentor can offer the mentee that is primarily valued. This is not to say that a mentor that has achieved seniority or has followed a career path that the mentee aspires to is without benefit; in fact, we know that learning from those who have experience of particular roles/industries can provide valuable insights and

guidance that may not be possible from a mentor outside of the desired field; instead, these findings highlight that assumptions surrounding the required alignment of mentor industry/role and mentee aspirations, or indeed the superiority of mentor leading to greater outcomes for the mentee, plays a lesser role in the positive perceptions held by mentees. This suggests that the approach to mentor recruitment and pairing must consider a range of variables that stretch beyond position and field. For example, pairing based on values has been found to derive positive outcomes (Illies & Reiter-Palmon, 2018; Kirsch et al., 2025). Equally, a more 'spontaneous' approach to pairing may also be effective, especially where the mentors have a combination of broad experiences, appropriate training on how to mentor, and skills such as empathetic relationship building (Cox, 2005) and communication (Clutterbuck, 2014, p. 42).

6.2.2. Scheme Structure and Prior Knowledge and Skills of Mentees

In addition to the assumptions made surrounding the mentors, there were also two assumptions made that centred on the mentees. First, that flexibility surrounding methods of engagement with the scheme would be beneficial to mentees, allowing individual needs to be met through a personalised approach that is individually led. Second, that students would understand what mentoring is, why they should engage, and how to navigate the process to derive individual benefit.

The flexibility of this mentoring scheme was for many a key draw to participation; free from the confines of a strict structure, mentors and mentees were able to approach the mentoring relationship in a way that suited their individual needs; however, what received less consideration was the support mentees would require to effectively engage with the scheme, considering the flexibility offered. Consequently, and as confirmed by the discussion of confidence, mentees require support before and during the provision of mentoring to enable them to both engage and benefit from being mentored. Similarly, for many students, engaging with a mentoring scheme during their studies may be their first experience of professional engagement and development, which naturally can be both daunting and difficult to navigate, not least if they're not fully sure what being mentored entails. As the scheme was aimed at final year undergraduates and postgraduates, there was an assumption that students would not only know what support they needed, but also how to acquire it; evidently, this was oversimplifying the situation. While some students may know what support they need, they may not be confident in asking the right questions, or conversely, a student may be incredibly confident in asking for support but may not know what support they need. This, therefore, signals a need for a supportive structure that not only guides mentees as they navigate what is likely their first experience of

being mentored but also prepares them for this experience in the first place. While flexibility and personalisation were noted as benefits of the scheme in some instances, there were also clear gaps in the provision that meant for some mentoring pairs, greater support was needed: for future mentoring schemes, the integration of education surrounding mentoring and structured support for the duration of the scheme is crucial.

Notwithstanding the above evaluation, it must be acknowledged that, as this was the first iteration of the mentoring scheme, there was an acceptance amongst stakeholders that there may be some teething issues, and therefore any challenges faced should not be seen as a failure of the scheme, but rather a learning opportunity to support future schemes. This notion applies to mentoring

schemes more broadly; they do not have to be perfect in order to be beneficial, and it should be expected that evaluation and refinement become a central part of any mentoring programme.

7. Recommendations for Practice

Using the findings of this study and the learnings of the steering group, the following recommendations have been developed:

- a) **Embed mentoring into the curriculum** – as suggested by our findings, several potential mentees failed to take advantage of the mentoring opportunity because they were unsure what mentoring was or because they had not even heard of the opportunity. Including mentoring (and coaching) as content areas within people-focused modules/courses seems to be an obvious solution to this.
- b) **Train mentees in mentoring skills** – as we suggest in the discussion above, it makes sense for universities to invest some time in supporting mentees to develop the skills needed to be an effective mentee. This will encourage student mentees to take ownership of their own learning and increase their sense of personal agency, which can only benefit them in their wider studies and development.
- c) **Define a clear programme structure** – programme structure should and will differ based on individual context; however, it is beneficial to provide clear guidance surrounding the expectations of the scheme, especially surrounding approaches to mentor/mentee meetings, and support this through activities such as regular touchpoints and progress tracking.
- d) **Recruit mentors based on qualities, not position or seniority** – recruit and pair mentors based on time available, commitment to the development of students, and the ability to share skills and knowledge, as opposed to seniority, specific role, or length of service. While students may initially value the title or background of a mentor, it is the support they can offer that determines the meaningfulness of the relationship and the potential for positive outcomes to be derived.
- e) **Remember that personal development is still important** – in a context where many universities – particularly those who deliver Degree Apprenticeship programmes – are focused on knowledge, skills & behaviours (KSBs), it is still important to remember that students are still developing, more broadly, as people, and that they should not lose sight of the overarching personal development journey they are on.
- f) **Recognise that learning is often emergent** – when evaluating the impact of mentoring programmes, it is important to remember that learners often only recognise the benefit of what they have learned, in hindsight. Timing of evaluation is therefore critical – mentees may not fully realise the benefit of the experience to them until several months afterwards.
- g) **Begin with the end in mind** – published mentoring research from a range of sectors tells us mentoring is good for employee retention; it is also good for student retention by universities. By identifying what key metrics they expect to be positively impacted by mentoring, university stakeholders can properly evaluate the impact and added value of mentoring to their offer to students; these can be individually focused (e.g. promoting increased personal confidence) or institutionally focused (e.g. reducing the degree awarding gap and enhancing graduate employment post award).

8. Limitations

As highlighted in section 4., over the one-year period in which data was collected, there was participant attrition. While this is not uncommon in longitudinal studies, it is accepted that this may have influenced the breadth of perspectives captured. Despite this, rich, in-depth data was collected through the three stages of semi-structured interviews, enabling meaningful thematic analysis to take place. Furthermore, as the participants were at different educational levels (undergraduate and postgraduate), varied perspectives on the experience of mentoring were gathered, contributing to a nuanced understanding of mentee perceptions.

Consideration should also be given to the implications of participant self-selection on bias and the transferability of the results, as participants who chose to participate may differ from non-participants in terms of personality, motivation, and other relevant traits (Galloway, 2005). The findings of this study should therefore be interpreted with these limitations in mind. Future research may benefit from a larger sample to account for potential attrition and to represent a wider range of individuals.

9. Conclusion

The provision of mentoring for personal and professional development is seen widely at an industry level; however, its application is currently lacking at UK universities, especially within business schools. Given the widely reported benefits of mentoring, especially in the professional business context, the lack of such provisions at a university level is surprising, especially where institutions are directing their focus to authentic, industry-focused learning. Consequently, this not only limits the number of development opportunities for students, but also the exposure to industry professionals and commonly used development approaches; this lack of prior exposure to, or training surrounding, the skills required for mentoring may result in future missed mentoring opportunities if learning does not take place at this early stage in their careers.

The aim of the study was to explore the perceived value of industry mentorship from the perspective of mentees to develop a greater understanding of the potential benefits mentoring relationships can provide, specifically in the context of female university students. The aim of this paper, therefore, was to provide academics, professional services staff, and business school leadership teams with actionable insights into industry-led mentoring for female business students to support the development of provisions that can further support the learning of their own students. While this study and the resulting discussion focus on a specific context, the findings and learnings are transferable more broadly, therefore providing insights that can be directly applied to other contexts, with increased relevance to those focused on underrepresented groups.

This study has demonstrated the benefits of mentoring for female business school students from their own perspective, highlighting the factors that contributed to the perceived positive outcomes of being mentored and what this may mean for future mentoring schemes. While it is acknowledged that the provision of mentoring is not without its challenges, there is a wealth of evidence provided within this study, and those referred to throughout, which suggests that mentoring schemes within business schools could have a significant positive impact upon the development of students, supporting them to overcome barriers to progression, improve personal skills, and understand the realities of the working world. By utilising the knowledge, skills, and experiences of industry

mentors, students are able to learn from those who have ‘done it all before’, thus providing another method through which they can enhance the learning gained during their university studies.

The recommendations resulting from this study enable readers to develop their own industry-focused mentoring programmes, with actionable steps provided to avoid the barriers posed by incorrect assumptions and to develop a scheme that meets the needs of mentees. As previously stated, a mentoring scheme does not need to be ‘perfect’ to be beneficial; therefore, the recommendations made should be considered and adjusted in line with the context within which they seek to be applied.

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Ethics Statement

Ethical approval for this study was obtained from the Sheffield Hallam University Research Ethics Committee (Approval Number ER60189149). All participants provided informed consent prior to participation. Participation was voluntary, participants could withdraw at any time, and all data were anonymised prior to analysis.

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Principal Preparation as Career Development: A Human-Centered Curriculum Design Approach to Skills Development for Future School Leaders in the United States

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Abstract

Principal preparation in the United States is often organized around leadership standards, administrative competencies, instructional leadership, legal responsibilities, and school improvement. While these areas remain essential, they do not fully capture the developmental process through which educators move into the role of principal. This matters because aspiring principals must navigate changes in identity, authority, relationships, and responsibility, while preparation programs and districts must support that transition without reducing readiness to visible performance alone. This study examines principal preparation as a human-centered career-development process and asks how humanized elements are represented within the curriculum and developmental structures of U.S. principal-preparation systems. Because formal preparation documents communicate what programs are expected to value, teach, and assess, the study draws on a scoping-informed literature review and qualitative document analysis of publicly available national standards, federal and state policy documents, program materials, residency and fellowship models, and practitioner-development resources. The analysis shows that humanized principal preparation is represented less as a distinct curriculum area than as an unevenly embedded developmental orientation. Humanized elements appeared through ethical and relational formation, reflection and mentoring for leadership identity development, authentic clinical learning, and continuity of support beyond certification. At the same time, these elements were often embedded within accountability structures that required visible

evidence of candidate competence. The findings suggest that humanized preparation cannot be inferred from the presence of mentoring, reflection, or internships alone. Instead, it depends on whether these structures provide equitable access to meaningful leadership work, psychologically safe opportunities to interpret experience, and sustained support during the transition into principalship. The study contributes to principal-preparation scholarship by showing how formal documents represent aspiring principals as developing professionals and by offering recommendations for aligning competency expectations with mentoring, reflective practice, authentic clinical learning, and early-career support.

Keywords: human-centered curriculum design; principal preparation; educational leadership; career development; leadership identity; skills development

1. Introduction

Educational leadership preparation programs (ELPPs) play an important role in developing effective principals who make a positive impact on student achievement and overall school success by contributing to improving academic outcomes, reducing student absenteeism, increasing teacher retention, and strengthening school climate (Grissom et al., 2021). Furthermore, shifts in the educational landscape with policies such as Race to the Top (RTTT), have prompted growing attention to educational leadership preparation programs and how quality school leaders are developed (Grissom et al., 2021; Reyes-Guerra & Lochmiller, 2016).

ELPPs are designed to meet accreditation standards and define what aspiring school principals should know and be able to do. Previous research has examined these programs from multiple perspectives including program design, instructional practices, equity, leadership standards, and organizational improvement (Crow & Whiteman, 2016; Darling-Hammond et al., 2007). Often substantial attention is given to formal knowledge like management, law, finance, and related organizational competencies (Fanoos & He, 2021). And while administrative competencies are valuable to understanding the principal preparation architecture, they do not capture the full developmental process of becoming a school leader.

Humanized preparation matters because the transition into principalship affects multiple stakeholders. For aspiring principals, it shapes whether preparation offers space to interpret uncertainty, develop relational authority, and build a sustainable leadership identity. For preparation programs and districts, it clarifies whether mentoring, internships, and reflection function as developmental support or mainly as evidence for accountability. For schools and communities, it matters because principals' readiness to exercise judgment, sustain relationships, and support adult and student well-being affects the conditions under which teaching and learning occur.

Therefore, the purpose of this study is to examine how publicly available U.S. principal-preparation documents represent the human dimensions of leadership development. These documents communicate what is valued within principal preparation and provide insight into how educational leadership development is formally conceptualized. By conducting a scoping review of existing scholarship and qualitative document analysis of available principal preparation program materials, national leadership standards, and policy documents, on educational leadership preparation, our paper aims to highlight the human-centered elements of principal preparation systems and contribute to a more holistic understanding of leadership

development. We also identify where these elements remain underdeveloped and offers recommendations for designing preparation systems that better connect competency expectations with mentoring, reflection, authentic clinical learning, and sustained support during the transition into principalship.

2. Conceptual Background: Principal Preparation as Human-Centered Career Development

Our study approaches principal preparation as both competency development and career development (Nagy, Froidevaux & Hirschi, 2019). Competency-based frameworks remain essential because they define the knowledge, skills, and professional responsibilities expected of future school leaders. However, they do not fully explain how aspiring principals move from an established professional role into a leadership role that involves new forms of authority, relational responsibility, and organizational judgment.

The aforementioned developmental process includes human competencies or dimensions such as cultivating professional identity, engaging in reflection, forming ethical judgment, developing interpersonal relationships, and making a commitment to equity (Mullen 2017; Jackson & Moraguez, 2025; Richard & Cosner, 2024; Ni et al., 2019). Within preparation programs, human dimensions of leadership development emerge in manifold experiences and challenges. In one example, novice principals cited conflict navigation and preserving relationships as a challenging but important aspect of school leadership (Nelson et al., 2008).

Human-centered aspects of leadership development also appear in self-reflection. Aspiring principals engage in reflection to develop awareness and promote judgement that is equity-oriented (Jackson & Moraguez, 2025). Given increasingly diverse student populations, ELPPs need to prepare future leaders to recognize how inequities and broader social conditions shape school communities and to navigate the practical, relational, and organizational challenges these conditions create for school leadership (Biolchino, 2024). Human-centered preparation may also require future leaders to self-examine their own beliefs, assumptions, and biases to strengthen cultural awareness and respond more effectively to the varied needs of students, families, and school communities (Miller & Martin, 2015). These examples represent only a few of the human-centered dimensions evident within ELPPs and throughout the array of principal preparation literature.

Although these areas have been examined, they are routinely investigated individually or as elements within broader preparation frameworks. Less is known about how the human side of leadership development is represented collectively within policies, standards, and curricular structures that shape principal preparation. The gap in the literature lies in understanding whether and how these human-centered concerns are reflected within the formal structures that guide principal preparation. Examining these documents can therefore provide insight into how preparation policies and program frameworks define the work of becoming a principal and support future leaders as developing professionals. This focus requires attention not only to whether human-centered elements are mentioned, but also to how they are embedded within the curriculum and developmental structures of principal preparation.

Guided by this gap, the following research question directed our analysis: **How are humanized elements represented within the curriculum and developmental structures of U.S. principal-preparation systems?** Humanized elements were understood as curricular principles and support structures that recognize aspiring principals as developing professionals.

3. Methods

The current study employed qualitative document analysis, informed by a scoping literature review (Pham, Rajic, et al., 2014), to examine how humanized elements are represented within the curricula of U.S. ELPPs. Qualitative document analysis enables the systematic examination of institutional texts and the meanings embedded within them (Cardno, 2018; Morgan, 2022). We selected this design because the research question focused on how professional standards and policies conceptualize principal development. The analysis also considered how preparation programs translated these expectations into curricular and developmental practices.

3.1. Scoping-Informed Literature Search

The literature search was not treated as a separate evidence base from the document analysis, but served two functions within the study design: First, it identified the concepts and empirical debates that informed the analysis, including leadership identity, reflection, mentoring, clinical learning, equity, and early-career support. Second, it helped contextualize the selected documents by showing how these humanized elements had been discussed in recent principal-preparation scholarship. The document analysis then examined whether and how these elements were represented within the standards, policy texts, and program materials that formally shape principal preparation.

Literature searches were conducted in the ERIC and Web of Science (WoS) databases to identify research related to principal preparation and leadership development. ERIC was searched on July 15th, 2026, using the following Boolean search strategy to include appropriate sources: “principal preparation” OR “educational leadership preparation” OR aspiring principals OR principal candidates AND leadership identity OR skills development OR career development -teacher. The term “teacher” was explicitly excluded from the search results to limit retrieval to literature focused on principal and educational leadership preparation rather than teacher preparation. The search was limited to publications since 2017 and yielded 62 records. WoS was searched using TS= (“principal preparation” *educational leadership*) refined by Country/Region to include only the USA on June 30th, 2026, and yielded 112 records. The two results were compared for duplicates. Only peer-reviewed articles and book chapters were included.

3.2. Document Selection and Sampling

Purposive criterion sampling was used to construct a corpus aligned with the research question. This form of sampling is appropriate when documents are selected because of their relevance to a clearly defined institutional issue (Dalglish et al., 2020; Morgan, 2022).

The materials selected for analysis were designed to capture variation in institutional level and document function: National standards established broad expectations for educational leadership. Federal and state texts showed how these expectations were authorized or regulated. Program materials provided more detailed descriptions of curriculum and clinical experience,

while practitioner resources illustrated how mentoring was conceptualized across the leadership career continuum. Following recommendations for qualitative document analysis, the document set was assembled to align source selection with the study's research purpose and to preserve variation across institutional levels and document functions (Cleland et al., 2023; Morgan, 2022).

A document was included when it met two main criteria. First, it had to be issued by a government body or recognized educational leadership organization. Second, it had to provide substantive information about principal-preparation curriculum or developmental support. Sources were excluded when they offered only brief promotional descriptions or lacked sufficient detail to address the research question. Duplicate versions were removed, and the most current relevant edition was retained when multiple versions were available.

The selected documents were not intended to represent every principal-preparation program in the United States. Instead, information-rich sources were chosen to provide variation across influential standards and selected program models. The conclusions are therefore interpretive and conceptual, not statistically generalizable. The final corpus included 12 documents representing national standards and policy frameworks, along with preparation and mentoring models, as shown in Table 1.

TABLE 1
DOCUMENTS INCLUDED IN THE FINAL CORPUS

No.	Document or Program	Category	Purpose in the Analysis
1	Professional Standards for Educational Leaders (PSEL)	National standards	Ten national standards developed by the National Policy Board for Educational Administration (NPBEA)
2	National Educational Leadership Preparation (NELP) Program Recognition Standards	National preparation standards	Standards for the design, review, and recognition of educational leadership preparation programs
3	Quality Measures toolkit (King, 2018)	Program evaluation toolkit	Framework for examining the quality and continuous improvement of principal preparation programs
4	Title II guidance under the Higher Education Act	Federal policy guidance	National context for educator preparation, program accountability, and reporting requirements
5	Florida Level I Educational Leadership Programs and Level II Principal Preparation Program requirements	State policy framework	Florida requirements for initial educational leadership

No.	Document or Program	Category	Purpose in the Analysis
			preparation and advanced principal preparation
6	Illinois Administrative Code, Title 23, Part 30: Programs for the Preparation of Principals in Illinois	State regulatory framework	Illinois requirements for the approval and operation of principal preparation programs
7	Massachusetts Principal Induction and Mentoring Handbook	State induction guidance	Guidance on induction and mentoring after principals enter the role
8	University of Washington Danforth Educational Leadership Program	University-based program	Example of a university-based model for preparing educational leaders
9	University of Illinois Chicago EdD in Urban Education Leadership	University-based program	Example of a university-based preparation model focused on urban school leadership
10	North Carolina State University Northeast Leadership Academy (NELA)	Residency-based program	Practice-intensive preparation model that includes a leadership residency
11	National Aspiring Principals Fellowship	Fellowship model	Alternative preparation pathway combining coursework, coaching, and applied leadership development
12	NAESP National Mentor Training and Certification Program	Mentor development program	Model of continuing professional support through mentor training and certification beyond initial preparation

Source: Authors' compilation based on study documents.

3.3. Data Analysis

The corpus was analyzed through a hybrid deductive–inductive thematic process (Mackieson et al., 2019). Deductive attention was informed by the study's conceptualization of humanized preparation, while inductive coding allowed new patterns to develop through close reading. This combined approach was appropriate because the study began with a defined interest in humanized development but did not a-priori assume how that concept would appear across the documents (Kuckartz, 2019).

The analysis was situated within an interpretivist orientation. Institutional texts do not carry a single meaning independent of their organizational contexts. Their significance is developed through the relationship between language and institutional purpose (Aspers & Corte, 2019). For this reason, references to mentoring or reflection were not assigned identical meanings across all documents. Mentoring could be framed as sustained developmental guidance in one text but function mainly as supervision in another. Each provision was interpreted in relation to the purpose and audience of the document in which it appeared.

Standards and program materials reflect the priorities of the organizations that produce them, while their omissions may reveal dimensions of preparation that receive limited formal recognition (Cleland et al., 2023; Dalglish et al., 2020). Documents were treated as institutional products that communicate particular understandings of leadership and professional readiness, instead of neutral descriptions of existing practice. We therefore examined both the elements explicitly included in the documents and the developmental concerns that remained weakly articulated.

Analysis began with repeated reading of each document. During this stage, we examined how principal readiness was defined and how candidate support was represented. Attention was also given to the institutional purpose of each text. Initial notes captured recurring ideas and points of contradiction. This process helped preserve context before individual passages were coded.

The unit of analysis was a meaningful passage related to principal development. A passage could include a sentence or a connected section of text. Coding focused on meaning instead of isolated terminology. For example, a reference to coaching was examined in relation to its stated purpose and connection to evaluation. It was not automatically coded as humanized support.

The first coding cycle identified how documents represented candidate development. Initial codes addressed relational support and leadership identity. Other codes emerged through the analysis, including tensions between developmental guidance and performance accountability. Earlier documents were revisited when new distinctions became visible. This recursive movement between individual passages and complete texts is consistent with interpretive thematic analysis (Braun & Clarke, 2019, 2021).

During the second coding cycle, related codes were compared across the corpus. Codes were grouped when they reflected a shared developmental process. Differences were retained when similar terminology served contrasting functions. Reflection within confidential coaching, for example, was distinguished from reflection submitted as an assessment requirement. Preserving these differences allowed the analysis to examine the conditions under which humanized preparation was supported or constrained.

Themes were developed when groups of codes formed meaningful patterns across documents and contributed directly to the research question. The importance of a theme was not determined solely by frequency. A pattern could also be significant because it revealed a contradiction or a consistent area of silence (Lindgren et al., 2020). Candidate well-being appeared less frequently than mentoring, but its limited operationalization was analytically important because the documents often assigned principals responsibility for supporting others.

The final thematic structure was reviewed against both coded passages and complete documents. Themes were refined to ensure internal coherence and sufficient distinction from

one another. Disconfirming evidence was retained when a source complicated an emerging interpretation. Through this process, the themes became analytic arguments about the corpus instead of summaries of individual documents.

We recognized themes as interpretive products shaped through engagement with the documents and research question (Braun & Clarke, 2019, 2021). Trustworthiness was therefore supported through contextual sensitivity and transparent reporting, along with a clear connection between documentary evidence and interpretation (Cena et al., 2024).

4. Results and Discussion

4.1. Humanized Elements of Curriculum in U.S. Principal Preparation

In response to the research question, our analysis shows that humanized elements are represented in U.S. principal-preparation systems less as a separate curriculum area than as an unevenly embedded developmental orientation. Across the documents, humanized preparation appeared through four interconnected forms: ethical and relational formation, reflection and mentoring for leadership identity development, authentic clinical learning, and continuity of support beyond certification. These elements positioned aspiring principals as developing professionals who must learn not only to demonstrate leadership competencies, but also to interpret authority, relationships, uncertainty, and responsibility during the transition into school leadership. At the same time, the documents revealed an important tension: humanized preparation was often supported through structures that also served accountability purposes, including internships, mentoring, reflection, and performance assessment.

National standards supplied a broad normative language, while state policies and program materials translated selected elements into mentoring arrangements, reflective activities, and clinical responsibilities. The documents also exposed an important tension: candidates were positioned as developing professionals who needed time and support to construct a leadership identity, yet their development remained embedded within systems that required visible evidence of competence. Table 2 summarizes the distinctive contribution of each document to humanized principal preparation and identifies the developmental mechanisms and limitations observed across the corpus.

TABLE 2

CROSS-DOCUMENT REPRESENTATION OF HUMANIZED PRINCIPAL PREPARATION

Document or Model	Primary Humanized Contribution	Developmental Mechanism	Critical Limitation Identified
NATIONAL FRAMEWORKS			
PSEL 2015	Ethical, relational, and sustainable leadership	Shared values, reflection, professional learning, and attention to adult well-being	Well-being is acknowledged but not translated into detailed candidate-support structures

Document or Model	Primary Humanized Contribution	Developmental Mechanism	Critical Limitation Identified
NELP Building-Level Standards	Candidate formation through knowledge and professional commitments	Sustained internship, trained mentoring, and reflective practice	Development remains closely tied to competency evidence and program review
Quality Measures Toolkit	Individualized and developmentally oriented preparation	Formative feedback, structured reflection, and carefully designed clinical practice	Leadership identity and emotional readiness receive limited explicit attention
FEDERAL AND STATE POLICY			
Title II, Part A Guidance	Preparation as part of a continuing leadership pathway	Permissible funding for clinical learning, induction, and job-embedded support	Authorizes humanized support without guaranteeing implementation
Florida Educational Leadership Framework	Ethics, constructive relationships, and adult well-being	Self-reflection, mentoring, coaching feedback, and early-career support	Relational development is operationalized mainly through assessment and certification
Illinois Principal Preparation Regulations	Shared institutional responsibility for candidate development	Extended internship, mentor preparation, and repeated feedback	Personal and emotional dimensions of the transition remain weakly articulated
Massachusetts Induction And Mentoring Handbook	Continued development during novice principalship	Sustained mentoring, guided inquiry, and organizational support	Quality depends on district capacity and implementation
PROGRAM AND RESIDENCY MODELS			
Danforth Educational Leadership Program	Values-based transition from educator to organizational leader	Professional growth plan, coaching, and applied ethical inquiry	Human development remains aligned with formal competency expectations
UIC Urban Education Leadership Program	Equity-centered and socially situated leadership	Residency, intensive coaching, and practitioner inquiry	Public materials provide limited detail about candidates' emotional transition

Document or Model	Primary Humanized Contribution	Developmental Mechanism	Critical Limitation Identified
NELA Residency	Layered and individualized developmental support	Principal mentoring, confidential executive coaching, and progressive responsibility	Candidate learning remains connected to standards-based evidence
National Aspiring Principals Fellowship	Accessible and job-embedded preparation	Monthly coaching, cohort learning, and school-based inquiry	Local clinical experiences may vary across candidates and settings
PRACTITIONER DEVELOPMENT			
NAESP Mentor Certification Program	Mentoring as a specialized professional practice	Formal mentor preparation, reflective dialogue, and supervised application	Influence depends on programs and districts using trained mentors

Source: Authors' conceptual model based on study findings.

4.1.1. Ethical and Relational Formation

The documents consistently framed principalship as an ethical and relational practice. PSEL associated effective leadership with the cultivation of an “inclusive, caring, and supportive school community” (National Policy Board for Educational Administration [NPBEA], 2015, p. 13). It also encouraged leaders to sustain their own effectiveness while “maintaining a healthy work-life balance” (p. 14). These statements connect professional responsibility with the quality of relationships created within schools and the leader’s capacity to sustain that work. NELP extended this orientation into candidate preparation by stating that program completers should “model ethical behavior in their personal conduct and relationships and to cultivate ethical behavior in others” (NPBEA, 2018, p. 13). Ethical leadership was therefore presented as conduct enacted through relationships, not only as knowledge of professional rules. Florida’s standards reinforced this position through expectations for “constructive conversations” and attention to the “well-being of all students and adults” (Florida State Board of Education [FSBE], 2022, p. 2). Together, these documents positioned authority as a relational responsibility because candidates were expected to consider how their conduct and decisions would shape the experiences of people within their schools.

Program materials demonstrated how this ethical orientation could become part of the preparation curriculum. Danforth connected ethical practice with candidates’ examination of their own leadership, expecting them to engage in “self-analysis of own values, behaviors, and dispositions” (University of Washington College of Education, n.d., p. 14). The program also expected candidates to respond to moral dilemmas by using their “personal values and beliefs to guide actions” (p. 15). These expectations made ethical development personally consequential because candidates had to examine how their identities influenced the exercise of authority. UIC similarly sought to “intensify leaders’ capacity as change agents” and prepared candidates to work through relationships within urban school communities

(University of Illinois Chicago, College of Education, n.d., para. 1). In both programs, ethical preparation extended beyond decision-making procedures to include reflection on how candidates understood themselves as emerging leaders. This framing positioned ethical leadership as part of the developmental process of assuming responsibility for a broader school community.

The literature reinforces this interpretation while exposing an important limitation. Research on principal leadership academies shows that strong preparation is contextual and relational, particularly when universities and districts share responsibility for candidate development (Fusarelli et al., 2019). Orr (2020) similarly argued that active leadership learning requires candidates to investigate practice instead of receiving leadership knowledge passively. These studies support the documentary finding that ethical formation develops through engagement with people and the examination of professional dilemmas. The standards establish expectations for relational conduct, while the program materials create opportunities for candidates to examine how their values influence that conduct.

However, the documents devoted greater attention to how principals should care for others than to how candidates should be sustained during preparation. Although PSEL explicitly recognized work–life balance, the examined materials provided fewer concrete curricular structures for helping candidates process stress and emotional strain. Mahfouz and Richardson (2021) identified well-being as a neglected dimension of principal preparation despite the emotional demands associated with school leadership. More recent evidence indicates that programs still need intentional strategies for embedding well-being within existing preparation structures (Adair & Reames, 2026). This creates a notable contradiction: candidates are prepared to assume responsibility for the well-being of school communities, yet their own capacity to manage the emotional demands of leadership may remain peripheral to the curriculum. Humanization is consequently directed outward more consistently than inward.

4.1.2. Reflection and Relational Support for Identity Development

Reflection emerged as the central process through which candidates interpreted experience and developed an emerging leadership identity. NELP required reflective practice and lifelong learning, stating that preparation programs should provide “ongoing experiences for candidates to examine, refine, and strengthen the leadership platform” guiding their decisions (National Policy Board for Educational Administration [NPBEA], 2018, p. 7). The Quality Measures toolkit similarly positioned collective meaning-making as a feature of program quality through “interactive, collaborative reflection” on program design and implementation (Education Development Center [EDC], 2023, p. 5). Danforth’s Professional Growth Plan allowed candidates to revise goals in response to experience, while NELA used weekly reflection and a Personal Leadership Development Plan to support residents treated as a “PRINCIPAL in training” (North Carolina State University College of Education, 2019, p. 22; University of Washington College of Education, n.d.). These structures acknowledged that participation in administrative work did not automatically produce leadership learning. Candidates needed structured opportunities to make sense of their experiences, connect those experiences to their values and goals, and translate them into a more intentional understanding of leadership practice.

The literature clarifies why this interpretive process matters. Drake et al. (2023) found that candidates’ internship reflections supported movement from task-oriented understandings of

leadership toward more relational conceptions. Resnick (2023) similarly conceptualized principal learning as professional identity development situated within changing local expectations. In this sense, reflection is not simply a way to evaluate completed work, but a process through which candidates reconsider who they are as professional actors. This is especially important for candidates moving from teacher to principal, since the transition changes not only their responsibilities, but also their authority, relationships, and organizational position. Bush (2018) described this movement as a process of personal socialization followed by learning within a specific school context. The documents supported aspects of both forms of development, yet they rarely named the disruption that may accompany the movement from an established teacher role and identity into school leadership.

Mentoring and coaching provided the relational infrastructure for this identity work. NELP required programs to explain how mentors were selected and trained, while Illinois regulations assigned preparation providers and school-system partners shared responsibility for mentor development and candidate supervision (NPBEA, 2018; Programs for the Preparation of Principals in Illinois, 23 Ill. Adm. Code pt. 30, 2022). NAESP went further by treating mentoring as a specialized professional practice that “encourages open and reflective conversations” with the protégé (National Association of Elementary School Principals [NAESP], n.d., Competency 4). NELA differentiated the school-based mentor from an executive coach who served as an “external source of confidential and expert support” (North Carolina State University College of Education, 2019, p. 23). This separation created different relational spaces for contextual learning and candid reflection.

Recent studies demonstrate why the design of these relationships matters. Thessin et al. (2020) found that the mentor–intern partnership shaped candidates’ access to authentic leadership experiences. Lipke (2020) showed that structured mentoring could promote co-learning and deepen leadership capacity when mentors and novices examined their practice together. These findings position mentors as both gateways to leadership learning and possible gatekeepers. A mentor can expand a candidate’s access to meaningful work, but the relationship may restrict openness when the mentor also contributes to formal evaluation. The NELA model is distinctive because confidential coaching reduces the pressure to perform certainty. Across the corpus, humanized mentoring was strongest when candidates could discuss mistakes without immediately turning those mistakes into evidence of inadequate readiness.

