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INTRODUCTION AND WELCOME

The Editors

The International Doctoral Research Centre (IDRC; www.idrcentre.org) was created by like-minded researchers who wish to promote excellence in doctoral and post-doctoral research.

The IDRC hosts two annual research seminars – the European Research Seminar held in April and the American Research Seminar held in September. In addition to the two annual seminars, the IDRC publishes an annual journal: the Journal of International Doctoral Research (JIDR).

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Regards,

Editorial Board of the JIDR
Directors of the IDRC

INTRODUCTION BY THE GUEST EDITOR

Introduction

Welcome to this new edition of the **Journal of International Doctoral Research**, a journal dedicated to interdisciplinary scholarship in management and economics, and to amplifying the voices of doctoral and postdoctoral researchers from around the world.

The articles gathered here address a shared reality: we are redesigning education and organisations in a period marked by geopolitical uncertainty, security pressures, and rapid technological change. In Europe, AI governance is no longer theoretical: the EU AI Act is being rolled out in stages, with general provisions (including AI literacy) taking effect from February 2025, general-purpose AI rules from August 2025, and a full rollout foreseen by August 2027. At the same time, Europol's 2025 threat assessment describes serious and organised crime as increasingly networked and digitally enabled, exploiting new technologies and instability. Across this issue, "redesign" is not treated as a slogan, but as practical work; work that happens at the level of systems, curricula, routines, values, and safeguards.

At the system level, the study of **Iceland's university merger initiatives** shows reform driven by financial constraints and ambitions for quality and international competitiveness, while also confronting the predictable friction points of consolidation: cultural integration, organisational complexity, and stakeholder resistance. The question is not only whether mergers increase efficiency, but how legitimacy and academic identity are maintained while institutions are re-stitched.

At the curriculum level, the article on **computer science education after generative AI** warns that automating "starter tasks" risks creating *cognitive debt*: graduates who can produce code but lack the conceptual depth to verify, maintain, and take responsibility for it. It's proposed that "Cognitive Apprenticeship 2.0" reframes the target outcome from output to judgment, focusing on verification, orchestration, and process transparency.
At the level of everyday coordination, the **Kanban meetings** case demonstrates how changing workflow logic can yield tangible results: shorter, more focused meetings, improved engagement, clearer visibility, and greater adaptability. This suggests that "how we meet" is not a side issue but a key productivity and well-being mechanism.

Two contributions then push deeper into the human side of redesign. The **positive opposites framework** posits that leadership values are not fixed, and that what appears "old-fashioned" (stability, pragmatism, performance focus) can serve as a constructive counterpart to innovation-centric ideals, depending on the career stage and context. The **slow work** study provides a concrete counterpoint to acceleration, demonstrating how calmer, more meaningful work patterns can support well-being and cohesion when embedded as a cultural norm rather than an individual coping mechanism.

Finally, redesign also concerns **fairness and safety**. The study on **oral final exams** finds real

learning benefits through dialogue and reflection, while surfacing predictable risks - anxiety and perceived inconsistency - that can be mitigated through transparency and support. And the analysis of **Satudarah in Norway**, using convenience theory, reminds us that reducing harm requires understanding the choice architecture that makes deviance attractive in the first place. Taken together, this edition argues - quietly but insistently - that resilience is built less through heroic effort than through better-designed pipelines: of learning, coordination, evaluation, leadership development, well-being, and social control. In that sense, the issue offers both diagnosis and direction for readers navigating institutions under pressure.

Thank you to the authors, reviewers, and the JIDR editorial team for making this edition possible.

Kind regards,

Guest Editor
Dr. Verena Karlsdóttir
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Heilbrigðis-, viðskipta- og raunvísindasvið-Viðskiptadeild / School of Health, Business and Natural Sciences-Faculty of Business Administration
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Redesigning Higher Education: Iceland's Merger Initiatives

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Abstract

This article examines university mergers in Iceland, analysing how such structural reforms can promote efficiency, enhance academic quality, and strengthen international competitiveness within the national higher education system. Drawing on scientific literature, government policy documents, and official reports, the article explores the primary motivations behind mergers and their effects on institutional finances, educational offerings, and research capacity. Special attention is given to mergers in Iceland as well as current governmental strategies promoting further consolidation. Findings suggest that university mergers in Iceland are largely driven by financial pressures and the desire to increase global visibility and performance. However, the process is not without challenges, including organisational complexity, cultural integration issues, and resistance from academic stakeholders. While mergers offer potential benefits in terms of resource optimization and institutional alignment, Iceland's relatively recent and limited experience with such initiatives makes it difficult to fully evaluate their long-term impact. Nevertheless, ongoing developments such as the proposed UNAK–Bifröst merger and federative models like that of Hólar University highlight a growing strategic interest in tailoring mergers to the Icelandic context through flexible and inclusive approaches.

Keywords: University mergers, efficiency, international competitiveness, higher education policy, higher education system.

1. Introduction

Mergers and acquisitions have long been used by corporate managers to gain a competitive advantage, increase economies of scale, access foreign markets, and integrate cutting-edge technologies (Bertrand, 2009; Gupta et al., 2023). In the university context, mergers involve the amalgamation of one or more higher education institutions into a newly formed or existing institution, resulting in the loss of legal independence of the merged entities (European University Association, n.d.).

In recent decades, university mergers have become increasingly common globally. Originally rare and often driven by financial constraints or demographic decline, mergers have evolved into strategic decisions aimed at strengthening sustainability, academic quality, and international competitiveness (Pon & Duncan, 2019). While initial motivations were primarily financial or demographic (Papadimitriou & Johnes, 2018; Pinheiro et al., 2015; Stewart, 2003), they now also encompass goals such as research excellence, global outreach, and digital transformation (Boling et al., 2017).

In many European, North American, and Asian countries, mergers are part of broader governmental strategies to consolidate higher education systems, reduce fragmentation, and create institutions that are more attractive to international students and funding (Deschamps & Lee, 2014; Ursin & Aittola, 2019; Vellamo et al., 2019). At the institutional level, mergers are often employed to establish research niches, address regional development needs, and expand educational offerings (McCauley-Smith

et al., 2013).

This article examines university mergers within the Icelandic context and assesses their potential to enhance efficiency, academic quality, and international competitiveness. The central research questions guiding this study are:

- What opportunities and challenges are associated with mergers in rural Iceland?
- How might consolidation affect access to higher education, regional development, and academic autonomy?
- What lessons can be drawn from previous national and international experiences with university mergers?

To answer these questions, this study adopts a qualitative, exploratory research design using document analysis. The article is based on a traditional (narrative) literature review in the sense described by Jesson et al. (2012), rather than a formal PRISMA-style systematic review. Data sources include peer-reviewed journal articles, book chapters, government and agency reports, feasibility studies, and official statements by Icelandic universities and public authorities related to merger processes in Iceland and abroad. This approach enables a comparative analysis of merger rationales, implementation strategies, and perceived outcomes. Special emphasis is placed on identifying the drivers and consequences of mergers, especially regarding resource utilisation, educational offerings, and research capacity.

University mergers can take various forms, depending on institutional goals and local contexts. Thereby, horizontal mergers occur between institutions with similar missions, typically to enhance size, efficiency, or global competitiveness. Vertical mergers involve the integration of institutions with complementary educational or research profiles, facilitating curricular integration and interdisciplinary collaboration (Harman & Meek, 2002). Federation models allow institutions to retain partial autonomy while sharing governance structures and strategic goals (Williams, 2017).

The Icelandic higher education system, despite the country's small population, comprises several universities. This has led to debates over whether consolidation could enhance academic quality and resource efficiency. A prominent example is the 2008 merger of the Iceland University of Education and the University of Iceland, aimed at strengthening teacher education. More recently, the government has proposed further mergers and federations among universities to align with international best practices and improve institutional resilience (Stjórnarráðið, 2024).

This article provides an overview of global trends in university mergers, with a focus on developments in Europe and the impact of the Bologna Process. It then discusses merger activities in the Nordic countries, before turning to the historical and current dynamics of the Icelandic higher education system. The final sections analyse ongoing merger initiatives in Iceland, particularly those involving rural institutions, and conclude with reflections and recommendations for future research and policy.

1.1 Approach to the Literature Review

Although this is not a systematic review in the PRISMA sense, the literature search followed a structured and transparent logic. Relevant publications on university mergers and higher education consolidation were identified through iterative searches in databases such as Scopus, Web of Science, and Google Scholar, using combinations of keywords including „university merger*"and „higher education consolidation «with a focus on publications from 2000 onwards. These database searches were complemented by backward and forward citation tracking of key contributions, as well as targeted searches of Icelandic policy documents and feasibility studies on university mergers. Sources were included if they (a) explicitly addressed mergers or comparable structural reforms in higher education, and (b) offered empirical or conceptual insights into rationales, implementation processes, or outcomes in a way that was relevant to the Icelandic context.

2. Literature Review

2.1 Rationale for University Mergers

University mergers are primarily driven by a combination of financial, demographic, strategic, and political factors. One of the most frequently cited motivations is financial pressure. Higher education institutions across Europe and beyond face shrinking public budgets, fluctuating student enrolment, and increasing operational costs. Mergers are often seen as a way to achieve economies of scale by streamlining administrative structures, eliminating redundancies, and reallocating resources to core functions such as teaching and research (Bernile & Lyandres, 2018).

Demographic change is another key driver. In countries experiencing declining birth rates such as Japan, South Korea, and several Eastern European states, universities face a shrinking pool of students (Tolstoukhova & Kryucheva, 2020). Mergers, in this context, are often seen as a survival strategy to maintain institutional viability and safeguard the breadth of academic programs. The increase of global competition also incentivizes mergers. Institutions seek to improve their national and international visibility, enhance research productivity, and attract top faculty and students. Mergers allow universities to consolidate their research strengths, develop specialized academic profiles, and improve their rankings and reputation (Pruisken, 2017). Governments increasingly support or mandate mergers as part of higher education reform agendas. These policy-driven consolidations are intended to enhance system-wide coordination, reduce duplication of programs, and boost national innovation capacity. In several cases, such reforms are accompanied by changes in funding mechanisms, legal frameworks, or performance-based incentives (Walsh, 2013; Wan & Peterson, 2007).

Mergers can also offer opportunities for research and innovation. Consolidated institutions can pool academic expertise, share infrastructure, and expand interdisciplinary collaborations. This may result in the development of new academic programs and research centers that individual institutions could not establish alone (Sursock et al., 2010). Larger institutions also tend to have better access to competitive research funding and are more likely to meet the eligibility criteria of international grant schemes (Pon & Duncan, 2019).