4.1.3. Authentic Clinical Learning and Equity

Authentic clinical practice was another major humanized element. NELP required candidates to complete a “minimum of six months of concentrated (10–15 hours per week)” clinical experience involving authentic leadership activity (NPBEA, 2018, p. 30). Illinois regulations similarly required candidates to work directly with mentors by “observing, participating in, and taking the lead” in leadership tasks (Programs for the Preparation of Principals in Illinois, 23 Ill. Adm. Code § 30.40(a)(3), 2022). Faculty supervisors were also required to organize seminars in which candidates discussed issues arising from their internships. The Quality Measures toolkit emphasized carefully selected placements and individualized learning goals, indicating that clinical learning should be deliberately designed around candidate development (EDC, 2023). Program models operationalized this expectation through progressive responsibility and context-specific inquiry. Danforth candidates examined moral dilemmas and conducted equity audits, while NELA connected residency experiences with individualized

development plans. UIC combined residency with intensive coaching, and the National Aspiring Principals Fellowship allowed candidates to remain employed while undertaking leadership work in their current schools.

These findings align with research suggesting that clinical experience becomes meaningful only when internships provide candidates with well-supported opportunities to engage in consequential leadership work. Dexter et al. (2022) identified gaps between the competencies emphasized in preparation programs and the pedagogies used to connect classroom learning with field practice. Rangel et al.'s (2025) synthesis similarly showed that internship research spans program design and candidate activities, indicating considerable variation in how clinical preparation is organized. The key distinction is not between programs that have internships and programs that do not. It concerns whether candidates receive sustained access to consequential leadership work and structured assistance in making sense of that work.

Evidence comparing program designs makes this distinction more visible. Rangel et al. (2024) found that residency and traditional-program candidates both encountered authentic leadership activities, but residents reported higher levels of engagement. Bastian and Drake's (2023) large-scale study adds a more troubling dimension. They found that internship placements were often located in schools facing greater organizational and contextual challenges than non-internship schools, with these patterns especially pronounced for racially minoritized candidates. This finding complicates the assumption that authentic practice is automatically humanizing. A challenging placement may provide meaningful learning, but unequal assignment to schools with more constrained working conditions can reproduce inequity within the preparation process. Clinical experience is shaped not only by what candidates do but also by where they are placed and who receives access to supportive environments.

Equity was explicitly embedded in PSEL and NELP, while UIC and Danforth translated it into applied curricular work. UIC sought candidates committed to “disrupt inequities and advance learning opportunities” for diverse student populations (University of Illinois Chicago, College of Education, n.d., program overview). Danforth's curriculum required candidates to “conduct an equity audit of an organization” and examine moral dilemmas encountered in their work (University of Washington College of Education, n.d., curriculum section). The National Aspiring Principals Fellowship addressed equity structurally through partnerships with minority-serving institutions and an employment-compatible model. Its job-embedded residency enabled fellows to “exercise your leadership, apply your learning” in their current schools (New Leaders, n.d., “Principal Residency” section). These models treated school communities as participants in leadership and linked equity commitments with practice in authentic settings.

Previous research, however, shows that equity-related development is not straightforward. Barakat et al. (2019) found that completing leadership preparation was associated with stronger cultural beliefs and knowledge, but not with stronger cultural skills. This distinction suggests that candidates may learn the language of equity without developing the capacity to enact it. In contrast, Guillaume et al. (2020) found that graduates of a social justice-oriented program drew on program learning to enact equity-focused practices, indicating that sustained curricular coherence may help connect commitments with actions. Stone-Johnson et al. (2021) similarly questioned whether programs can develop socially just leaders without attending to candidates' readiness to recognize inequity. Rasmussen and Raskin (2023) found that making race central

across curriculum and pedagogy strengthened candidates' preparation for racial-equity leadership. Jackson (2025) also found that program quality was the strongest predictor of graduates' perceived preparedness to lead for equity. Yet Khemakhem (2026), using data from 54 U.S. universities, found no significant difference in several dimensions of cultural intelligence between program starters and completers. Together, these studies suggest that adding equity content is insufficient. Equity becomes a humanized curricular practice when it is embedded across the program and connected to repeated opportunities for implementation.

4.1.4. Continuity and Accountability

Several documents framed principal development as extending beyond certification. PSEL connected preparation with induction, while the Quality Measures toolkit evaluated graduates' entry into leadership positions (EDC, 2023; NPBEA, 2015). Title II defined meaningful professional development as "sustained, intensive, collaborative, job-embedded, data-driven, and classroom-focused" and allowed funds to support principal induction and mentoring (U.S. Department of Education, 2025, p. 11). Its description of school-leader residencies also required "ongoing support from an experienced and effective principal mentor" (p. 45). Florida required limited assistance during graduates' first two years, while Danforth and UIC extended coaching into early principal practice (Florida Department of Education [FDOE], 2025; University of Illinois Chicago, College of Education, n.d.; University of Washington College of Education, n.d.). Across these documents, certification appeared less as a marker of completed learning than as one point within a longer transition into school leadership.

Massachusetts provided the clearest induction model by describing a program that "develops, supports, accelerates, and sustains" effective and equitable leadership (Massachusetts Department of Elementary and Secondary Education [MDESE], 2022, p. 8). Its guiding principles defined induction as a "learning continuum from principal preparation through selection, placement, development, evaluation, and retention" (p. 8). This language connected preservice preparation with the organizational conditions novice principals encounter after appointment and assigned responsibility for that transition to district and state leaders, not only to individual participants. The handbook therefore positioned early principal development as a shared institutional responsibility, rather than as an individual effort to manage the first years of leadership alone.

This emphasis on continuity aligns with research showing that early principalship introduces developmental demands that preparation cannot fully anticipate. Kılınç and Gümüş's (2021) systematic review identified socialization and mentorship as central concerns in research on novice principals. Watts's (2023) review concluded that beginning principals benefit from broader support networks, not only traditional one-to-one mentoring. Rogers and VanGronigen (2023), however, found that only about half of U.S. states required any form of principal induction. This finding mirrors the pattern in the documents: continuity is valued, but not consistently guaranteed. Whether a novice principal receives sustained support depends substantially on location, policy infrastructure, and institutional capacity.

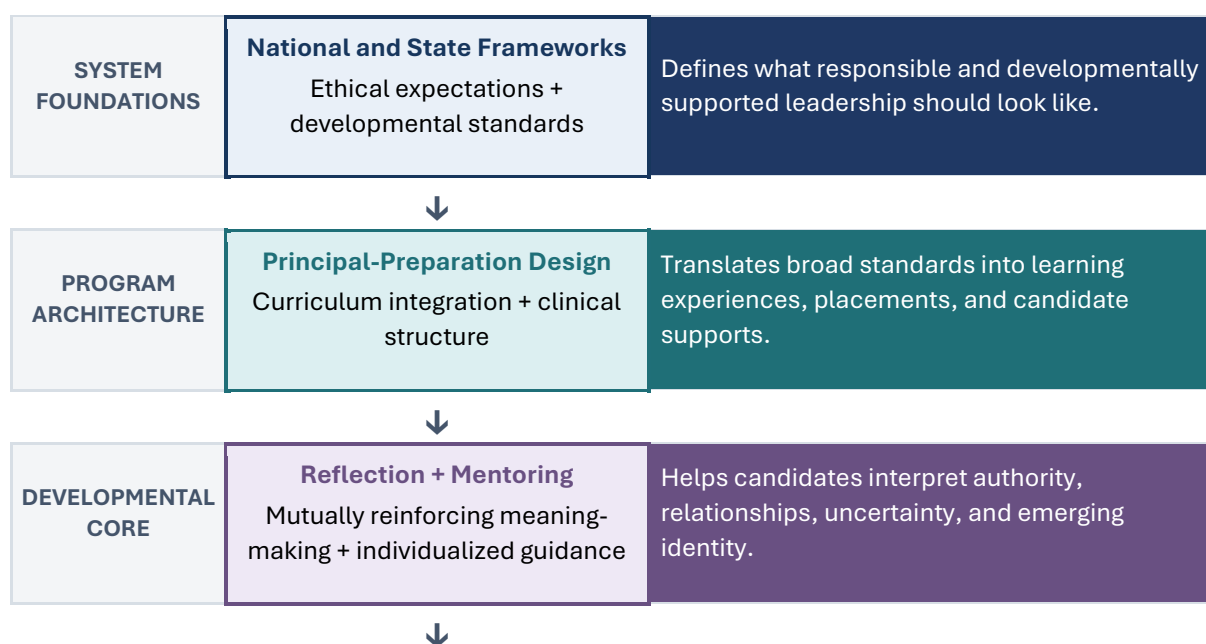
The final tension concerns accountability. Standards can protect candidates from weak preparation by requiring programs to provide meaningful clinical experiences and evidence of candidate learning. However, they also privilege development that can be documented through performance evidence. NELP explicitly identifies performance-based measures as central to

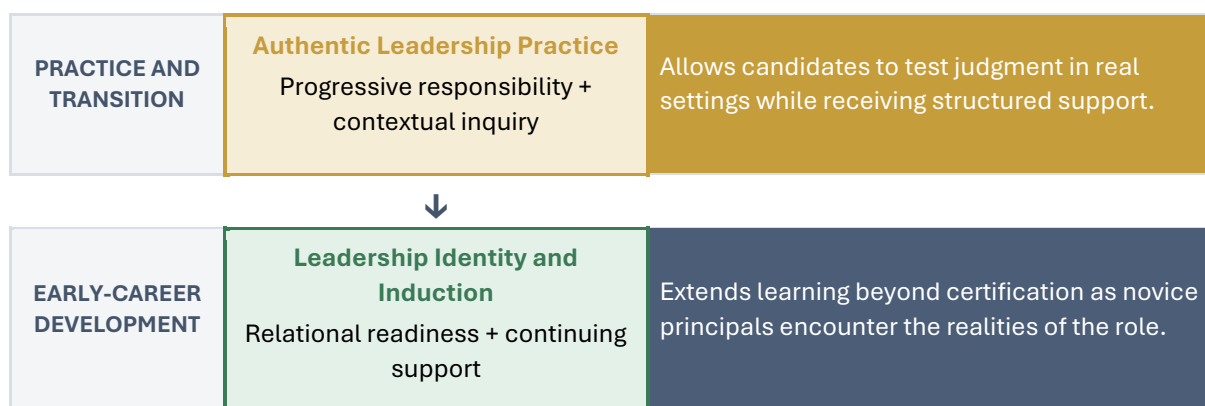
candidate evaluation, while Illinois requires candidates to achieve formal competency ratings during the internship (NPBEA, 2018; Programs for the Preparation of Principals in Illinois, 23 Ill. Adm. Code § 30.45, 2022). Other aspects of becoming a principal, such as emotional readiness, professional belonging, confidence, and identity development, are less easily captured through such assessments. The documents therefore humanized preparation within a system that continued to prioritize demonstrable competence. Candidates were encouraged to reflect, but their reflections could become evidence for evaluation. Mentors were expected to create trust, but they could also judge readiness. Authentic practice offered space for exploration, but it also generated assessment artifacts.

Overall, it appears that U.S. principal preparation is meaningfully but incompletely humanized. The documents that most explicitly addressed human-centered preparation connected sustained relationships with authentic practice and recognized that becoming a principal involves a transformation of not only professional responsibility, but also identity and authority. Recent research supports these features while showing that their influence depends on program coherence, placement quality, as well as sustained support. Humanized preparation therefore cannot be inferred from the presence of mentoring or an internship alone. It depends on whether these structures provide equitable access to meaningful leadership work and protected opportunities to interpret experience. Taken together, the findings suggest that humanized principal preparation develops through alignment among policy expectations, program design, relational learning, and authentic leadership practice, while remaining shaped by the tension between developmental support and competency-based accountability. Figure 1 presents this process.

FIGURE 1.

CONCEPTUAL MODEL OF HUMANIZED PRINCIPAL PREPARATION
From Policy Expectations to Sustained Leadership Development





Source: Authors' conceptual model based on study findings

5. Conclusion

Our study shows that humanized principal preparation in the United States is best understood as a career developmental orientation that connects professional learning with the lived transition into school leadership. Across the analyzed standards and program materials, candidates were expected to develop ethical judgment and relational capacity while learning to interpret complex organizational situations. The documents and program models that most explicitly addressed this transition created conditions in which aspiring principals could test emerging leadership identities through authentic practice and receive guidance responsive to their contexts. Humanization was therefore most visible when preparation recognized that becoming a principal involves a change in professional authority and self-understanding, not simply the completion of certification requirements. This perspective shifts attention from what candidates can demonstrate at the end of a program to how they learn to exercise leadership responsibly within relationships.

At the same time, the analysis reveals that these developmental conditions are not consistently secured across the preparation system. Mentoring may support honest reflection, yet its evaluative function can limit openness. Clinical experiences may expose candidates to consequential leadership work, yet unequal placements can produce uneven opportunities for growth. Humanized preparation therefore depends less on the presence of particular program components than on how those components are designed and experienced. A coherent approach would protect spaces for developmental uncertainty while extending support into the early years of principalship. Such a shift would allow principal preparation to evaluate readiness without reducing leadership development to visible performance alone, while also recognizing that sustainable leadership emerges through continued learning in context.

A broader implication is that effectiveness in one professional role should not be assumed to translate automatically into effectiveness in a leadership role. In education, this means that being a strong teacher does not necessarily mean being prepared to become a principal. The transition requires a different configuration of skills, including ethical judgment, relational authority, organizational sensemaking, communication, conflict navigation, and the ability to support the learning and well-being of an entire school community. Humanized principal preparation can therefore help clarify what aspiring leaders need in order to move from individual professional expertise into leadership that supports the success and thriving of schools.

5.1. Theoretical Contributions

Our study contributes to principal-preparation theory by conceptualizing humanized preparation as a relational and identity-centered developmental process. Prior research has shown that principal learning involves identity development, reflection, mentoring, and clinical experience. Our contribution is to examine how these elements are represented together within the formal documents that structure principal preparation. Our conceptualization extends competency-based frameworks by showing that becoming a principal involves changes in how candidates understand themselves and exercise authority within local professional contexts (Resnick, 2023). Reflection is theoretically significant because it connects clinical experience with the construction of a leadership identity, helping candidates move from task-centered views of administration toward more relational understandings of leadership (Drake et al., 2023). Mentoring likewise functions as more than a delivery mechanism for practical knowledge; its developmental value depends on the quality of the mentor–candidate relationship and the opportunities it creates for authentic leadership participation (Thessin et al., 2020).

Our analysis further shows that the formal inclusion of humanized components should be distinguished from their developmental quality. The existence of an internship or mentoring requirement does not ensure that candidates experience meaningful support, particularly when placement conditions and access to effective mentors vary (Bastian & Drake, 2023). In addition, preparation cannot be considered fully humanized when candidates are trained to support the well-being of school communities without comparable attention to their own emotional readiness for principalship (Mahfouz & Richardson, 2021). By locating identity development and candidate well-being within standards, program materials, and systems of assessment, our study shows how humanized preparation is both supported and constrained by existing preparation structures. Humanized principal preparation therefore depends not only on what programs include, but also on whether their structures provide psychologically safe opportunities for candidates to interpret uncertainty and develop sustainable leadership identities.

5.2. Implications for Practice

Principal-preparation providers should design mentoring and clinical learning as connected components of a coherent developmental curriculum. Reflection on identity and authority should be integrated across coursework and field experiences, instead of being confined to an internship assignment. Leggett et al. (2023) found that coherent program redesign required collaboration with professional partners and explicit alignment between core program commitments and candidate learning experiences. District–university partnerships can strengthen this coherence by connecting academic preparation with the conditions candidates will encounter in schools. Evidence from a sustained partnership model indicates that long-term collaboration can support contextually relevant preparation and continuing assistance for developing school leaders (Williams et al., 2022). Building on this work, our analysis suggests that coherence should be understood not only as alignment among courses, standards, and field experiences, but also as alignment around the developmental transition into leadership. Programs should therefore establish shared expectations with districts for mentor preparation and meaningful leadership responsibilities. They should also provide developmental spaces where candidates can examine uncertainty without treating every challenge as evidence of inadequate readiness.

5.3. Implications for Policy

State approval and accreditation policies should assess the developmental quality of principal preparation, not only the formal presence of required components. Abdelrahman et al. (2022) found that strong university–district partnership policies were significantly associated with stronger internship policies, suggesting that policy coherence across institutional actors can influence the quality of candidates’ clinical preparation. State frameworks should consequently establish clearer expectations for partnership responsibilities and the integration of internships with coursework. However, mandates should be accompanied by sufficient institutional capacity. Clement et al. (2022) found that successful program redesign depends on technical resources and relational conditions within preparation organizations. Policies that require mentoring or program redesign without supporting implementation may therefore produce procedural compliance without meaningful humanization. Our findings extend this policy discussion by showing that humanized preparation requires attention to the conditions under which required components are enacted. Accountability frameworks should examine whether candidates receive sustained developmental support and equitable access to authentic leadership work, rather than treating the presence of an internship, mentor, or performance assessment as sufficient evidence of developmental preparation.

5.4. Limitations and Future Research Directions

This study is limited by its reliance on publicly available standards, policy documents, program descriptions, and professional-development materials. These documents provide valuable insight into how humanized principal preparation is formally described, but they cannot fully capture how candidates experience preparation in practice. A program may emphasize reflection and mentoring in its written materials, yet candidates may experience these supports differently depending on the mentor, internship setting, or institutional resources available to them. The selected documents also represent only a portion of the principal-preparation landscape in the United States, so the findings should not be interpreted as reflecting every state or program. In addition, the documents were created for different purposes. Regulatory texts often focused on requirements and accountability, while program materials provided more detailed descriptions of candidate support. These differences influenced which humanized elements were most visible in the analysis.

Future research should therefore move beyond formal documents and listen directly to the people experiencing principal preparation. Interviews with candidates and novice principals could provide deeper insight into whether mentoring and reflection create genuine support or are experienced mainly as program requirements. Longitudinal research could follow aspiring leaders from preparation into their first years of principalship, allowing researchers to examine how confidence and professional identity develop over time. Comparative studies across states and program models could also explore why some candidates receive stronger mentoring or more meaningful clinical opportunities than others. Particular attention should be given to candidates whose backgrounds or professional circumstances may shape their access to supportive preparation. Such research could help determine whether the humanized commitments expressed in policy and program documents are experienced as meaningful support during the demanding transition into school leadership.

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Ethics Statement

This study was based on qualitative analysis of publicly available documents and did not involve human participants, identifiable private information, or direct interaction with individuals. Ethical approval and informed consent were therefore not required. The authors conducted the study in accordance with applicable ethical standards for document-based research.

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Aligning Entrepreneurship Curriculum and Pedagogy for Graduate Entrepreneur Development: A Systematic Literature Review and an OBE-ELT Analytical Framework

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Abstract

Despite growing attention to entrepreneurship education, the alignment between entrepreneurship curricula and pedagogy approaches remains inconsistent, limiting higher education institutions' ability to develop graduates with the skills and competencies required for entrepreneurship. While earlier studies have explored individual curriculum components or pedagogical approaches, limited research has integrated these elements into an analytical framework. To systematically identify, evaluate, and synthesise empirical studies on entrepreneurship curriculum and pedagogy, a comprehensive Systematic Literature Review (SLR) was adopted. In line with the predefined inclusion and exclusion criteria, 12 eligible studies were analysed to identify the theoretical perspectives, pedagogical practices, and curriculum determinants underpinning entrepreneurship education. The findings revealed that constructivist learning theory, cognitive learning theory, Outcome-Based Education (OBE) and Experiential Learning Theory (ELT) constitute the principal theoretical foundation supporting curriculum-pedagogy alignment. Building on these findings, the study proposes an OBE-ELT analytical framework that integrates curriculum design, experiential pedagogy, entrepreneurial motivation, real-world learning activities, and graduate entrepreneur development. The framework explains how curriculum design and pedagogy practices can be systematically aligned to strengthen entrepreneurial competencies and graduate development. Furthermore,

the study contributes to the entrepreneurship education literature by offering a synthesised analytical framework that advances understanding of curriculum-pedagogy alignment while providing practical guidance for curriculum designers, educators and higher education institutions.

Keywords: Entrepreneurship Education, Curriculum Alignment, Pedagogy, Graduate Entrepreneurs, Outcome-Based Education (OBE), Experiential Learning Theory (ELT), Higher Education, Conceptual Framework

1. Introduction

Entrepreneurship curriculum has become an important tool that promotes effective learning, enabling students to cultivate the necessary entrepreneurial skills and mindsets to address long-term societal issues, including unemployment, restricted wealth generation, and financial dependency (Iwu et al., 2024; Nzembayie et al., 2024). While pedagogical strategies are essential, Ayandibu (2025) and Nwachukwu et al. (2026) assert that the curriculum serves as a structured framework that promotes the development of the knowledge, skills and practical abilities necessary for graduates to engage in entrepreneurial endeavour. This is particularly important in South Africa, where high unemployment and persistent skills mismatches necessitate educational programmes that prepare students not only for employment but also for venture creation and economic independence (Bridge, 2017; Lahn & Erikson, 2016). Consistent with this imperative, government-funded initiatives such as Sector Education and Training Authorities (SETAs) have emphasised the need for skills-based and competency-based programs that prepare graduates for work and self-employment (SETA, 2022). Similarly, Amjad et al. (2020) and Bell and Bell (2020) have argued that a well-structured curriculum and pedagogical practices foster creativity, innovative thinking, problem-solving, analytical reasoning, self-efficacy and entrepreneurial confidence.

Nonetheless, despite the perceived potential, data on substantial graduate involvement or positive outcomes within the national entrepreneurship ecosystem remain scarce (Tewari & Ilesanmi, 2020). This shortfall persists because the alignment of curriculum structure and delivery has not consistently translated into entrepreneurial competencies and real-world skills (Nwachukwu et al., 2026; Nzembayie et al., 2024; Udeozor et al., 2025). As Iwu (2022) and Udekwe and Iwu (2024) assert, entrepreneurship curriculum delivery remains predominantly theoretical, while pedagogical practice frequently lacks experiential exposure in various South African universities, hindering opportunities for skills development and practical problem-solving experience crucial for entrepreneurial preparedness. As a result, graduates may acquire conceptual knowledge without developing the applied competencies, confidence, and entrepreneurial mindsets necessary to navigate the complexities of venture creation (Rodrigues, 2023). Thus, this persistent disconnect underscores the need to integrate an analytical framework capable of explaining how entrepreneurship curricula and pedagogical practices can be systematically aligned to support the development of graduate entrepreneurs.

1.1. Entrepreneurship Curriculum and Pedagogy

While curriculum and pedagogy are inherently interdependent because they operate as two dimensions of the same educational process, curriculum refers to the articulation of the intended learning outcomes, while pedagogy encompasses the instructional strategies and learning

processes through which intended outcomes are actualised (Ngoasong, 2022). Analysing the design and scope of the desired learning outcome shows that the curriculum is developed as a program framework (Japee & Oza, 2021), whereas pedagogy is typically understood as the training method through which these outcomes are achieved (Rodrigues, 2023). The entrepreneurship curriculum and pedagogical methodologies offer a comprehensive learning experience that equips graduates with the essential practical skills and knowledge required to initiate and maintain new enterprises (Matlay, 2019). Moreover, Ajani (2024) and Lackéus (2020) highlight that these components foster critical thinking and innovative capabilities, enabling learners to identify and seize opportunities for business start-ups. Thus, these positions enable graduates to effectively translate their competencies into entrepreneurial realities through venture creation, thereby contributing to job creation and reducing unemployment (Hägg & Gabrielsson, 2020).

1.2. Alignment of Entrepreneurship Curriculum and Pedagogy

The alignment of curriculum-pedagogy in entrepreneurship education encompasses the conceptual alignment that specifies the learning content and shapes the teaching method (Boldureanu et al., 2020; Iwu et al., 2024). These two elements operate as complementary dimensions of entrepreneurship education, collectively creating an educational environment that develops entrepreneurial mindsets, competency and knowledge (Nzembayie et al., 2024). Hence, the conceptualisation of these components is essential for developing entrepreneurially competent graduates through meaningful entrepreneurial activities.

1.3. Theoretical Frameworks Pertinent to the Study

The Systematic Literature Review (SLR) identified theories that support the study's aim. Among these, Outcome-Based Education (OBE) and Experiential Learning Theory (ELT) emerged as the most appropriate theoretical foundations for explaining the alignment between curriculum design, pedagogical practices and graduate entrepreneur development (Peschl et al., 2021; Pradhan, 2021).

The OBE theory focuses on the achievement of clearly defined learning outcomes that guide the designed curriculum content, learning activities, instructional strategies and assessment practices (Pradhan, 2021). As a learner-centred educational approach, OBE specifies the knowledge, skills, competencies, and graduates' attributes expected upon completion of a programme of study (Asim et al., 2021; Driscoll & Wood, 2023). The key elements on which the OBE framework was built were the Learning activities, Learning assessments and Learning outcomes.

Experiential Learning Theory (ELT) explains how entrepreneurial competencies are developed through experience, reflection, conceptualisation and experimentation (Ferreira, 2020; Motta & Galina, 2023; Peschl et al., 2021). According to Kolb (2014), learning occurs through a continuous four-stage cycle comprising concrete experience, reflective observation, abstract conceptualisation and active experimentation. Within this context, these stages enable learners to transform experience into entrepreneurial knowledge and competence practice (Monllor et al., 2024; Oo et al., 2023; Perusso et al., 2020).

Separately, OBE and ELT provide valuable insights into entrepreneurship education. OBE aligns learning outcomes, curriculum, pedagogy, learning activities, and assessment, while ELT explains how entrepreneurial competencies are developed through experiential learning.

Together, they offer a comprehensive framework for developing graduate entrepreneurs. (Driscoll & Wood, 2023). While the integration provides a more comprehensive analytical lens through which entrepreneurial competencies are acquired via authentic learning experiences (Monllor et al., 2024; Sultono et al., 2025).

Drawing on this integration-theoretical perspective, the study proposes an analytical construct to examine the alignment between the entrepreneurship curriculum and pedagogy. First, the curriculum dimension of OBE facilitates the evaluation of curriculum design and intended entrepreneurial learning outcomes within the programme competencies. Second, the pedagogical construct enables the examination of the experiential learning process that fosters entrepreneurial competence, consistent with ELT. Finally, the integration of these two theoretical perspectives informed both the analytical framework proposed in this study and the design of the systematic literature review used to identify and synthesis the relevance evidence.

2. Methodology

As indicated by the study's overarching aim to develop graduate entrepreneurs, this research seeks to analyse the underlying framework or model that informs the entrepreneurship curriculum and its corresponding pedagogical approaches. This analysis enables the identification of factors that impede the effective alignment of these elements in cultivating graduate entrepreneurs. To achieve this objective, a systematic review methodology was employed. The review included peer-reviewed journal articles published in English between 2017 and 2025 that examined entrepreneurship curriculum, pedagogy, curriculum alignment, Outcome-Based Education, Experiential Learning Theory or graduate entrepreneur development. To extract the useful publications, all journals not written in English, studies lacking empirical relevance, non-peer-reviewed materials, and publications beyond the specified period were excluded. To ensure that the current literature was covered, only studies published within the past eight years were selected. In the preliminary stage, 250 articles were identified. Duplicated records were removed before titles, publication years, and abstracts were screened to assess the relevance of the study's objective. Subsequently, full-text reviews were conducted for shortlisted publications. Finally, 12 articles emerged from the systematic application of the eligibility criteria rather than from a predetermined, targeted number of publications.

2.1. Research Design

A systematic literature review (SLR) was conducted to synthesise the existing evidence on the alignment of entrepreneurship curriculum and pedagogy for the development of graduate entrepreneurs. Unlike traditional narrative reviews, a systematic literature review was conducted using a transparent, rigorous, and replicable process to identify, select, appraise, and synthesise the relevant studies. Furthermore, the transparent review protocol enhances the reproducibility and credibility of the findings.

The review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines to ensure explicit methodological reporting across the search, screening, eligibility assessment, and inclusion stages (Shamseer et al., 2015; Wijaya et al., 2024). The objective is not to summarise the previous literature but to identify recurring theoretical perspectives, curriculum alignment strategies, pedagogical approaches, and learning processes

that informed the development of integrated analytical frameworks grounded in Outcome-Based Education (OBE) and Experiential Learning Theory (ELT).

Given the fragmented nature of research on entrepreneurship curriculum alignment, an SLR was considered the most appropriate design because it enables the systematic integration of evidence from multiple empirical and conceptual studies while revealing patterns, knowledge gaps and opportunities for future curriculum development.

2.2. Search Strategies

The Systematic Literature Review (SLR) employed a structured search strategy to identify peer-reviewed studies examining the alignment between entrepreneurship curricula and pedagogy for the development of graduate entrepreneurs. The search was conducted using major academic databases and scholarly search platforms, including ScienceDirect, Scopus, Google Scholar, and Web of Science, which provide a broad range of resources for entrepreneurship, education, and higher education research (Gusenbauer & Haddaway, 2020). These databases are widely recognised as appropriate sources for identifying high-quality peer-reviewed literature for systematic reviews (Kraus et al., 2022).

To retrieve relevant studies, the keyword combination and Boolean operators were used. The primary search terms included *entrepreneurship education*, *entrepreneurship curriculum*, *curriculum alignment*, *pedagogy*, *Outcome-Based Education (OBE)*, *Experiential Learning Theory (ELT)*, and *graduate entrepreneurs*. While OBE and ELT were included in the search strategy based on their relevance to entrepreneurship education and curriculum alignment, the review was not restricted to these frameworks. Other theoretical perspectives identified in the literature were also considered. OBE and ELT were ultimately selected because they demonstrated the strongest alignment with the study's objectives and the evidence synthesised from the reviewed literature. These keywords were combined using Boolean operators (AND/OR) to refine the search (Wijaya et al., 2024). The search string examples include:

- ("entrepreneurship education" AND "Outcome-Based Education")
- ("entrepreneurship curriculum" AND pedagogy AND "Experiential Learning Theory")
- ("graduate entrepreneurs" AND "curriculum alignment")
- ("entrepreneurship education" AND higher education AND "experiential learning")

The search was confined to English-language, peer-reviewed journal articles published between 2017 and 2025 to engage in contemporary development of entrepreneurship education while ensuring the relevance of the evidence-based approach. The reference lists of the added studies were assessed to identify additional relevant publications that may not have been retrieved via the electronic database searches (Page et al., 2021).

2.3. Eligibility Criteria

In this SLR, explicit inclusion and exclusion criteria were formulated before the screening process to ensure consistency in methodology and to minimise selection bias (Wijaya et al., 2024). The inclusion criteria focused on studies published in peer-reviewed academic journals, written in English, published between 2017 and 2025, and centred on entrepreneurship education within higher education institutions. Furthermore, studies that explicitly examined

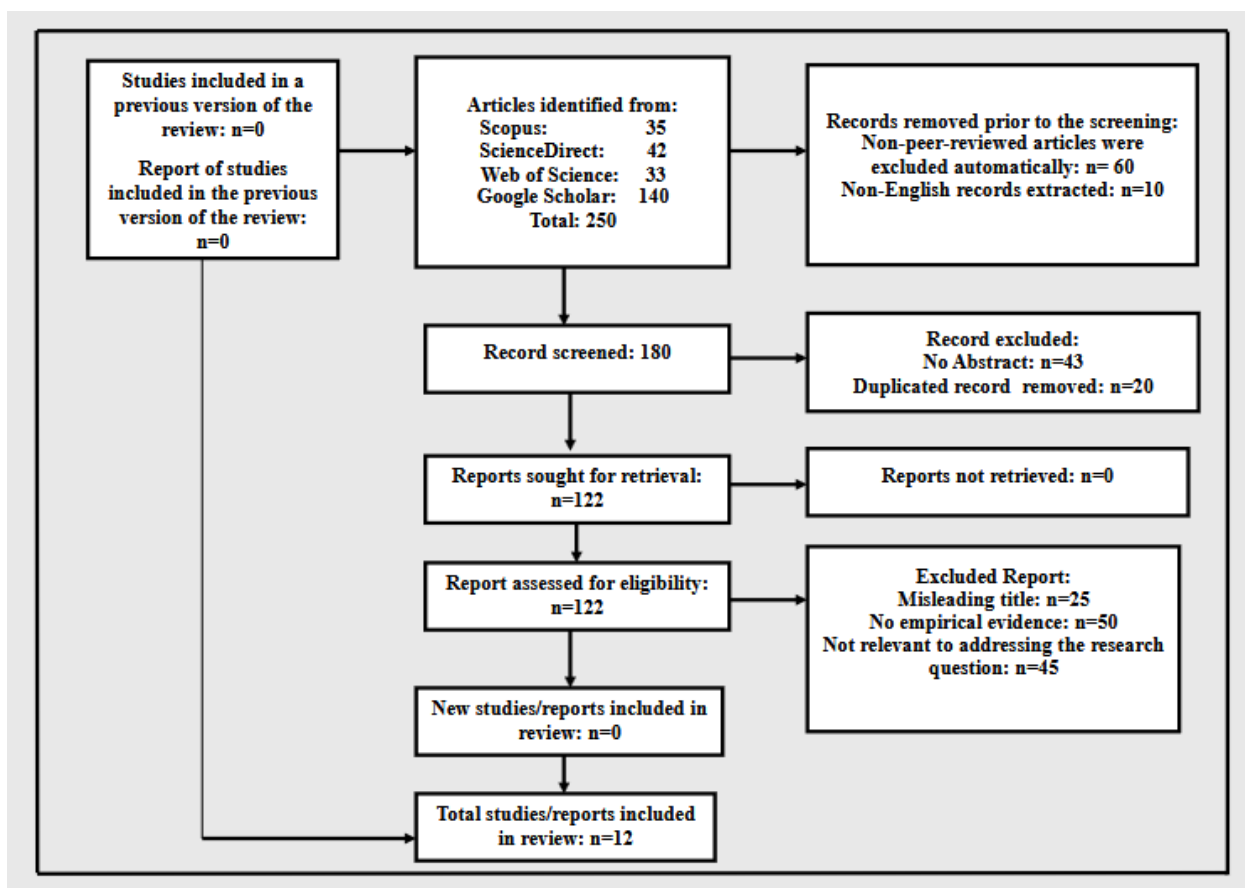
entrepreneurship curriculum, pedagogy, curriculum alignment, Outcome-Based Education (OBE), and Experiential Learning Theory (ELT) were included, which provided sufficient conceptual or empirical evidence relevant to graduate entrepreneur development. While the exclusivity criteria centred on publications on entrepreneurship outside higher education, not published in English, lacked sufficient methodology, and publications that did not directly address the alignment of entrepreneurship curriculum and pedagogy were not relevant to the objective of the review (Page et al., 2021).

2.4. Study Selection Process

The study selection process adhered to the PRISMA framework to ensure transparency and reproducibility. All retrieved records from the e-database search were imported for screening, and all duplicate records were excluded before proceeding to the title and abstract level. While the remaining studies were examined against the predefined inclusion and exclusion criteria.

Full-text publications that satisfied the eligibility criteria were reviewed comprehensively. Although a large amount of literature was identified during the initial search on entrepreneurship education, only 12 studies met the eligibility criteria and directly addressed the review objectives of examining the alignment between the entrepreneurship curriculum, pedagogy, and graduate entrepreneurs' development. Therefore, the reasons for exclusion at each stage were summarised in the PRISMA framework (see Figure 1).

FIGURE 1. PRISMA FRAMEWORK



Source: PRISMA protocol adapted from Page et al. (2021)

2.5. Data Extraction

A structured data extraction approach was undertaken to maintain consistency across all the selected studies. Data extracted from each article include the author(s)' names, date of publication, geographic context, research objectives, theoretical framework, methodological approach, key findings, and implications for the entrepreneurship curriculum and pedagogy. While it is worth noting that particular attention was given to identifying evidence on Outcome-Based Education (OBE), Experiential Learning Theory (ELT), curriculum alignment, pedagogical strategies, entrepreneurship competencies, and graduate entrepreneur development.

2.6. Content Analysis

A qualitative content analysis was utilised to synthesise the results from the selected studies. Each article was given several comprehensive readings to identify recurring concepts, theoretical perspectives, pedagogical approaches, curriculum alignment strategies and entrepreneurship development outcomes. The extracted information was coded and organised in thematic categories that reflect common patterns across the literature.

Through an iterative procedure of comparison and synthesis, the thematic analysis identified five interrelated themes: curriculum design, pedagogical practices, entrepreneurship motivation, entrepreneurial learning, and graduate entrepreneur development. The relationships among these themes informed the development of the proposed analytical framework for Outcome-Based Education and Experiential Learning.

3. Empirical Outcomes

The systematic literature review identified entrepreneurship curriculum design as a central theme influencing graduate entrepreneur development. Across the reviewed studies, the entrepreneurship curriculum was consistently characterised as competency-oriented, with an emphasis on experiential learning, authentic assessment, and industry engagement (Bell, 2021; Du Toit & Kempen, 2020; Lee, 2020). Although individual studies differed in emphasis, there was a broad consensus that curriculum effectiveness depends on its alignment with pedagogical practices that foster entrepreneurial competency. Similarly, researchers like Donaldson et al. (2021), Hägg and Gabrielsson (2020), and Olutuase et al. (2023) have examined the link that connects entrepreneurship curricula and pedagogical techniques for equipping graduate entrepreneurs through effective practical learning and the promotion of entrepreneurial skills and competencies. Consequently, this research demonstrated that diverse conceptual perspectives utilised theories such as self-determination theory, cognitive and experiential learning theories, and entrepreneurship-education assessment for the framework analysis.

Different theoretical frameworks have also been adopted to evaluate how a well-designed entrepreneurship curriculum and pedagogy contribute to the development of entrepreneurial skills among graduates, using behaviourism, humanism, and action learning, as highlighted by several scholars (Bell, 2021; Nzembayie et al., 2024). The frameworks that further explained the importance of aligned curriculum and pedagogy are Outcome-Based Education (OBE), the entrepreneurial ecosystem framework, entrepreneurial competencies models, and curriculum adaptation frameworks (Bell & Bell, 2020; Japee & Oza, 2021; Ncube, 2022; Ngoasong, 2022). The examination of these studies helped identify the diverse models, frameworks, and

determining factors that have been applied to align curriculum and pedagogy in the delivery of entrepreneurship education.

TABLE 1. TWELVE ARTICLES APPLICABLE FOR THIS STUDY

Author's Name and Year	Objective	Theory Adopted	Determinant
Bell (2021)	Examine to understand how entrepreneurship educators can align their teaching philosophy with effective pedagogical practice.	Behavioural theory (BT), Constructivist theory (CT), Cognitive theory (CT), and Humanism Theory (HT)	Strengthen educators' pedagogical choices and effective practice
Bell & Bell (2020)	The study aimed to bridge theory and practice learning by integrating constructivism, objectivism, and Kolb's experiential learning	Experiential Learning Theory (ELT)	It identified the need to integrate theoretical and practical applications into entrepreneurship learning to enhance quality.
Donaldson et al. (2021)	Examined pedagogical engagement that influences graduates' entrepreneurial intentions.	Self-determination theory (SDT)	Pedagogical innovation leads to student motivation.
Du Toit & Kempen (2020)	The study found that insufficient pedagogical training and resources hinder effective entrepreneurship instruction, leading to inconsistent practices.	Constructivist Learning Theory (CLT)	Developed a practical curriculum
Hägg & Gabrielsson (2020)	Examined pedagogical approaches in entrepreneurial education.	Cognitive Learning Theory (CLT) and Experiential Learning Theory (ELT)	Diversified theory for effective practical learning.
Japee & Oza (2021)	Examined enhancement of curriculum design and evaluation through Outcome-Based Education.	Outcome-Based Education (OBE)	Student-Oriented learning
Lee (2020)	The study explored how university students engage and learn within entrepreneurship education (EE) curricula and pedagogical frameworks.	Constructivist Learning Theory (CLT)	It revealed the need to align pedagogical methods with the development of entrepreneurial identities among students.
Ncube (2022)	The study assessed the implementation of EE, its role in developing entrepreneurial competencies, and its potential to address youth unemployment through self-reliance.	Entrepreneurial Competencies Theory (ECT) and EE Effectiveness Evaluation Models (EEEEEM)	Highlighted the incoherent nature of entrepreneurship, insufficient competence of educators and underscored the need for alignment.

Ngoasong (2022)	The study examined factors influencing curriculum adaptation.	Curriculum Adaptation Theory (CAT)	Highlighted effective adaptation of the curriculum, blended learning attributes, and systemic implementation challenges.
Nzembayie et al. (2024)	Examine effective learning that foster entrepreneurial mindset	Action-Learning theory (ADT)	Action learning, engagement and iterative
Olutuase et al. (2023)	Assess the extent to which EE programs are aligned with contextual realities for effective competencies and skill development.	Evaluation of Framework Theory (EFT)	Entrepreneurship education, competencies, effectiveness and entrepreneurial development and skills.
Xu et al. (2023)	Investigated the impact of entrepreneurship education on entrepreneurial intention.	Self-Efficacy Theory and Event System Theory.	Entrepreneurship education, entrepreneurial self-efficacy, entrepreneurial experience, and entrepreneurial intention.

Source: own compilation/calculations based on data extracted from the 12 articles included in the systematic review (n=12)

4. Results of Systematic Literature Review

Research indicates that the alignment of entrepreneurship curricula and pedagogical strategies is shaped by multiple factors, including learning outcomes, teaching approaches, and assessment practices. Bell (2021), Du Toit and Kempen (2020), and Lee (2020) found that the alignment of these elements contributes to curriculum fit and strengthens the development of entrepreneurial competencies. The related framework is reviewed critically to understand how a well-structured curriculum and pedagogy promote interactive learning experiences that empower graduates with entrepreneurial skills and competencies (Nwachukwu et al., 2026). While numerous studies have examined interventions aimed at aligning entrepreneurship curricula with contemporary pedagogical demands, such as formally structuring entrepreneurship as a discipline, integrating it into non-business programmes, providing early exposure to entrepreneurship education, bridging theoretical knowledge with practical application, establishing supportive institutional systems, and ensuring that lecturers possess specialised expertise in entrepreneurship (Bell, 2021; Du Toit & Kempen, 2020; Lee, 2020). All these measures are implemented to ensure that graduates receive an education that equips them with the entrepreneurial skills, knowledge, and competencies necessary for successful venture creation.

The comprehensive review of the literature showed that constructivist learning theory and cognitive theory are the most commonly used theoretical models for studying the alignment of the entrepreneurship curriculum and pedagogy to promote the development of graduates for entrepreneurial uptake. Moreover, several of these studies employed a single theoretical framework or model to evaluate the alignment of entrepreneurship curricula and pedagogy (Bell, 2021; Donaldson et al., 2020; Du Toit & Kempen, 2020; Lee, 2020; Japee & Oza, 2021; Ngoasong, 2022; Nzembayie et al., 2024; Olutuase et al., 2023; Xu et al., 2023). In contrast, other studies adopted multiple frameworks or models to investigate the effectiveness of entrepreneurship curricula and teaching methods in achieving alignment (Bell, 2021; Hägg & Gabrielsson, 2020; Ncube, 2022). Several reasons can be provided for incorporating multiple frameworks or variables when examining curriculum and pedagogy alignment. However,

researchers argue that many existing models and frameworks are too fragmented to adequately contextualise the alignment of curriculum and pedagogy effectiveness (Hägg & Gabrielsson, 2020). Furthermore, as many of the existing curriculum and pedagogy models and frameworks proposed in prior research address only a limited range of the determinants influencing alignment, Nabi et al. (2017) highlighted that theoretical frameworks in entrepreneurship education are often disjointed and that more robust theoretical grounding is needed to understand the alignment between curriculum framework and learning processes.

4.1. Curriculum Framework

The curriculum framework comprises standards and competencies that serve as a roadmap, shaping entrepreneurship programmes and supporting systematic learning and graduate development (Iwu et al., 2024). A well-designed framework is therefore essential for producing graduates with the skills and competencies required for effective entrepreneurial practice. Without such structure, nurturing students who aspire to specialise in entrepreneurship becomes challenging. The entrepreneurship curriculum, in turn, encompasses the specific content, learning experiences, and activities designed to develop entrepreneurial competencies (Iwu et al., 2021). Within this framework, entrepreneurship education should be engaging, opportunity-driven, and sufficiently flexible to accommodate interdisciplinary programmes (Iwu, 2022; Nwachukwu et al., 2026). Such a framework can enhance the development of students' entrepreneurial talents and competencies.

4.1.1. Curriculum Activities

Curriculum activities indicate the extent to which an entrepreneurship curriculum delivers meaningful and engaging educational value beyond traditional theory-driven instruction (Lee, 2020; Xu et al., 2023). Therefore, it is recognised as a key determinant of how effectively entrepreneurship education fosters practical learning and prepares graduates for entrepreneurial practice, forming a foundational component of curriculum development by defining required competencies and learning outcomes that influence the design of teaching, learning and assessment activities. While considering this approach, students whose practical learning is denied may be disadvantaged in acquiring real-world problem-solving skills, gaining practical experience, and cultivating entrepreneurial mindsets and attitudes, compared to traditional classroom methodologies (Japee & Oza, 2021). Such activities enhance learners' readiness for entrepreneurial practice and increase the curriculum's relevance to both student and industry needs.

4.1.2. Curriculum Characteristics – Opportunity-Driven

Curriculum characteristics refer to the structured elements, such as learning outcomes, competencies, instructional activities, and assessments, that guide the execution of learning tasks. It ensures that curriculum design supports the expected outcomes of entrepreneurial skills and knowledge, encompassing competency foundations, structural coherence, and functional components that shape entrepreneurial knowledge and skills. According to Xu et al. (2023), curriculum characteristics represent the quality and relevance of the curriculum structure used to support learning activities and outcomes in entrepreneurship education. However, the OBE framework plays a vital role in shaping the designed curriculum, that equip an entrepreneurial mindset, such as opportunity recognition, creativity, problem-solving, and practical engagement.

4.2. Theoretical Foundation

The qualitative content analysis of the twelve included studies identified several theoretical perspectives that underpin the alignment of entrepreneurship curriculum and pedagogy. Although the reviewed studies utilised different theoretical lenses, recurring patterns emerged regarding how entrepreneurship education should be designed to facilitate the development of graduate entrepreneurs. The analysis indicated that Constructivist Learning Theory (CLT) and cognitive learning theory (CLT) were the most frequently adopted perspectives, followed by Outcome-Based Education (OBE), Experiential Learning Theory (ELT), Self-Efficacy Theory (SET), Human Capital Theory (HCT), and Entrepreneurial Intentional Model (EIM) (Bell & Bell, 2020; Japee & Oza, 2021; Ncube, 2022; Ngoasong, 2022; Xu et al., 2023).

The findings suggest that entrepreneurship education is increasingly conceptualised as an active, learner-centred process in which entrepreneurial competencies are developed through purposeful curriculum design and authentic learning experiences rather than solely through knowledge transmission (Bell & Bell, 2020; Passarelli & Kolb, 2023). While Constructive and Cognitive perspectives explain how students construct entrepreneurial knowledge, Outcome-Based Education provide a framework for defining intended graduates' competencies, and Experiential Learning Theory explains the pedagogical process through which those competencies are acquired through experiences, reflections, conceptualisations and experimentation (Japee & Oza, 2021; Passarelli & Kolb, 2023; Pradhan, 2021).

The diversity of theoretical perspectives identified across the reviewed studies further demonstrates that no single theoretical perspective can adequately explain the complexity of the entrepreneurship curriculum and its pedagogical alignment, thereby supporting the development of the OBE-ELT analytical framework as an integrative approach (Nwachukwu et al., 2026). Consequently, the synthesis of the reviewed literature informed the development of the proposed analytical framework, which integrates Outcome-Based Education (OBE) and Experiential Learning Theory to provide a comprehensive explanation of how curriculum design and pedagogical practices collectively support the development of graduate entrepreneurs (Japee & Oza, 2021; Passarelli & Kolb, 2023).

4.3. ELT Pedagogy and Skill Development

The consolidation of the twelve reviewed studies demonstrated that Experiential Learning Theory (ELT) is one of the influential pedagogical perspectives for illustrating how entrepreneurship education develops entrepreneurial competencies (Karami & Tang, 2019). Across the reviewed studies, ELT appeared explicitly only in two articles, indicating that its application in entrepreneurship education research remains limited. Nevertheless, several studies have shown that learner-centred pedagogical approaches integrate authentic entrepreneurial experiences with structured reflection, conceptual understanding, and practical application. Rather than viewing entrepreneurship education solely as the transmission of theoretical knowledge, the reviewed evidence indicates that entrepreneurial competencies are more effectively developed through active engagement in experiential learning.

Drawing from the reviewed articles, the analysis identified three interrelated pedagogical dimensions through which ELT contributes to entrepreneurship education: (i) experiential pedagogy design, (ii) reflection and meaning making and (iii) active application and

experimentation. Collectively, these dimensions explain how experiential learning enables students to transform classroom knowledge into entrepreneurial competencies while supporting the achievement of intended learning outcomes.

4.3.1. Experiential Pedagogical Design

This entails the use of strategical instruction to offer practical learning that enables students to acquire skills and competencies. It involves the use of simulations, practice-based exercises, case studies, role-play, and project-based learning, which enhance student learning through strategic teaching delivery in an active and reflective real-world environment (Bell & Bell, 2020). Hands-on learning fosters learners' development and builds confidence in displaying theoretical knowledge (Donaldson et al., 2021; Morris, 2020).

4.3.2. Reflection Activities

In ELT, reflective ability plays a significant role in skill development (Nzembayie et al., 2024). It ensures that learning engagement provides opportunities for reflection that help to analyse skills and knowledge, identify areas of strength and weakness, and apply experience in real-life lessons for personal growth (Hägg & Gabrielsson, 2020). This reflective process strengthens metacognitive skills and supports lifelong learning.

4.3.3. Active Application and Experimentation

In experiential learning, an active, hands-on approach to gaining knowledge and skills is paramount (Roberts, 2018). Through the cycle of action, feedback, and adjustment enhances their capacity for innovation, adaptability, and independent problem-solving (Amjad et al., 2020; Oo et al., 2023; Taneja et al., 2022). Bell (2021) and Bell and Bell (2020) suggest that experiential learning includes foundational (case studies, simulations, and problem-based learning), applied (industry projects, mentoring, and guest entrepreneur engagement), and authentic practice (internships, work-integrated learning, and venture creation). This progression demonstrates that experiential learning can be adapted to different learning outcomes and curriculum contexts. Collectively, these findings reinforce the complementary relationship between ELT and OBE. This indicates that ELT provides the pedagogical process for developing entrepreneurial competencies, while OBE ensures alignment with intended graduate outcomes and assessment. This, therefore, informs the proposed OBE-ELT analytical framework.

4.4. Development of the Proposed OBE-ELT Analytical Framework

The synthesis of the twelve reviewed studies identified motivation as a critical contextual factor influencing the effectiveness of entrepreneurship curriculum and pedagogy (Donaldson et al., 2021). Across the reviewed literature, motivation was consistently associated with students' entrepreneurial confidence, opportunity recognition, self-efficacy and willingness to engage in entrepreneurial activities (Donaldson et al., 2021). The findings indicate that motivation is not developed through curriculum content alone but is strengthened through authentic learning experiences, mentorship, early entrepreneurial exposure and supportive institutional environments.

The review further revealed that the entrepreneurship curriculum fosters entrepreneurial motivation by incorporating experiential learning opportunities, work-integrating learning, industry engagement, and mentorship, while simultaneously enhancing educators' capacity to facilitate entrepreneurial learning (Udekwe & Iwu, 2024). Collectively, these findings suggest

that motivation provides the contextual foundation for the development of entrepreneurial competencies.

4.4.1. Explanation of the Proposed OBE-ELT Analytical Framework

As illustrated in Figure 2, the proposed framework consists of five interrelated components that collectively explain how entrepreneurship curriculum and pedagogy contribute to the development of graduate entrepreneurs (Nwachukwu et al., 2026; Passarelli & Kolb, 2023). Although presented sequentially, each component functions as a continuous, iterative process in which curriculum design, pedagogy, assessment, and graduate outcomes continually inform one another (Pradhan, 2021).

Outcome-Based curriculum design forms the foundation of the framework by defining the entrepreneurial competencies and learning outcomes expected from entrepreneurship education (Pradhan, 2021). Curriculum alignment ensures that pedagogical strategies and assessment practices remain directly linked to these intended outcomes (Driscoll & Wood, 2023).

Experiential pedagogical implementation represents the instructional process through which students actively engage in entrepreneurial learning. Consistent with experiential learning theory, experiential pedagogical strategies include business simulation, problem-based learning, industry projects, mentoring, work-integrated learning, and venture creation activities that enable students to translate theoretical knowledge into entrepreneurial practice (Kolb, 2014; Motta & Galina, 2023; Passarelli & Kolb, 2023).

Reflection, feedback, and authentic assessment provide the mechanisms that reinforce entrepreneurial learning. Continuous reflections enable students to evaluate their experience, while authentic and constructive feedback supports competency development and provides evidence of achievement of intended learning outcomes (Driscoll & Wood, 2023; Kolb, 2014).

The interaction of these components contributes to graduate entrepreneur development, reflected in enhanced entrepreneurial knowledge, opportunity recognition, innovation capability, self-efficacy, problem-solving ability, an entrepreneurial mindset, and readiness for venture creation, intrapreneurship, or other forms of entrepreneurial engagement (Bell & Bell, 2020; Nwachukwu et al., 2026; Passarelli & Kolb, 2023).

Finally, the framework incorporates a continuous curriculum improvement process in which evidence obtained from assessment outcomes, reflective practices and continuous feedback informs the identification of gaps and improvement needs, guiding curriculum and pedagogical revisions, implementation enhancements and subsequent monitoring and evaluation. This continuous feedback loop ensures that entrepreneurship education remains responsive to changing industry needs, institutional priorities and graduate employability requirements (Driscoll & Wood, 2023; SETA, 2025).

4.4.2. Analysis of Task Characteristics

The reviewed studies identified task characteristics as an important factor in entrepreneurship education. This finding informed the inclusion of task characteristics as a core component of the proposed OBE-ELT analytical framework. Within Experiential Learning Theory, task characteristics are defined by their capacity to create authentic or stimulated entrepreneurial experience through fieldwork, stimulation, laboratories, action learning, case studies, and

practical projects that actively engage learners and promote entrepreneurial motivation and cognitive development (Bell, 2021; Donaldson et al., 2020; Du Toit & Kempen, 2020; Lee, 2020; Japee & Oza, 2021; Udekwe & Iwu, 2024; Xu et al., 2023). The review further revealed that experience-based tasks such as business planning, pitching, market research, and prototyping help learners to connect theoretical knowledge with entrepreneurial practice. Consequently, entrepreneurship curriculum and pedagogy should incorporate coherent, practice-oriented learning task that aligns intended learning outcomes with authentic entrepreneurial competencies, thereby reducing the gap between classroom learning and entrepreneurial practice (Ngoasong, 2022; Nzembayie et al., 2024).

4.4.3. Development of Graduate Entrepreneurs

The reviewed studies identified graduate entrepreneur development as a principal outcome of aligning entrepreneurship curriculum and pedagogy through Outcome-Based Education and Experiential Learning Theory. The findings indicate that graduates develop entrepreneurial knowledge, skills, attitudes, and behaviour through authentic learning experiences supported by mentorship, work-integrated learning, early entrepreneurial exposure, and educators' expertise (Bell & Bell, 2020; Olutuase et al., 2023). These pedagogical mechanisms collectively strengthen entrepreneurial capacity by enabling students to apply theoretical knowledge in real-world contexts.

The synthesis further revealed that effective entrepreneurship depends on educators who are competent in experiential pedagogies and capable of facilitating active, learner-centred engagement. According to Japee and Oza (2021), entrepreneurship curriculum that integrate structured experiential learning, skilled facilitators, supportive learning environments, and authentic entrepreneurial activities are more likely to cultivate graduates who possess the confidence, competence, and commitment required for entrepreneurial practice.

4.5. Conceptual Integration of the Proposed OBE-ELT Analytical Framework

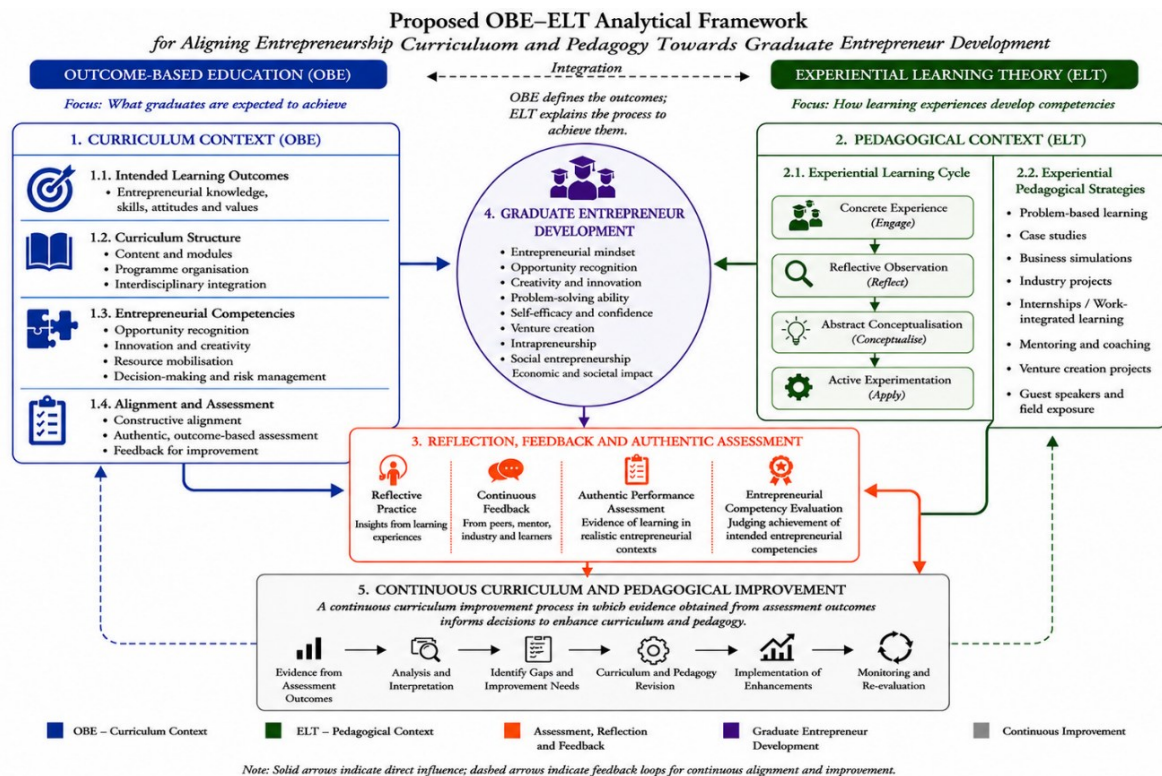
The synthesis of the reviewed studies provides the conceptual rational for integrating Outcome-Based Education (OBE) and Experiential Learning Theory (ELT) within the proposed analytical framework. The findings demonstrate that effective entrepreneurship education depends on aligning clearly defined entrepreneurial learning outcomes with experiential pedagogical practices that enable students to develop entrepreneurial competencies through authentic learning experiences. While OBE establishes the intended graduates' outcomes and guides curriculum alignment, ELT provides the pedagogical processes through which these outcomes are achieved through concrete experiences, reflective observations, abstract conceptualisation and active experimentation.

The review further revealed that effective teaching, reflective practice and active application constitute the core pedagogical mechanisms underpinning entrepreneurial competency development (Du Toit & Kempen, 2020; Japee & Oza, 2021; Lee, 2020; Xu et al., 2023). These pedagogical processes are reinforced through coherent curriculum design, authentic learning activities, appropriate task characteristics and constructive curriculum alignment, collectively enhancing the effectiveness of entrepreneurship education and supporting graduate entrepreneur development (Bell, 2021; Donaldson et al., 2020).

The proposed framework also highlights the complementary roles of motivation and task characteristics in strengthening experiential learning. Early entrepreneurial exposure,

mentorship, educators' expertise, and work-integrated programs create supportive conditions that foster entrepreneurial confidence and readiness, while authentic learning tasks facilitate the transfer of entrepreneurial knowledge into practice. Collectively, these interrelated components provide a coherent explanation of how curriculum design and pedagogy can be systematically aligned to develop graduates with the knowledge, skills, attitudes, and behaviours required for entrepreneurial practice, as shown in Figure 2 below.

FIGURE 2 PROPOSED OBE-ELT ANALYTICAL FRAMEWORK



Source: authors' compilation

5. Discussion

5.1. Theoretical Contributions of the Proposed OBE-ELT Analytical Framework

The findings of this systematic literature review extend entrepreneurship education by providing a synthesised analytical framework that integrates Outcome-Based Education (OBE) and Experiential Learning Theory (ELT) to explain the alignment among the entrepreneurship curriculum, pedagogy, and graduate entrepreneur development (Bell, 2021; Donaldson et al., 2020; Japee & Oza, 2021; Ngoasong, 2022; Nzembayie et al., 2024; Olutuase et al., 2023; Xu et al., 2023). While previous studies have examined entrepreneurship curriculum design, experiential learning and entrepreneurial competency development independently, the present review demonstrates that these dimensions are most effective when considered as complementary and mutually reinforcing educational processes (Du Toit & Kempen, 2020; Lee, 2020).

The findings are broadly consistent with the systematic review by Motta and Galina (2023), which concluded that experiential learning plays a central role in entrepreneurship education by promoting active engagement, reflection and authentic learning experiences. However, whereas Motta and Galina primarily synthesised experiential learning approaches, the present

study advances the literature by integrating these pedagogical processes within an Outcome-Based Education framework (Iwu et al., 2024; Ncube, 2022; Nwachukwu et al., 2026). This integration explains not only how entrepreneurial competencies are developed but also how curriculum design, learning outcomes, pedagogy and assessment can be systematically aligned to support graduate entrepreneur development in South Africa.

Similarly, the findings complement the broader systematic literature review conducted by Sultono et al. (2025), which analysed a substantially larger body of entrepreneurship education literature and identified dominant theoretical perspectives and emerging research trends. Rather than seeking to provide a comprehensive mapping of the entire entrepreneurship education field, the present review adopted a focused synthesis of studies that explicitly examined entrepreneurship curriculum alignment and pedagogical practices. Consequently, the proposed analytical framework offers a more targeted conceptual explanation of how curriculum alignment can be operationalised through the integration of OBE and ELT (Ngoasong, 2022; Nzembayie et al., 2024).

The principal theoretical contribution of this study, therefore, lies not in introducing new educational theories but in synthesising existing theoretical perspectives into a coherent analytical framework that explains the relationships among curriculum design, experiential pedagogy, authentic learning activities, entrepreneurial motivation and graduate entrepreneur development. By conceptualising these elements as an interconnected educational system rather than isolate curriculum components, the framework provides a stronger theoretical foundation for future empirical investigations into entrepreneurship curriculum alignment.

5.2. Practical Implications for Entrepreneurship Curriculum and Pedagogy

The proposed OBE-ELT analytical framework offers practical guidance for curriculum designers, educators and South Africa's higher education institutions seeking to strengthen entrepreneurship education. By integrating Outcome-Based Education with Experiential Learning Theory, the framework provides a structural approach for aligning intended learning outcomes, curriculum content, pedagogical strategies, and assessment practices to support graduate entrepreneur development.

For curriculum designers, the framework emphasised the constructive alignment of entrepreneurial competencies with curriculum content, learning activities, and assessment. For educators, it advocates progressive, authentic, experiential learning through case studies, simulations, problem-based learning, industry projects, mentoring, work-integrated learning, and venture creation, supported by reflective practices to strengthen entrepreneurial competencies.

The framework also informs institutional quality assurance by encouraging continuous evaluation of graduate outcomes, stakeholder feedback, and curriculum review to ensure that entrepreneurship programs remain responsive to changing industry needs. Overall, it offers a practical roadmap for systematically aligning entrepreneurship curriculum and pedagogy to develop entrepreneurial graduates across diverse higher education institutions.

5.3. Implications for Higher Education and Graduate Entrepreneurs' Development

The findings of this study have broader implications for South Africa's higher education institutions seeking to produce graduates equipped to thrive in a dynamic entrepreneurship

ecosystem. The proposed OBE-ELT analytical framework demonstrates that graduate entrepreneur development requires a systematic alignment of curriculum design, experiential pedagogy, authentic assessment, and continuous curriculum improvement. Beyond preparing graduates to establish new ventures, the framework supports the development of entrepreneurial competencies applicable across employment, innovation, intrapreneurship and social entrepreneurship. Consequently, higher education institutions can utilise the framework to strengthen curriculum quality, enhance graduate employability and contribute to sustainable economic and societal development.