However, mergers are not without risks. Institutional culture remains one of the most cited challenges. Universities often have long-standing traditions, identities, and pedagogical approaches. Resistance may arise when stakeholders perceive mergers as a threat to institutional autonomy or disciplinary heritage (Wollscheid & Røsdal, 2021). Without careful integration strategies, mergers can lead to internal conflicts, loss of morale, and reduced productivity (Bor & Shargel, 2020). Financially, while mergers promise cost savings in the long term, the initial costs are often substantial. Legal fees, system coordination, personnel restructuring, and infrastructure integration may require significant upfront investment (Sułkowski et al., 2019). Moreover, disparities in institutional financial health can complicate mergers, especially when one university carries significant debt (Martin & Samels, 2017). Lastly, aligning curricula, quality assurance systems, and research agendas can be a complex and time-consuming process. If not managed inclusively, these efforts can disrupt academic planning and cause dissatisfaction among staff and students (Barnard et al., 2016). To succeed, mergers require transparent communication, participatory decision-making, and strategic leadership (Goldman, 2012; Kotter, 2012).

The following sections build upon this literature by analysing European and Nordic case studies before focusing on the Icelandic context.

2.2 University Mergers in Europe

Across Europe, university mergers have become a prominent strategy to address fiscal pressures, enhance research capacity, and elevate institutional profiles in global rankings. Between 2000 and 2016, over 120 university mergers and acquisitions were documented within the European Higher Education Area (European University Association, n.d.). Early mergers were frequently initiated in response to

government-imposed efficiency reforms and budgetary constraints. More recently, however, they are increasingly associated with ambitions to boost research performance, foster innovation, and meet the objectives of internationalization (Estermann & Pruvot, 2015).

A key policy mechanism for European mergers has been the Bologna Process, launched in 1999 to standardise European higher education systems. The Bologna Process introduced mechanisms for academic degree comparability, quality assurance, and mobility enhancement, creating new pressures for universities to modernize and integrate (Puhakka et al., 2010). Within this policy framework, mergers have been employed to improve institutional alignment with Bologna standards, streamline governance, and develop cross-border academic collaborations (Poutanen, 2022).

The goals of the European Higher Education Area (EHEA), including improving graduate employability, enhancing student and faculty mobility, and fostering transnational knowledge cooperation, have further incentivized structural reforms. Mergers are thus seen as both a response to and a driver of system-level innovation. By merging institutions, countries aim to develop competitive universities that can participate effectively in the global knowledge economy while preserving accessibility and regional engagement.

In some countries, university mergers have led to the creation of powerful academic hubs with expanded research capabilities. These initiatives are often accompanied by state funding and legislative changes to facilitate integration. However, mergers across Europe have also faced resistance related to concerns over loss of institutional identity, diminished local responsiveness, and reduced diversity in educational offerings. Despite these challenges, European experiences provide valuable insights into how structural consolidation can serve strategic purposes when carefully planned and inclusively implemented. The following overview draws on the structured traditional review, complemented by recent Icelandic policy documents and feasibility studies. It examines merger activities in the Nordic region, where countries have pursued distinct yet coordinated approaches to strengthening their higher education systems through consolidation.

2.3 University Mergers in the Nordic Region

The Nordic countries – Denmark, Norway, Sweden, and Finland- have undergone substantial restructuring of their higher education sectors in recent decades, often using mergers as a tool to achieve long-term strategic goals such as regional development, research excellence, and international visibility.

Denmark represents one of the most comprehensive merger efforts in Europe. Between 2005 and 2012, the number of higher education institutions was reduced from 25 to 11. This included the integration of research institutes into universities and the merging of technical colleges (polytechnics). The rationale was to streamline governance, increase interdisciplinary collaboration, and boost the global competitiveness of Danish universities. Aarhus University, for example, underwent three major mergers (in 2006, 2007, and 2012), incorporating multiple research institutes and smaller colleges to form a more cohesive and research-intensive institution (European University Association, n.d.). Evaluations of these reforms suggest that Danish universities have improved their research performance and climbed international rankings.

Norway pursued a more gradual path to merging. University mergers gained traction after 2009, driven by government policies to promote better coordination between research and teaching institutions and to enhance academic capacity. A notable case is the University of Tromsø, which merged with several regional colleges to form an institution with a strong Arctic and northern focus. The government provided targeted support to facilitate integration and encourage innovation in both research and regional engagement (European University Association, n.d.).

In Sweden, formal mergers have been fewer and more regionally motivated. The government has generally favoured partnerships and increased collaboration over full institutional integration. For instance, the formation of Linnaeus University in 2010 combined Växjö University and Kalmar

University College, aiming to create a stronger institution in southern Sweden while retaining its regional identity and accessibility. The Swedish approach reflects a policy balance between centralization for competitiveness and decentralization to meet local needs.

Finland has actively used mergers to modernize its higher education landscape. Pressures to enhance efficiency, support innovation, and align with global standards culminated in several major mergers, particularly following the introduction of new university legislation in 2010. The most significant development was the creation of Aalto University in 2010, which merged the Helsinki School of Economics, the University of Art and Design Helsinki, and the Helsinki University of Technology. Aalto University was designed as a flagship institution for innovation, entrepreneurship, and interdisciplinary education. Another example is the University of Eastern Finland, established in 2010 by merging the universities in Joensuu and Kuopio, with an emphasis on health sciences and technology.

Most Nordic mergers have been horizontal, involving institutions with comparable missions and academic structures. However, the Finnish case also illustrates how vertical mergers – linking different disciplinary strengths – can create globally competitive, innovation-driven institutions. In general, Nordic experiences underline the importance of government support, regional policy alignment, and careful attention to institutional cultures in ensuring successful mergers (Välimaa, 2012).

The following section examines the development of the Icelandic higher education system and assesses how historical paths and recent policy shifts have influenced current merger initiatives.

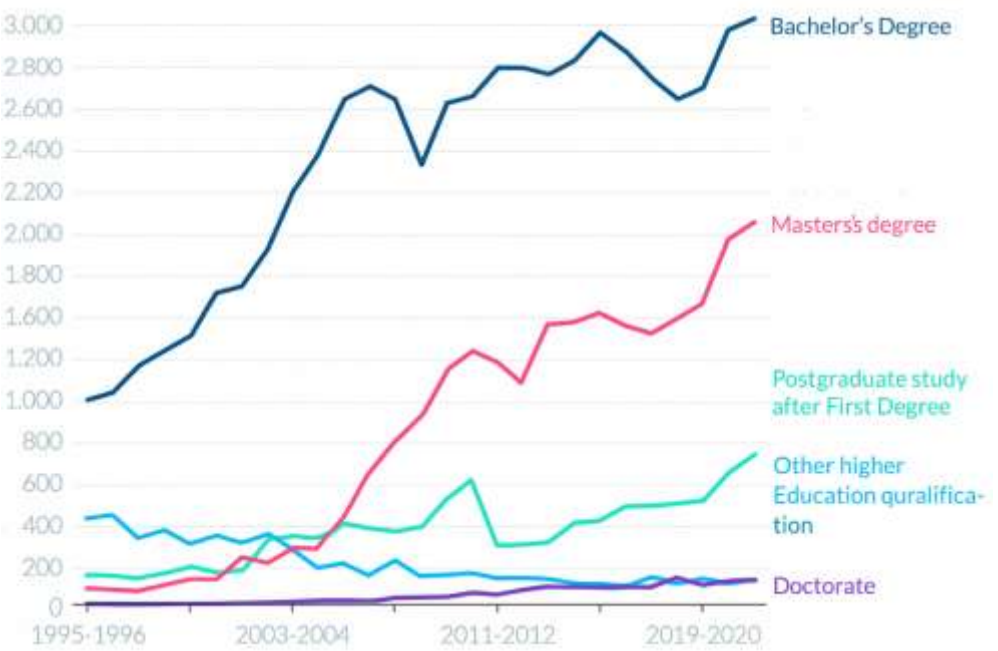
2.4 Historical Development of the Icelandic Higher Education System

The evolution of the Icelandic higher education system has been shaped by a combination of national priorities, demographic shifts, and regional development goals. For much of the 20th century, the University of Iceland (Háskóli Íslands), established in 1911, was the country's only university. The first significant diversification occurred in the late 1960s and early 1970s with the creation of specialized institutions such as the Iceland University of Education (Kennaraháskóli Íslands) and the Technical College of Iceland, reflecting growing demand for professional and technical training. Subsequent decades witnessed the establishment of several new institutions aimed at increasing access to higher education nationwide. The University of Akureyri (UNAK) was founded in 1987 to address regional needs in northern Iceland, initially focusing on nursing and business but later expanding into education, social sciences, and Arctic studies. The University of Reykjavík (UR) was established in 1998, building on the legacy of the Reykjavík School of Business, and has quickly grown into a major provider of programs in law, psychology, computer science, and engineering. Other developments included the establishment of Bifröst University (initially a cooperative school), the Agricultural University of Iceland, and the Iceland University of the Arts. These institutions broadened the academic landscape, offering programs in law, economics, the arts, and agricultural sciences. Hólar University (Háskólinn á Hólum), granted university status in 2003, specializes in equine sciences, aquaculture, and tourism. A major structural change occurred in 2008 with the merger of the Iceland University of Education into the University of Iceland, resulting in the formation of the School of Education. The rationale was to combine teacher education, enhance research capacity in the field of educational sciences, and align with international trends of integrating smaller, specialized colleges into larger, research-oriented universities. Although the transition was generally seen as successful, it also sparked debates regarding institutional identity and academic autonomy. The expansion of distance education in the 2000s played a key role in improving access to higher education in rural areas. Institutions like UNAK and Bifröst emerged as pioneers in offering flexible study formats, enabling students from across the country to pursue degrees without relocating to Reykjavík. This model helped democratize access to education and respond to the specific needs of working adults, caregivers, and residents in remote communities.

Figure 1 illustrates the development of graduations at the university level in Iceland between 1995–1996 and 2019–2020, providing important contextual background for understanding structural

changes in the higher education system with regard to institutional diversification and reform. The marked increase in bachelor's and, particularly, master's degrees from the early 2000s aligns with national efforts to expand academic offerings beyond Reykjavík and improve access through the development of regional universities. The rapid growth in master's graduations from 2005 onward also reflects the implementation of the Bologna Process and the growing importance of postgraduate qualifications in the Icelandic labour market. In contrast, the number of doctoral degrees remains relatively low but shows a gradual upward trend, indicating a more limited research capacity despite the implementation of structural reforms. Postgraduate programs following the first degree and other higher education qualifications display modest but steady growth, underscoring diversification in educational pathways. In this context, the expansion of distance education further supports degree completion nationwide, contributing to the steady increase in graduation rates observed across most qualification types.

Figure 1. Graduations at the university level.



Source: Hagstofa Íslands (e.d.)

Despite this expansion, the Icelandic higher education system remains highly dependent on public funding. According to OECD data (2019), public sources account for 89% of university funding in Iceland, which is significantly above the OECD average of 67%. However, public investment per student remains relatively low compared to other Nordic countries. Instability in public funding and performance-based budgeting models has posed challenges for institutional planning and long-term development (Arnmundsson, 2018). As of 2024, funding allocation is based on graduation rates and research outputs, reflecting a shift toward performance-linked financing (Stjórnarráðið, 2023). While intended to reward quality and efficiency, this model has drawn criticism for placing disproportionate pressure on smaller institutions and exacerbating resource imbalances across the system. In light of these financial and structural dynamics, discussions on mergers and closer cooperation between universities have gained new momentum. The following section analyses recent and ongoing merger initiatives in Iceland, with

particular attention to their rationale, implementation, and strategic implications.

2.5 Merger Initiatives in Iceland

In recent years, there has been a notable revival of interest in university mergers in Iceland, driven by a growing consensus that institutional consolidation may help address long-standing challenges related to financial sustainability, regional equity, and international competitiveness. These initiatives reflect broader international trends, particularly from other Nordic neighbours, where mergers have been used to strengthen strategic capacity, broaden academic offerings, and enhance research profiles. In the Icelandic context, merger proposals are increasingly framed as developmental strategies to ensure the long-term viability of regional universities and improve coordination within a small and resource-constrained higher education system.

Formation and Development of the Agricultural University of Iceland (LbhÍ): The Agricultural University of Iceland (LbhÍ) was established in 2005 through the merger of three institutions in the field of agriculture and natural resource management: the Agricultural Research Institute (RALA), the Icelandic Agricultural College at Hvanneyri, and the Horticultural School at Reykir in Ölfus. This merger marked a significant turning point in the evolution of agricultural education and research in Iceland, aligning with broader governmental efforts to consolidate academic institutions to enhance quality, efficiency, and interdisciplinary collaboration. Thereby, RALA had a long-standing role as a key player in agricultural innovation and scientific development in Iceland. Its research covered areas such as soil science, crop production, livestock management, land use, and environmental sustainability. RALA played a crucial role in providing applied research that informed public policy and supported the farming community. The Agricultural College at Hvanneyri had historical roots dating back to the late 19th century and played a central role in training agricultural professionals. Over time, the college evolved into a higher education institution with strong academic programs in agricultural sciences and land management and maintained a strong connection to regional development in rural Iceland. The Horticultural School at Reykir specialized in vocational and technical education in horticulture, with a focus on sustainable cultivation methods, greenhouse production, and applied plant sciences. It provided hands-on training and contributed to the development of Iceland's horticultural sector, including floriculture and vegetable farming. By merging these institutions, the Agricultural University of Iceland was envisioned as a comprehensive, interdisciplinary university dedicated to education, research, and innovation in sustainable use of natural resources. The goal of the merger was to strengthen academic programs, utilize existing infrastructure and expertise more effectively, and enhance the university's national and international relevance. Following the merger, LbhÍ underwent a process of organisational restructuring and academic innovation. The university introduced new degree programs at both the undergraduate and graduate levels, reflecting the growing demand for expertise in environmental science, sustainability, planning, and natural resource management. Programs such as Environmental Planning, Forestry, and Restoration Ecology were added to the university's portfolio, alongside more traditional agricultural studies. The university also increased its collaboration with domestic and international partners. LbhÍ has participated in joint research initiatives and educational programs with other Icelandic universities, including the University of Iceland and the University of Akureyri, as well as Nordic and European institutions. These partnerships have enhanced the university's capacity to offer a diverse range of courses and conduct cutting-edge research on climate change, sustainable agriculture, and biodiversity conservation. In terms of governance and organizational structure, the university has moved toward a more integrated and interdisciplinary model. Academic departments have been reorganized to facilitate collaboration across fields, and efforts have been made to streamline administrative processes and strengthen student support services. Despite its relatively small size, LbhÍ has positioned itself as a key institution in promoting sustainability, food security, rural development, and responsible land use in

Iceland. It has also maintained a strong commitment to regional engagement, offering distance learning opportunities and working closely with rural communities across the country.

Reflections on the 2008 Education Merger: Iceland's most significant completed merger to date occurred in 2008, when the Iceland University of Education was incorporated into the University of Iceland to form its School of Education. The rationale was to centralize teacher education, consolidate research in educational sciences, and improve the international standing of the field. While the merger succeeded in improving research performance and aligning degree structures, it also caused concerns over the loss of institutional identity, reduced visibility for education as a discipline, and insufficient attention to cultural integration (Papadimitriou & Johnes, 2018). This earlier experience remains an important case study for current merger discussions. It demonstrates the need for long-term planning, effective communication strategies, and explicit efforts to manage organisational culture and stakeholder expectations. Lessons from this merger continue to inform recent initiatives and underscore that structural changes must be guided by strategic purpose, not merely administrative convenience.

These mergers represent a shift toward more integrated and sustainable higher education governance in Iceland. As Iceland continues to manage with the pressures of funding volatility and international ranking metrics, these initiatives may offer viable paths toward enhanced resilience, specialization, and cross-regional collaboration.

University of Iceland-Hólar Federation (2023-2025): In 2023, the University of Iceland (UI) and Hólar University formalized a partnership aimed at establishing a university consortium or federative model. Hólar University, located in northern Iceland, specializes in equine sciences, aquaculture, and tourism – fields with strong local relevance but limited national redundancy. The initiative, supported by the Ministry of Higher Education, Science and Innovation, aims to integrate selected administrative and academic functions while allowing Hólar to retain its legal independence and institutional identity. This includes collaboration on curriculum development, faculty mobility, joint research applications, and shared digital infrastructure (Stjórnarráðið, 2024). The federative model aligns with international examples where smaller institutions maintain autonomy within a broader governance umbrella. It seeks to realize economies of scale and academic synergies while protecting specialized mandates. While implementation is still underway, the model is viewed as a low-risk, high-potential step toward improving cohesion in the Icelandic higher education landscape.

University of Akureyri-Bifröst University Merger Talks: Parallel to the UI–Hólar initiative, informal discussions and a feasibility study were initiated between the University of Akureyri (UNAK) and Bifröst University, leading to formal merger talks supported by the Ministry (Háskólinn á Akureyri & Háskólinn á Bifröst, 2023; Stjórnarráðið, 2024). Both institutions are known for their strong focus on flexible learning formats and have positioned themselves as leaders in distance and hybrid education. UNAK has academic strengths in Arctic studies, health sciences, and education, while Bifröst has focused on business, law, and political science with a longstanding emphasis on entrepreneurship and regional outreach (Háskólinn á Akureyri & Háskólinn á Bifröst, 2023; Karlsdóttir, 2024). The envisaged merger was framed as a horizontal integration between two institutions with complementary yet distinct academic profiles, with goals such as expanding joint online programmes, enhancing institutional resilience and developing a coordinated research agenda.

However, in October 2025, UNAK's University Council decided by common consent to halt further merger negotiations. According to the official announcement, closer critical review revealed that some of the key assumptions underpinning the merger did not hold: in particular, it proved extremely difficult to reconcile Bifröst's status as a self-owned foundation with UNAK's public-sector governance model, and there was considerable uncertainty regarding the establishment and governance of a proposed research fund based partly on the sale of Bifröst's assets. As a result, the Council concluded that the merger would be overly complex, time-consuming, and create long-lasting uncertainty for both institutions (Háskólinn á Akureyri, 2025). At the same time, UNAK underlined its continued commitment to regional development

in north Iceland and expressed the intention to build on the relationships created during the negotiations in the form of future collaboration rather than a full structural merger.

2.6 Opportunities and Threats for Regional Universities

One of the key opportunities presented by university mergers in Iceland is the potential to expand academic offerings and improve access to specialized degree programs. The University of Akureyri and Bifröst University, both of which have strong profiles in distance learning, could, with increased cooperation, develop more robust academic pathways and enhance accessibility to higher education for students across Iceland and internationally. The integration of teaching and research could strengthen regional knowledge hubs, particularly in fields such as Arctic studies and rural development.

Mergers can also enhance research capacity and interdisciplinary collaboration. Similar patterns have been observed across the Nordic region, where smaller regional universities have joined larger institutions, leading to increased research synergies, particularly in niche areas. In the Icelandic context, this could mean the consolidation of expertise in fields like northern studies, remote learning technologies, and regional policy development within merged institutions.

However, several threats accompany this merger process. Smaller regional universities risk losing their distinctive identity and mission. A merger with a larger institution may reduce the focus on specialized fields, decrease institutional visibility, and lead to the centralization of decision-making processes in Reykjavík. This shift could undermine the autonomy and strategic responsiveness of regional campuses, weakening their engagement with local communities (Edvardsson, 2014). International experiences demonstrate that successful mergers rely on careful planning, strong leadership, and effective stakeholder engagement. If poorly managed, mergers can lead to top-down governance, increased bureaucracy, and a disconnect from local needs. For Iceland, striking a balance between efficiency and institutional diversity is crucial to ensure that mergers yield substantial benefits for students, faculty, and the broader regional community.

To this end, merger strategies should be designed to preserve institutional strengths while promoting collaboration. Models such as federations or university networks offer promising alternatives, enabling institutions to retain their autonomy while benefiting from shared resources, coordinated governance, and joint academic initiatives. Examples from other countries suggest that such hybrid arrangements can foster innovation without compromising institutional identity.

In summary, mergers in the Icelandic context should be viewed as strategic development tools, rather than merely cost-saving measures. The ultimate success of these efforts will depend on whether they lead to enhanced educational access, improved research performance, and stronger connections between universities and the communities they serve.

3. Discussion

The reflections from Iceland resonate with broader international trends in higher education, where university mergers are increasingly used as strategic instruments to strengthen research performance, improve teaching quality, enhance institutional visibility, and align academic profiles with national and global priorities (McCauley-Smith et al., 2013; Pruisken, 2017). Across Europe, and particularly within the Nordic region, long-term merger strategies have been implemented to create more efficient, robust, and internationally competitive institutions. Notable examples include Denmark's consolidation of universities in the mid-2000s and Finland's structural reforms culminating in the establishment of Aalto University. These processes combined a drive for excellence in research and innovation with efforts to maintain strong regional engagement and accessibility (European University Association, n.d.).

Icelandic policymakers appear to be pursuing similar objectives, albeit within the constraints of a smaller and more geographically dispersed higher education system. The merger talks between UNAK

and Bifröst University initially signalled a strong commitment to regional empowerment, academic sustainability, and innovation in flexible learning formats. Both institutions have established reputations in online and hybrid education, and their complementary strengths in business, law, social sciences, and Arctic-related fields appeared to offer a promising foundation for creating a national leader in distance education. The subsequent decision in 2025 to terminate the merger negotiations, however, illustrates how legal form, funding arrangements, and governance questions can ultimately constrain even strategically attractive mergers. Rather than a failed experiment, the UNAK–Bifröst case can be read as a stress test of the current regulatory framework and as a reminder that mergers in small systems must be judged not only by their potential benefits but also by their institutional and legal feasibility.

At the same time, the proposed federative collaboration between UI and Hólar University reflects a more measured and decentralized approach to integration. Rather than full structural absorption, this model seeks to preserve institutional identity and niche specialization – such as Hólar's focus on equine science and aquaculture, while fostering academic cooperation and administrative synergies. Such federative or network-based models have gained traction internationally as a way to balance centralization with institutional diversity and autonomy, particularly in systems where cultural and geographic factors make full mergers politically or practically difficult.

A relevant precedent in this regard is the formation of the Agricultural University of Iceland (LbhÍ) in 2005, which brought together three distinct entities. This merger sought to consolidate expertise in agricultural sciences, natural resource management, and vocational education into a unified institution focused on sustainability and regional development. The process illustrates how strategic mergers in small systems can enhance academic offerings, research capacity, and institutional coherence without sacrificing regional engagement or disciplinary depth.