5.4. Limitations and Future Research

The study has several limitations that should be considered when interpreting the findings. First, the review was restricted to English-language, peer-reviewed studies identified through Scopus, Web of Science, Direct Science and Google Scholar. Consequently, relevant studies published in other languages or indexed in other databases may have been excluded. Second, although the systematic selection process yielded twelve studies that met all predefined inclusion criteria, the proposed analytical framework represents a conceptual synthesis rather than an empirically validated model. Therefore, the findings should be interpreted within the scope of the selected literature.

Future research should empirically test the proposed OBE-ELT analytical framework across diverse higher education contexts to examine its applicability and effectiveness in strengthening entrepreneurship curriculum alignment and graduate entrepreneur development. Comparative studies across disciplines, institutional settings, and national contexts would further enhance understanding of how curriculum design and experiential pedagogy interact to develop entrepreneurial competencies.

6. Conclusion

By adopting a systematic literature review approach, this study identified, evaluated and critically analysed empirical research evidence on the alignment of entrepreneurship curriculum and pedagogy for graduate entrepreneur development in South Africa. Through the rigorous application of predefined inclusion and exclusion criteria, the review identified the key theoretical perspectives, pedagogical practices, and curriculum determinants that influence entrepreneurship education. Based on this synthesis, this study proposed an analytical framework integrating Outcome-Based Education (OBE) and Experiential Learning Theory (ELT) to provide a comprehensive conceptual explanation of how curriculum design and pedagogical practices can be systematically aligned to develop entrepreneurial graduates in South Africa higher education institutions.

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Ethics Statement

This study received ethical approval from the relevant institutional Research Ethics Committee prior to commencement. Although this research was conducted as a Systematic Literature Review based exclusively on published literature and did not involve direct data collection from human participants, the study was undertaken in accordance with the institutional requirements for ethical approval. The review was conducted in line with recognised principles of research integrity, transparency, and ethical scholarship, and all sources included in the review have been appropriately acknowledged and cited.

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Coaching for Wellbeing in Entrepreneurial Education: A PERMA+4-Informed Framework for Higher Institutions in Emerging Economies

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Abstract

Entrepreneurship education in emerging economies often emphasises venture creation and technical competencies, with comparatively less attention to the psychological, relational, physical, environmental, and economic conditions that may shape students' entrepreneurial learning and well-being. This paper develops the Coaching for Well-being (C4W) conceptual framework to integrate coaching-informed pedagogy and student well-being within entrepreneurship education. The framework was developed through a conceptual synthesis of relevant literature, informed in part by findings from an earlier systematic review of entrepreneurial coaching, complementary scholarship on coaching, positive psychology, well-being and entrepreneurship education, and the authors' practice-informed experience in African higher education. C4W uses the nine dimensions of PERMA+4, Positive Emotion, Engagement, Relationships, Meaning, Accomplishment, Physical Health, Mindset, Environment, and Economic Security as its well-being architecture, and conceptually maps these dimensions to entrepreneurship teaching and coaching-informed activities. These include reflection, peer coaching, goal setting, networking, business simulations, values clarification, ecosystem mapping, and financial-resource activities. The framework articulates the pedagogical rationale that links these activities to the PERMA+4 dimensions and identifies the intended entrepreneurial learning outcomes. C4W contributes a context-sensitive framework that positions well-being as integral to entrepreneurial learning rather than as a separate student-support concern, with relevance to resource-constrained higher education environments. As a

theoretically informed conceptual framework rather than an empirically validated intervention, its proposed relationships require testing and refinement across different institutional, cultural, and socioeconomic contexts.

Keywords: entrepreneurship education; coaching-informed pedagogy; student well-being; PERMA+4; emerging economies

1. Introduction

The process of learning through entrepreneurship is increasingly associated with emotional stress among students, particularly in emerging economies (González-López et al., 2019; Hjelle & Roald, 2025). This phenomenon frequently occurs in challenging environments, thereby affecting students' capabilities and learning outcomes. Developing resilience is crucial for achieving success in entrepreneurship (White & Gupta, 2020), as is fostering qualities such as innovation, adaptability, and problem-solving skills in resource-constrained settings (Nabi et al., 2017). Nevertheless, pedagogical approaches that incorporate positive psychology and coaching remain underrepresented. The primary sources of stress are environmental factors, including financial hardships, peer and instructor-related issues, and domestic problems (Alsulami et al., 2018; Almojali et al., 2017; Khumalo, 2026). Entrepreneurial students encounter distinctive challenges, such as balancing academic responsibilities with business pressures, limited time for learning, and market uncertainties (Mulyono & Mulyana, 2025; Khumalo, 2026). Such stressors adversely affect mental health and academic achievement. In South Africa, students attending underserved institutions often contend with socio-economic instability, identity crises, and psychological stress (Cele et al., 2025). Many of these students are first-generation learners susceptible to systemic inequalities, including financial hardship, food insecurity, language barriers, and social exclusion (Naudé & Breshears, 2025). These issues are compounded by legacy apartheid policies, resulting in learning environments that are both emotionally and cognitively demanding (Akokuwebe et al., 2026; Ebewo et al., 2026). The implementation of well-being support measures has the potential to enhance learning outcomes (Wilson Fadiji et al., 2025; Weiss et al., 2025).

Research indicates that learning constitutes a rational process influenced by emotional, psychological, and social factors (Immordino-Yang & Damasio, 2007). In high-adversity contexts such as South Africa, limited emotional safety diminishes the cognitive resources necessary for learning, creativity, and engagement (Mutinta, 2022; Ebewo, Ndlovu & Mlotshwa, 2026; Vogel & Schwabe, 2016). A study identified a positive correlation between psychological safety and students' creativity in project-based learning (Han et al., 2022). Ávila et al. (2023) underscore the significance of emotions in entrepreneurship, highlighting their motivational function and social influences. In fields characterised by risk-taking, such as entrepreneurship, emotional and psychological well-being are of paramount importance, as trauma or self-doubt impede essential personal skills. Therefore, entrepreneurship education must also focus on developing emotional and psychological capabilities, as recommended by Ou and Kim (2025), who advocate integrating psychological interventions to foster ambition, personality, and emotional skills. Existing pedagogical approaches predominantly emphasise outcomes such as business planning and innovation, often at the expense of student well-being, identity, and resilience (Göksen-Olgun et al., 2022; Ndlovu et al., 2025). This study investigates

the potential of well-being coaching, grounded in a PERMA+4 framework, to support entrepreneurial learning within emerging economies.

The PERMA+4 model of well-being, developed by Donaldson et al. (2021), expands upon Seligman's (2011) PERMA, incorporating Physical Health, Mindset, Environment, and Economic Security to enhance the prediction of well-being and work-related outcomes. Its widespread application in workplace settings is complemented by its support for student flourishing on an international scale, although its utilisation among African entrepreneurship students remains relatively limited (Song et al., 2025; Dorri Sedeh & Aghaei, 2024). The model demonstrates considerable adaptability, as evidenced by its PERMAH variant implemented in the Philippines to align with indigenous values (Guinto & Campoamor-Olegario, 2025), and may be employed to address well-being among African entrepreneurship students. The PERMA+4 framework can be integrated into coaching methodologies, which are increasingly prevalent in entrepreneurship education (Rajasinghe & Mansour, 2019; Ndlovu et al., 2025). Coaching facilitates self-reflection, identity development, and learner agency, with significant connections to positive psychology (Cannon-Bowers et al., 2023). Research indicates that coaching enhances self-efficacy within entrepreneurship education contexts (Ndlovu et al., 2025; Rajasinghe & Mansour, 2019; Wijaya et al., 2025). Nonetheless, as Wilson Fadji et al. (2025) observed, notable gaps persist in the application of coaching strategies to promote well-being in higher education within emerging economies, particularly in resource-constrained undergraduate environments, compared with contexts in the Global North. Few studies have developed frameworks for coaching well-being in entrepreneurial education that employ the PERMA+4 model within these academic institutions.

This study presents a Coaching for Well-being framework that integrates well-being science with coaching methodologies and is specifically designed for developing nations such as South Africa, where students face a range of social, emotional, and economic challenges. Arguably, this proposed framework can be regarded as a response to Wilson Fadji et al.'s (2025) concerns that the dominance of Global North literature and models and their interpretations of relationships between well-being, engagement, and learning experiences among students in higher socioeconomic contexts have been a significant limitation in identifying appropriate well-being interventions to improve learning outcomes among African higher education students. It utilises the PERMA+4 well-being domains and aligns them with pragmatic coaching strategies tailored for entrepreneurship education. The aim is to reconceptualise entrepreneurship instruction not merely as a means of developing economic skills but also as a pathway to personal identity, emotional resilience, and holistic flourishing.

2. Literature Review

2.1. Entrepreneurship Education in Emerging Economies: A Pedagogical Gap

Entrepreneurship education in emerging economies, particularly in Africa, is associated with promoting employment, innovation, and social development. In South Africa, challenges such as inequality, youth marginalisation, and graduate unemployment have compelled universities to adopt a competency-based approach that emphasises economic participation and self-reliance, often at the expense of transformative learning (Iwu et al., 2021). This approach tends to confine pedagogy to technical skills, business plan development, and venture creation, with minimal emphasis on students' psychological, emotional, and identity-related well-being,

especially among marginalised groups. First-generation students encounter difficulties, including financial insecurity, identity dislocation, trauma, and insufficient psychosocial support (Ebewo et al., 2026). These obstacles impede academic success and personal development, both of which are vital for entrepreneurial endeavours. Educational models that overlook learners' lived realities risk perpetuating inequalities rather than alleviating them, thereby underscoring the necessity for frameworks that also cultivate self-efficacy, reflective capacity, and resilience to enable thriving in uncertain, resource-constrained environments (Emami & Hunt, 2025).

2.2. Coaching as a Pedagogical Approach to Entrepreneurial Learning

Coaching, and particularly entrepreneurial coaching, is increasingly recognised as a learner-centred developmental approach within entrepreneurship education (Cronje et al., 2025a, 2025b). In this study, coaching is understood as a facilitative process that supports learners in reflecting on their experiences, clarifying goals and values, developing self-awareness, and identifying actions and solutions rather than relying primarily on directive advice. This distinguishes coaching from conventional instruction, in which educators predominantly transmit knowledge, and from mentoring, in which a more experienced individual may provide advice, guidance, and expertise. Coaching instead emphasises questioning, reflection, goal clarification, and learner agency (Passmore & Fillery-Travis, 2011; van Nieuwerburgh & Rehal, 2026).

Within entrepreneurship education, this orientation is particularly relevant because entrepreneurial learning involves more than acquiring technical knowledge about business creation. Students must also learn to navigate uncertainty, setbacks, relationships, decision-making, and evolving entrepreneurial identities (Göksen-Olgun et al., 2022). Previous research associates entrepreneurial coaching with the development of self-efficacy, adaptive learning, agency, and identity formation (Molema et al., 2026; Ndlovu et al., 2025). Coaching-informed activities such as reflective dialogue, goal setting, narrative reflection, peer coaching, and feedback can complement experiential entrepreneurship education by encouraging students to examine not only what they do but also how they interpret experiences and respond to entrepreneurial challenges (Ndlovu & Ebewo, 2026).

Entrepreneurial learning also involves relational capabilities (Emami & Hunt, 2025). Students need to develop networks and establish relationships with peers, customers, partners, suppliers, and other actors within entrepreneurial ecosystems. Consequently, coaching-informed pedagogy can be combined with experiential activities such as networking exercises, peer interaction, and simulated business encounters. Such activities provide opportunities for students to practise communication and relationship-building while reflecting on their interpersonal experiences. This relational orientation is particularly relevant in African contexts, where communal learning, relational identity, and social interconnectedness can be important dimensions of development (Chilisa, 2012).

However, the use of coaching techniques in education should not imply that any educator who employs a coaching framework becomes a professional coach. Coaching effectiveness depends partly on how practices are facilitated and on the practitioner's competence, relational skills, and contextual awareness. Evidence-based research on coaching and mentoring similarly points to the importance of structured developmental processes in supporting entrepreneurial self-

efficacy (Cronje et al., 2025a, 2025b). The present study, therefore, uses the term “coaching-informed pedagogy” to describe the integration of selected coaching principles and practices into entrepreneurship education. This distinction recognises the professional expertise associated with coaching while allowing educators to incorporate appropriately bounded reflective, relational, and goal-oriented practices into learning environments.

2.3. The Role of Well-being in Higher Education Learning

Well-being science, rooted in positive psychology, has evolved beyond an emphasis on alleviating distress towards promoting optimal functioning across emotional, psychological, and social domains (Irene et al., 2025). In higher education, well-being is increasingly recognised as relevant to students’ learning experiences because emotional and psychological conditions shape cognitive functioning, motivation, memory, creativity, and engagement. Students’ capacity to engage effectively with learning may therefore depend not only on the acquisition of disciplinary knowledge and skills but also on the psychological and social resources available to them.

This relationship is particularly important in demanding or resource-constrained educational environments. Students at underserved institutions may face financial pressures, social marginalisation, academic demands, and limited psychological safety during their studies. Hammond (2015) highlights the importance of emotional regulation and resilience for cognitive functioning in stressful or marginalised settings. Similarly, the broader literature suggests that learning environments that support well-being can enhance students’ capacity to engage, adapt, and respond constructively to academic challenges (Seligman et al., 2011; van Nieuwerburgh & Meehan, 2024). Well-being should therefore not be understood as separate from the educational process, but as one of the conditions that may influence how students participate in and respond to learning.

This has particular relevance for entrepreneurship education. Entrepreneurial learning frequently requires students to operate under conditions of uncertainty, take initiative, respond to setbacks, collaborate with others, and persist when outcomes are unclear. Supporting well-being in such environments may, in turn, complement the development of entrepreneurial competencies by helping students build the personal and relational resources needed to navigate demanding learning experiences. Rather than positioning well-being as an additional or peripheral student-support activity, integrating it into pedagogy offers an opportunity to consider students’ cognitive, emotional, and social development alongside entrepreneurial learning.

However, the application of well-being approaches within South African higher education also requires attention to context. Many established well-being frameworks originate predominantly from Western theoretical traditions, raising questions about their cultural and contextual fit when applied to students whose experiences are shaped by different social, economic, institutional, and communal realities. Consequently, well-being approaches in South African higher education should not simply be transferred without consideration of students’ lived circumstances. This reinforces the need for context-sensitive approaches that recognise both psychological dimensions of flourishing and the wider relational, environmental, and socioeconomic conditions that shape students’ capacity to thrive.

2.4. The PERMA+4 Well-being Framework

Seligman's (2011) PERMA framework conceptualises well-being through five dimensions: Positive Emotion, encompassing positive affect and optimism; Engagement, referring to absorption and involvement in meaningful activities; Relationships, emphasising supportive social connections; Meaning, reflecting purpose and contribution beyond the self; and Accomplishment, involving progress, mastery, and achievement. PERMA+4 extends this framework by incorporating Physical Health, Mindset, Environment, and Economic Security, thereby recognising the physical, cognitive, contextual, and financial conditions that also shape well-being (Donaldson et al., 2021; Donaldson et al., 2022; Cabrera & Donaldson, 2024).

This expanded framework is particularly relevant to entrepreneurship education in resource-constrained contexts, where student well-being may be shaped simultaneously by psychological resources, relationships, physical functioning, learning environments, and financial insecurity. PERMA-related measures have also demonstrated relevance among university students, including within sub-Saharan contexts (Magare et al., 2022). C4W therefore adopts PERMA+4 because dimensions such as Economic Security and Environment enable consideration of material and contextual realities alongside psychological well-being. While alternative well-being approaches offer distinct perspectives, PERMA+4 provides a useful, multidimensional framework for integrating well-being with coaching-informed entrepreneurship pedagogy.

2.5. Synthesis: Integrating Coaching and Well-being in Entrepreneurship Education

Coaching and positive psychology share an emphasis on development, agency, strengths, reflection, and purposeful action (Cannon-Bowers et al., 2023), yet they have generally developed as distinguishable strands of scholarship. Within entrepreneurship education, coaching has primarily been examined in relation to entrepreneurial development, self-efficacy, reflective learning, and venture-related outcomes (Ndlovu et al., 2025; Cronje et al., 2025a, 2025b). PERMA and PERMA+4, by contrast, provide multidimensional accounts of well-being but do not prescribe a pedagogy specifically for entrepreneurship education.

This creates a conceptual gap between what dimensions of well-being might require attention and how entrepreneurship educators might create learning activities through which students can reflect on and develop those dimensions. The gap may be particularly consequential in resource-constrained higher education contexts, where entrepreneurial learning occurs alongside financial uncertainty, identity development, social pressures, and unequal access to entrepreneurial resources.

The C4W framework addresses this gap by establishing a proposed pedagogical relationship between the two bodies of scholarship. PERMA+4 provides the organising architecture of well-being, while coaching-informed and experiential activities offer potential pedagogical mechanisms for students to engage with these dimensions. The contribution is therefore not the claim that either coaching or PERMA+4 is independently new, but the conceptual integration of coaching-informed entrepreneurship pedagogy with the nine PERMA+4 dimensions in a context-sensitive framework for entrepreneurial learning.

Importantly, this integration remains propositional. Existing evidence can support the theoretical plausibility of individual components, but it does not establish the effectiveness of C4W as an integrated framework. Empirical evaluation is therefore required to determine

whether the proposed relationships operate as anticipated, under what conditions, for which students, and with what implications for educators' coaching competence and professional boundaries.

3. Methodological Approach

3.1. Research Design and Knowledge Sources

This study adopts a conceptual framework development approach informed by a structured narrative synthesis of the literature. This study did not conduct a new systematic literature review; instead, it integrated relevant theoretical, empirical, and practice-informed knowledge to develop the Coaching for Well-being (C4W) framework. The conceptual synthesis was informed, in part, by findings from an earlier systematic literature review of entrepreneurial coaching (Ndlovu et al., 2025), as well as scholarship on well-being, positive psychology, entrepreneurship education, and higher education in emerging-economy contexts.

The framework draws on three interconnected knowledge bases. First, evidence on entrepreneurial coaching and coaching-informed pedagogy drew particularly on Ndlovu et al. (2025), whose systematic literature review examined the role of entrepreneurial coaching in entrepreneurship education. This evidence was complemented by scholarship concerned with reflective learning, goal setting, learner agency, self-efficacy, and identity development (Passmore & Fillery-Travis, 2011; Rajasinghe & Mansour, 2019; Ndlovu & Ebewo, 2026; Iwu et al., 2025). These sources informed consideration of coaching practices relevant to student well-being and entrepreneurial learning.

Second, the well-being architecture of C4W was derived from the PERMA+4 framework. PERMA+4 extends Seligman's (2011) original dimensions of Positive Emotion, Engagement, Relationships, Meaning, and Accomplishment by incorporating Physical Health, Mindset, Environment, and Economic Security (Donaldson et al., 2021; Donaldson et al., 2022). This expanded framework was considered particularly relevant to entrepreneurship education in resource-constrained higher education contexts because it incorporates psychological and relational functioning alongside physical, environmental, and economic conditions.

Third, the authors' scholarship and professional experience in entrepreneurship education and coaching in African higher education provided a practice-informed, contextual knowledge base (Ebewo et al., 2026; Ndlovu & Ebewo, 2026). This experience informed consideration of the contextual relevance and practicability of the pedagogical activities incorporated into C4W. It was not treated as empirical evidence of the framework's effectiveness. The authors' positioning and its potential influence on the conceptual-development process are considered explicitly in Section 3.3.

3.2. Conceptual Mapping and Framework Development

The C4W framework was developed through an iterative process of conceptual synthesis and mapping. The nine PERMA+4 dimensions provided the organising architecture of well-being, while the pedagogical activities reflected coaching-informed and experiential practices used in the authors' entrepreneurship education practice. Their selection and interpretation were further informed by the earlier systematic review of entrepreneurial coaching (Ndlovu et al., 2025) and

complementary scholarship on coaching and entrepreneurship education (Passmore & Fillery-Travis, 2011; Rajasinghe & Mansour, 2019; Ndlovu & Ebewo, 2026).

The mapping proceeded in three stages. First, each PERMA+4 dimension was considered in relation to its underlying well-being construct and relevance to entrepreneurship students (Seligman, 2011; Donaldson et al., 2021; Donaldson et al., 2022). Second, we considered existing entrepreneurship teaching and coaching-informed activities, including reflection, peer coaching, networking, business simulations, goal setting, experiential learning, ecosystem mapping, and financial-resource activities, in relation to the psychological, behavioural, relational, or contextual processes they were intended to engage. Third, activities were mapped to the PERMA+4 dimensions, in which a theoretically coherent relationship could be established among the well-being construct, pedagogical mechanism, and intended entrepreneurial-learning outcome.

Table 1. operationalises these relationships by presenting the activities, rationale for their PERMA+4 alignment, and intended learning outcomes. The mappings represent theoretically informed pedagogical propositions rather than empirically established causal relationships. Accordingly, C4W is presented as a conceptual framework that requires empirical evaluation and refinement across diverse institutional, cultural, and socioeconomic contexts.

3.3. Reflexivity

The development of C4W was informed in part by the authors' experience in entrepreneurship education and coaching in African higher education. This practitioner's positioning provided contextual insight into the challenges that entrepreneurship students encounter. It informed consideration of pedagogical activities such as reflection, peer coaching, networking, business simulations, goal setting, and resource-focused exercises. At the same time, the authors recognise that their professional backgrounds and pedagogical assumptions may have influenced which activities were considered relevant and how these were interpreted and mapped onto PERMA+4 dimensions. The mapping process should therefore be understood as an interpretive conceptual exercise informed by both scholarship and practitioner knowledge, rather than as an objective or empirically validated classification. To strengthen transparency, the framework distinguishes the authors' practice-informed judgements from the supporting literature and presents the resulting mappings as propositions that require empirical testing and refinement.

4. The Coaching for Well-being (C4W) Conceptual Framework

Building on the literature synthesis and conceptual-development process described above, this study proposes the Coaching for Well-being (C4W) conceptual framework for entrepreneurship education. C4W connects the nine PERMA+4 dimensions with coaching-informed and experiential pedagogical activities to provide a structured approach for considering student well-being alongside entrepreneurial learning.

The framework responds to the premise that entrepreneurial learning extends beyond technical knowledge and venture-creation competencies. Students also navigate uncertainty, setbacks, relationships, identity development, resource constraints, and decisions about their entrepreneurial futures (Rajasinghe & Mansour, 2019; Iwu et al., 2025; Ndlovu et al., 2025;

Ndlovu & Ebewo, 2026; Iwu et al., 2026). C4W therefore positions well-being as integral to the entrepreneurial learning experience rather than as a separate student-support activity.

Within C4W, PERMA+4 provides the organising well-being architecture, while coaching-informed and experiential activities provide the proposed pedagogical mechanisms through which students engage with its dimensions. Activities such as reflective questioning, peer coaching, goal setting, values clarification, networking, business simulations, ecosystem mapping, and financial-resource reflection connect wellbeing-oriented reflection with entrepreneurial learning and action. This integration is particularly relevant to relational, identity, agency, and resource dimensions of entrepreneurial learning, which may be especially salient in resource-constrained contexts (Chilisa, 2012; Rajasinghe & Mansour, 2019; Ndlovu et al., 2025).

C4W does not assume that particular activities automatically produce well-being or entrepreneurial outcomes. Rather, the relationships within the framework are theoretically informed mappings derived through the conceptual process described in Section 3. Existing scholarship supports the relevance of individual constructs and practices, but C4W as an integrated framework has not yet been empirically evaluated. Its intended outcomes should therefore be understood as propositions requiring empirical examination.

Table 1. operationalises C4W by mapping each PERMA+4 dimension to entrepreneurship-teaching- and coaching-informed activities, explaining the pedagogical rationale for each alignment, identifying intended entrepreneurial learning outcomes, and providing supporting literature.

TABLE 1. OPERATIONALISATION OF THE C4W FRAMEWORK THROUGH ENTREPRENEURSHIP TEACHING AND COACHING-INFORMED ACTIVITIES

PERMA+4 dimension	Entrepreneurship teaching and coaching-informed activities	Pedagogical rationale for alignment	Intended entrepreneurial-learning outcomes	Supporting literature
Positive Emotion	Reflective journaling; recognition of successes and progress; personal SWOT and strengths reflection	Encourages students to identify strengths, resources and progress and to reflect constructively on entrepreneurial experiences, including setbacks.	Self-awareness; optimism; confidence; entrepreneurial self-efficacy	Seligman (2011); Van Tonder et al. (2022); Ndlovu et al. (2025)
Engagement	Real-world entrepreneurial simulations; experiential activities using students' business ideas;	Actively engages students in entrepreneurial tasks and problems. Combining experience with	Active learning, problem-solving, persistence, adaptive thinking, and application of	Iwu et al. (2025); Ndlovu et al. (2025); Ndlovu & Ebewo (2026)

PERMA+4 dimension	Entrepreneurship teaching and coaching-informed activities	Pedagogical rationale for alignment	Intended entrepreneurial-learning outcomes	Supporting literature
	entrepreneurial problem-solving; reflective debriefing	reflection encourages involvement, application and learning through action rather than passive content acquisition.	entrepreneurial knowledge	
Relationships	Peer coaching, structured group dialogue, networking exercises, business-relationship simulations	Provides opportunities to practise listening, reciprocal communication, trust-building and collaboration. Networking and simulations extend relational learning to interactions with customers, partners, and other actors in the entrepreneurial ecosystem.	Communication and interpersonal skills; networking competence; collaboration; relationship-building; social capital development	Chilisa (2012); Molema et al. (2026); Ndlovu & Ebewo (2026)
Meaning	Identity storytelling; values clarification; reflection on entrepreneurial purpose and aspirations	Enables students to connect entrepreneurial aspirations with personal identity, values, purpose and desired contribution, rather than viewing entrepreneurship solely as an economic activity.	Entrepreneurial identity development, values awareness, clarity of purpose, and intrinsic motivation	Rego (2020); Kimmitt et al. (2024); Ndlovu et al. (2025)
Accomplishment	SMART goal setting; milestone mapping; action	Translates entrepreneurial aspirations into specific goals and manageable	Goal-setting competence; action orientation; entrepreneurial	Seligman (2011); Passmore & Fillery-Travis (2011);

PERMA+4 dimension	Entrepreneurship teaching and coaching-informed activities	Pedagogical rationale for alignment	Intended entrepreneurial-learning outcomes	Supporting literature
	planning; progress reviews	actions. Reviewing milestones enables students to identify progress, barriers and necessary adjustments.	agency; self-efficacy; progress monitoring	Rajasinghe & Mansour (2019)
Physical Health	Well-being and resilience reflection; workload reflection; boundary setting; self-care planning	Encourages students to consider the relationship between workload, physical functioning, recovery and sustainable entrepreneurial activity.	Self-management; awareness of sustainable working practices; resilience; awareness of burnout risk	Donaldson et al. (2021, 2022); Dorri Sedeh & Aghaei (2024)
Mindset	Failure and setback debriefing; reflective questioning; reframing activities; learning-from-failure exercises	Encourages students to examine interpretations of challenge and failure, extract learning from setbacks and consider alternative responses and courses of action.	Reflective learning; learning orientation; adaptive thinking; resilience; constructive responses to setbacks	Donaldson et al. (2021, 2022); Donaldson & Donaldson, 2025; Ndlovu et al. (2025); Ndlovu & Ebewo (2026)
Environment	Entrepreneurial ecosystem mapping; stakeholder mapping; support-network planning; resource identification	Directs attention beyond individual capabilities towards the institutional, social, and entrepreneurial environment, enabling students to identify resources, constraints, stakeholders, and	Ecosystem awareness; stakeholder awareness; contextual intelligence; resource navigation; support mobilisation	Donaldson et al. (2021, 2022); Ndlovu & Ebewo (2026)

PERMA+4 dimension	Entrepreneurship teaching and coaching-informed activities	Pedagogical rationale for alignment	Intended entrepreneurial-learning outcomes	Supporting literature
		potential sources of support.		
Economic Security	Financial planning activities; resource mapping; bootstrapping exercises; resource-constrained venture simulations	Enables students to work with realistic financial constraints, prioritise expenditure, identify resources already available and explore lower-cost ways of mobilising resources before or alongside external finance.	Financial awareness; resourcefulness; financial decision-making; bootstrapping capability; financial resilience	Donaldson et al. (2021, 2022); Donaldson & Donaldson, 2025; Ndlovu et al. (2025)

Source: own compilation

Table Note: The activities presented in Table 1. reflect entrepreneurship teaching and coaching-informed practices used within the authors' educational context and informed by relevant scholarship. C4W conceptually aligns these pedagogical activities with the PERMA+4 dimensions and articulates the mechanisms by which they may contribute to intended entrepreneurial learning and well-being outcomes. The mappings and outcomes are theoretically informed propositions and should not be interpreted as empirically established effects of C4W.

5. Implications, Limitations and Future Research

5.1. Practical Implications

The C4W framework provides entrepreneurship educators with a structured way to consider student well-being alongside entrepreneurial learning. Rather than requiring a separate well-being intervention, C4W can inform the design of existing entrepreneurship activities through coaching-informed practices such as reflective questioning, peer dialogue, goal setting, networking exercises, business simulations, ecosystem mapping, and financial-resource reflection. These activities can be aligned with PERMA+4 dimensions according to the pedagogical relationships proposed in Table 1.

Implementing C4W nevertheless requires appropriate educator competence and institutional support. The framework does not assume that educators using coaching-informed practices become professional coaches or can provide the same services as trained or accredited coaching practitioners. Educators need appropriate skills in facilitative questioning, listening, feedback,

reflection, and managing professional boundaries. With these coaching competencies, teachers can encourage students' self-discovery journeys, enhance their professional development, and unlock their potential as entrepreneurs (van Ede et al., 2023). Institutions may therefore need to provide professional development for educators who intend to use coaching-informed approaches within entrepreneurship programmes. Van Ede et al. (2023) make a similar argument in their study examining an innovative, longitudinal training for (bio)medical educators to fulfil roles as a teacher and a coach.

Ethical considerations are particularly important where educators combine teaching, assessment, and coaching-informed roles. The power asymmetry between educator and student may affect students' willingness to disclose personal experiences or participate openly in reflective activities (Duby et al., 2022). Implementation should therefore establish clear boundaries concerning confidentiality, voluntary disclosure, safeguarding, and the limits of the educator's role. Where student needs extend beyond pedagogical support, consider appropriate referral to qualified coaching, counselling, or other professional services. C4W should therefore be understood as a coaching-informed pedagogical framework, not a substitute for professional coaching or psychological support.

5.2. Limitations

C4W is a conceptual framework and has not yet been empirically evaluated as an integrated pedagogical approach. Although its individual components draw on existing scholarship and the authors' entrepreneurship education practice, the proposed relationships among coaching-informed activities, the PERMA+4 dimensions, and intended entrepreneurial learning outcomes should not be interpreted as established causal effects. The conceptual mapping also reflects the authors' interpretive judgements. It may therefore have been influenced by their pedagogical experience, disciplinary perspectives, and assumptions about the relevance of particular activities for entrepreneurship students. An empirical investigation is required to test and refine these relationships.

A further limitation concerns context. C4W was developed primarily with entrepreneurship education in mind for African and resource-constrained higher education environments. Consequently, its relevance should not be assumed to be uniform across institutions, student populations, cultures, or socioeconomic settings. PERMA+4 also represents one multidimensional conceptualisation of well-being and does not encompass every theoretical perspective on human flourishing. Its selection in C4W reflects its conceptual fit with the psychological, relational, physical, environmental, and economic conditions considered relevant to the study rather than the outcome of a comparative empirical test against alternative well-being frameworks.

5.3. Future Research

Future research should empirically examine the feasibility, acceptability, and outcomes of C4W before claims are made about its effectiveness. An initial pilot study could implement selected C4W activities within an entrepreneurship education programme and examine students' and educators' experiences of the framework. A mixed-methods design could combine pre- and post-intervention measures of relevant well-being and entrepreneurial learning constructs with interviews, focus groups, reflective accounts, or classroom observations to investigate how

students experience the proposed relationships among coaching-informed activities, the PERMA+4 dimensions, and entrepreneurial learning.

Subsequent research could compare implementation across institutions and student populations to examine how socioeconomic, cultural, and institutional conditions influence the framework's application. Longitudinal studies would also help determine whether changes observed during entrepreneurship education are sustained beyond the immediate learning experience. Research should also investigate implementation conditions, including educators' competence, training requirements, role boundaries, students' willingness to engage in coaching-informed activities, and the ethical implications of combining teaching, assessment, and coaching-informed roles.