A recurring theme in global merger literature is the critical role of cultural integration, stakeholder engagement, and clear communication (Bor & Shargel, 2020; Wollscheid & Røsdal, 2021). Mergers that succeed over the long term do so not solely because of structural reforms, but because they build trust, mutual understanding, and shared purpose among leadership, faculty, staff, and students. Iceland's higher education leaders must therefore prioritize inclusive and transparent governance processes that recognize the unique contributions of each institution. Institutional diversity – rather than being viewed as a barrier to efficiency – should be embraced as a strategic asset, particularly in a country where regional engagement and linguistic, cultural, and disciplinary plurality are vital to national development.

In the case of LbhÍ, the post-merger period saw the introduction of new interdisciplinary programs in fields such as environmental planning, forestry, and restoration ecology, alongside traditional agricultural education. The university also developed partnerships with other Icelandic and international institutions, thereby expanding its research profile and curricular diversity. These developments underscore the potential of mergers not only to combine resources but also to drive curricular innovation and cross-sector collaboration.

The Icelandic case also raises critical and unresolved challenges that echo concerns found elsewhere. One such issue is the legal and operational complexity of merging public and private institutions. Questions remain as to how private or semi-private universities (e.g., Reykjavík University or Bifröst University) could be integrated into a unified framework without jeopardizing their financial autonomy, legal status, or academic missions. These concerns are further amplified by the existence of financial disparities between institutions. Without clear financial oversight, there is a risk that institutional debt could be redistributed in ways that intensify rather than improve inequalities (Martin & Samels, 2017).

Other pressing concerns include harmonizing academic cultures, employment contracts, faculty evaluation systems, and career progression pathways, especially when institutions differ significantly in size, mission, or governance model. The absence of alignment in these areas can undermine internal cohesion and lead to long-term dissatisfaction among academic and administrative staff. Moreover,

mergers that lack a clearly articulated strategic vision and a continual commitment from political and institutional stakeholders are vulnerable to becoming largely symbolic, with limited impact on academic quality or student outcomes.

Despite these challenges, the current merger discussions offer Iceland a rare and valuable opportunity to strategically reposition its higher education landscape. With proper planning and commitment, mergers can enhance institutional capacity, foster innovation, and enhance access and equity. However, success will depend not only on ministerial declarations or structural blueprints, but on open collaboration between universities, government agencies, academic communities, and society stakeholders. The experience of LbhÍ demonstrates that even within a small system, well-executed mergers can result in strengthened institutional identity, improved academic coherence, and increased responsiveness to national needs – if cultural integration and long-term vision are prioritized.

Ultimately, Iceland's higher education system must navigate the tension between centralization and regional responsiveness, between efficiency and diversity, and between global objectives and national needs. If these tensions are addressed constructively, merger strategies could become a catalyst for renewal, positioning Icelandic universities to respond more effectively to future societal, technological, and demographic shifts.

The following section concludes with key reflections and actionable recommendations for policymakers, university leaders, and stakeholders considering future merger pathways in Iceland and beyond.

4. Conclusion and Recommendations

University mergers in Iceland represent a significant turning point in the development of the national higher education system. As shown in this article, international experiences, particularly from other Nordic countries, demonstrate that mergers, when well-designed, can be powerful tools for enhancing institutional efficiency, strengthening research capacity, and increasing international visibility. Yet, the Icelandic context poses unique challenges: a small and geographically dispersed population, a mix of public and private institutions, and strong institutional identities rooted in regional relevance and niche academic profiles. These factors demand merger strategies that are not only structurally sound but also contextually sensitive, inclusive, and forward-looking. The case of the Agricultural University of Iceland exemplifies how a strategic merger can succeed in a small system. It demonstrates that even within limited geographic and demographic constraints, well-planned mergers can enhance academic coherence, drive curricular innovation, and preserve regional functions and disciplinary diversity. Recent initiatives – including the federative model involving Hólar University and the University of Iceland and the now-discontinued merger talks between UNAK and Bifröst University – reflect a willingness to explore multiple pathways to integration, while also revealing the limits of what is legally and organisationally feasible in the Icelandic context. Together, these experiences suggest that future merger strategies in Iceland will need to combine ambitious academic and regional goals with early, detailed assessment of governance and funding constraints. These models range from horizontal consolidations to more decentralized and collaborative arrangements. While differing in form, they all share a common goal: to strengthen the overall capacity, resilience, and relevance of Icelandic higher education in a rapidly changing national and international landscape.

To maximize the potential of these transformations, future merger efforts in Iceland should adhere to the following key recommendations:

Prioritize strategic alignment over structural uniformity: Rather than applying a standardized merger formula, each initiative should be grounded in clear academic, societal, and regional development objectives. Flexible organisational models such as federations, alliances, or multi-campus universities can accommodate diversity while encouraging collaboration and shared services.

Ensure broad-based stakeholder engagement: Transparent and inclusive planning processes involving

faculty, staff, students, local communities, and relevant government bodies are essential to building legitimacy and reducing resistance. Stakeholder trust is not a by-product of structural reform but a prerequisite for successful implementation.

Safeguard regional access and specialization: Iceland's regional universities play a crucial role in supporting local development, preserving cultural identity, and providing place-based education in fields such as Arctic studies, tourism, equine science, and aquaculture. Merger strategies must protect and enhance these functions, rather than centralize them in ways that risk reducing accessibility and relevance for rural populations. As demonstrated by LbhÍ, the continuation of regionally embedded campuses and specialized programs post-merger can ensure that rural development and sector-specific expertise remain central to institutional missions.

Invest in capacity-building and transitional planning: Mergers require substantial administrative coordination, legal harmonization, and alignment of quality assurance, funding mechanisms, and human resource policies. Adequate planning, capacity building, and financial support are necessary to prevent inefficiencies and ensure a smooth institutional integration.

*Develop long-term evaluation frameworks***:** Post-merger success should be assessed not only in terms of cost efficiency or student enrollment, but also by tracking improvements in academic quality, research performance, faculty collaboration, international engagement, funding acquisition, and student satisfaction. Such evaluations should inform continuous adjustments to merger strategies.

In conclusion, university mergers in Iceland should not be viewed as isolated administrative activities, but rather as part of a broader, long-term transformation process aimed at building a more sustainable, accessible, and internationally competitive higher education system. The window of opportunity currently open – shaped by both national imperatives and global shifts – can be used to position Icelandic universities as agile, collaborative, and impactful institutions. Achieving this potential will require leadership, strategic foresight, and, above all, a commitment to inclusive governance and shared academic values.

It should be noted that this article is based on a structured traditional (narrative) review rather than a fully systematic PRISMA review. The intention has been to prioritise analytical depth and contextual relevance to the Icelandic higher education system over exhaustive coverage of all possible merger cases worldwide. As a result, the selection of international examples is illustrative rather than comprehensive. Future research could build on this article in several ways. First, a fully systematic PRISMA-based review of university mergers and federative arrangements would allow a more comprehensive mapping of international experience and provide a stronger basis for comparative generalisations. Second, in-depth case studies of Icelandic initiatives – such as the UI–Hólar federation and the discontinued UNAK–Bifröst merger talks – could explore how legal form, governance arrangements, and regional expectations shape the design and feasibility of structural reforms in small systems. Third, longitudinal quantitative studies could examine how different merger and collaboration models affect outcomes such as student access, regional engagement, research capacity, and financial sustainability over time. Finally, qualitative research with staff, students, and local stakeholders would deepen understanding of how merger processes are experienced on the ground, including issues of institutional identity, trust, and perceived legitimacy.

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Beyond “Prompting”: Redesigning Computer Science Education for the Post-Generative-AI Workforce

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Abstract

The rapid integration of Generative Artificial Intelligence (GenAI) into software engineering is disrupting the traditional entry-level labor market, raising urgent questions for computer science pedagogy. While recent industry reports project significant productivity gains, they also reveal an emerging "hollow middle": the automation of routine debugging and syntax generation tasks that historically served as essential training ground for novice engineers. This article argues that the severance of this "learning by doing" pipeline risks inducing "cognitive debt" in students—producing graduates capable of generating sophisticated code but lacking the deep conceptual understanding required to verify or maintain it. Addressed primarily to the computing education community, this paper adopts an integrative literature review approach to synthesize labor market signals, cognitive science research on the "multiple demand network," and sociological analyses of student practices. From this synthesis, we develop **Cognitive Apprenticeship 2.0 (CA 2.0)**—a theoretical pedagogical framework comprising three pillars: Epistemic Verification, AI Orchestration, and Process Transparency. We then present a proposed validation design, outlining a two-phase pilot implementation within a Bachelor's degree program intended to empirically test the framework's core constructs. Rather than reporting empirical findings, this paper contributes conceptual vocabulary and structured intervention logic to guide future research and curriculum reform. We argue that future-proofing computing students requires a fundamental shift from syntax-centric instruction toward cultivating the systems thinking, evaluative judgment, and tacit knowledge that current AI systems cannot replicate.

Keywords: Computer Science Education and Assessment, Cognitive Apprenticeship, Generative AI, Curriculum Design, Adaptive Expertise, Cognitive Debt.

1. Introduction and underpinning theories

1.1 The Pedagogical Crisis of the "Hollow Middle"

For decades, the pedagogical trajectory of a software engineer was mirrored by the structure of the labor market. Novices entered the workforce possessing basic syntactic knowledge, and their early years were defined by codified knowledge tasks: fixing minor bugs, writing unit tests, and implementing well-defined specifications. These tasks served a critical educational function: they constituted the deliberate practice required to build sophisticated mental models of complex systems (Ericsson et al., 1993). However, the advent of Large Language Models (LLMs) and "Agentic AI" systems (McKinsey, 2025) has introduced a discontinuity in this model, severing the mechanism that produces the senior engineers the industry needs.

We are currently witnessing a paradox that strikes at the heart of the Computer Science (CS) curriculum: while AI is dismantling the entry-level roles that graduates rely on for skill consolidation, the demand for high-level architectural judgment remains stable (Brynjolfsson et al., 2025a). Economic projections suggest that AI could expose the equivalent of 300 million full-time jobs globally to automation (Goldman Sachs, 2023). Recent data

indicates that 66% of global enterprises plan to reduce entry-level hiring due to AI adoption (Intuition Labs, 2025). For educators, this "hollow middle" presents a specific challenge: *if the "bottom rungs" of the career ladder are automated, universities can no longer rely on industry apprenticeships to bridge the gap between academic syntax and professional engineering. The curriculum itself must now bridge this gap.*

1.2 Cognitive Atrophy and the "Wrong Kind of AI" in the Classroom

The integration of AI into the curriculum involves risks beyond future employability. As universities rush to adopt AI tools under the banner of "innovation," there is a growing concern regarding the "deskilling" of critical thought (AAUP, 2025). A growing coalition of academics has formally warned against uncritical adoption of AI technologies, arguing that deployment often outpaces understanding of their limitations and societal effects (Guest et al., 2025). Questions of how to regulate AI use in academic settings remain contentious, with scholars noting the tension between innovation imperatives and educational integrity (Colonna, 2022). When students offload the cognitive struggle of coding to an LLM, they accumulate "cognitive debt", a deficit in neural connectivity and deep conceptual understanding that results from bypassing the productive friction of learning (Purser, 2025; Kosmyna et al., 2025).