Although C4W was developed primarily for entrepreneurship education in African and resource-constrained higher education contexts, some of its underlying principles may be relevant in other educational, geographical, or community settings. This potential transferability should be treated as an empirical question rather than assumed. Comparative research across settings could therefore establish which elements of C4W are context-specific, which may be transferable, and what adaptations are necessary before wider application.

6. Conclusion

This paper proposes the Coaching for Well-being (C4W) conceptual framework as an approach to integrating student well-being with entrepreneurship education. By connecting coaching-informed and experiential pedagogical activities with the nine dimensions of PERMA+4, C4W extends attention beyond technical entrepreneurial competencies to include the psychological, relational, physical, environmental, and economic conditions that may shape students' entrepreneurial learning.

The contribution of C4W lies in bringing together two established bodies of scholarship, coaching-informed pedagogy and multidimensional well-being, within a context-sensitive framework for entrepreneurship education. It provides a structured basis for considering how activities such as reflection, peer coaching, goal setting, networking, business simulations, ecosystem mapping, and financial resource exercises can be aligned with well-being dimensions and intended entrepreneurial learning outcomes.

C4W remains a theoretically informed conceptual framework rather than an empirically validated intervention. Its value at this stage, therefore, lies in providing a foundation for pedagogical application, critical examination, and subsequent empirical evaluation. By positioning well-being as integral to entrepreneurial learning rather than peripheral, the framework contributes to ongoing efforts to develop more holistic and context-sensitive approaches to entrepreneurship education in emerging-economy higher education contexts.

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Ethics Statement

For studies involving human participants, the authors confirm that the research complied with relevant institutional and national ethical standards. Ethical approval was obtained where required, and informed consent was secured from all participants prior to data collection. If ethical approval was not required, the authors confirm that the study adhered to applicable ethical guidelines.

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Exploring Empowerment Challenges Facing SMMEs in the Nelson Mandela Bay Automotive Industry: Implications for Youth Skills Development and Workforce Development Pathways

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Abstract

Small, Medium and Micro Enterprises (SMMEs) play a critical role in South Africa's automotive industry by promoting economic growth, supplier development, and employment creation. However, persistent empowerment challenges continue to constrain their participation in automotive value chains and limit their contribution to youth skills development and workforce development pathways. This study aimed to explore the empowerment challenges facing SMMEs within the Nelson Mandela Bay automotive industry and to examine how these challenges influence opportunities for youth skills formation and sustainable workforce development. A qualitative case study design was adopted, employing purposive and snowball sampling to recruit 15 participants comprising SMME owners, Sector Development representatives, and Automotive Industry Development Centre (AIDC) officials. Data were collected through semi-structured interviews and analysed using six-phase thematic analysis. The findings identified six interrelated themes that constrain SMME empowerment: access and resources, skills and training, communication and information, policy and leadership, infrastructure and operations, and motivation and organisational culture. Collectively, these barriers restrict SMMEs' competitiveness, reduce their ability to participate in supplier development initiatives, and weaken their capacity to provide workplace learning opportunities, apprenticeships, and technical skills development for young people entering the automotive

industry. The study concludes that strengthening institutional support, improving communication between stakeholders, expanding access to finance and infrastructure, and aligning empowerment initiatives with industry needs are essential to enhancing SMME sustainability and supporting inclusive workforce development. The study contributes to the growing body of knowledge on SMME empowerment by demonstrating the close relationship between enterprise development, youth employability, and regional workforce development within South Africa's automotive industry.

Keywords: empowerment challenges, SMMEs, automotive industry

1. Introduction

One of South Africa's most important manufacturing hubs, the automotive industry in Nelson Mandela Bay (NMB), makes a significant contribution to the growth of industrial supply chains, employment generation, and regional economic activity (Sirayi et al., 2024). Small, medium, and micro enterprises' (SMMEs') involvement in this industry is nonetheless limited by enduring structural and developmental obstacles that restrict their competitiveness and empowerment (Basson & Omoruyi, 2025; Weilbach, 2025). Crucially, these obstacles do not merely affect business owners; they create significant bottlenecks in workforce development pathways, preventing young people from accessing technical training and sustainable employment opportunities within the sector. Given the growing emphasis on inclusive industrialisation and the development of historically marginalised businesses in national policy frameworks, Sibiya et al. (2023) assert that it is critical to comprehend the factors impeding SMME growth in important economic sectors. To place itself within this larger framework, this study looks at the intricate empowerment challenges faced by SMMEs, reframing these constraints as systemic inhibitors to youth skills development and the broader regional employability agenda.

Previous research on SMME growth in South Africa frequently focuses on issues such as limited access to funding, insufficient entrepreneurship skills, a mismatch between government support services and enterprise requirements, and infrastructural impediments to business expansion (Akinsolu & Vermaak, 2025; Letsaolo & Rankhumise, 2024). However, empirical research in the NMB automotive industry remains limited, despite development of suppliers, localisation programmes and industry-specific training are fundamental to transformation agendas (Monaco & Wuttke, 2023; Neethling et al., 2023). There is an ongoing academic discussion on the impact of state-led empowerment and support programmes on SMMEs with some academics suggesting that policy frameworks are too complex or not well communicated (Ngcobo, 2025; Weilbach, 2023), while others maintain that SMMEs are not ready to take advantage of available opportunities (Bello et al, 2024; Bushe, 2019). These tensions illustrate the importance of industry-sensitive investigation that gives an insight into the everyday practices and workarounds of SMMEs negotiating issues of industry and development. Even though there is research on SMMEs in South Africa, there is limited empirical research that focuses specifically on the Nelson Mandela automotive industry, especially from a qualitative, experience-based perspective. Given this context, the current study intends to investigate the interlocking institutional, structural, and operational barriers to SMME empowerment in the NMB automotive industry, paying special attention to leadership, infrastructure, communication, skills, and resource limitations.

2. Problem Investigated

Despite the automotive industry's strategic economic importance in South Africa, especially in the Nelson Mandela Bay (NMB) region, Botha et al. (2021) state that SMMEs still face ongoing structural and developmental obstacles that limit their ability to participate, compete, and be empowered in the industry. High failure rates and limited integration into automotive value chains are caused by SMME's chronic challenges. These challenges include limited access to capital, low managerial and technical skills, inadequate infrastructure, and a lack of government assistance, according to existing research (Botha et al., 2021; Mhlongo et al., 2023; Sibiya et al., 2023). Furthermore, many national policy interventions and empowerment measures are still not well matched with the real needs and different capacities of SMMEs, which has led to prolonged marginalisation rather than genuine empowerment (Aluko et al., 2023; Kraai, 2021). As a result, these initiatives have not produced the promised developmental effects. Although transformation and localisation are the goals of the South African Automotive Masterplan 2035, institutional impediments that disproportionately harm smaller businesses have kept the sector's empowerment levels low (Barnes & Black, 2017).

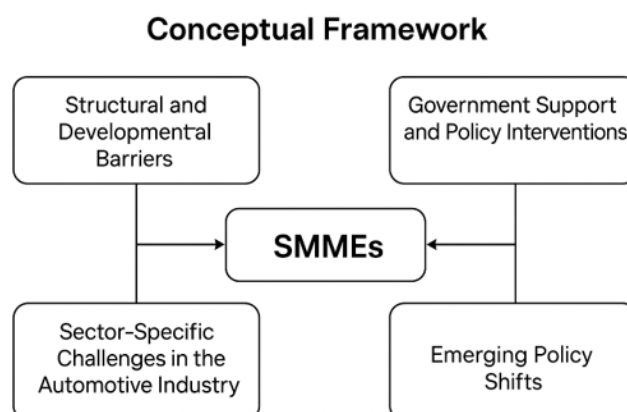
These empowerment challenges have important ramifications for young skill development and workforce development routes within the NMB automotive industry, in addition to limiting enterprise growth and sustainability (Laseinde & Kanakana, 2017; Sirayi et al., 2024). SMMEs are widely acknowledged as essential entry points for young employment, workplace education, apprenticeships, and the development of technical and entrepreneurial skills relevant to the industry (OECD, 2018; OECD & ILO, 2017). However, SMMEs' capacity to absorb young people, host skill development projects, and contribute to sustainable labour pipelines is seriously compromised when they lack the institutional backing, resources, and capacity to expand and integrate into automotive value chains (OECD, 2025; UNESCO, 2022). The region's already-existing problems with youth unemployment, skill mismatches, and poor school-to-work transitions are made worse by this circumstance (ILO, 2019; Nelson Mandela Bay Business Chamber, 2026; Statistics South Africa, 2024).

Additionally, SMMEs' engagement in formal skills development systems, such as learnerships, internships, and supplier development programs, is limited because of the mismatch between empowerment policies and their operational realities (Department of Higher Education and Training [DHET], 2019; World Bank, 2020). This weakens the workforce development ecosystem at large. As a result, the automobile industry's intended use of SMMEs as platforms for youth development, inclusive growth, and talent transfer is still underutilised (Black Economic Empowerment Advisory Council, 2017; Sturgeon & Van Biesebroeck, 2011).

Therefore, it is crucial to investigate the empowerment challenges that SMMEs in the Nelson Mandela Bay automotive industry face to better understand how structural, operational, and institutional factors restrict SMME development and how these limitations, in turn, affect youth skills development and workforce development pathways. To develop more adaptable, context-appropriate support systems that concurrently encourage SMME empowerment and long-term youth workforce inclusion, such an inquiry is required.

3. Literature Review

FIGURE 1. SMMEs



Source: researcher's own construction (2026)

3.1. Theoretical Framework

This study adopts an integrated theoretical framework of skills ecosystems theory and institutional theory to analyse the systemic barriers hindering SMME empowerment and youth workforce development. Skills ecosystems theory defines regional social formations wherein human capability is developed and deployed for productive purposes, emphasising that skill formation is deeply embedded in place-based social contexts, institutional frameworks, and collaborative networks (Buchanan et al., 2017; Ramsarup et al., 2023). This perspective allows the research to reframe SMME empowerment challenges not as discrete operational hurdles, but as systemic failures within the workforce development ecosystem that disrupt technical learning pathways for young entrants (Grainger & Spour, 2018). Complementing this, institutional theory explains how organisations conform to formal regulatory frameworks and informal societal norms to gain legitimacy and secure the resources necessary for survival (Balzano et al., 2025). This dual lens elucidates the structural mismatch within the Nelson Mandela Bay automotive industry, while SMMEs may adopt formal empowerment and training policies to meet institutional expectations, these structures are often decoupled from their daily operational realities due to severe resource and infrastructure constraints that prevent them from serving as effective sites for youth apprenticeship.

3.2. The Nexus of SMME Growth, Skills Formation, and Youth Employment

SMMEs are widely recognised as essential to South Africa's economic growth, job creation, and reduction of poverty (Rungani, 2025; Sibiya et al., 2023). However, their high failure rates (70% to 90%) represent a critical failure in the workforce development pipeline, as these enterprises are traditionally the primary entry points for young workers seeking technical expertise (Crowley, 2024; Julija, 2017). SMMEs make up a sizable share of formal enterprises and are crucial in promoting entrepreneurship and bolstering regional economies (Ramsuraj, 2023). According to Sibiya et al. (2023), SMMEs employ a significant percentage of the workforce and contribute between 30 and 34 percent of the nation's GDP, highlighting their vital role in fostering inclusive growth and reducing socioeconomic gaps. Notwithstanding these efforts, South Africa still has significant SMME failure rates (about 70% to 80%), which

raise questions about the sustainability of the industry over the long run and the suitability of the current support systems (Adjabeng & Osei, 2022).

3.3. Structural Constraints as Barriers to Workforce Development

South African SMMEs continue to suffer persistent structural and developmental challenges that limit their competitiveness and long-term viability, according to a substantial body of literature (Akinsolu & Vermaak, 2025; Zondi, 2023). While existing literature often treats these as operational hurdles, they are fundamentally skills development barriers. Empirical studies suggest that limited technological capability and innovation readiness prevents SMMEs from providing the industry 4.0 training necessary for modern automotive manufacturing, thereby widening the skills gap for the youth workforce (Fodor et al., 2026; Jamwal et al., 2025). When SMMEs lack specialised digital infrastructure, they cannot offer the high-value learning environments required to integrate young people into global value chains. These barriers include excessive regulations, inadequate funding, a lack of managerial expertise, and inadequate infrastructure, all of which hinder SMME involvement in various economic sectors across both informal and formal sectors. Additional research demonstrates that these structural obstacles reinforce exclusionary patterns by limiting SMMEs' capacity to expand, formalise, and integrate into larger industrial networks in the automotive industry (Bello et al., 2024; Nthangu & Msweli, 2025). Bello et al. (2024) contend that internal managerial capacity is more important, while Akinsolu and Vermaak (2025) highlight budgetary limits as the main obstacle. This implies that issues with empowerment are not just structural but rather multifaceted.

Structural and developmental barriers still prevent SMMEs from growing and integrating into the regional value chain in the NMB automotive industry (Botha et al., 2021). Previous research indicates that these issues stem from broader institutional and systemic factors that support small businesses' long-term exclusion from the regional automotive industry (Hasan et al., 2024; Nassery & Zamani., 2024). The ability of NMB-based SMMEs to grow, invest in assets that increase productivity, and move into more formalised and higher-value segments of the automotive supply chain is restricted by enduring obstacles to financial access, such as strict lending requirements and a highly concentrated banking environment (Bello et al., 2024; Kirsten et al., 2025). Furthermore, alongside these financial limitations, there are still significant gaps in technological capability and innovation readiness, with many local SMMEs lacking the specialised technical skills, digital infrastructure, and sector-specific support systems required to comply with Industry 4.0 requirements and modern automotive manufacturing processes (Gold, 2025; Jamwal et al., 2025). Therefore, disparities in market participation are further entrenched by region-specific infrastructure deficiencies that disproportionately affect smaller businesses outside NMB's core economic zones. These deficiencies include an unreliable electricity supply, inadequate transportation networks, and restricted access to well-equipped industrial facilities, all of which limits their wider contribution to industrial change and limits the growth trajectory of the area automotive industry.

3.4. Government Support, Policy Interventions, and Their Limitations

The South African government has implemented several policies and programmes to assist SMMEs over the last 20 years (Matsieli & Mutula, 2025). Such programmes include supplier development plans, enterprise development efforts, and financial incentives. Nevertheless, new

data indicates that these interventions have not always been successful. Many government-assisted SMMEs show little to no significant growth, according to Peters, Pretorius, and Marais (2025). This suggests a mismatch between the actual needs of local businesses and the design of support programs. Similarly, Botha et al. (2021) discover that SMME opinions of government assistance differ greatly based on the size of the operation, with many smaller businesses expressing ongoing difficulties despite legislative initiatives to boost the industry. These flaws imply that although policy frameworks are in place, their responsiveness and execution are still insufficient to produce significant empowering results.

3.5. Policy Gaps in Skills Alignment

For SMMEs, the automotive industry in South Africa, especially in areas such as Nelson Mandela Bay, offers special opportunities and challenges (Neethling et al., 2023). Although the South African Automotive Masterplan (SAAM 2035) lays out goals to improve localisation, encourage enterprise growth, and accelerate industry transformation, the industry's level of empowerment is still quite low (eNtsa Engineering, 2023). There is a documented mismatch between government support programs and the actual needs of local businesses, which results in prolonged marginalisation rather than genuine empowerment (Kumar & Singh, 2023; Prasannath et al., 2024; Qiong & Premaratna, 2024). A critical gap in current research is the failure to synthesise how these policy shortcomings specifically impact the transition of young people from basic training into specialised automotive roles (Blommaert et al., 2020; World Bank, ILO & UNESCO, 2023). SMME participation is still hampered by obstacles such as low localisation rates, inadequate infrastructure, and poor institutional coordination, despite the industry's desire for global competitiveness and inclusivity, according to findings from national automotive policy reports (Monaco & Wuttke, 2023; Rungani, 2022). Further exacerbating their marginalisation within the industry, automotive SMMEs operating in resource-constrained environments often find it difficult to comply with transformation requirements, access value chains, or meet industry standards.

3.6. Emerging Policy Shifts and Implications for SMME Empowerment

Government efforts to match industrial policy with empowerment goals are reflected in recent policy developments, such as changes to the Automotive Production and Development Programme (APDP2) and an increased focus on transformation compliance (APDP2 Transformation Fund Guidelines, 2024; Goga & Avenyo, 2022). These regulations put more pressure on automakers to show advancements in inclusion and enterprise development. However, SMMEs may still find it difficult to meet the changing demands of the industry if underlying barriers such as inadequate infrastructure, a lack of skills, and financial exclusion are not addressed (Basson & Omoruyi, 2025; Mhlongo et al., 2023). SMMEs continue to be disproportionately disadvantaged by structural and operational barriers that impede their empowerment and long-term sustainability, despite the sector undergoing significant restructuring to promote inclusive growth, according to analyses of automotive policy trends.

4. Research Design and Methodology

4.1. Research Design Approach

This study adopted a qualitative research approach, while the logical approach was inductive reasoning. The case study was chosen as the research methodology since it is both exploratory and descriptive. Face-to-face interviews were conducted to collect data using a semi-structured interview technique. The data collection process was conducted in participant's natural settings, enabling the researcher to develop new knowledge and understanding of theoretical and practical tools to help development stakeholders, industry players, and policymakers overcome systemic obstacles and support sustainable SMME empowerment in one of South Africa's most important economic sectors.

4.2. Sampling Criteria and Recruitment

A qualitative case study approach was adopted to facilitate an in-depth exploration of empowerment challenges experienced by automotive SMMEs within their real-world context. Participants were selected by the principal researcher using purposive sampling to identify individuals possessing direct knowledge and experience of SMME empowerment within the automotive sector. Snowball sampling was subsequently employed whereby initial participants recommended additional individuals with relevant expertise and experience.

Participants were included if they:

- owned or managed an automotive SMME operating within Nelson Mandela Bay;
- occupied positions within organisations responsible for SMME development and supplier support, including the Automotive Industry Development Centre (AIDC) and Sector Development programmes;
- possessed practical experience relating to enterprise development, supplier development or automotive value chains.

Fifteen participants were ultimately interviewed. Data saturation was achieved during the fifteenth interview when no substantially new information or themes emerged.

4.3. Participant Profile

The study included 15 participants representing different stakeholder groups within the regional automotive ecosystem. These comprised owners and managers of automotive SMMEs together with officials responsible for enterprise and supplier development programmes. Participants possessed diverse professional experience across manufacturing, automotive services, supplier development, business incubation and skills development. This diversity ensured that multiple perspectives regarding empowerment challenges were represented while remaining directly relevant to the research objectives.

4.4. Data Collection

Semi-structured interviews were utilised to obtain detailed accounts of participant's experiences and perceptions regarding SMME empowerment challenges. An interview guide containing open-ended questions aligned with the research objectives was developed to ensure consistency

across interviews while allowing flexibility for participants to elaborate on issues they considered important.

Interviews were conducted face-to-face or virtually, depending on participant availability, and lasted approximately 45 to 60 minutes. All interviews were conducted in English, the preferred professional language of the participants. Prior to each interview, participants received an explanation of the purpose of the study, their voluntary participation, confidentiality arrangements, and their right to withdraw at any stage without prejudice. Written informed consent was obtained before data collection commenced.

4.5. Data Coding Process

Interview recordings were transcribed verbatim and analysed using Braun and Clarke's six-phase thematic analysis process. The researcher first familiarised himself with the interview transcripts before generating initial inductive codes that reflected meaningful segments of participant responses. Similar codes were then grouped into broader categories through iterative comparison and refinement. These categories were subsequently consolidated into overarching themes based on conceptual similarity, recurrence across interviews, and their relevance to the research question.

The final themes: Access and Resources, Skills and Training, Communication and Information, Policy and Leadership, Infrastructure and Operations, and Motivation and Organisational Culture represented the principal empowerment challenges affecting automotive SMMEs. Theme development was therefore informed by both the prevalence of issues across participants and their analytical significance in explaining barriers to SMME empowerment.

4.6. Reflexivity

To maintain integrity and manage bias, the researcher engaged in self-monitoring throughout every phase of the investigation. Regular consultations with the supervisor were held to incorporate objective feedback and refine the research design. Participants were also provided with their transcribed interviews to verify accuracy.

Several strategies were employed to enhance the trustworthiness of the study. Credibility was strengthened through prolonged engagement with participants, member checking, and data saturation. Dependability was supported through the maintenance of an audit trail documenting methodological decisions throughout the research process. Confirmability was enhanced by maintaining reflexive field notes during data collection and analysis, while transferability was supported through detailed descriptions of the research context and participant characteristics.

Throughout the research process, the principal researcher remained conscious of personal assumptions arising from prior knowledge of enterprise development and the automotive sector. Continuous reflexive self-monitoring was undertaken to minimise the influence of researcher bias during interviewing, coding and interpretation. Emerging interpretations were continually compared with participant's accounts to ensure that the findings accurately reflected participant's perspectives rather than the researcher's preconceptions.

5. Empirical Findings

5.1. Reframing Empowerment Challenges Through a Skills Lens

There are 6 themes that were developed regarding empowerment challenges. These themes include access and resources, skills and training, communication and information, policy and leadership, infrastructure and operations, and motivation and culture. They are presented and discussed with their codes in Table 1 below.

TABLE 1. EMPLOYMENT CHALLENGES CODES AND THEMES

Access & Resources	Skills & Training	Communication & Information	Policy & Leadership	Infrastructure & Operations	Motivation & Culture
Limited access to funding	Inadequate skills and training	Communication deficiencies	Government policies are unfavourable to SMMEs	Lack of workshop/ infrastructure	SMME resistance to change
Limited access to market	Insufficient training programs	Inadequate communication	Leadership is not supportive	No proper workshop	Change-resistant culture
Limited access to infrastructure	Insufficient compliance knowledge	Lack of clear goals and communication	No clear directive from leadership to SMMEs	Working from home	Staff is not motivated
Limited resources	Insufficient funding for specialist skills	Lack of communication from Sector Development	Lack of policy understanding by SMMEs	Conducting operations outside my yard	Loss of confidence in government processes
Limited credit history	Restricted access to training	No feedback from the sector development	SMMEs not registered as formal businesses	Unconducive working conditions of SMMEs	SMMEs are not responsive
Not having enough tools	SMMEs not completing training	Lack of access to information	No innovation	Lack of infrastructure	Poor communication
Support systems lack requisite resources	SMMEs refuse training	No time to access information	No access to loan/finance	Company lacks workshop	SMMEs lack motivation to participate
Economic recessions	SMMEs not participating in programmes	SMMEs struggle to access information	No access to finance and market	No workshop	
	SMMEs lack knowledge	Lack of information		Not having a workshop	
		SMMEs do not have record management system	Company lacks innovation	Workshop unavailable	

Source: researcher's own construction (2026)

Theme 1 (Access and Resources): The participants in this study have expressed significant concerns around access and resources. They affirmed that limited access to finance, markets, infrastructure, and economic recessions are obstructing their progress. Additionally, they highlighted the absence of support mechanisms. The following are responses from participants concerning the deficiency of access and resources in the automotive industry:

“Limited resources (financial, human, and time) hinder the implementation of extensive empowerment programmes. Also, I have limited capacity to focus on empowerment initiatives alongside day-to-day operations” (Participant C, 2025).

“The support systems lack the requisite reach to effectively empower all SMME's, especially those in distant locations/ or regions” (Participant D, 2025).

“We lack infrastructure, like diagnostics tools to be able to provide quality training” (Participant E, 2025).

“My challenge is the absence of workshop; I am conducting operations outside my yard; I have no access to finance and market. I do not have enough tools to operate” (Participant I, 2025).

The above-mentioned responses indicate that SMMEs in South Africa persist in facing economic hurdles despite their entrepreneurial endeavours and growth potential. Importantly, these resource limitations immediately restrict SMME's capacity to offer young people entering the automotive industry organised workplace learning environments, such as internships, apprenticeships, and informal skill transfer possibilities. Having access to resources boosts people's self-confidence in their entrepreneurial ability, which improves well-being while a venture is being developed (Botha et al., 2021).

SMMEs continue to encounter numerous problems in South Africa, and due to elevated failure rates, they are unable to contribute to job creation and economic growth as anticipated. To better understand how structural, operational, and institutional factors limit SMME's development and to inform more responsive, context-appropriate support mechanisms, it is imperative to investigate the specific empowerment challenges faced by SMMEs in the NMB automotive industry. The South African government has acknowledged the demands and importance of the SMME sector. Access to resources enhances individual's confidence in their entrepreneurial capabilities, leading to improved well-being during venture development (Botha, et al., 2021).

Theme 2 (Skills and Training): Participants highlighted "insufficient funding for specialised skills" and "non-completion of training". This suggests that the "skills development" ecosystem is fragmented; SMMEs are not just failing to grow, they are failing to sustain the learning pathways required for their staff and potential youth recruits (ILO, 2024; OECD, 2023). The following are responses provided by participants concerning skills and training within the automotive industry:

“SMME's are not fully completing their training programmes, and some are refusing to be trained” (Participant G, 2025).

“The majority of SMME's still require training and mentoring to perform well” (Participant G, 2025).

These findings show that SMMEs are not serving as efficient venues for the development of skills, which restricts their capacity to help young people become employable and develop their technical abilities in the automotive industry. Young people entering the business face additional challenges in their school-to-work transition pathways due to the difficulty of maintaining structured training programs.

Theme 3 (Communication and Information): The participants have shown significant concern regarding communication and information. The participants acknowledged the existence of communication inadequacies, inadequate communication, the absence of clear goals and communication, limited access to information, inadequate time to obtain information, challenges faced by SMMEs in accessing information, and a general lack of information. The participants particularly highlighted that SMMEs lack access to record management systems. The following are responses provided by participants concerning communication and information in the automotive industry:

“My company encounters obstacles in communication and decision-making that may impede bottom-up empowerment programmes” (Participant I, 2025).

“There is a lack of communication from Sector Development and their partners” (Participant J, 2025).

“SMMEs don't have time to access the information, which is there; they don't take the time to check trends on the internet, or research papers so that they can remain competitive. SMMEs lose confidence in government processes, claiming that the government comes with empty promises” (Participant H, 2025).

Reduced productivity, disengagement, and missed opportunities are the outcomes of poor communication among SMMEs. From the standpoint of workforce development, these communication gaps also impede adolescent engagement in skills development initiatives by limiting exposure to training possibilities, funding appeals, and apprenticeship programs. Effective communication strategies, encompassing clear channels, appropriate digital technologies, and a culture of feedback, are essential for SMMEs to promote internal alignment, enhance engagement with consumers and stakeholders, and facilitate business growth. SMMEs require access to sufficient information to improve productivity and provide market entry. SMMEs should find prospective business partners to form alliances that would augment their operations.

Theme 4 (Policy and Leadership): The participants expressed considerable apprehension regarding policy and leadership. The participants recognised the presence of detrimental policies affecting SMMEs, insufficient support from leadership, a lack of clear directives for SMMEs, inadequate policy comprehension among SMMEs, unregistered SMMEs, absence of innovation, limited access to loans/finance, and restricted market access. The subsequent replies were given by participants about policy and leadership within the automobile sector:

“The role of my company (AIDC) is to empower SMMEs, not employees. The challenge I have encountered is that SMMEs are not registered as a formal business. They do not have a record management system of what they do on daily basis (invoices, quotations) due to poor financial management” (Participant M, 2025).

“For now, I could say, government structures are not supportive enough to empower SMMEs” (Participant K, 2025).

“The support structures are failing SMMEs in my region with empty promises” (Participant F, 2025).

“The support mechanism are inadequate, and government policies are unfavourable to SMMEs” (Participant C, 2025.)

These responses point to a structural mismatch between the operational realities of SMMEs and policy formulation. Crucially, poor policy execution weakens youth workforce integration routes by decreasing SMME participation in organised skills development programs including learnerships, internships, and sector-based training efforts.

Theme 5 (Infrastructure and Operations): The lack of "proper workshop" facilities and "diagnostic tools" (Participant E & I) directly impedes the quality of on-the-job training. Without adequate infrastructure, SMMEs cannot serve as viable sites for apprenticeships, effectively stalling the workforce development pathway for the NMB region (ILO, 2024; SACN, 2023).

These findings show that SMMEs are not serving as efficient venues for developing skills, which restricts their capacity to support young people's employability and technical capability development in the automotive industry. The school-to-work transition pathways for young people entering the business are further disrupted by the inability to maintain formal training programs.

Theme 6 (Motivation and Culture): The participants expressed negative views on motivation and culture, emphasising resistance to change among SMMEs, insufficient staff motivation, diminished confidence in government processes, inadequate communication, and a lack of enthusiasm among SMMEs to participate. This is corroborated by the following responses:

“SMME resistance to change. SMMEs don't want to formulate their businesses. SMMEs don't want to register their businesses for compliance as they are hiding from SARS” (Participant B, 2025).

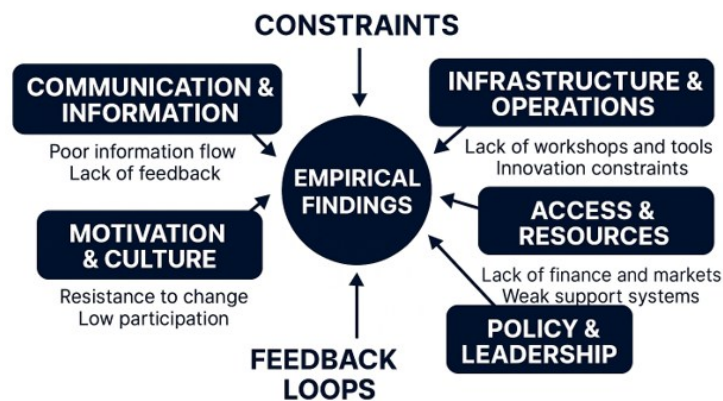
“SMMEs are not responsive. They don't have formal business documents in place. They don't have funding, and they don't have informed decisions. They have limited access to technology and connectivity, so that by the time information reaches them, the closing date has reached. They don't have processes in place to meet the requirements. They are not well informed” (Participant N, 2025).

“Leadership should be transparent when dealing with SMMEs, and the policy makers should also form part of SMME development programmes, so that they could understand the needs of SMMEs” (Participant O, 2025).

Both intrinsic and extrinsic factors, such as job creation and economic reform, have an impact on SMME's motivation. However, low organisational motivation and opposition to formalisation can limit adolescent skills transfer and workplace learning opportunities by decreasing participation in structured training programs.

The findings summarised in Figure 2 below show that rather than being limited by discrete flaws, SMME empowerment in the automotive industry is hampered by a network of interrelated structural, organisational, and behavioural issues. The operational capabilities of SMMEs are undermined by unfavourable regulations, inadequate leadership support, and restricted access to markets, finance, and infrastructure. This is especially true when it comes to training completion, skill development, and access to sufficient workshops and tools. Coordination, compliance, and informed decision-making are all hampered by these capacity gaps, which are made worse by inadequate communication and restricted access to timely, pertinent information. When taken as a whole, these factors encourage SMMEs to be resistant to change, unmotivated, and disengaged, which eventually limits their involvement in empowerment programs and lowers the efficacy of government and development agency assistance. According to the findings, effective SMME empowerment necessitates coordinated, multi-level interventions that develop organizational capacities, improve information flows, address policy and resource restrictions, and actively restore motivation, confidence, and a culture of involvement.

FIGURE 2. SUMMARY OF EMPIRICAL FINDINGS



Source: researcher's own construction (2026)

6. Discussion

The findings demonstrate that the empowerment challenges affecting automotive SMMEs in Nelson Mandela Bay extend beyond individual business constraints and represent interconnected structural barriers that influence enterprise competitiveness, workforce development, and youth employability. The six themes identified through the thematic analysis—access and resources, skills and training, communication and information, policy and leadership, infrastructure and operations, and motivation and organisational culture—collectively explain why many SMMEs struggle to participate effectively in supplier development programmes and automotive value chains. These themes were developed through the systematic grouping of recurrent codes generated from participant interviews using Braun and Clarke's six-phase thematic analysis. Their prominence across multiple participants demonstrates that they are not isolated organisational issues but systemic challenges affecting the regional automotive ecosystem.

The findings relating to access and resources reinforce existing literature identifying access to finance, production resources, and business support services as fundamental determinants of SMME sustainability. Consistent with previous studies, participants reported that limited access

to finance constrains investment in specialised equipment, technology adoption, and business expansion. However, this study extends existing knowledge by demonstrating that resource constraints also limit opportunities for workplace-based learning and practical skills development, thereby reducing the capacity of SMMEs to contribute to youth employment pathways within the regional automotive industry.