This aligns with Acemoglu and Restrepo's (2020) warning against the "wrong kind of AI", technology that automates work without creating new tasks. Some scholars argue more starkly that while AI may not fully replace human workers, uncritical integration poses existential risks to the very nature of human cognitive development and professional competence (Xie, 2025). In the educational context, the "wrong kind of AI" usage manifests as students engage in "vibe programming," where code is generated via natural language without an understanding of the underlying logic (Michigan Tech, 2025). This creates a "jagged technological frontier" where students may produce sophisticated outputs while lacking the fundamental competence to verify, debug, or secure them (Dell'Acqua et al., 2023).

1.3 Reframing Learning Objectives: From Coders to Orchestrators

Despite these challenges, the obsolescence of the human software engineer is not a foregone conclusion; rather, the learning objectives for the discipline must shift from "construction" to "orchestration." As AI systems evolve from passive chatbots to autonomous agents capable of planning and executing complex workflows (McKinsey, 2025), the market value of a graduate will shift from syntactic fluency to *evaluative judgment* and *systems thinking*. Therefore, the imperative for higher education is to prepare students not just to use AI, but to audit, govern, and orchestrate it. Scholars have increasingly framed this moment as a 'clarion call' requiring fundamental reconceptualization of both learning objectives and assessment practices (Overono & Ditta, 2025), a shift that requires moving beyond the 'techno-optimism vs. doom' binary toward a pragmatic restructuring of pedagogy (Dubhashi, 2022).

1.4 Research Objectives and Questions

The primary objective of this paper is to bridge the gap between rapidly shifting labor market realities and the relatively static conventions of computer science education. To achieve this, this integrative review is guided by three central research questions:

- **RQ1 (Contextual):** How is the automation of codified knowledge by Generative AI reshaping the structure of entry-level software engineering employment?
- **RQ2 (Cognitive):** What are the cognitive and pedagogical risks associated with "offloading" syntax generation and debugging to AI agents during the novice phase of learning?

- **RQ3 (Pedagogical):** What design principles and curricular frameworks are required to mitigate these risks and create "adaptive expertise" in the post-GenAI era?

In answering these questions, this work makes the following contributions to the field of computing education:

- **Cognitive Debt as a post-GenAI risk construct.** We synthesize labor market signals and cognitive science to link the emerging "hollow middle" in software employment to a specific educational risk: *cognitive debt*—a widening gap between AI-assisted performance and underlying competence. We define this construct, distinguish it from cognitive load and novice status, and outline behavioral and epistemic indicators that make it observable in classroom assessment.
- **A three-pillar framework mapped to concrete assessment practices.** Extending classical cognitive apprenticeship (Collins et al. 1991) models, we propose **Cognitive Apprenticeship 2.0**, organized around *Epistemic Verification*, *AI Orchestration*, and *Process Transparency*. Each pillar is tied to specific assessment formats—such as adversarial AI-code audits, test-first "prompt-to-product" labs, version-history forensics, and oral verification, offering a structured way to redesign courses for the post-GenAI era.
- **A program-level implementation model integrating AI orchestration into capstone project.** We outline a two-phase pilot (in the "Business Intelligence" and "Bachelor Thesis" courses) in which AI use is not merely permitted but *formally orchestrated and audited* through process logs, methodology chapters, and oral defenses. This provides a portable template for embedding AI governance and verification into high-stakes projects and capstones in other software engineering programs.

1.5 Organization of the Paper

The remainder of this paper is structured to address these guiding research questions sequentially. **Section 2** discusses our methodology. **Section 3** addresses **RQ1** by synthesizing labor market data to define the "Hollow Middle" and the structural displacement of entry-level roles. **Section 4** addresses **RQ2** by exploring the neural and behavioral risks of "cognitive debt" and the critical distinction between augmentation and atrophy. **Section 5** responds to **RQ3** by proposing the Cognitive Apprenticeship 2.0 framework and detailing its pilot implementation in a capstone project. **Section 6** concludes the paper by discussing the current limitations and future research directions.

2. Methodology

Given the nascent and rapidly evolving nature of Generative AI, this paper adopts an **Integrative Literature Review** approach (Torraco, 2005). Unlike systematic reviews that aggregate established empirical evidence to answer a narrow query, an integrative review synthesizes diverse streams of literature—experimental, theoretical, and non-empirical—to generate new frameworks for emerging topics. This method is particularly appropriate here, as it allows for the triangulation of established learning sciences theories (e.g., Cognitive Apprenticeship) with real-time labor market signals that have not yet undergone multi-year longitudinal study. Furthermore, the paper presents the design of a pilot intervention to illustrate the practical application of the proposed framework.

2.1 Search Strategy and Selection Process

A comprehensive search was conducted for literature published between November 2022 and October 2025, alongside foundational texts in cognitive science. We utilized a multi-database search strategy targeting three distinct domains: Computer Science Education (ACM Digital Library, IEEE Xplore), Labor Economics (NBER, SSRN, Google Scholar), and Cognitive Science (PubMed, PsycINFO).

To ensure high relevance, the search process followed an iterative screening protocol:

1. **Initial Screening:** Queries such as "Generative AI in Software Engineering," "Novice Programmers LLM," and "Labor Market Displacement IT" yielded an initial pool of approximately 200 potential sources.
2. **Relevance Filtering:** Search results were reviewed in rank order. Due to the high volume of generalist AI content, we limited detailed review to the first 30–50 results per query, stopping when relevance diminished (saturation).
3. **Inclusion/Exclusion Criteria:** To manage domain overlap, strict criteria were applied.
    a. **Inclusion:** Sources were retained only if they specifically addressed *software engineering contexts*, *IT labor market dynamics*, or *cognitive mechanisms relevant to coding*.
    b. **Exclusion:** Broad discussions of AI in the humanities, general automation studies not specific to knowledge work, non-IT fields, non-knowledge work automation and pre-LLM educational tools were excluded.
    c. **Result:** This screening process reduced the pool to a final set of 58 sources used in this review.

2.2 Hierarchy of Evidence and Source Types

Given the nascent nature of the topic, traditional peer-reviewed journals have not yet caught up with the velocity of GenAI development. Therefore, this review deliberately includes "gray literature" to capture real-time market signals. We employed a stratified "Best-Evidence" approach:

1. **Peer-Reviewed Empirical Studies (Foundational):** Used for established cognitive principles (e.g., Ivanova et al., 2020) and pre-2023 pedagogical theories.
2. **Academic Working Papers (Emerging):** Sourced from reputable repositories (e.g., NBER, arXiv) to capture recent economic data.
3. **Industry Reports (Contextual):** High-currency reports (e.g., McKinsey, Intuition Labs) are utilized strictly as "market signals" regarding hiring trends, rather than as scientific fact.

2.3 Thematic Analysis and Synthesis

The final selection of 58 sources was analyzed using a deductive-inductive thematic synthesis approach (Torraco, 2005).

- **Coding:** Sources were first coded deductively based on the three research questions (e.g., codes for "displacement," "cognitive load," "assessment").
- **Clustering:** As analysis progressed, inductive codes emerged from the data (e.g., "senior premium," "internal compiler"). These codes were clustered to identify patterns that bridged the disparate domains of economics and cognition.
- **Synthesis:** These clusters formed the three dominant themes that structure this paper: *Structural Displacement*, *Cognitive Divergence*, and *Pedagogical Restructuring*.

Table 1 provides a summary of the distribution of sources used in this synthesis, highlighting the balance between established theory and emerging market data.

Table 1: Distribution of Literature Sources by Domain and Type

DOMAIN	PRIMARY FOCUS	SOURCE TYPES INCLUDED	COUNT (APPR.)	ROLE IN REVIEW
LABOR ECONOMICS & INDUSTRY	Market displacement, hiring trends, productivity metrics.	Industry Reports (e.g., McKinsey), NBER Working Papers, Economic Analysis.	14	Establishing the "Hollow Middle" phenomenon (RQ1).
COGNITIVE SCIENCE	Neural mechanisms of coding, memory, and cognitive load.	Peer-Reviewed Journals (e.g., *Nature*, *eLife*), Psychology Reviews.	12	Defining the "Multiple Demand" network and cognitive risks (RQ2).
CS EDUCATION (CSED)	Pedagogy, assessment, student practices with AI.	Conference Proceedings (ACM, IEEE), Journal Articles, Preprints.	24	Analyzing student behavior and proposing CA 2.0 (RQ3).
POLICY & ETHICS	Institutional governance, academic integrity.	Association Reports (AAUP), Position Papers, Essays.	8	Contextualizing the ethical implementation of the framework.
TOTAL SOURCES			**58**	

Note: The timeframe of selected literature is heavily weighted toward the post-GenAI era (2022–2025), with foundational cognitive science texts dating prior to 2022.

This triangulation ensures that the proposed pedagogical interventions are not merely reactive but grounded in both economic reality and cognitive science.

3. The Structural Disintegration of the Entry-Level Pipeline

The integration of Generative AI (GenAI) into the software development lifecycle has not resulted in a uniform uplift in productivity across all experience levels. Instead, empirical data from 2024 and 2025 indicates a fracturing of the traditional labor pyramid. We identify this phenomenon as the **"Hollow Middle"**—a market condition where demand for high-level architectural expertise remains robust, while the entry-level roles that historically served as the training ground for that expertise are systematically automated. Given the recency of GenAI, this analysis relies on real-time employer surveys and working papers; we therefore treat the 'hollow middle' as a *strong emerging signal* rather than a settled historical fact.

3.1 Empirical Evidence of the "Hollow Middle"

Theoretical debates regarding AI's impact on employment are often speculative; predictions dating back a decade anticipated significant disruptions to labor markets from AI and robotics (Smith & Anderson, 2014). However, recent industry data provides early signals of a structural shift. While long-term peer-reviewed economic data is still crystallizing, real-time hiring metrics reveal a crisis specifically targeting early-career professionals. The World Economic Forum projects that 39% of core workplace skills will change by 2030, with *analytical thinking* and *AI literacy* among the fastest-growing skill requirements (World Economic Forum, 2025).

Multiple independent data sources provide converging evidence of a structural shift in entry-level employment. The pace of this transformation is historically unprecedented; survey data indicates that ChatGPT

achieved faster adoption than any prior technology, with approximately 40% of the U.S. population aged 18-64 used Gen AI by late 2024, with 23-24% using it for work weekly (Bick et al., 2024). Analysis of ADP payroll records covering millions of U.S. workers reveals a 13% relative decline in employment for early-career workers (ages 22–25) in AI-exposed occupations since late 2022, even after controlling for firm-level shocks (Brynjolfsson et al., 2025a). Federal Reserve Bank of New York data indicates the unemployment rate for recent college graduates reached 5.8% in Q1 2025, the highest since 2021, with the gap between graduate and overall unemployment at a historic low (HubbardOBrienEconomics, 2025). Job posting data from Revelio Labs shows entry-level postings declined 35% from January 2023, with AI-exposed entry-level roles experiencing steeper declines than non-exposed roles (Simon, 2025). Research estimates that approximately 80% of the U.S. workforce could have at least 10% of their tasks affected by LLMs, with software developers among the most exposed professions (Eloundou et al., 2024). Similarly, SignalFire's analysis of LinkedIn data documents a 50% decline in new graduate hiring at major tech firms since 2019 (SignalFire, 2025).