The skills and training theme highlights that empowerment extends beyond technical training and requires sustained investment in managerial capability, digital competencies, and business development skills. Participants consistently indicated that inadequate technical skills, limited exposure to emerging automotive technologies, and insufficient management capacity reduce organisational competitiveness. These findings support previous research emphasising that skills development remains central to enterprise productivity while also demonstrating that limited organisational capability weakens the ability of SMMEs to provide apprenticeships, internships, and experiential learning opportunities for young people entering the labour market.

The findings also reveal that communication and information represent critical enabling factors within the regional empowerment ecosystem. Participants described limited awareness of government programmes, funding opportunities, and supplier development initiatives, resulting in low participation despite the availability of support mechanisms. These findings suggest that improving communication between government agencies, development organisations, and SMMEs is equally as important as increasing the availability of support programmes. Effective information dissemination would enable greater participation in enterprise development initiatives and improve access to opportunities that strengthen business sustainability and workforce development.

The themes of policy and leadership and infrastructure and operations further demonstrate that institutional support plays a significant role in determining the effectiveness of empowerment initiatives. Participants identified regulatory complexity, administrative burdens, limited workshop facilities, and inadequate diagnostic equipment as significant barriers to growth. These structural constraints reduce productivity, discourage innovation, and limit the ability of SMMEs to comply with industry standards required for participation in automotive supply chains. Consequently, empowerment initiatives should extend beyond financial assistance to include investment in shared industrial infrastructure, technical facilities, and coordinated institutional support.

The final theme, motivation and organisational culture, illustrates that psychological factors influence the effectiveness of empowerment programmes. Participants expressed frustration with delayed government responses, inconsistent policy implementation, and previous unsuccessful support applications, resulting in declining confidence and reduced willingness to engage with future empowerment initiatives. This finding demonstrates that sustainable empowerment requires not only structural support but also institutional credibility, trust, and ongoing stakeholder engagement.

Collectively, these findings have important implications for the regional workforce ecosystem. Automotive SMMEs function as important providers of workplace learning, apprenticeships, supplier development, and entry-level employment. When empowerment challenges limit business growth, opportunities for youth skills development and labour market participation are similarly constrained. Addressing these barriers would therefore strengthen both enterprise competitiveness and the broader regional skills ecosystem by creating additional opportunities for technical training, employment creation, and sustainable workforce development.

7. Research Limitations

Although the study provides valuable insights into the empowerment challenges experienced by automotive SMMEs within Nelson Mandela Bay, several limitations should be acknowledged. First, the qualitative case study design focused on a single metropolitan automotive region, limiting the transferability of the findings to other provinces or industrial sectors. Second, the purposive and snowball sampling strategies were appropriate for identifying knowledgeable participants but do not permit statistical generalisation. Third, the study relied on participants' experiences and perceptions, which may have been influenced by organisational contexts and individual viewpoints. Nevertheless, the diverse stakeholder representation, data saturation, and strategies employed to enhance trustworthiness strengthen the credibility of the findings.

8. Future Research Directions

Future studies could extend this research by examining empowerment challenges affecting automotive SMMEs across multiple provinces to enable comparative analysis between different regional contexts. Quantitative or mixed-methods studies could also assess the relative influence of the identified empowerment challenges on enterprise performance and youth employment outcomes. Furthermore, future research should evaluate the long-term effectiveness of government empowerment initiatives, supplier development programmes, and skills development interventions in strengthening SMME sustainability and workforce development within South Africa's automotive industry.

9. Conclusion and Practical Implications

Government must enact reforms to simplify the cumbersome regulatory framework and diminish bureaucratic obstacles that hinder SMME growth. Concurrently, policies should specifically reserve a percentage of contracts for SMMEs to facilitate market access. Additionally, establishing a legal framework that provides collateral registries would help mitigate the hesitation of commercial banks to lend to SMMEs. AIDC and Sector Development should implement measures to provide dedicated incubation hubs, industrial clusters, and

advanced manufacturing facilities specifically for historically disadvantaged SMMEs. There is a need for AIDC to facilitate value chain linkages between smaller businesses and large manufacturers. SMMEs should proactively engage in networking colloquiums to share experiences and collaboratively devise solutions for sustaining or expanding their businesses. SMMEs must also transition from informal backyard operations to formalised business structures to meet compliance standards like SARS. Tertiary education should be fortified to include specialised programs in SMME development and project administration. Vocational

training must focus on Industry 4.0 technical skills and financial literacy to ensure SMMEs can remain competitive. By creating an enabling environment through incubation centres and technology-focused support, the government can leverage the youthful demographic potential to address unemployment. SMMEs serve as critical entry points for youth apprenticeships and technical skill acquisition; thus, their empowerment directly impacts youth employability. This research adds to existing knowledge by applying Kanter's Theory of Structural Empowerment and Spreitzer's Psychological Empowerment specifically to the automotive SMME sector in a

regional South African context. It identifies a skills trap where a lack of physical infrastructure (such as diagnostic tools) directly stalls the workforce development pathway for the region.

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Ethics Statement

For studies involving human participants, the authors confirm that the research complied with relevant institutional and national ethical standards. Ethical approval was obtained and informed consent was secured from all participants prior to data collection Ref: [1410 / Approval].

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From Skills Lists to Career Resources: Rethinking Career Preparation and Program Design

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Abstract

Career preparation is frequently framed around skills young people should acquire. Although useful, such lists can overlook how motivation, environmental support, and opportunities for career-management action shape skills development and use. This article provides a scholarly overview of the Career Resources Model, informed by a narrative review and integrative synthesis. It shows how a career-resources perspective can broaden skills-development research and practice by connecting individual capability with direction, access, and action. Four principles translate this perspective into recommendations for designing programs and assessing their coverage of career resources. This guidance helps researchers, academic programs, career centers, employers, and community partners identify gaps, coordinate support, and distribute responsibility for career preparation more realistically. Although centered on education-to-work and early-career transitions, the approach can be adapted for career change and renewal across the lifespan. Together, these contributions frame career preparation as a shared responsibility and offer a foundation for meaningful, sustainable careers.

Keywords: career development, career preparation, skills development, career education, program design, integrative narrative review

1. Introduction

What should (young) people learn to prepare for contemporary careers? Career preparation frameworks often answer this question by identifying sets of competencies, such as technical expertise, communication, teamwork, digital capability, adaptability, networking, or career-management skills (Sultana, 2012; Talluri et al., 2024). These capabilities matter. Research on career competencies and career interventions shows that they can support employability, career behavior, and work engagement (Akkermans et al., 2015; Talluri et al., 2024). Such lists can also give educators and learners concrete developmental targets.

The difficulty begins when a skills list is treated as a sufficient account of career preparation. A person can possess relevant capabilities but lack knowledge of where opportunities exist, confidence in pursuing them, access to developmental experiences, or relationships that make information and opportunity available (Hirschi, 2012; Hirschi et al., 2018a). Similarly, a person may know how to network or explore careers but encounter financial, institutional, or social

barriers to doing so (Inkson et al., 2012; Lent, 2026). Neither readiness for a career transition nor the likelihood of longer-term career success can therefore be inferred from skills alone (Haenggli & Hirschi, 2020; Hirschi et al., 2018a).

This limitation is increasingly consequential. Careers may involve repeated transitions between education and work, as well as among employers, roles, occupations, and forms of work (Akkermans et al., 2024). Against this background, two influential perspectives help describe how people navigate contemporary careers: The protean career perspective emphasizes self-directed career management and the use of personal values to guide career choices and define success (Briscoe et al., 2012; Waters et al., 2014). The boundaryless career perspective draws attention to careers that extend across traditional organizational or occupational boundaries, including psychological and physical mobility (Briscoe & Hall, 2006; Hirschi & Koen, 2021). These perspectives capture important features of contemporary careers, but they do not imply that all careers have become mobile or unconstrained. Boundaries created by organizations, occupations, institutions, geography, and social structures continue to constrain, enable, and punctuate career development (Inkson et al., 2012). Furthermore, digital technologies have expanded the settings in which career exploration, learning, networking, and self-presentation occur (Korkmaz et al., 2025), while economic conditions, institutional practices, and social support continue to shape which possibilities are realistic (Lent, 2026). People are consequently expected to exercise greater career agency within environments that may enable or constrain that agency. Although this article focuses especially on education-to-work and early-career transitions, the demands of career development do not end with workforce entry. Resources developed during these early transitions may shape subsequent possibilities. At the same time, the resources people need and the ways they manage their careers may continue to evolve across the lifespan as work roles, goals, health, relationships, and organizational contexts change (Akkermans et al., 2024; Nagy et al., 2019).

The Career Resources Model (CRM; Hirschi, 2012) offers a useful lens for reconsidering this skills-development challenge. Building on the CRM, Hirschi et al. (2018a) developed the Career Resources Questionnaire (CRQ) to assess 13 developable career-related factors organized into four complementary domains: knowledge and skills, motivation, environment, and career-management activities. Taken together, these domains direct attention to the resources a person can draw on, what gives career effort direction, what the surrounding context makes possible, and the actions through which a career can be developed. This broader perspective moves the discussion beyond identifying which skills young people should acquire and toward understanding how capability, direction, access, and action jointly contribute to career preparation throughout the lifespan. Accordingly, this article addresses two linked questions:

1. What does a career-resources perspective add to skills-based approaches to preparing people for contemporary careers?
2. How can this perspective inform the design of career-preparation programs?

To address these questions, this article provides a scholarly overview of the CRM and CRQ and situates the career-resources framework within contemporary and lifespan career research by distinguishing it from adjacent concepts. These concepts are used to clarify the framework's boundaries, not to propose new CRQ dimensions or revise its factor structure. The article then distills four principles for resource-based career preparation and translates them into practical

questions for designing more balanced developmental support. For skills-development scholarship, this integrative and translational approach broadens attention from individual capability alone to the interplay among capability, motivation, access, and action.

2. Review Approach

This article is informed by an integrative narrative review rather than a systematic or exhaustive evidence review. Literature was identified iteratively through the foundational CRM and CRQ publications, backward and forward citation tracing, relevant reviews, and targeted scholarly searches conducted through August 2026. Searches focused on career resources, career self-management, career competencies, education-to-work transitions, contemporary career orientations, lifespan career development, and career interventions.

The review approach was informed by methodological guidance for integrative reviews and quality criteria for narrative reviews, which emphasize a clearly stated purpose, a transparent description of literature identification and selection, appropriate referencing, and explicit scientific reasoning (Baethge et al., 2019; Snyder, 2019; Torraco, 2016). Consistent with this guidance, the selection criteria were derived from the article's guiding questions. Priority was given to sources that established or validated central constructs, synthesized relevant evidence, examined developmental or intervention applications, or clarified the relationship between individual agency and contextual opportunity.

As a descriptive indicator of the overall source base, 30 of the 33 cited sources (91%) were peer-reviewed journal articles. The remaining sources consisted of one academic book chapter, one academic reference-work entry, and an LSE Business Review article used as a knowledge-translation and visual reference. No formal study-level risk-of-bias assessment was undertaken. Such assessments are designed to evaluate whether features of a study's design, conduct, analysis, or reporting may systematically distort its results and are a core component of systematic reviews that synthesize empirical findings or estimate effects (Higgins et al., 2011). In broader narrative and integrative reviews, the use of formal quality assessment depends on the review's purpose and design (Grant & Booth, 2009). Because the present review was designed for conceptual integration and practice translation rather than comprehensive effect estimation, sources were considered in relation to their relevance and contribution to the guiding questions.

The resulting literature was synthesized according to the explanatory purposes of the article: to clarify what the CRM and CRQ assess, to distinguish capabilities from motivation, environmental access, and enacted behavior, and to position the framework alongside related concepts without treating them as additional CRQ factors. The resulting overview is selective by design. It supports conceptual clarification and practice translation, but it does not estimate cumulative effects, compare every application of the CRQ, or claim comprehensive coverage of the wider career literature.

3. Why Skills Are Necessary but Not Sufficient

The term *skill* is used broadly in career education and may refer to occupational proficiency, transferable workplace capability, career-management behavior, confidence in performing a behavior, or even a personal attitude. This breadth is reflected in substantial variation in how career competencies are defined, theoretically grounded, and measured (Sultana, 2012; Talluri et al.,

2024). Recent work has therefore sought to distinguish more precisely among competencies, resources, and enacted career behaviors (Hirschi & Wilhelm, 2025; Wilhelm et al., 2024).

These distinctions matter for intervention design. A competency refers to the capacity to perform a behavior proficiently, whereas a behavior is the action itself, such as exploring occupations, building relationships, or pursuing learning (Hirschi & Wilhelm, 2025; Wilhelm et al., 2024). Motivation influences whether and where a person directs effort, while environmental resources and barriers shape whether action is feasible and likely to produce its intended result (Hirschi, 2012; Hirschi et al., 2018a; Lent, 2026). Treating competencies, behaviors, motivation, and environmental conditions as interchangeable skills obscures why a learner may understand what to do yet not do it, or may act appropriately without obtaining the expected result.

A skills-only framing can create three related blind spots. First, it can blur the distinction between capabilities needed to perform work and those needed to navigate career development. Occupational expertise may help a graduate perform a job, but it does not necessarily provide knowledge of hiring pathways, occupational alternatives, or changing labor-market demand (Hirschi et al., 2018a; Sultana, 2012). Second, it can confuse capacity with enactment. Knowing how to seek advice differs from having supportive people available and from actually seeking advice when needed (Hirschi & Wilhelm, 2025; Wilhelm et al., 2024). Third, it can individualize outcomes that also depend on opportunity structures. Training a student to network does not ensure equal access to professional networks, paid experiences, transportation, time, technology, or inclusive recruitment processes (Lent, 2026; Sultana, 2012).

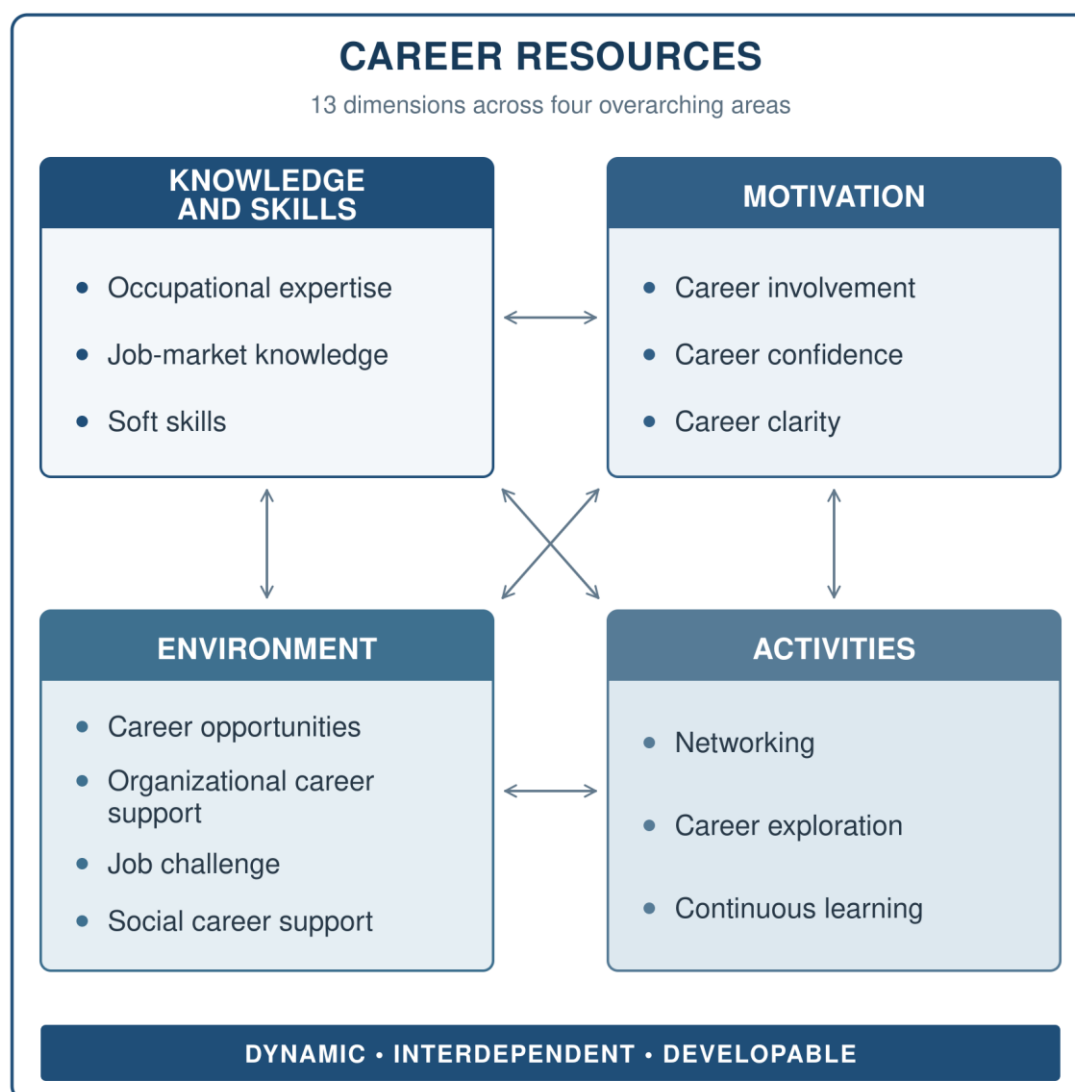
The point is not that skills frameworks are inherently misguided. Well-designed competency interventions can produce meaningful benefits. For example, the CareerSKILLS intervention improved career competencies, self-efficacy, career-related behaviors, perceived employability, and work engagement among young employees (Akkermans et al., 2015). The narrower claim is that capability development must be situated within a wider account of the motivation, access, and activity required to mobilize that capability. A resource perspective provides that wider account without diminishing the value of skills.

3.1. A Career-Resources Lens on Career Preparation

The original CRM integrated fragmented perspectives on self-directed career management into four broad categories: human capital, social, psychological, and career identity resources (Hirschi, 2012). Career-management behaviors were positioned as means through which people build and use these resources. The CRQ subsequently adapted this foundation to assess 13 developable factors across four domains: knowledge and skills, motivation, environment, and career-management activities (Hirschi et al., 2018a).

Knowledge and skills include occupational expertise, job-market knowledge, and transferable soft skills. Motivation includes career involvement, confidence, and clarity. Environmental resources encompass career opportunities, organizational career support, job challenge, and social career support. Activities include networking, career exploration, and continuous learning. Figure 1 presents the 13 dimensions within four overarching domains and emphasizes that the domains are dynamically interdependent rather than isolated categories.

FIGURE 1. THE 13 CRQ DIMENSIONS WITHIN FOUR INTERDEPENDENT DOMAINS



Source: The dimensions and domain assignments are based on Hirschi et al. (2018a). The visual arrangement was informed by Hirschi et al. (2018b) and developed for this article. The arrows represent conceptual interdependence rather than tested causal pathways.

The framework does not imply that the 13 factors exhaust every influence on a career. The CRQ deliberately emphasizes career-relevant factors that are potentially developable and useful for assessment and intervention. More stable traits and sociodemographic characteristics were not included, although they may affect both access to resources and career outcomes (Hirschi et al., 2018a). The four domains should therefore be understood as an organizing framework rather than a closed inventory.

Evidence supports treating the domains as related but distinguishable. The original CRQ studies established the factor structure, reliability, convergent validity, and relationships with indicators of career success across worker and university-student samples (Hirschi et al., 2018a). Longitudinal research has subsequently shown that different resource domains and career adaptability have distinctive relationships with facets of subjective and objective career success

(Haenggli & Hirschi, 2020). Research on career self-management likewise indicates that specific career behaviors relate differently to facets of employability (Wilhelm et al., 2024).

The framework has also been adapted to reflect how relevant career resources differ across stages of career development. The adolescent CRQ replaces employment-specific environmental factors with support from school, family, and friends, and replaces continuous work-related learning with self-exploration (Marciniak et al., 2021). This adaptation is important for program design: the meaning and availability of a resource depend partly on a person's transition and institutional setting. Validation work in other educational and national contexts has not always reproduced the same factor structure, reinforcing the need to examine local relevance rather than assume that one configuration transfers perfectly across populations (Pace & Sciotto, 2025).

Taken together, this evidence shows that the practical value of the CRM and CRQ does not lie in prescribing the same resources in the same form for every learner. Rather, the framework offers a structured way to consider what learners know and can do, what motivates and directs them, what their environments make available, and what career-management activities they undertake. At the same time, it draws attention to how the relevance and accessibility of these resources may vary across career transitions, populations, and institutional settings. This provides the basis for moving from a description of the framework to its implications for career preparation.

4. Four Principles for Resource-Based Career Preparation

Career preparation does not occur through individual effort alone. People develop career resources through educational programs and career guidance, supportive relationships, work-integrated and extracurricular learning, community-based interventions, and early work experiences (Jackson & Bridgstock, 2021; Marciniak et al., 2021; Ngai et al., 2023; Talluri et al., 2024).

These settings can help learners develop knowledge and skills, but they also influence whether learners gain access to career information, supportive relationships, feedback, challenging experiences, and opportunities to practice career-management activities. The CRM and CRQ therefore have relevance beyond describing the resources available to an individual. Their multidimensional structure can also help institutions consider the range of resources their programs make accessible or help learners develop (Hirschi, 2012; Hirschi et al., 2018a; Marciniak et al., 2021).

From this perspective, career education encompasses more than the teaching of occupational or transferable skills. It includes organized efforts to help learners understand possible career directions, develop confidence and motivation, access supportive people and opportunities, and translate what they know into career-related action (Sultana, 2012; Talluri et al., 2024). Program design concerns how these efforts are structured, including which developmental outcomes are prioritized, how learning experiences are organized, who can access them, and what forms of guidance and support accompany them (Jackson & Bridgstock, 2021; Sultana, 2012). A career-resources perspective therefore connects the development of individual capabilities with the educational and institutional conditions under which those capabilities can be acquired, strengthened, and used (Hirschi, 2012; Hirschi et al., 2018a; Marciniak et al., 2021).

This connection does not imply that educational institutions can remove every structural barrier or guarantee successful career outcomes. It does, however, invite them to examine whether

career preparation places most of the responsibility on learners while overlooking the motivational, relational, and environmental conditions that make action possible. The following four principles distill the implications of this perspective for career education and program design. They are not proposed as new CRQ dimensions, revisions to the framework's factor structure, or validated criteria for program evaluation. Rather, they provide an organizing lens for considering what learners may need for a particular transition and how institutions can support the development and accessibility of those resources.

4.1. Complement Skills Frameworks With Resource Profiles

Skills frameworks and checklists can clarify shared developmental targets and support structured progression. However, they may offer less insight into which personal and environmental resources are most relevant to a learner's particular transition. A resource profile asks which resources are relevant to that transition, which are already available, and which require further development or improved access (Hirschi, 2012; Hirschi et al., 2018a). This provides a more differentiated starting point because learners may enter the same type of transition with different configurations of resources, supports, and developmental needs. The form and relevance of these resources may also vary across populations and institutional settings (Marciniak et al., 2021; Pace & Sciotto, 2025).

The profile principle also changes how apparent gaps are interpreted. Limited labor-market knowledge may indicate a need for additional information and exposure, whereas low career clarity may call for guided exploration and opportunities to test possible directions (Hirschi, 2012; Marciniak et al., 2021). Limited professional networks may reflect unequal access to relationships and opportunities rather than unwillingness to connect (Hirschi, 2012; Inkson et al., 2012; Lent, 2026). The purpose of assessment is therefore to identify a developmental response that fits the learner's needs and context, rather than merely to label an individual deficiency (Hirschi, 2012; Sultana, 2012).

4.2. Distinguish Capability From Enactment

People may be capable of performing a career behavior without using it in a particular setting. Conversely, frequent activity does not establish that the activity is performed skillfully. Recent scholarship distinguishes career self-management competencies, understood as capacities for effective self-management, from career self-management behaviors, understood as enacted actions (Hirschi & Wilhelm, 2025; Wilhelm et al., 2024). The distinction prevents an intervention from assuming that telling students to network, explore, or learn continuously is equivalent to building the competence and conditions required for those behaviors.

Skills-development programs should consequently teach, scaffold, and provide opportunities to practice career-management behaviors rather than assume that knowledge will automatically translate into action (Hirschi, 2012; Sultana, 2012; Talluri et al., 2024). Career exploration can be modeled and practiced through structured comparisons of occupations, educational pathways, and available opportunities. Networking can first be practiced through role-play, guided conversations, and other structured, low-stakes activities before learners are expected to approach unfamiliar professionals (Hirschi, 2012; Sultana, 2012). Continuous learning can be supported through developmental feedback, learning plans, and access to authentic projects and work-related experiences (Jackson & Bridgstock, 2021; Talluri et al., 2024). Assessment can

then combine learners' perceptions of their capabilities with evidence of thoughtful enactment, such as reflective portfolios, action plans, observed practice, or completed career-management activities (Hirschi, 2012; Sultana, 2012).

4.3. Treat Environmental Access and Support as Developmental Inputs

Environmental resources are not background variables that become relevant only after skills have been taught. They are part of career preparation itself (Hirschi, 2012; Hirschi et al., 2018a; Marciniak et al., 2021). Mentors, supportive faculty and supervisors, challenging assignments, credible labor-market information, access to professional networks, and accessible work experiences create conditions in which people can develop and apply personal resources (Hirschi, 2012; Jackson & Bridgstock, 2021; Lent, 2026; Talluri et al., 2024).

This principle distributes responsibility more realistically. People can learn to seek opportunities and support, but institutions influence whether such opportunities and support exist, who receives them, and what financial, logistical, or social costs participation entails (Inkson et al., 2012; Lent, 2026; Sultana, 2012). For example, an unpaid or self-sourced internship, an extracurricular networking event, or an informally allocated developmental assignment may be valuable for learners who can participate while remaining inaccessible to others (Jackson & Bridgstock, 2021; Lent, 2026; Talluri et al., 2024). A resource-based approach therefore evaluates the provision and distribution of opportunity alongside the capabilities of learners (Hirschi, 2012; Lent, 2026; Sultana, 2012).

4.4. Connect Learning Experiences Across Resource Domains

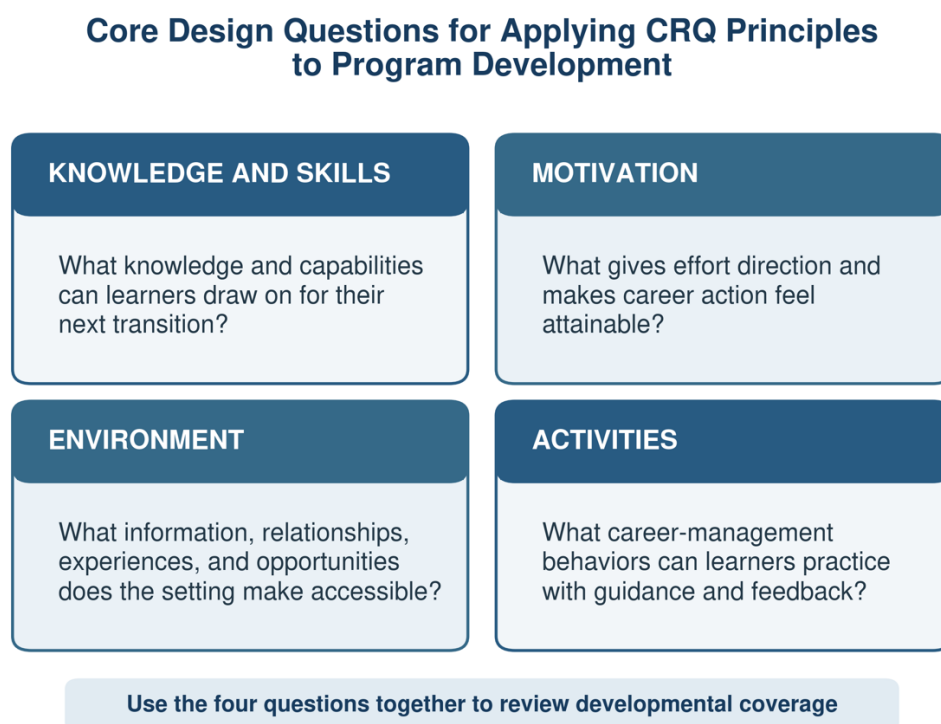
Career preparation is often distributed across separate activities, such as a skills workshop, occupational-information session, mentoring program, or internship (Jackson & Bridgstock, 2021; Soares et al., 2022; Sultana, 2012). Because the CRM conceptualizes career resources as interdependent and mutually reinforcing, it provides a rationale for designing these experiences as connected developmental opportunities rather than isolated offerings (Hirschi, 2012). Viewed through the four CRQ domains, a well-structured employer project may simultaneously build occupational knowledge and soft skills, increase confidence and clarity through feedback, provide access to professionals and challenging work, and prompt exploration, networking, and learning (Hirschi et al., 2018a; Jackson & Bridgstock, 2021; Talluri et al., 2024).

Connected design does not require every activity to address every domain. Instead, it asks program leaders to examine the collective developmental coverage and sequencing of a curriculum or service portfolio. This approach is consistent with calls for career learning to be coordinated, visible to learners, and purposefully integrated across educational experiences (Sultana, 2012). Systematic reviews indicate generally positive effects of career interventions on career decision-making, planning, exploration, adaptability, and related outcomes among university and high-school students. They also identify limited use of follow-up assessments and recommend stronger longitudinal, mixed-method, and tracer evaluation designs (Soares et al., 2022; Wang et al., 2024). Used in this way, a resource map can make intended outcomes more explicit and reveal when a program repeatedly teaches personal skills while providing little access to environments in which those skills can be practiced and applied.

5. Translating the Principles Into Program and Intervention Design

The four CRQ domains can be translated into practical design questions without turning them into a new checklist. Figure 2 brings these questions together as a concise guide for program and intervention development. Considered together, they encourage program leaders to examine what learners can draw on, what gives career effort direction, what the surrounding setting makes accessible, and which career-management behaviors learners can practice with guidance and feedback.

FIGURE 2. CRQ DESIGN QUESTIONS



Source: The four domains are based on Hirschi et al. (2018a). The design questions were developed for the present article.

Because career resources develop across multiple settings, Table 1 extends this overview by illustrating how academic programs, career centers, employers, and other institutional and community partners can contribute. The examples deliberately distribute responsibility across settings rather than assuming that any single unit can provide all the resources people need.

Although young people and education-to-work transitions are the primary focus of this article, the career-resources perspective and program-design approach are applicable across the lifespan. Career development can involve repeated transitions between education and work and across employment situations, roles, and occupations, rather than a single sequence of age-bound stages (Akkermans et al., 2024; Nagy et al., 2019). People may therefore revisit exploration, learning, identity development, and relationship building in early, mid, or later career, creating new needs for personal and environmental resources (Nagy et al., 2017; Nagy et al., 2019). Table 1 consequently applies not only to people who are young in chronological age, but also to those who are early in a career, entering a new field, or navigating another career transition.

TABLE 1. RESOURCE-BASED DESIGN QUESTIONS AND ILLUSTRATIVE CONTRIBUTIONS TO CAREER PREPARATION

Domain	Design question	Illustrative contributions across settings
Knowledge and skills	<i>What knowledge and capabilities can learners draw on for their next transition?</i>	Academic programs and faculty: Occupational learning, transferable-skill practice, and work-integrated projects. Career centers and advising units: Current labor-market information, occupational exploration, and support in articulating skills developed through education and experience. Employers and workforce partners: Authentic projects, job previews, and feedback about evolving capability requirements.
Motivation	<i>What gives effort direction and makes career action feel attainable?</i>	Academic programs and faculty: Guided reflection connecting learning with possible futures and achievable career experiments. Career centers and advising units: Goal clarification, values and strengths reflection, self-affirmation support, coaching, and individualized feedback. Employers, alumni, and mentors: Exposure to varied career trajectories, encouragement, role models, and developmental feedback.
Environment	<i>What information, relationships, experiences, and opportunities does the setting make accessible?</i>	Schools, universities, and colleges: Paid or otherwise supported experiences, transparent pathways, accessible and flexible participation options, institutional efforts to reduce barriers and make participation feasible. Career centers: Structured mentoring, alumni and employer connections, proactive, targeted outreach, and broadly available information about opportunities. Employers: Transparent recruitment focused on person-job fit and job-relevant capabilities, developmental supervision, and optimally challenging assignments calibrated to employees' experience and career stage. Student-support, workforce, and community partners: Financial, technological, transportation, referral, and other forms of practical support.