3.2 The Agentic Shift: From Chatbots to Autonomous Systems

The displacement of junior roles is accelerating due to the rapid evolution of AI capabilities from passive "chatbots" to active "agents." McKinsey's *State of AI in 2025* report highlights a critical transition toward **Agentic AI**, systems capable of planning, executing, and refining complex workflows with minimal human intervention. Their data indicates that by 2025, nearly one-third of surveyed organizations had begun scaling AI systems, particularly in IT and software engineering functions (McKinsey & Company, 2025).

Unlike previous iterations of GenAI that required a human to prompt every step (e.g., "write a function to sort this list"), agentic systems can be assigned high-level objectives (e.g., "refactor this codebase to improve latency"). These agents autonomously break down the goal, generate code, run tests, and iterate over errors. This capability directly overlaps with the primary value proposition of a junior developer. Consequently, organizations are moving toward a model where **AI serves as the "first author"** of code, while human seniors act merely as reviewers and verifiers (Grothe-Hammer et al., 2025).

3.3 The Productivity Paradox: The "Equalizer" Effect vs. The Senior Premium

It is important to acknowledge that within the context of *task completion*, AI acts as a powerful leveler. Contrary to the narrative of pure displacement, empirical studies on tools like GitHub Copilot suggest that AI assistants benefit novice developers disproportionately. Peng et al. (2023) found that less experienced developers saw greater relative productivity gains than their senior counterparts, effectively narrowing the performance gap for routine coding tasks. By bridging the distance between intent and syntax, these tools allow juniors to contribute to production-level codebases much earlier in their careers (George, 2024).

However, this "equalizer" effect generates a paradoxical economic risk: the **"Senior Premium."** While AI allows a junior developer to perform at a higher level, it simultaneously allows a senior developer to act as a "10x engineer," automating the tasks they previously delegated to juniors. If a senior engineer equipped with AI can generate, test, and deploy code at a velocity that negates the need for support staff, the economic rationale for hiring juniors—typically based on lower labor costs for lower-value work—evaporates. The "jagged technological frontier" described by Dell'Acqua et al. (2023) suggests that while novices are more productive *with* the tool, they remain unable to operate effectively *outside* the tool's competence envelope, creating a workforce that is highly efficient but dangerously fragile.

4. The Cognitive Cost of Automation: Atrophy and the Illusion of Competence

The structural displacement of entry-level roles described in the previous section precipitates a second, perhaps more insidious crisis: a fundamental alteration in the cognitive development of novice engineers. As students and junior professionals increasingly rely on AI to generate code, they bypass the "productive struggle" historically required to build mental models of computational logic. This phenomenon, characterized by recent scholarship as "Cognitive Debt" is distinct from "cognitive load" (the immediate mental effort required for a task). Cognitive Debt describes a cumulative deficit in foundational understanding. It threatens to produce a generation of technologists capable of generating sophisticated outputs while possessing brittle, superficial understanding. Operationally, a student with high cognitive debt manifests as one who can rapidly produce working applications via prompting but fails to diagnose logic errors or explain the execution flow without external assistance (Purser, 2025).

4.1 Defining and Operationalizing "Cognitive Debt"

Given the centrality of this construct to our framework, we offer a formal definition to guide both pedagogical application and future empirical validation.

Definition: *Cognitive Debt* is the cumulative deficit in foundational conceptual understanding that accrues when learners repeatedly bypass effortful cognitive processing by offloading problem-solving to external agents (in this case, GenAI). Unlike *cognitive load*, which describes momentary mental effort during a task, cognitive debt is longitudinal and compounding—it represents knowledge and neural development that was never acquired, creating a widening gap between apparent performance and actual competence.

We conceptualize cognitive debt as manifesting across three interrelated dimensions, each with distinct observable indicators:

Dimension	***Definition***	***Observable Indicators***
Neural	Reduced development of the cognitive infrastructure (particularly the Multiple Demand network) required for systematic reasoning, resulting from insufficient effortful practice.	Decreased activation in fronto-parietal regions during unassisted problem-solving tasks; reduced EEG connectivity in frequency bands associated with memory encoding (cf. Kosmyna et al., 2025).
Behavioral	Inability to perform foundational programming tasks—such as debugging, tracing execution flow, or identifying logic errors—without AI assistance.	Failure to complete debugging tasks under "AI-off" conditions; inability to explain code logic during oral examination; reliance on trial-and-error prompting rather than systematic diagnosis.
Epistemic	Gaps in declarative and procedural knowledge of core computational concepts, resulting from skipped instruction or bypassed practice.	Poor performance on closed-book conceptual assessments; inability to recognize why AI-generated code is incorrect; absence of accurate mental models when asked to predict program behavior.

These three dimensions are theoretically distinct but empirically correlated: repeated behavioral offloading (Behavioral) prevents the acquisition of foundational knowledge (Epistemic) and the neural consolidation

required for expertise (Neural). For the purposes of this framework, we focus primarily on the **Behavioral** and **Epistemic** dimensions, as these are directly accessible through pedagogical assessment. The Neural dimension, while theoretically grounding, requires neuroimaging methodologies beyond typical educational research.

Crucially, cognitive debt is not equivalent to *novice status*. All learners begin with knowledge gaps; what distinguishes cognitive debt is that these gaps persist or widen *despite apparent task completion*, because AI-mediated success masks the absence of underlying learning. A student exhibiting high cognitive debt may produce sophisticated artifacts while remaining unable to reproduce, explain, or adapt the underlying logic independently.

4.2 Neural Divergence: The "Multiple Demand" Network vs. Language Processing

To understand the risk of deskilling, one must examine the neural mechanisms of programming. Established fMRI research has demonstrated that code comprehension activates the **Multiple Demand (MD) network**—a fronto-parietal system essential for complex problem-solving (Ivanova et al., 2020). Writing code manually exercises this network, forging the neural pathways necessary for systemic reasoning.

However, recent preliminary investigations suggest that reliance on AI agents may alter this cognitive engagement. A working paper from the MIT Media Lab (Kosmyna et al., 2025) utilized electroencephalography (EEG) to measure brain activity during AI-assisted tasks. Their initial findings suggest a significant reduction in neural connectivity—specifically in frequency bands associated with memory encoding—when participants relied heavily on AI assistants compared to working unaided. While this represents a small-scale, early investigation, it raises important hypotheses about how AI assistance modulates neural engagement. Critically, these physiological findings converge with established learning sciences theory: specifically, Bjork's concept of "desirable difficulties" (1994). By removing the friction of syntax generation, AI tools may inadvertently eliminate the cognitive struggle required for deep memory consolidation, potentially impeding the formation of deep conceptual knowledge.

4.3 "Vibe Programming" and the Shift to Editorial Roles

This neural disengagement manifests pedagogically in the rise of **"Vibe Programming"**—an informal paradigm where developers describe desired outcomes in natural language ("vibes") and rely on stochastic models to handle implementation details (Michigan Tech, 2025). While this lowers the barrier to entry, it fundamentally changes the learner's role from "author" to "editor."

A qualitative study of university students in 2025 reveals that this shift is already entrenched. Grothe-Hammer et al. (2025) identified distinct typologies of student AI usage, most notably **"AI as First Author,"** where students generate text or code via AI and merely tweak it for submission. In this workflow, the student acts as a "second author," refining output they did not conceive. The danger lies in the **Verification Gap**: students often lack authoritative competence (knowledge of syntax, security, and efficiency) to effectively judge the quality of the AI's output. As Purser (2025) argues, this creates a dynamic where "students graduate fluent in prompting, but illiterate in judgment," effectively outsourcing their cognition to corporate infrastructure.

4.4 The Illusion of Competence and "Brownfield" Development

Cognitive offloading is not inherently detrimental; indeed, the history of computer science is a history of successful abstraction. Just as compilers freed programmers from the cognitive load of memory management, LLMs free them from the cognitive load of syntax recall. Proponents argue that this offloading allows students to focus on higher-order problem solving and "computational thinking" rather than the minutiae of semicolons (George, 2024). Under this model, AI serves as a scaffold that supports learners in tackling problems that would otherwise be beyond their Zone of Proximal Development.

However, the distinction lies in *what* is being offloaded. Unlike a compiler, which is *deterministic*, GenAI is *probabilistic*. When a student offloads the logic generation to an LLM, they are not merely abstracting complexity; they are bypassing the neural activity required to verify truth. The immediate gratification of working code creates a dangerous "illusion of competence." Students using AI tools can produce applications far exceeding their actual skill level, masking their inability to perform foundational tasks unaided. This becomes critical in what software engineering terms **"brownfield development"**, maintenance of existing, legacy codebases.

While AI accelerators allow novices to write *new* (greenfield) code rapidly, maintenance requires a deep, mental simulation of how code executes, a skill developed specifically through the manual debugging processes that AI now automates (Vaithilingam et al., 2022). By skipping the frustration of syntax errors and logic bugs, students accumulate cognitive debt that comes due when they encounter edge cases the AI cannot solve. If the academic sector normalizes this dependency under the guise of "innovation," it risks validating a low-quality degree, credentialing students for outputs they did not create and cannot maintain (Purser, 2025).

5. Redefining Pedagogy: Cognitive Apprenticeship 2.0

To mitigate the risks of the "hollow middle" and "cognitive debt," higher education must undergo a fundamental restructuring. The traditional "bootcamp" mentality, focused on rapid syntax acquisition, is no longer sufficient. Instead, we propose a **Cognitive Apprenticeship 2.0 (CA 2.0)** model.

Rooted in the original theory by Collins et al. (1991), which emphasized modeling, coaching, and scaffolding, CA 2.0 adapts these principles for a fundamentally different epistemological environment. In the classic model, the "expert" is a human mentor whose thought processes are visible and trustworthy. In the post-GenAI era, the "expert" generating the artifact is often a probabilistic AI—a "black box" that mimics competence without comprehension. Therefore, CA 2.0 necessitates a shift from imitation to interrogation. While Collins et al. focused on helping apprentices internalize the expert's tacit knowledge (Polanyi, 2009), CA 2.0 focuses on helping apprentices verify and orchestrate the output of synthetic intelligence.

5.1 The Three Pillars of CA 2.0

The framework is built upon three pedagogical pillars designed to foster *Adaptive Expertise*—the ability to apply skills flexibly in novel situations (Hatano & Inagaki, 1986). This construct distinguishes between routine expertise, which enables efficient execution of familiar procedures, and adaptive expertise, which enables innovation and flexible response to novel problems (Schwartz, Bransford, & Sears, 2005). These pillars map specific cognitive shifts to actionable teaching strategies, as detailed in Table 2.

Table 2: The Cognitive Apprenticeship 2.0 Framework

PILLAR	SHIFT IN FOCUS	LEARNING OBJECTIVE	PEDAGOGICAL INTERVENTION (ACTIVITY)
1. EPISTEMIC VERIFICATION	From *Generating* to *Auditing*	Cultivating the "internal compiler" required to validate probabilistic AI outputs and detect hallucinations.	**The Adversarial Audit**: Students receive a pre-generated AI codebase containing subtle logic errors and security vulnerabilities. The task is not to write code, but to document, explain, and correct the AI's failures without running the executable.
2. AI ORCHESTRATION	From *Syntax* to *Systems*	Developing the architectural judgment to decompose complex problems into discrete tasks for AI agents.	"**Prompt-to-Product**" Labs: Students act as "Technical Leads." They must write a comprehensive test suite (TDD) first, then orchestrate AI agents to generate code that passes those tests, effectively grading the AI's performance against their specifications.
3. PROCESS TRANSPARENCY	From *Product* to *Process*	Ensuring the mental model belongs to the student, not the LLM, by assessing the *evolution* of the solution.	**Version History Forensics**: Submission requires the full Git history and a "Process Log." Assessment focuses on the decision points: why a specific AI suggestion was rejected, how a prompt was refined, and how the student debugged the integration.

5.2 Positioning CA 2.0 within Existing CS Education Frameworks

Cognitive Apprenticeship 2.0 builds on, but also departs from, several established strands in computing education: structured programming pedagogies such as Predict, Run, Investigate, Modify and Make (PRIMM) (Sentence et al., 2019), collaborative practices such as pair programming (Preston, 2005) and Test-Driven Development (TDD), constructive alignment models (Cain, 2013), and recent "AI across the curriculum" (Southworth et al., 2023) initiatives. Early implementations of AI-integrated CS courses, such as Harvard's CS50, have demonstrated both the potential and challenges of embedding AI assistants directly into introductory programming instruction (Liu et al., 2024).

5.2.1 Relation to Existing Programming Pedagogies

Approaches like PRIMM help students move from reading and predicting code to modifying and writing it. Pair programming emphasizes collaboration and shared problem solving. CA 2.0 reinterprets these practices under post-GenAI conditions: students are no longer only authors of code but also *auditors* of code produced by opaque systems. Epistemic Verification turns "predict–run–investigate" (as in PRIMM) into a structured *forensic audit* of AI-generated artefacts; AI Orchestration extends pair-programming ideas to a triad of student, AI agent, and human supervisor; and TDD is repositioned as a control surface over generative models, where tests define the specification against which AI outputs are interrogated.

5.2.2 Relation to Constructive Alignment and AI-era Assessment

Work on constructive alignment and on assessment in the age of AI has argued for closer coupling between learning outcomes, tasks, and assessment formats, and has highlighted the value of oral, process-revealing assessments when products may be AI-generated (Farazouli et al., 2024). CA 2.0 makes this alignment

discipline-specific: the three pillars map directly to concrete mechanisms—adversarial audits and oral defenses (Epistemic Verification), test-first AI labs (AI Orchestration), and process logs and version-history forensics (Process Transparency). Rather than treating these as ad hoc safeguards, the framework treats them as primary evidence for or against the presence of "cognitive debt."

5.2.3 Relation to "AI Across the Curriculum"

AI-across-the-curriculum models aim to embed broad AI literacy, ethics, and civic understanding across programmes (Southworth et al., 2023). CA 2.0 is narrower but deeper. It targets a specific failure mode in software engineering: students who can ship impressive AI-assisted systems but cannot independently understand, verify, or maintain them. In that sense, AI-across-the-curriculum provides a horizontal layer of AI literacy, while CA 2.0 offers a vertical, high-stakes layer that redesigns core projects and capstones so that AI becomes a visible, auditable part of the learning process.

5.2.4 Distinctive Contribution

Taken together, CA 2.0 contributes (a) the construct of *cognitive debt* as a way to reason about hidden gaps between AI-assisted performance and underlying competence; (b) a three-pillar framework that translates this risk into specific assessment practices; and (c) a model for integrating AI orchestration, documentation, and verification into the governance of capstone and thesis work. It is best understood as a post-GenAI evolution of cognitive apprenticeship in which the central student role is to *interrogate and orchestrate synthetic expertise*, not merely to consume it.

5.3 The Teacher-AI Task Spectrum: From Sage to Architect

The integration of AI necessitates a re-evaluation of the division of labor in the classroom. According to Koh et al. (2023), educational tasks exist on a spectrum ranging from procedural to high-cognitive. As AI encroaches on lower-order tasks (generating boilerplate), the instructor must shift from the "Sage on the Stage" to a **Systems Architect** of learning experiences.

If AI serves as a "second author" for students (Grothe-Hammer et al., 2025), the instructor's primary role becomes teaching the *integration* of that work. This aligns with Hernholm (2025), who argues that "uniquely human skills" such as ethical judgment and problem-scoping must move from "soft skills" to core technical differentiators.

5.4 Beyond "Prompt Engineering": Critical AI Literacy

A dangerous trend in current institutional responses is the reduction of AI education to "prompt engineering", teaching students merely how to operate commercial tools efficiently. As Purser (2025) critiques, this produces graduates who are "fluent in prompting but illiterate in judgment." CA 2.0 rejects this functionalist approach. Instead, it mandates **Critical AI Literacy**, where students interrogate the material realities of the tools. Research indicates that learners often hold naive conceptions of AI capabilities that must be explicitly addressed in curriculum (Heeg et al., 2024). This includes understanding issues of trustworthiness and responsible AI modeling (Sarker, 2024), the "Anatomy of Slop" (analyzing failure modes and bias) and recognizing that LLMs are "stochastic parrots" capable of confident hallucinations (Birhane, 2022), not oracles of truth.

The "Human-in-the-Loop" Debugger: Critical literacy also involves recognizing the AI's limitations in specific technical contexts. Here, the pedagogical value lies in the student's ability to recognize *when* the

AI has failed—such as detecting hallucinated columns in a CSV file or correcting invalid SQL joins—and intervening. This reinforces the necessity of the "Internal Compiler"; without a fundamental understanding of the underlying logic, students would be unable to prompt the AI to correct its own errors.

The overall structure of CA 2.0 and its comparison with Cognitive Atrophy is illustrated in Figure 1.

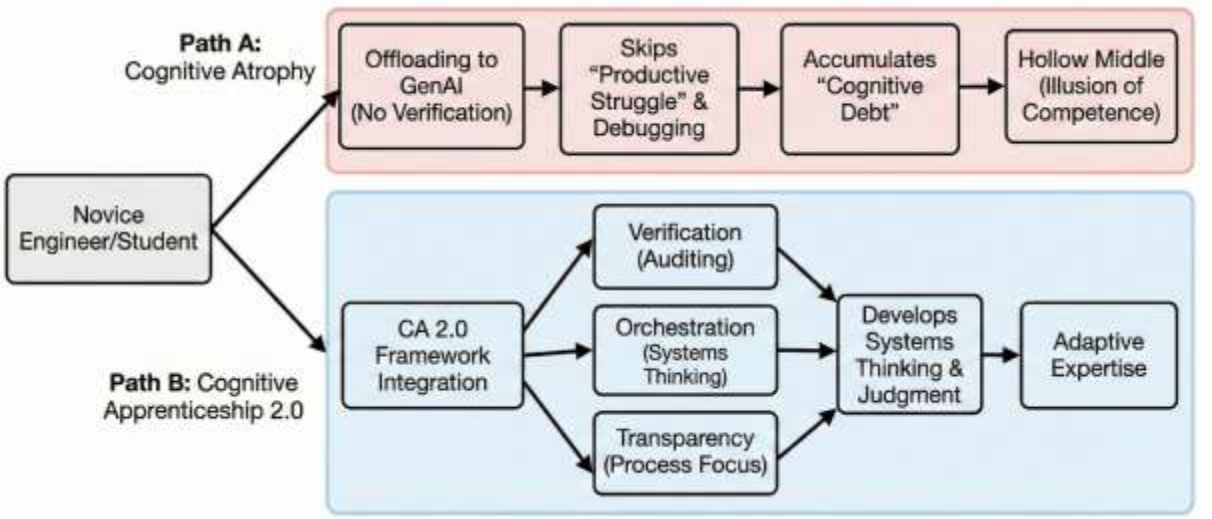

Figure 1 Caption: *The Bifurcation of Competence. Path A (Cognitive Atrophy) illustrates the cycle of offloading without verification, leading to the "Hollow Middle." Path B (Cognitive Apprenticeship 2.0) illustrates the intervention strategy, where the three pillars (Verification, Orchestration, Transparency) serve as the bridge to "Adaptive Expertise."*

5.5 Iterative Implementation: From Coursework to Capstone

To validate the Cognitive Apprenticeship 2.0 framework, we have adopted an iterative implementation strategy spanning two distinct pedagogical contexts at the University of South-Eastern Norway. This approach allows us to observe student "AI Orchestration" behaviors in a technical course (BID3000) before subjecting them to rigorous assessment in the high-stakes Bachelor Thesis (BOP3000).

5.5.1 Phase 1: Exploratory Application

The initial principles of CA 2.0 were introduced in the *Business Intelligence & Data Warehousing* (BID3000) course in Fall 2025. In this technical course, students were tasked with building complex ETL (Extract, Transform, Load) pipelines. Rather than banning AI, students were encouraged to utilize LLMs as "Senior Architects." Analysis of student submissions reveals that high-performing groups spontaneously adopted the **Epistemic Verification** and **Orchestration** pillars:

- **Optimization over Generation:** One cohort utilized AI not to generate boilerplate code, but to refactor inefficient row-by-row SQL insertions into bulk-loading methods, explicitly documenting the performance gain (e.g., "Optimization from 10 minutes to 10 seconds").
- **Concept Generation:** Students used LLMs to generate domain-specific business questions (KPIs) to guide their schema design, effectively using the AI as a "client proxy" rather than a code generator.

- **Provenance Disclosure:** Several groups voluntarily included an "AI Assistance Disclosure" chapter in their technical reports. They detailed specific prompts (e.g., "refine DAX queries") and explicitly stated that "all outputs were reviewed, rewritten, and validated by the group."

These behaviors confirm that students are capable of the "System Thinking" required by CA 2.0 when the assessment criteria value *architecture* over *syntax*.