Domain	Design question	Illustrative contributions across settings
Activities	<i>What career-management behaviors can learners practice with guidance and feedback?</i>	Academic programs and faculty: Career exploration, networking, and learning plans embedded in coursework or projects. Career centers and advising units: Repeated practice with applications, interviews, networking, and online career activities. Employers and workforce partners: Job shadowing, informational conversations, workplace projects, and opportunities to pursue further learning. Mentors and advisers: Follow-through, feedback, and accountability as learners apply these behaviors.

Source: The four domains are based on Hirschi et al. (2018a). The design questions and illustrative contributions were developed for the present article. The examples are not exhaustive and do not imply that any single institutional actor is responsible for an entire domain.

5.1. Illustrative Applications

Two brief examples illustrate how the design questions in Table 1 could be translated into concrete learning activities. These examples are proposed applications of the career-resources perspective rather than validated intervention protocols.

Within an academic program, a faculty member and career practitioner could embed a career-resource exercise in a capstone or other required course. Students could select one plausible next-step role, compare two or three current job postings and a credible labor-market source, and map the resources the transition would require against those they can presently draw on. They could then conduct a structured informational conversation with a graduate or practitioner and complete a one-page reflection organized around four prompts: What knowledge and capabilities can I draw on? What direction has become clearer? Which people, experiences, or opportunities can support this transition, and what remains difficult to access? What action will I take next? Providing class time, vetted contacts, alternative conversation partners, and feedback would make the exercise a supported learning experience rather than a test of students' preexisting networks. This example is consistent with recent research on embedding career-development learning in curricula and with evidence emphasizing reflective pedagogy, structured mentorship, and institutional collaboration in work-integrated learning (Curto-Reverte et al., 2025; Glover-Chambers et al., 2024).

Within a career center, the same four domains could structure an individual consultation or short group workshop around a specific upcoming transition. Rather than beginning with a general judgment of readiness, the practitioner and participant could identify one current strength or need in each domain and select one feasible next action. For example, a student with strong disciplinary knowledge but limited labor-market knowledge and few professional contacts could compare two occupational routes, prepare questions, conduct an informational interview, and return for a brief debrief: What did I learn? What became clearer or more attainable? Which resource remains missing? What will I do next, and what support do I need? The career center could provide contacts or a facilitated alternative so that the exercise does not

depend on the participant's existing network. Evidence from two studies suggests that informational interviewing can strengthen networking self-efficacy among university students, although its effects on the broader CRQ resource profile remain to be tested (Kantar, 2023). This example also reflects the expanding role of career services in counseling, mentoring, employer connections, and experiential learning, as well as the value of coordination between careers advisers and graduate recruiters (Buckholtz & Donald, 2022; Khurumova & Pinto, 2024).

The illustrative contributions in Table 1 do not always require extensive programming. Motivational support, for example, may sometimes take the form of a brief intervention. In two randomized field experiments, a 10- to 15-minute values-based self-affirmation exercise, in which unemployed job seekers reflected on personally important values, increased reemployment success and the number of job offers during the following four weeks (Pfrombeck et al., 2023). Although the study did not directly assess CRQ career confidence, it illustrates how reinforcing self-integrity may help people sustain constructive career action during a threatening transition.

A resource-based approach also considers how institutional practices shape the environments in which career resources are developed and used. Within the environmental domain of Table 1, two employer contributions warrant clarification. Fit-focused recruitment here refers specifically to person-job fit: assessing the match between applicants' job-relevant knowledge, skills, and abilities and the requirements of the role, rather than relying on an undefined impression that someone "fits" the organization (Kristof-Brown, 2000). Challenging assignments should similarly be calibrated rather than maximized. Their effects depend partly on career timing, with research showing a positive relationship with performance in early career but an inverted U-shaped relationship in mid-career (Carette et al., 2013).

At the program level, these questions can support a resource audit both within and across organizational units (Hirschi, 2012; Sultana, 2012). An academic program might provide extensive communication and teamwork instruction but offer few opportunities for students to learn how occupations are structured or to form relationships beyond their existing social circles. A career center might provide strong exploration tools but have limited curricular reach or insufficient opportunities for students to test possible directions through projects or paid experiences (Jackson & Bridgstock, 2021; Sultana, 2012). Employers might recruit graduates for their technical capabilities while providing inconsistent supervisory support or few developmental assignments (Talluri et al., 2024). Student-support and community partners may address practical barriers that neither faculty nor career practitioners can remove alone (Lent, 2026; Ngai et al., 2023).

Career centers may be especially well positioned to serve a coordinating role by connecting academic programs, students, alumni, employers, and support services (Jackson & Bridgstock, 2021; Sultana, 2012). Responsibility for career preparation nevertheless remains shared because career development depends on both individual resources and the conditions created by educational, organizational, and broader social contexts (Hirschi, 2012; Lent, 2026). In each case, the problem is not simply the absence of another skills list. It is an imbalance between what learners are expected to possess and what the surrounding system enables them to develop and use.

5.1. Developmental Assessment Without Individualizing Responsibility

The CRQ and its adaptations can help organize reflection and assessment, but their interpretation should remain consistent with the underlying resource perspective (Hirschi, 2012; Hirschi et al., 2018a; Marciniak et al., 2021). A score reflects a respondent's self-report of resources and activities at a particular time and within a particular context. It is not a fixed verdict on readiness or an objective demonstration of every skill, nor does it provide a prediction that supersedes structural conditions and unforeseen events (Akkermans et al., 2024; Hirschi, 2012; Lent, 2026).

For individual guidance, results are most useful as starting points for dialogue rather than definitive judgments: Which resources matter for the next step? Which are already strong? Which can the person develop directly? Which require support, access, or institutional change? This dialogic use is consistent with the CRM's emphasis on individualized assessment and the active involvement of clients in interpreting results and planning development (Hirschi, 2012). At the program level, aggregated profiles may be used descriptively to identify the domains that an intervention intends to strengthen, although the CRQ should not be treated as a stand-alone program-evaluation instrument. Self-report data should therefore be complemented, where possible, with behavioral evidence, learning artifacts, participation and access data, observations, or indicators of opportunity provision (Hirschi, 2012; Sultana, 2012).

This approach is especially important for understanding differences in access and opportunity. If lower scores on environmental resources are interpreted only as weaknesses of the learner, assessment ignores the contextual information that the environmental domain is intended to capture (Hirschi, 2012; Hirschi et al., 2018a). Institutions should therefore examine how access to mentoring, career information, placements, professional networks, and developmental work varies among learners and whether program structures create barriers to participation (Jackson & Bridgstock, 2021; Sultana, 2012; Talluri et al., 2024). Career agency remains important, but it is exercised within conditions that differ in the opportunities and support they provide (Inkson et al., 2012; Lent, 2026).

6. Discussion

This article examined what a career-resources perspective adds to skills-based approaches to preparing people for contemporary careers and how that perspective can inform program design. The central implication is that career preparation cannot be reduced to developing individual capabilities in isolation. The CRM and CRQ distinguish what people know and can do, what gives their career efforts direction, what support and opportunities their environments provide, and which career-management activities they enact. For people navigating transitions, these domains offer a coherent way to examine how individual development and institutional provision work together.

Table 1 translates this perspective into questions that can be used to review curricula, services, and partnerships. Its purpose is not to create another standardized checklist or to suggest that every program must address all 13 CRQ dimensions equally. Instead, it can support a resource audit: Which resources does a program intentionally develop? Which are assumed rather than provided? Who can access the available opportunities? Where are connections among learning, guidance, experience, and support missing? These questions move program evaluation beyond

counting the activities offered toward examining whether learners can develop and use resources relevant to their next transition.

The resource-audit perspective also makes institutional coordination visible. Academic programs can connect disciplinary learning with occupational knowledge and authentic tasks. Career centers can contribute specialized guidance, labor-market information, opportunities for practice, and relationships with alumni and employers. Employers and workforce partners can provide work-based experiences, feedback, role models, and developmental assignments. Student-support and community partners can help address practical barriers to participation. Career centers may be particularly well positioned to connect these contributors, but they cannot compensate alone for gaps in curricula, institutional policies, employer practices, or opportunity provision.

Applied in this way, the career-resources perspective can help programs avoid two opposing errors. The first is to place responsibility entirely on learners by assuming that career outcomes follow from acquiring the correct skills. The second is to discount individual agency by treating environmental constraints as making personal development irrelevant. The four domains keep both sides in view. Programs can strengthen capabilities, motivation, and career-management activity while also improving access to information, supportive relationships, experiences, and opportunities. This is particularly important when those resources are distributed unequally.

6.1. Boundaries of the Overview and Recommendations for Future Research

This integrative narrative review is explanatory and selective. It does not establish that all four CRQ domains must be maximized, that the same resources matter equally for every learner or transition, or that the questionnaire captures every influence on career development. The CRQ and CRQ-A rely primarily on self-reports, and much of their validation evidence is concentrated in particular national and educational contexts. Career outcomes also depend on labor-market conditions, discrimination, health, caregiving, economic resources, and chance events that are not reducible to individual development. In addition, the design questions and institutional contributions presented in Table 1 were developed for this article as an applied translation of the framework. They should not be treated as a validated program-evaluation instrument.

Research should therefore test the practical claims of resource-based program design more directly. Comparative and intervention studies could examine whether programs that address capability, motivation, environmental access, and supported action produce broader or more durable outcomes than programs focused primarily on skill acquisition. Longitudinal and mixed-method designs could assess changes in learners' resources alongside changes in institutional provision, including whether learners gain actual access to information, relationships, experiences, and opportunities. Research could also investigate how academic programs and career centers conduct resource assessments, how coordination across institutional and workforce partners influences implementation, and whether program responses have comparable meaning and value across cultural and socioeconomic contexts.

7. Conclusion

Skills are indispensable to career preparation, but a career is not built from skills alone. People also need direction, confidence, information, relationships, opportunities, and supported chances to act. The CRM and CRQ make these complementary requirements visible by organizing them across knowledge and skills, motivation, environment, and career-management activities. Their practical

value lies not in replacing existing skills frameworks, but in showing where skills development must be connected with motivation, access, and action.

Instead of asking only which skills a person should acquire, academic programs, career centers, employers, and other partners can also ask which resources a transition requires, which resources individuals can develop directly, and which the surrounding system must help provide. Table 1 offers a starting point for identifying imbalances across programs and services and for coordinating developmental support across settings.

Although this article has emphasized education-to-work and early-career transitions, these transitions are not defined by chronological age. People may enter a field for the first time, return to education or employment, change roles or occupations, or renew an established career at many points in life. Each transition can create a new configuration of resource needs. Career preparation can therefore be understood as a recurring process across the lifespan, with education-to-work and early-career transitions representing especially important, but not exclusive, periods of resource development.

Across these transitions, a career-resources perspective frames career development as a shared responsibility among individuals and the educational, organizational, and community partners that shape their opportunities. For skills-development research and practice, its broader promise is to help create conditions in which people can build careers that remain meaningful and sustainable as their circumstances, priorities, and aspirations evolve over time.

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This article is based exclusively on published literature and does not report primary research involving human participants, animals, or identifiable personal data. Institutional ethics approval and informed consent were therefore not required. The author confirms that the work was conducted in accordance with applicable principles of research integrity and publication ethics.

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Frugal Innovation as a Catalyst for Youth Skills Development in South Africa's Resource-Constrained Environments: A Literature Review

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Abstract

South Africa continues to experience a severe youth employment crisis. In 2026, the unemployment rate among young people aged 15 and 24 years remained above 60%, while 37.6% of this cohort was not in employment, education, or training. Conventional skills development approaches, which rely mainly on formal Technical and Vocational Education and Training (TVET) colleges and universities, have struggled to address the needs of young people living in resource-constrained communities such as townships, informal settlements, and rural areas. This article argues that frugal innovation, which is defined in the study as the creation of practical, affordable, and sustainable solutions using limited resources, offers an alternative pathway for developing employable skills in these contexts. Resource-constrained environments encourage creativity and innovation, problem-solving, collaboration, and entrepreneurship, enabling young people to acquire technical, digital, business, and socio-emotional skills through practical experience. The study employs an integrative literature review that synthesises international scholarship on frugal innovation alongside South African studies on informal innovation, youth entrepreneurship, and recent labour market and policy developments. Based on this review, the study develops the frugal innovation youth skills-development pathway, a conceptual framework that explains how frugal innovation can strengthen youth skills development. The framework is illustrated using evidence from South African fabrication laboratories, township maker spaces, community-based digital innovation initiatives, and youth employment programmes. The study concludes that frugal innovation complements rather than replaces formal education and training systems by creating accessible opportunities for experiential learning and skills acquisition. It recommends integrating frugal innovation into South Africa's National Skills Development Strategy and related government

policies to improve youth employability, promote inclusive entrepreneurship, and strengthen innovation ecosystems in underserved communities.

Keywords: frugal innovation, resource-constrained, sustainability, inclusive, socio-economic development

1. Introduction

South Africa enters the 21st century facing one of the world's most severe youth labour-market crises. Statistics South Africa's Quarterly Labour Force Survey (QLFS) for the first quarter (Q1) of 2026 reports an unemployment rate of 60.9% among youth aged 15 to 24 years, while unemployment among those aged between 25 and 34 years stands at 40.6% (Stats SA, 2026a). Of South Africa's approximately 42.2 million working-age population, nearly half are between the ages of 15 and 34 years. However, only 13.3% young people were employed during Q1 of 2026, compared with 11.1% unemployed and 25.1% economically inactive (Stats SA, 2026a). Equally concerning is the continued rise in the proportion of young people who are not in employment, education or training (NEET), which reached 37.6% for those aged 15 to 24 years and 45.6% for the broader 15 to 34 years age group (Stats SA, 2026a; 2026b). Collectively, these indicators reflect a structural disconnect between education, skills development, and labour-market participation, highlighting the limitations of conventional pathways into employment.

The ongoing nature of this crisis has intensified academic and policy interest in alternative pathways to skills acquisition and economic participation that are less dependent on formal institutions and traditional employment opportunities. One pathway that is gaining significance is frugal innovation, defined as the development and application of products, services, processes, and business models that create value under conditions of severe resource constraints (Hossain et al., 2016). In South Africa, frugal innovation extends beyond isolated entrepreneurial activity and has become a defining feature of township, informal, and rural economies. Contemporary evidence suggests that approximately 2.5% of South Africans are active informal innovators (de Jong et al., 2023), while the township economy contributes an estimated R900 billion annually (Malau & Motloun, 2025) and in 2024 MSMEs created an estimated 13.4 million jobs (Nxumalo, 2025). These results highlight the economic importance of grassroots innovation (Hossain, 2018) and its possible role in fostering youth development.

This study asserts that frugal innovation, whether it emerges from informal economies or through structured initiatives, constitutes an important yet under-theorised catalyst for youth skills development in South Africa. The assertion is not that frugal innovation can replace formal education (Masters, 2024) or resolve unemployment (Ahola & Zafar, 2020). Instead, frugal innovation is suggested that its emphasis on improvisation, innovative problem-solving, community engagement, and interdisciplinary learning provides a practical environment in which technical, entrepreneurial, digital (Jardim, 2021), and socio-improvisational skills are developed (Mannucci, Orazi & De Valck, 2021). These skills are widely recognised as essential for employability, self-employment, and participation in contemporary knowledge and informal economies, particularly where formal opportunities remain limited.

Adopting an integrative review methodology, this study develops a youth skills development pathway that explains the mechanisms through which participation in frugal innovation

contributes to skills acquisition and youth economic participation. Drawing on international and South African scholarship, the study situates frugal innovation within broader theoretical perspectives on human capital, the capability approach and practical learning, while contextualising its relevance within South Africa's post-school education and training (PSET) landscape. Empirical illustrations from fabrication laboratories (Fab Labs), township maker communities, community digital innovation initiatives, and youth employment programmes demonstrate the practical application of these initiatives. The study further examines the institutional, digital, and socio-economic barriers that constrain the scalability and inclusiveness of frugal innovation as a pathway for youth skills development. By positioning frugal innovation as both an economic practice and a pedagogical process, the study contributes a novel perspective on expanding skills development opportunities in contexts characterised by persistent unemployment, resource scarcity, and structural inequality.

2. Literature review

Since this study focuses on frugal innovation and youth skills development in resource-constrained environments, through an integrative review of international, African and South African literature, the following sub-sections elaborate on these concepts.

2.1. The Global Frugal Innovation

The literature on frugal innovation has expanded considerably over the past decade, evolving from a management-oriented discourse focused on emerging-market business strategy (Bhatti, Khilji & Basu, 2013; Bhatti & Ventresca, 2012) into a multidisciplinary field (Dabic et al., 2022) encompassing innovation studies, development economics, sustainability and digital transformation (Al Omoush, Lassala & Ribeiro-Navarrete, 2025). Dabic et al. (2022) demonstrate this evolution by highlighting the field's increasing engagement with global challenges, including climate change, poverty, healthcare access, and the socio-economic impacts of the COVID-19 pandemic. Other reviews identify persistent definitional fragmentation across related concepts such as Jugaad innovation, Gandhian innovation, constraint-based innovation (Agarwal et al., 2017), grassroots innovation (Hossain, 2018), catalytic innovation and indigenous innovation (Brem & Wolfram, 2014).

Contemporary academic literature has further extended frugal innovation into digital and sustainability contexts. Qin (2024) points out that technologies such as the Internet of Things (IoT) and artificial intelligence (AI), supported by entrepreneurial knowledge, can enhance frugal innovation capabilities. Importantly, Qin (2024) emphasises that entrepreneurial knowledge and digital competencies act as complementary capabilities that allow organisations to convert technological resources into sustainable frugal innovation outcomes. Similarly, Escudero-Cipriani et al. (2024) examine the contribution of frugal innovation to digitalisation and the Sustainable Development Goals (SDGs). Their findings suggest that digital platforms, mobile technologies, digital finance, and data-driven decision-making facilitate inclusive innovation by extending products and services to underserved populations, reducing environmental waste and improving resource efficiency. Jaiswal et al. (2022) argue that frugal innovation contributes directly to circular economy principles by encouraging resource efficiency, waste minimisation, product longevity, and environmentally responsible production

systems. Similarly, Moleka (2024) contends that frugal innovation supports inclusive and sustainable development by enabling affordable solutions for low-income communities, while Le Bas (2020) suggests that frugal innovation promotes sustainable development by eco-designing actions to reduce environmental footprints.

From a societal perspective, contemporary scholarship emphasises the role of frugal innovation in promoting inclusive development and reducing socio-economic inequalities (Hossain & Sarkar, 2023). Studies suggest that affordable digital technologies, mobile platforms, and AI-enabled services can democratise access to education, healthcare, financial services, and entrepreneurial opportunities, particularly in developing economies where resource constraints remain pervasive (Akanfe, Bhatt & Lawong, 2025; Oyedokun, Anyahara & Oyedokun, 2025; Ezenwa, 2025). By lowering barriers to innovation adoption and expanding access to essential services, frugal innovation contributes to broader developmental objectives such as poverty reduction, digital inclusion, and sustainable livelihoods (Mutipforo et al., 2025). This perspective aligns closely with the SDGs, particularly those relating to quality education, decent work, industry and innovation, reduced inequalities, and responsible consumption and production (Sachs et al., 2019). These perspectives reinforce the argument that frugal innovation represents an integrated approach to achieving economic viability, social equity, and environmental sustainability.

Collectively, contemporary literature demonstrates that frugal innovation has evolved into a multidisciplinary concept that integrates digital transformation, sustainability, organisational resilience, and inclusive socio-economic development (Dabic et al., 2022). Instead of focusing entirely on cost efficiency, contemporary research portrays frugal innovation as a strategic capability supported by emerging digital technologies, entrepreneurial knowledge, and sustainable business models (Qin, 2024). This expanded conceptualisation highlights its growing relevance for entrepreneurs seeking to achieve competitive advantage while simultaneously addressing complex economic, environmental, and social challenges in the digital era. This dynamic, multi-dimensional focus on resource constraints provides a crucial perspective for understanding the innovation landscapes among the youth in South Africa.

2.2. Frugal Innovation in African and South African Contexts

A distinct scholarship has emerged examining frugal innovation within African economies, with several studies directly relevant to South Africa. Kraemer-Mbula et al. (2024) analyse frugal innovation in South Africa, showing how firms adapted frugal design principles in response to pandemic-related supply-chain disruptions. Chakravarty (2022) investigates the concept of frugal innovation orientation by analysing six medical devices developed by South African firms. The findings reveal that frugal innovation in this context takes two distinct forms. First, some devices are explicitly designed to address the unique healthcare challenges of low-resource environments, such as affordability, ease of use, and limited infrastructure. Second, other innovations are technologically advanced yet more affordable than conventional alternatives, making them globally relevant while still incorporating key principles of frugal innovation. While the study by Lorini, Ngwenyama and Chigona (2022) makes a significant contribution to the understanding of frugal social innovation by demonstrating that innovation can emerge from resource-constrained communities through collaborative, participatory, and socially driven processes rather than through conventional business-led innovation models.

Their study conclude that frugal social innovation is fundamentally a people-centred, participatory process rather than merely the production of low-cost technologies, illustrating that innovation in underserved communities emerges through the interaction of resource scarcity, collective creativity, social purpose, and flexible technological adaptation.

Further empirical studies in South Africa deepen this literature. Mutongoreni et al. (2026) examine the role of frugal innovation and techno-entrepreneurship as strategic mechanisms for promoting sustainable development in Sub-Saharan Africa, arguing that despite the region's abundant natural resources and youthful population, economic growth remains constrained by dependence on labour-intensive industries, limited industrialisation, inadequate infrastructure, poverty, weak healthcare and education systems, and environmental challenges. Their study concludes that to overcome these challenges, the combined application of frugal innovation, technology-driven entrepreneurship, and supportive public policies provides a practical pathway for Sub-Saharan Africa to address socio-economic challenges while advancing inclusive and sustainable development. This aligns closely with concepts such as Jugaad innovation, Gandhian innovation, and constraint-based innovation (Agarwal et al., 2017). Importantly, the innovation process generates key developmental value through participatory engagement, collaboration, and social transformation, reinforcing the view that frugal innovation functions as a skills-generating process (Rambe, 2025).

The institutional dimension of frugal innovation in South Africa is also evident in the role of the higher education system. Schonwetter and Van Wiele (2020) examine social entrepreneurs' use of Fab Labs and 3D printing in South Africa and Kenya. The study reveals that Fab Labs play an important role in fostering innovation by providing access to digital manufacturing technologies, technical expertise, and collaborative innovation spaces, suggesting that digital fabrication technologies, particularly low-cost 3D printing supported by open-source ecosystems, strengthen the capacity of social entrepreneurs to develop sustainable and scalable social innovations in developing countries, while reducing dependence on expensive manufacturing infrastructure. Initiatives such as the Gauteng Provincial Government's eKasi Labs programme via the Innovation Hub in Ga-Rankuwa (Kraemer-Mbula & Armstrong, 2017), the Craft and Design Institute's Product Support Space in Cape Town (Armstrong et al., 2018), and the Ekurhuleni Fab Labs (Schonwetter & Van Wiele, 2018) provide township-based social entrepreneurs and community innovators, including youth, with access to otherwise unaffordable digital fabrication tools such as 3D printers and laser cutters. This represents a structured, institutionally supported form of frugal innovation infrastructure, complementing the more informal, spontaneous innovation processes.

2.3. Youth Skills Development in South Africa's Post-School Education and Training System

South Africa's formal skills-development architecture is anchored in the Department of Higher Education and Training's (DHET) Post-School Education and Training (PSET) system, which comprises 366 registered institutions, including 50 public Technical and Vocational Education and Training (TVET) colleges, 9 Community Education and Training (CET) colleges, 26 public higher-education institutions, and 21 Sector Education and Training Authorities (SETAs) funded through the Skills Development Levy (DHET, 2025). Despite this extensive institutional network, a substantial body of literature continues to highlight persistent challenges relating to quality, articulation, and labour-market relevance within the TVET sub-sector (Badenhorst &

Radile, 2018). As such, Wedekind (2016) traces the ongoing contestation and incomplete reform path of South Africa's TVET system, emphasising structural instability and policy discontinuities. Similarly, Buthelezi (2018) documents the unintended consequences of post-apartheid educational reform on TVET lecturers, focuses on how curriculum changes have affected teaching practices, lecturer adaptation, student preparedness, and the broader objectives of skills development within the sector. The study finds that meaningful TVET reform depends on aligning curriculum, educator capability, student preparedness, and national development objectives to achieve sustainable improvements in skills development and employability. Extending this critique, Majola (2026) examines the need for curriculum transformation in South Africa's TVET lecturer education, arguing that existing programmes have not sufficiently responded to the country's social, economic, and educational realities. Using qualitative narratives from 15 graduates of the National Certificate Vocational (NCV) programme, the study explores how students' lived experiences can inform more inclusive and socially responsive curriculum reform, advocating for a transformative model of TVET lecturer education that positions students as active contributors to knowledge creation and curriculum development.

Within this broader institutional context, entrepreneurship education in TVET colleges has emerged as a critical but contested domain, particularly given its relevance to youth unemployment and informal-sector innovation. An analytical review by Sikhosana and Tshishonga (2026), "Bridging the Skills Gap Through TVET Colleges in South Africa," further clarifies the nature of labour-market inefficiencies by distinguishing between skills shortages, skills mismatches, and under-qualification. The review situates these dynamics within a broader labour-market paradox in which youth unemployment for the 15 to 24 years age cohort exceeds 60%, while employers simultaneously report chronic shortages of appropriately skilled technical and artisanal labour. This coexistence of mass youth unemployment and persistent employer-reported skills shortages constitutes a central analytical puzzle (Allais et al., 2021). If the formal skills-development system were adequately aligned with labour-market demand, such extreme simultaneity would be unlikely. Instead, the evidence suggests systemic disconnection between institutional training outputs and labour-market absorption capacity (Mahlaole, 2026). It is for this reason that frugal-innovation-based, community-embedded, low-cost learning pathways may provide more inclusive mechanisms for skills acquisition, providing a stronger integration with formal certification frameworks and improved labour-market outcomes to ensure that competencies acquired outside traditional institutions are recognised and economically convertible.

3. Research methodology

3.1. Research Design

This study employs a consolidative review methodology, an approach that is particularly appropriate for addressing research questions requiring the synthesis of methodologically diverse bodies of literature (Elsbach & van Knippenberg, 2020), rather than the empirical testing of a discrete hypothesis. Specifically, the review integrates scholarship on international frugal innovation (Bhatti et al., 2013; Escudero-Cipriani et al., 2024; Jaiswal et al., 2022; Le Bas, 2020), African and South African innovation studies (Armstrong et al., 2018; Chakravarty, 2022; de Jong et al., 2023; Schonwetter & Van Wiele, 2018), South African labour market and

education policy, as well as relevant grey literature and institutional reports concerning youth-focused development programmes (Mahlaole, 2026; Majola, 2026; Masters, 2024; Wedekind, 2016). This methodological approach facilitates the development of a novel frugal innovation skills-development pathway that integrates these usually isolated knowledge domains.

An integrative review is particularly appropriate for the current study, because both the phenomenon of frugal innovation and the domain of youth skills development have been extensively examined within their respective academic fields. However, despite the maturity of these individual fields, limited research has explicitly explored their theoretical and empirical intersection, particularly within the South African context. By synthesising these distinct yet complementary streams of literature, this review seeks to advance a more comprehensive understanding of the potential role of frugal innovation in addressing youth skills development challenges in South Africa.

3.2. Data Sources and Search Strategy

The review draws on three categories of source material. First, peer-reviewed academic literature on frugal innovation, jugaad innovation, grassroots innovation, constraint-based innovation and the informal-economy innovation literature, prioritising publications from 2020 to 2026 to ensure currency, while retaining foundational earlier texts such as Agarwal et al. (2017), Bhatti and Ventresca (2012) and Hossain et al. (2016) that continue to anchor the field's rich pedagogy. Second, peer-reviewed and institutional literature specific to South African youth skills development, TVET reform, and entrepreneurship education, again prioritising 2018 to 2026 publications. Third, current South African labour-market statistics and policy documentation, including Statistics South Africa's Quarterly Labour Force Survey releases through the first quarter of 2026, the Department of Higher Education and Training's strategic planning documents, and SETA sector skills plans.

3.3. Analytical Approach

The reviewed sources underwent thematic analysis to identify recurring mechanisms, illustrative case examples, and areas of convergence and divergence within the extant literature. The literature review sub-sections discussed in Section 2 were purposively selected to reflect the diversity of frugal innovation contexts pertinent to South African youth, including the evolution of frugal innovation into an integrated approach to achieving economic viability, social equity, and environmental sustainability, community-based innovation, structured fabrication laboratory ecosystems, and formally implemented youth employment programmes. Section 2.3, "The Youth skills-development architecture", was specifically intended to provide analytically informative examples rather than to constitute a representative or exhaustive sample of frugal innovation initiatives. As an integrative review, rather than a primary empirical investigation, this study does not generate or report original survey, interview, or observational data. Instead, its scholarly contribution resides in the systematic synthesis of existing evidence, the advancement of conceptual theorisation, and the translation of established knowledge into policy-relevant insights.

4. Discussion of Findings

This integrative review demonstrates that frugal innovation has significant potential to function as an alternative and complementary pathway for youth skills development in South Africa,

particularly in response to persistent unemployment, resource constraints, and the limited capacity of conventional education and labour-market systems. Instead of presenting frugal innovation purely as a mechanism for producing low-cost products or services, the study conceptualises it as a dynamic learning ecosystem in which young people acquire technical, entrepreneurial, digital, problem-solving, and socio-behavioural competencies through participation in innovation activities.

The review finds that the global literature has also shifted from viewing frugal innovation primarily as a cost-reduction strategy to recognising it as a multidimensional capability that integrates digital technologies, sustainability, entrepreneurship, and inclusive development. Emerging technologies such as AI, IoT, digital platforms, and digital finance enhance the effectiveness of frugal innovation by enabling resource-efficient solutions while expanding access to education, entrepreneurship, and economic opportunities. These developments position frugal innovation as an important contributor to the SDGs through its promotion of social inclusion, environmental sustainability, and economic strength.

Within the African and South African context, the findings reveal that frugal innovation is deeply embedded within both informal and institutionally supported innovation ecosystems. Studies reviewed indicate that innovation frequently emerges through community participation, collaborative problem-solving, and adaptive use of limited resources rather than through conventional research and development processes. Empirical evidence from South African medical device manufacturers, social enterprises, Fab Labs, township innovation hubs, and community makerspaces suggests that frugal innovation contributes to the development of a diverse portfolio of employability skills among youth. Beyond fostering general creativity and adaptability, participation in these innovation ecosystems enables the acquisition of technical skills such as digital design, computer-aided design (CAD), prototyping, 3D printing, product development, and basic engineering competencies. Frugal innovation also cultivates adaptive problem-solving skills, requiring young people to identify local challenges, evaluate available resources, and design practical solutions under conditions of constraint. Through this process, participants strengthen critical thinking, resourcefulness, decision-making, and resilience, all of which are essential in uncertain and rapidly changing labour market environments. In addition, involvement in community-based innovation projects promotes entrepreneurial skills, including opportunity recognition, business-model development, cost management, marketing, and customer engagement. Collaborative innovation activities further develop interpersonal competencies such as communication, teamwork, leadership, negotiation, and project management. Collectively, these technical, entrepreneurial, cognitive, and socio-emotional skills enhance both employability and self-employment potential, positioning youth to participate more effectively in innovation-driven and knowledge-based economies while simultaneously addressing local socio-economic challenges.

The review further identifies that South Africa's formal PSET system continues to experience substantial challenges despite its extensive institutional infrastructure. Persistent curriculum misalignment, lecturer preparedness, limited responsiveness to labour-market needs, and weak articulation between education and employment contribute to an ongoing skills mismatch. The coexistence of exceptionally high youth unemployment alongside employer-reported shortages of technical and artisanal skills highlights a structural disconnect between formal education outputs and labour-market requirements. The findings suggest that community-based frugal

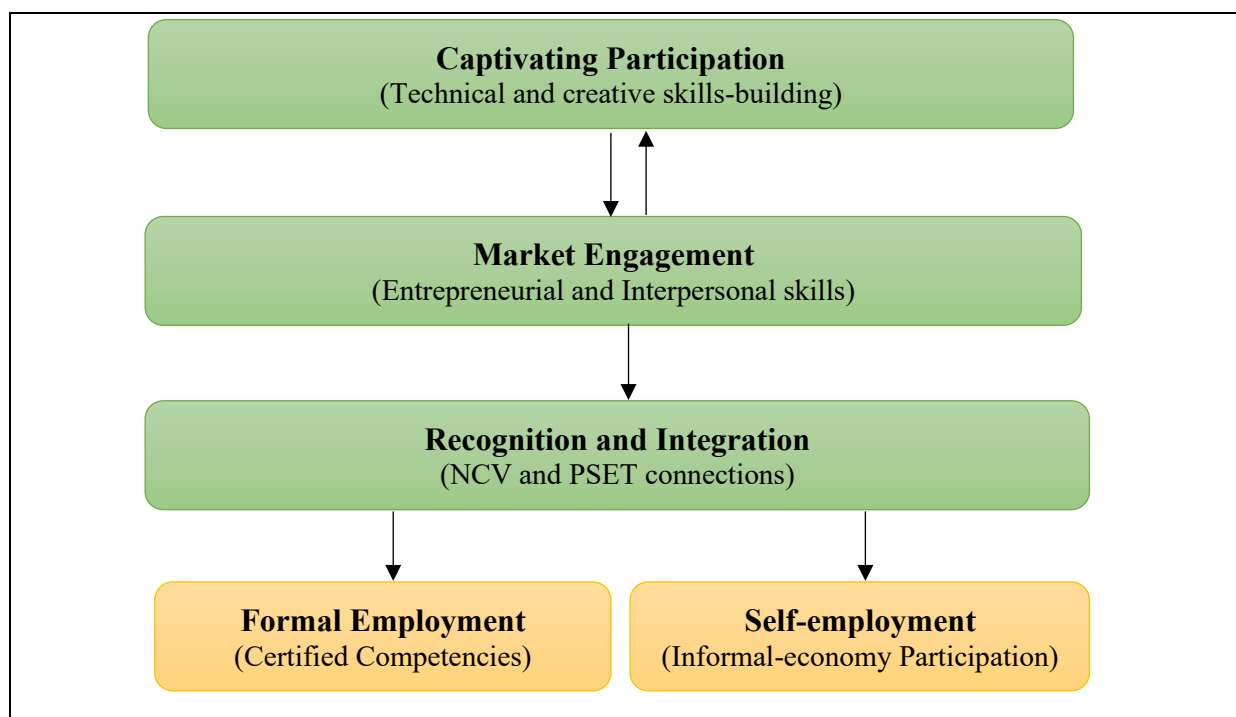
innovation initiatives can complement formal education by creating experiential learning environments in which practical skills are developed through real-world problem solving. Unlike conventional classroom instruction, these initiatives provide opportunities for youth to apply theoretical knowledge while developing competencies in digital literacy, product design, prototyping, coding, entrepreneurship, financial literacy, and project management. Such programmes also expose participants to industry-relevant practices, including customer-centred innovation, market analysis, business planning, and collaborative problem solving. Importantly, the skills gained extend beyond technical expertise to include leadership, communication, teamwork, and innovation management, which are increasingly recognised by employers as critical workplace competencies. Strengthening partnerships between educational institutions, SETAs, municipalities, innovation hubs, and community organisations could help formalise these learning opportunities and improve pathways to certification, employment, and entrepreneurship. Consequently, frugal innovation should be viewed not merely as a mechanism for resource-efficient innovation but also as a strategic approach to youth skills development and workforce preparedness in South Africa.

Despite these opportunities, the review also identifies important barriers limiting the broader impact of frugal innovation. These include inadequate institutional support, limited access to digital infrastructure and financing, fragmented innovation ecosystems, unequal access to emerging technologies, and the absence of formal recognition for competencies acquired outside traditional educational institutions. Consequently, the study argues that while frugal innovation should not be viewed as a substitute for formal education or a complete solution to youth unemployment, it represents a valuable complementary approach that can broaden access to skills development, particularly for marginalised youth. Based on this information, the study proposes that frugal innovation should be recognised not only as an economic practice but also as a pedagogical process that supports inclusive youth development. By integrating community-based innovation ecosystems with formal education, entrepreneurship support, digital technologies, and skills recognition frameworks, policymakers can create more responsive and inclusive pathways that strengthen youth employability, promote entrepreneurship, and contribute to sustainable socio-economic development in South Africa.

5. Youth Skills-Development Pathway

One of the study's significances is the development of a proposed youth skills-development pathway framework that explains the mechanisms through which participation in frugal innovation can strengthen youth skills development. The framework proposes a staged pathway through which South African youth can acquire technical, digital, entrepreneurial, creative, and interpersonal competencies. The framework is designed to operate both within informal township/community innovation ecosystems and structured institutional settings, such as Fab Labs, TVET colleges and SETA-supported programmes. Critically, since the skills-development pathway is non-linear, youth may cycle between captivating participation and market engagement multiple times, with recognition and integration mechanisms available at multiple entry points, reflecting the reality that informal innovators often develop competencies non-sequentially, outside conventional curricular logic.

FIGURE 1. PROPOSED YOUTH SKILLS-DEVELOPMENT PATHWAY FRAMEWORK



Source: researcher's own construction (2026)

The proposed youth skills-development pathway framework operationalises the review's central argument, that frugal innovation functions simultaneously as an economic practice and a pedagogical process.

6. Conclusion

This study demonstrates that frugal innovation represents a valuable and underutilised pathway for strengthening youth skills development in South Africa's resource-constrained environments. Through an integrative review of international and South African literature, the study shows that frugal innovation extends beyond the development of low-cost products and services to function as a dynamic learning process in which young people acquire technical, digital, entrepreneurial, creative, and socio-emotional competencies through practical problem-solving and community engagement. By synthesising evidence from informal innovation ecosystems, Fab Labs, township maker spaces, social enterprises, and youth employment initiatives, the study establishes that resource constraints can stimulate innovation while simultaneously creating meaningful opportunities for practical learning and employability.

The review further highlights that South Africa's persistent youth unemployment and skills mismatch cannot be addressed through formal education alone. Despite the extensive PSET system, structural challenges such as curriculum misalignment, limited labour-market responsiveness, inadequate lecturer preparedness, and weak articulation between education and employment continue to constrain youth economic participation. In this context, frugal innovation provides an important complementary mechanism by enabling young people to develop practical competencies in authentic, community-based environments that respond directly to local socio-economic challenges.

A key contribution of the study is the development of the Frugal Innovation Youth Skills-Development Pathway, a conceptual framework that explains how participation in frugal innovation can facilitate the acquisition of employable skills through a non-linear process of experimentation, collaboration, mentorship, digital engagement, and entrepreneurial activity. The framework positions frugal innovation not only as an economic practice but also as a pedagogical process capable of bridging the gap between learning and employment, while accommodating the realities of informal and resource-constrained contexts.

The study also recognises that frugal innovation is not a substitute for formal education or a standalone solution to South Africa's youth unemployment crisis. Its effectiveness depends on supportive public policy, investment in digital infrastructure, stronger innovation ecosystems, access to finance and mentorship, and mechanisms for recognising competencies acquired outside conventional educational institutions. Integrating frugal innovation into the National Skills Development Strategy, TVET programmes, SETA initiatives, and broader youth development policies would strengthen the relationship between formal and informal learning while expanding inclusive opportunities for entrepreneurship, self-employment, and sustainable livelihoods.

In conclusion, the study contributes to the growing body of knowledge on frugal innovation by repositioning it as a catalyst for youth skills development and inclusive socio-economic transformation. It provides both a conceptual foundation and practical policy direction for leveraging community-based innovation ecosystems to improve youth employability, strengthen local innovation capacity, and support sustainable development in South Africa.

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What Lies Beyond ‘Basic’ Literacy? An Opinion Paper on the Broader Developmental Value of Compulsory and Post-Elementary Education

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Abstract

Technological advances, changing labour markets, and the growing accessibility of online learning have renewed debate over the value of education beyond the compulsory (elementary) school years. This opinion paper examines the contribution of education once basic literacy and foundational knowledge have been established, particularly during adolescence and emerging adulthood. We argue that its value extends beyond academic and vocational preparation: educational institutions across elementary, secondary, vocational, and higher education can support character development, social and ethical development, civic responsibility, and the acquisition of transferable competencies. In addition, it provides social, mentoring, and developmental experiences that are difficult to replicate through independent learning or early employment. While acknowledging concerns about costs, curriculum relevance, and employability, we conclude that these challenges call for reform rather than reduced participation. Education should therefore strengthen character and transferable competencies alongside academic learning, preparing not only knowledgeable individuals but also adaptable, responsible, and socially engaged people capable of becoming the best versions of themselves and navigating the challenges of ‘real’ life.

Keywords: post-elementary education, compulsory education, adolescents, youth development, character development, transferable competencies

1. Introduction

Although education beyond elementary school (including secondary, vocational, and higher education) has long played a fundamental role in educating professionals and future leaders

who shape society (Brooks et al., 2019), its value has increasingly been questioned (Fellows, 2024; Németh et al., 2021; Tóth et al., 2021; Varghese & Musthafa, 2021). Advances in artificial intelligence, accessible online learning, and skills-based hiring have further challenged whether investing additional years in formal education remains worthwhile. In a related context, compulsory education in Hungary, as in many other European countries, currently covers the school years from approximately ages 6 to 16 (covering mostly elementary education), however, the appropriate length of compulsory schooling remains subject to debate, with reform proposals for the upper age limit ranging from 12 to 18 years. These concerns regarding schooling often overlook the broader developmental purpose of education. Beyond academic knowledge, educational institutions provide environments in which adolescents shape their character, values, relationships, and future aspirations—the non-academic dimension that Berkowitz and Bier (2005) described as “the other side of the report card” (p. 64). This is particularly relevant amid rapid technological and societal disruptions, which increasingly require young people to navigate uncertainty and continuous change (Shtaltovna, 2026). Against this background, this opinion paper contends that, despite legitimate criticisms, education after the compulsory elementary school years remains valuable because it supports character development, provides a unique social and developmental environment, and cultivates transferable competencies needed in an increasingly complex world.

2. To Learn or Not to Learn Further?

We argue that one of the strongest justifications for education beyond compulsory schooling lies in its contribution to character development. Adolescence and emerging adulthood are formative stages during which individuals establish their identity, values, and moral judgement (Erikson, 1956; Griszbacher & Griszbacher, 2025; Lamb et al., 2021; Lerner, 2017), while experimenting with new roles, relationships, and aspirations and asking fundamental questions such as “What kind of person do I want to become?” (Brooks et al., 2019, p. 176). As young people prepare for adult responsibilities, educational institutions inevitably influence their development, whether intentionally or not (Arthur, 2024). Their responsibility therefore extends beyond academic metrics to include developing the ‘whole child’ (Wiley, 2000) and preparing students for citizenship, ethical decision-making, and the common good (Arthur & Bohlin, 2005; Berkowitz & Bier, 2005). Indeed, schools have long recognised their role in shaping future generations of citizens (Berkowitz & Bier, 2005). As Dalton and Crosby (2010) observed, “Whether it is concern about academic cheating, sports scandals, racial bias, research and professional ethics, or increasing materialism and consumerism, the college campus is often at the crossroads of moral issues and ethical conflicts” (p. 1). Educational institutions therefore support students’ moral and civic development and helping them translate values and social competencies into everyday behaviour (Dena & Darmawan, 2024; Kuh, 2000).

Equally important is the social environment educational institutions provide. For example, Ryan and Lickona (1992) described universities as an ‘adult culture’ that mirrors wider society, exposing students to role models, diverse perspectives, and real-life dilemmas. Through daily interaction with peers, teachers, mentors, coaches, and other supportive adults, students develop communication, teamwork, emotional intelligence, conflict resolution, and cultural awareness (Berkowitz & Bier, 2005; Griszbacher & Griszbacher, 2025; Kuh & Umbach, 2004; Lerner, 2017). Exposure to peers from diverse cultural, social, and economic backgrounds can further challenge students’ assumptions and strengthen their ability to engage constructively with

different perspectives, building competencies that are becoming increasingly valuable in multicultural societies and workplaces (Rockenbach, 2020). Extracurricular activities, sports, volunteering, and student organisations similarly foster responsibility, belonging, and civic engagement (Dena & Darmawan, 2024; Kuh & Umbach, 2004). Similarly, Lerner (2017) identified supportive adult relationships, life-skill development, and meaningful participation as central to positive youth development. Although institutional effects vary considerably (Kuh, 2000; Kuh & Umbach, 2004), educational institutions can provide relatively safe environments for encountering different perspectives, and developing the capacities required for responsible participation in society.

Beyond formal instruction, educational institutions also offer resources and experiences that may be difficult to access independently, including libraries, laboratories, sports facilities, mentoring, mental health services, international opportunities, student organisations, and residential communities (Gács et al., 2025; Karner, 2024; Kuh, 2000; Reynolds, 2020). Such opportunities reflect Ryan and Lickona's (1992) 'multiversity' notion and provide a safe space for exploration during the transition into adulthood. This resembles Arnett's (2007) developmental moratorium, during which emerging adults can explore identities, ambitions, and relationships before assuming full adult responsibilities. Such opportunities contribute not only to academic achievement but also to students' social, emotional, and psychological well-being (Javed et al., 2016), thereby providing support during one of the most formative and psychologically demanding stages of life (Griszbacher & Griszbacher, 2025).

Nevertheless, education beyond compulsory schooling—and to some extent, compulsory education itself—may demand substantial financial and time investment. Furthermore, access may be limited, curricula may lag behind societal needs, and acquired knowledge can quickly become outdated without guaranteeing employment. These concerns highlight flaws in educational design rather than dismiss its broader developmental value. In increasingly dynamic labour markets, Kuh's (2000) concept of 'just-in-time learning' highlights the importance of preparing individuals for continuous learning and career transitions. Educational priorities should therefore extend beyond knowledge transmission towards transferable competencies such as critical thinking, creativity, adaptability, collaboration, communication, digital literacy, resilience, and lifelong learning (see also Fellows, 2024; Németh et al., 2021; Shtaltovna, 2026; Tóth et al., 2021; Varghese & Musthafa, 2021). Unlike specific knowledge, these competencies can retain their value as technologies, professions, and societies continue to change.

3. Conclusions and Recommendations

The debate surrounding education after completing the required 'elementary' years often focuses on whether acquired knowledge justifies the considerable investment of time, effort, and financial resources. While subject-specific knowledge may become outdated, personal qualities, values, and transferable competencies can remain valuable long after graduation. Education should therefore address the development of the whole person rather than academic achievement alone. We conclude that education should be viewed not merely as vocational preparation, but as a broader investment in human development, particularly during the formative years of adolescence and emerging adulthood. Educational institutions can act as agents of character development, helping young people cultivate resilience, ethical judgement, critical thinking, social responsibility, and openness to diverse perspectives (e.g., Arthur, 2024;

Dena & Darmawan, 2024; Kuh & Umbach, 2004; Rockenbach, 2020; Wiley, 2000). Still, as discussed above, institutional effects may vary (Kuh, 2000; Kuh & Umbach, 2004), these differences underscore the need for educational environments that match students' individual needs and aspirations. Just as seeds require fertile soil to flourish, young people need supportive environments that encourage exploration, reflection, personal growth and learning from failure. Notably, these human-centred functions of education remain difficult to replace in an increasingly complex world.

In line with Fellows (2024) and Shtaltovna (2026), we would like to highlight that, to remain relevant, educational institutions should modernise curricula while strengthening character education, mentoring, interdisciplinary and experiential learning, community engagement, and transferable competencies. Instead of questioning the value of education beyond the elementary years, policymakers and educators should focus on maximising its developmental impact, particularly during the formative years of adolescence and emerging adulthood. Indeed, despite being published nearly three decades apart, Ryan and Lickona (1992) and Rockenbach (2020) similarly recognised the potential of higher education to positively transform society through its graduates. Ultimately, education should not be judged solely by what students know at graduation, but also by who they become through it, because the future of society rests with these individuals. As growing numbers of young people leave education early (post- or even during elementary years) in favour of what they perceive as 'real life' and other pursuits, often employment from which they can 'actually profit,' reflecting on the broader developmental purpose of education becomes increasingly vital. This concise Food for Thought paper provides a timely and novel opportunity to examine the value of education and its role in shaping future generations—not by criticising or unnecessarily limiting the years of mandatory schooling, but by considering what valuable opportunities education can and should provide.

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Beyond the Badge: Microcredentials and the Skills Economy

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Abstract

Microcredentials are increasingly positioned as flexible alternatives to traditional degrees in a rapidly evolving labour market. However, their proliferation has raised fundamental questions about their meaning, comparability, and value as signals of capability. This article shifts the focus from growth narratives to the problem of trust: under what conditions do microcredentials function as credible indicators of skill? Drawing on current literature and industry perspectives, the paper argues that the effectiveness of microcredentials depends on three interrelated factors: robust educational design grounded in clearly defined learning outcomes, rigorous and verifiable assessment that demonstrates applied competence, and the reputational authority of the issuing body. Without these elements, microcredentials risk contributing to credential inflation, where an abundance of low-stakes certifications undermines their signalling power. The analysis highlights a critical distinction between participation-based certificates and evidence-based credentials aligned with established models such as ISO/IEC 17024 (International Organization for Standardization, 2026). The article concludes that the future value of microcredentials lies not in their volume, but in their ability to function as trusted evidence systems that support meaningful skill development and labour market transparency.

Keywords: microcredentials, skills economy, credential trust, assessment, signalling

1. Introduction

A growing narrative suggests that microcredentials are replacing traditional degrees. Arguments put forward to defend this claim involve the rapidly escalating cost of university education, the speed of technological change, and the unpredictability of future industry needs. The argument is that skills are no longer acquired once - now they must be constantly updated, validated, and made visible. As a result, digital badges and short-form credentials now appear routinely on CVs, reflecting a broader shift toward lifelong learning and rapid skill acquisition. What is often missing from this discussion is a more fundamental focus - not whether microcredentials are growing, but under what conditions they can be trusted as meaningful signals of capability.

2. Body

What do microcredentials demonstrate, and to what extent are they trusted by employers? Even the term itself is unstable. Brown and Nic-Giolla-Mhichil (2022) described the microcredential landscape as "messy and undefined." As Alex Usher (2021) argues, perhaps a touch polemically: "The word "micro-credential", precisely because it remains relatively undefined, is absolute catnip to politicians. It's tabula rasa: you can tell politicians the word means damn near anything and not only will they believe you, but no one can contradict you because no one can contradict you." Yeyati, Seyal, and Henn (2025) note that non-degree credentials, including microcredentials, have proliferated rapidly, yet evidence regarding their labour market value remains limited.

Hiring managers are faced with the challenge of determining the actual value of a flood of emerging badges and certificates as the number of providers has risen rapidly and the prerequisite performance for issuance varies dramatically from one microcredential to another. A European Centre for the Development of Vocational Training (Cedefop) working paper from 2024 states that the perception of microcredentials by employers suffers accordingly (Pouliou, 2024).

The central question, then, is how trust can be built and maintained. After all, as Brown Brown and Nic-Giolla-Mhichil point out – the word "credential" comes from the Latin root credence.

A trustworthy microcredential has, in my view, three defining characteristics:

First, it is based on strong educational principles. As laid out in the Cedefop working paper, learning outcomes must be "assessed against transparent and clearly defined standards". Desmarchelier and Cary (2022) argue that the value of microcredentials lies not merely in the credential itself, but in their contribution to learner development, employability, and lifelong learning.

Second, credibility depends on rigorous and verifiable assessment. Many microcredentials certify course completion, but employers increasingly look for evidence that a learner can apply knowledge. As Pouliou (2024) notes, for microcredentials to become a "trusted skills currency", assessment must be quality-assured and based on scientifically sound criteria.

Third, trust is reinforced by independent validation and recognised providers. Whether issued by industry bodies, leading universities, or accredited certification organisations, the issuer acts as a proxy for quality. In practice, this mirrors established models of personnel certification under ISO/IEC 17024, where independent assessment and periodic reassessment help ensure that credentials remain meaningful over time. The labour market value of a credential therefore depends not only on the skills it purports to represent, but also on the credibility of the institution that issues and quality-assures it.

The real risk for young professionals entering the working world is credential inflation, where the sheer volume of credentials reduces their signaling power. There is a growing desire to relentlessly accumulate low-cost, low-stakes credentials, but of course CVs do not benefit accordingly. Yeyati et al. (2025) found that the labour market value of additional non-degree

credentials depends heavily on their relevance to the holder's occupation; accumulation of job-irrelevant credentials may yield little benefit and can even be associated with negative returns.

Rather than asking, “Which certificate should I take next?”, individuals should ask:

- What capability am I building?
- How does this credential contribute to that capability?
- What evidence can I provide that I can apply it?

Young people should pursue meaningful microcredentials that are embedded in a broader narrative: supported by projects, experience, and demonstrable outcomes. In the end, what matters is not what you have completed, but what you can convincingly demonstrate. In this sense, the future of microcredentials will not be determined by their volume, but by their ability to function as serious and credible evidence systems.

3. Conclusion

This article has argued that the future relevance of microcredentials does not depend on their continued expansion, but on their ability to function as credible signals of capability. In a fragmented and rapidly evolving skills ecosystem, trust emerges as the central challenge. Microcredentials that are not grounded in transparent standards, rigorous assessment, and credible issuance risk contributing to credential inflation and diminishing labour market value.

The implications of this analysis are both practical and immediate. For individuals, the findings suggest a shift away from accumulating credentials toward deliberately building demonstrable capability, supported by evidence of application. For organisations, including employers and training providers, the results highlight the importance of evaluating and designing microcredentials not as participation records, but as verifiable evidence systems. This includes embedding robust assessment practices, aligning credentials to clearly defined competencies, and ensuring that issuance is tied to recognised quality assurance frameworks.

At a systems level, the approach outlined in this paper provides a pathway to address the current ambiguity surrounding microcredentials. By applying principles already established in certification models such as ISO/IEC 17024, organisations can increase the comparability and credibility of credentials across contexts. In doing so, microcredentials can move beyond their current inconsistencies and contribute meaningfully to labour market transparency, workforce development, and the long-term functioning of the skills economy.

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GILE Journal of Skills Development

The Decline of the Degree: Why Micro-Credentials Are the Employee Currency of the Future

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Abstract

Micro-credentials have become one of the most exciting products in higher education, adult education and the labour market in recent years. This paper argues that micro-credentials are not just a complement to university courses but can be one of the most important tools for competence development in a rapidly changing world. We seek an answer to the question of why the university degree may lose its relative importance as the primary measure of knowledge and why skills, competencies, adaptability and job-specific skills are coming to the fore. We also present two short examples: the Irish practice and the example of University at Buffalo, how micro-credentials can become one of the strongest elements of the connection between the labour market and higher education. Our main assumption is that the degree will not disappear, but its value may slowly fade into the background, and in the future, micro-credentials that demonstrate verifiable, performance-based competence, immediately applicable skills and the ability to continuously learn will become a competitive advantage. Micro-credentials offer flexible, labour-market-relevant skills but lack the trust, recognition, and quality assurance of degrees, with employers citing consistency concerns more often than skill-fit benefits. Uneven recognition, oversupply, and barriers like cost, language, and digital access further weaken trust and risk excluding vulnerable learners, potentially deepening inequality in adult education.

Keywords: micro-credentials, skills-based hiring, competency-based education, lifelong learning, adaptability

1. Introduction

For centuries, a university degree has been one of the most important socially recognizable indicators of knowledge and expertise. The question today is not whether a degree is valuable, but whether it is sufficient in a world where technology, jobs and the required competencies are

changing constantly and at an accelerating pace. The labour market is becoming less linear, career paths are becoming less predictable, and university learning has become an increasingly targeted process. In this environment, micro-credentials can provide a solution that is both flexible, short-cycle and directly linked to improving the efficiency of work performance (Council of the European Union, 2022; Cedefop, 2022).

The appeal of micro-credentials is that they do not appear as a multitude of learning units accumulated over years, which are difficult to separate, but rather as a certification of well-defined specialized knowledge. This can be particularly important where employers expect quick, measurable and task-oriented skills and knowledge from the candidates. The European Union's recommendation on micro-credentials also points in this direction: micro-credentials can be a key element of lifelong learning, retraining and employability (Council of the European Union, 2022; McCoshan, 2023).

The debate is not simply about education, of course, but about what we consider knowledge. The traditional degree has long been a means of broad literacy, theoretical foundation and social legitimacy. At the same time, the questions of whether a candidate can solve real problems, learn quickly, adapt and mobilize the skills appropriate to the given situation are appearing in a growing tendency in employer decisions. Increasingly, the decisive factor is no longer the formal seals attesting to a qualification, but the demonstrable competencies that individuals can acquire and apply (Bone et al., 2025; Butrica & Mudrazija, 2022).

2. From degrees to demonstrated competence

The reframing of the value of a university degree does not constitute a repudiation of knowledge but rather reflects a transformation in the modalities through which knowledge is measured and validated. Formal qualifications often encompass a wide range of content and acquired knowledge, and it is not always clear which of these can be directly applied in the workplace. Micro-credentials, on the other hand, are targeted and demonstrate the acquisition of a specific competence or skill (Cedefop, 2022; Tamoliune et al., 2023). This is especially important in the digital, green and data-driven economy, where job requirements are changing faster than institutional curricula can adapt to them.

The competency-based approach is not new, but it has only recently become a truly strategic one. In some cases, competency-based learning can lead to better performance than the traditional educational model, especially when the learning outcomes are clearly defined and measurable (Denny et al., 2024). The same logic works in the labour market: the employer does not buy the curriculum description, but the real knowledge acquired during university education.

To put it provocatively: a degree often still shows that someone has been able to meet the expectations of an institutional system for a long time. A micro-credential, on the other hand, shows that someone has acquired the knowledge that allows them to provide an actual solution to a specific problem or current challenge. This difference is important because it can be of immediate benefit to employers, and it is no coincidence that skills-based hiring has become a prominent recruitment method in multiple industries (Bone et al., 2025; SHRM, n.d.; Taamneh et al., 2026).

The primary importance of skills is shown by numerous studies. Adaptability skills include leadership, influencing, behavioural flexibility, and initiative, as well as adaptive behaviour, all of which are key to workplace success (Ybarra, 2023). Similarly, the skills-or-degree debate is increasingly tilting towards skills where work takes place in a rapidly changing environment and where employers are looking for specific task-solving skills (Bone et al., 2025; Horowitz, 2018).

3. Why employers increasingly trust micro-credentials

One of the biggest advantages of micro-credentials is that they are directly linked to employer needs. A well-designed micro-learning course does not demonstrate general literacy, but only a specific competency. This is attractive to employers because it reduces the uncertainty of selection, as candidates can not only demonstrate their general knowledge, but can also demonstrate in a certified way that they have specialized knowledge (ICDL, 2025; Galindo, 2026).

A second important advantage is pace. The labour market cannot wait for the entire higher education training cycle to be completed and for freshmen to become graduates. The need for upskilling and reskilling is continuous due to accelerated technological and organizational changes, which is why short, targeted learning forms have become particularly attractive. In the coming years, there will therefore be a huge need for skill updating, especially due to automation, digitalization and AI solutions (World Economic Forum, 2020; UNICEF & ILO, 2025).

A third aspect is measurability. Micro-credentials are often based on specific performance criteria, assessment logics and demonstrable learning outcomes. This means that employers do not see a vague “level of qualification” but rather precisely defined skills. This kind of transparency is particularly valuable in sectors where, for example, performance, data management, digital tool use or project-based work dominate (Galindo, 2026; Cedefop, 2022).

4. Examples

The Irish system clearly shows that micro-credentials are not theoretical buzzwords but working policies and educational tools. According to the Irish Cedefop example, micro-credentials are used in Ireland at different levels of education, training and learning for the labour market, and the system plays an important role in bridging formal and non-formal learning. This is important because it allows learners to think not only in terms of long educational programmes, but in terms of specific competence packages that can be immediately interpreted and valued by the labour market. Based on the experience of Irish practice, micro-credentials do not dilute the value of learning, but make it more visible, flexible and targeted (McCoshan, 2023).

Although it is not as deeply integrated or nationwide as the Irish example, another success story is the experience of the University at Buffalo. The institution implemented micro-credentials by leveraging its existing academic and administrative systems, which accelerated the introduction of this form of education, and at the same time, reduced the risks associated with its introduction. The point here was not simply to issue a new type of certification, but to enable students to enter the labour market faster, acquiring relevant skills more quickly. This model is interesting because it shows that micro-credentials do not work against higher education, but

can represent an expanded, more marketable face of higher education (Downs, 2022). This example illustrates only an institutional-level success rather than national recognition.

The examples show that concerns about micro-credentials can be avoided with proper quality assurance and standardization, whether they are implemented widely or within a single institution.

5. Adaptability, flexibility and the new skill portfolio

One of the most important requirements for the workplace of the future will not be technical knowledge alone, but adaptability. An employee who learns quickly in new environments, adapts to change, and is not afraid of uncertainty will be increasingly valuable. According to research, adaptive behaviour also includes behavioural flexibility, initiative, and a tendency to act (Ybarra, 2023). This is important because employers are increasingly looking for less of a "ready-made person", but rather for an employee who can develop along with changing tasks.

It follows that in the future a well-built skills portfolio can be more valuable than a single degree. It is not a static set of documents, but a chain of evidence: micro-credentials, project results, practical demonstrations, peer reviews and other validated performance evidence. This logic is particularly strong when AI, the green transition and digitalization are simultaneously transforming jobs (Bone et al., 2025).

6. Limitations

Although micro-credentials provide flexible, labour-market-relevant competences, they fail to command the same trust and recognition as university degrees because the absence of standard quality assurance and institutional accreditation enables an oversupply of inconsistent credentials, which in turn makes employers selective and produces uneven recognition across countries and institutions. This causal chain helps explain why employer concerns about consistency dominate the evidence – appearing in around 80% of studies, more often than the top benefit of meeting specific skill requirements at about 75% (Varadarajan et al., 2023) – and why the resulting credibility gap, combined with language, cost, and digital barriers, excludes vulnerable learners and risks reinforcing inequalities in adult education.

The equity gap may arise through several reinforcing mechanisms: disadvantaged learners may face higher costs, language barriers, limited digital access, and less availability of guidance to identify credible and relevant credentials. They may also lack the institutional support that helps learners persist when courses become difficult, while employers may discount micro-credentials from candidates without a recognised university or institutional background. Consequently, those who most need flexible learning opportunities may be more likely to choose low-quality or poorly recognised credentials, receive less support to complete them, and gain fewer labour-market benefits. Addressing this problem therefore requires more than expanding access; it also requires affordable provision, accessible guidance, learner-support structures, transparent quality signals, and employer recognition.

7. Conclusion

The emergence and growing acceptance of micro-credentials are not a short-term trend, but rather a sign of a deeper structural transformation of the labour market and education. A degree will remain important, but it will become less sufficient to gain the trust of employers. In the future, skills, competencies, adaptability and a willingness to continuously learn will become the main carriers of labour market value (Ybarra, 2023; Taamneh et al., 2026).

Micro-credentials can be more powerful because they respond more quickly to changes, better measure specific performance, and are closer to real expectations. The Irish and American examples show that this model is already working (McCoshan, 2023; Downs, 2022).

Learners bear the risk of investing in micro-credentials that may not pay off, with disadvantaged groups hit hardest by costs, limited guidance, and the need to stack credentials wisely. Employers, in turn, must vet issuers themselves, raise screening costs, and favour only trusted providers, which fuels credential theatre and could erode the access and flexibility benefits micro-credentials promise.

Our conclusion is simple: the degree will not disappear, but it may certainly lose its monopoly position. The question of the future will not be whether someone has a degree, but whether they have a validated, flexibly expandable skill portfolio that truly matches the expectations of the labour market. The traditional degree will not become worthless in this environment, but its function will be transformed. It will increasingly need to provide basic, broad-based background knowledge, while micro-credentials and other skills certifications will provide the evidence of meeting specific workplace expectations. The question is therefore not whether it is a degree or a micro-credential, but rather which one proves what. The answer is increasingly clear: a degree is more about having gone through a training system; a micro-credential is about having been able to acquire and use a specific skill (Galindo, 2026; ICDL, 2025; Acreditta, 2025).

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Ethics Statement

For studies involving human participants, the authors confirm that the research complied with relevant institutional and national ethical standards. Ethical approval was obtained where required, and informed consent was secured from all participants prior to data collection. If ethical approval was not required, the authors confirm that the study adhered to applicable ethical guidelines.

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