5.5.2 Phase 2: Rigorous Validation

Building on the successful behaviors observed in BID3000, the Spring 2026 Bachelor Thesis course (15 ECTS) will formalize these practices into mandatory assessment criteria. While BID3000 allowed for voluntary disclosure, the Capstone implementation enforces the **Process Transparency** pillar via three mandatory mechanisms designed to measure "Cognitive Debt":

1. **The Forensic Process Log ("Dagbok"):** Students must maintain a living document recording not just *what* code was written, but *how* GenAI was prompted. This emphasis on structured reflection as a pedagogical tool is supported by emerging research on integrating reflective practices with AI use in higher education (Sellnow, 2025). Crucially, students are required to document **'Failure Cases'**—instances where the AI hallucinated, provided inefficient logic, or failed to connect to database drivers. The student must explicitly write out the logic they used to intervene and correct the AI. This shifts the grading focus from the final artifact to the forensic history of the problem-solving process.
2. **Reflective Methodology Chapter:** The final thesis report (30–50 pages) must include a distinct chapter on "AI Development Methodology." This requirement draws on the tradition of reflective inquiry as foundational to deep learning (Dewey, 1910). Unlike standard method chapters, this must critically analyze the *utility and limitations* of the specific agents used, effectively auditing the AI as a team member.
3. **The Verification Defense:** During the final oral examination, the assessment criteria explicitly weight the student's ability to explain and defend code segments generated by AI. This ensures that while the student may not be the "first author" of the syntax, they possess the **"epistemic sovereignty"** required to verify it.

The BOP3000 pilot is designed to test three core hypotheses:

- **H1 (Process Transparency → Verification Performance):** Students who maintain higher-quality process logs (measured by documented AI failure cases and intervention rationale) will demonstrate stronger performance in oral defense verification questions.
- **H2 (Orchestration Behavior → Independence):** Students exhibiting "AI as Architect" behaviors (using AI for optimization, review, and concept generation rather than wholesale code generation) will show greater ability to modify or debug their code without AI assistance.
- **H3 (Cognitive Debt Detection):** The three-mechanism assessment structure (process log + methodology chapter + oral defense) will identify students whose final artifacts exceed their demonstrable independent competence.

Measurable Outcomes:

INDICATOR	SUCCESS THRESHOLD	FAILURE THRESHOLD
ORAL DEFENSE PASS RATE ON AI-GENERATED CODE EXPLANATION	≥ 80%	< 60%
CORRELATION BETWEEN LOG QUALITY AND DEFENSE PERFORMANCE	≥ 0.4	< 0.2
STUDENTS UNABLE TO EXPLAIN CORE CODE SEGMENTS	< 15%	> 30%

5.5.3 Data Collection Strategy

To empirically validate this two-phase implementation, future research will correlate the "AI Disclosure" depth from Phase 1 with the "Verification Performance" in Phase 2. We aim to determine if the habit of documenting AI usage (Process Transparency) serves as a predictor for a student's ability to defend their code (Adaptive Expertise).

Although the concrete implementation sketched above is anchored in the local structures of USN (e.g., BID3000/BOP3000, 15 ECTS courses, dagbok requirements, and a bachelor thesis with oral defense), the Cognitive Apprenticeship 2.0 framework is not specific to a single institution. It is better understood as a set of portable design principles that can be instantiated in many ways depending on program structure, assessment traditions, and regulatory environments.

At a high level, we can distinguish between **context-dependent elements** and **portable principles**.

Context-dependent elements include:

- Credit systems and workload units (e.g., 15 ECTS vs. 3–4 credit modules).
- Formal thesis structures (e.g., whether a capstone is required, length of project).
- Assessment traditions (e.g., prevalence of oral exams or vivas, institutional rules for group vs. individual grading).
- Local tools and platforms (e.g., specific LMS, version control policies, or institutional AI guidelines).

Portable principles of CA 2.0 include:

- **Epistemic verification**: assessment practices that require students to reconstruct, explain, or debug work—whether produced by themselves, peers, or AI tools—under conditions where retrieval cues and external scaffolds are limited.
- **AI orchestration**: explicitly designing tasks where AI tools are treated as fallible collaborators whose suggestions must be evaluated, adapted, or rejected, rather than as infallible oracles.
- **Process transparency**: systematically capturing the trajectory of work (e.g., process logs, version histories, AI-use statements, reflection notes) and making that trajectory visible in assessment.

These principles can be realized across a wide range of course types and levels, even in institutions without extensive capstone projects or oral defenses.

6. Conclusions and Future Research

The integration of Generative AI into the information technology sector represents a rupture in the continuity of professional development. This integrative review set out to analyze this rupture through the lens

of labor market shifts, cognitive science, and curriculum design. Returning to our guiding research questions, the early evidence supports three critical conclusions.

6.1 Addressing RQ1: The Structural Reality of the "Hollow Middle"

Regarding the impact on employment (RQ1), our analysis suggests that we are not merely witnessing a cyclical fluctuation in hiring, but potential signs of a structural dissolution of the "junior" role. The empirical signal specifically the 13% decline in early-career employment in AI-exposed fields alongside a sharp reported drop in entry-level job postings (Brynjolfsson et al., 2025b; Intuition Labs, 2025) provide strong market indicators that the "hollow middle" is a developing reality. The automation of routine coding tasks appears to be severing the traditional apprenticeship model, meaning higher education can no longer rely on industry entry-level roles to consolidate foundational skills.

6.2 Addressing RQ2: The Danger of Cognitive Atrophy

Regarding the risks of AI reliance (**RQ2**), the findings suggest a bifurcation of paths: "Augmentation" vs. "Atrophy." We identified that uncritical adoption leads to **Cognitive Atrophy**, where students accumulate "cognitive debt." By bypassing the productive struggle of debugging and syntax generation, students fail to activate the Multiple Demand network required for deep conceptual understanding (Ivanova et al., 2020). This produces graduates who suffer from an illusion of competence, capable of prompting code they cannot verify, maintain, or secure.

6.3 Addressing RQ3: A Framework for Cognitive Apprenticeship 2.0

Finally, regarding the necessary pedagogical evolution (RQ3), we presented the Cognitive Apprenticeship 2.0 model. Through the pilot implementation in the USN Bachelor Thesis program and a technical course, we demonstrated that assessing the *process* of AI orchestration, rather than just the final code, provides a viable path to verify student competence in the post-GenAI era. To produce the "architects" and "orchestrators" the market now demands, educators must prioritize *Adaptive Expertise* (Hatano et al., 1986). This requires specific design principles:

1. **From Construction to Verification:** Assignments must shift focus from generating code to auditing, debugging, and integrating AI-generated outputs.
2. **Process-Oriented Assessment:** The adoption of Interactive Oral Assessments (IOA) and version history forensics to evaluate the *mental model* rather than the final artifact.
3. **Critical AI Literacy:** Teaching the material realities, ethical limitations, and "hallucination" risks of LLMs to prevent technological determinism.

6.4 Current Limitations and Future Research

While this paper argues for an urgent restructuring of software engineering education and presents an initial implementation of the Cognitive Apprenticeship 2.0 framework, it is necessary to outline the boundaries of our analysis and the constraints of the current validation.

6.4.1 Dependence on "Gray Literature" and Real-Time Data

A primary limitation of the labor market analysis is its reliance on non-peer-reviewed "gray literature," including industry reports and working papers. While this strategy is necessary to capture the real-time velocity of GenAI's impact, these sources lack the rigor of established economic census data. The "hollow middle" phenomenon should be interpreted as a strong *market signal* rather than a settled historical fact.

6.4.2 Scope of the Pilot Implementation

The implementation of the CA 2.0 framework described in this paper is currently limited to a single pilot cohort: the Spring 2026 Bachelor Thesis and the BID3000 course at the University of South-Eastern Norway. While the mandate for students to utilize and document GenAI usage mirrors corporate "AI Orchestration" workflows, the data collected is currently qualitative consisting of process logs, reflection notes, and oral defense performance. Furthermore, as this is a capstone project, the students have already completed the majority of their syntax-based training under traditional curricula. Therefore, this pilot validates the *Assessment* and *Orchestration* pillars of our framework but does not yet measure the impact of CA 2.0 on early-stage novices (freshmen) who have not yet formed mental models of code.

6.4.3 Need for Longitudinal Verification

The distinction between "Cognitive Augmentation" and "Cognitive Atrophy" may not be immediately visible in a single semester's output. High-quality thesis products produced with GenAI support may mask underlying gaps in foundational understanding that only manifest later in professional practice (the "brownfield" maintenance problem). Future research must track this specific cohort of graduates into their first two years of employment to verify if the "process reflection" mandated in their thesis successfully mitigated the risks of cognitive debt.

6.5 Final Remarks

The disappearance of the junior developer role is a crisis, but it is also an opportunity to elevate the discipline of computer science education. By abandoning the rote memorization of syntax in favor of deep systems thinking and ethical stewardship, we can prepare a generation of technologists who are not merely "users" of AI, but its masters. The tools have changed, but the mission of the university remains constant: to cultivate the human capacity for critical thought in a world that increasingly seeks to automate it.

Generative AI Disclosure

The author used generative AI tools (ChatGPT 5.1, Claude Opus 4.5, and Gemini 3 Pro) during the preparation of this manuscript solely for language editing (clarity, grammar, and readability) and for high-level feedback on early draft structure and argumentation. These tools were not used to generate original research data, analyses, results, or conclusions. All substantive content, interpretation, and final editorial decisions were made by the author, who also reviewed and verified the manuscript for accuracy, completeness, and proper citation.

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Meetings that matter. Kanban for effective project meetings in software engineering teams?

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Abstract
Despite their importance, meetings typically lack efficiency and effectiveness, leading to team disengagement and project delays. Therefore, this study explores effectiveness of team meetings in software engineering projects for higher productivity and project team success. Grounded in pragmatic worldview, this qualitative case study analyses software engineering company that has recently switched to from Scrum to Kanban approach as means for enhancing meeting practices, which improve engagement, problem-solving, efficiency, and team satisfaction. Results indicate that the adoption of Kanban at researched company has resulted in shorter, more focused meetings that enhance time management and team engagement. It has improved collaboration, visual project tracking, and flexibility, reducing pressure and promoting a more cohesive and responsive workflow. Overall, the transition has led to increased meeting efficiency, team satisfaction, and operational adaptability. This study advances the theoretical understanding of Kanban's practical impact in software development by empirically confirming its benefits in enhancing meeting efficiency, transparency, and team engagement, particularly in small or resource-constrained organizations. Furthermore, it advocates for a paradigm shift in understanding the role of meetings, positioning them not merely as subordinate tactical procedures, but as pivotal mechanisms that significantly influence a broad spectrum of organizational outcomes.

Keywords: meeting effectiveness, project management, continuous improvement, Kanban, software engineering

1. Introduction

Quality of meetings can make or break team effectiveness (Harvard Business Review, 2016). Yes, meetings are that vital for team success. Today's dynamic business environment requires organizations in all sectors to make sure their project meetings are effective and leading to desired organisational outcomes (Beaudry, 2023). However, for some companies, namely for those categorized as project-based with up to 95% of their activities being projects (Müller, Drouin, & Sankaran, 2019; Minelgaite & Hinriksdóttir, 2022), effectiveness of project meetings becomes not metaphorical, but actual make or break reality. These companies are typically found in software development, engineering, R&D, and construction industries, to name a few. In context project-based organisation balancing effectiveness and efficiency in project team meetings becomes a challenging necessity leading towards optimal performance.

Effective and efficient meetings should energize participants rather than drain them (Lencioni, 2004). Meetings facilitate collaboration, decision-making, and problem-solving, especially in organizations with dispersed teams reliant on digital communication (Lynn, 2024; Ola et al., 2023). Literature indicates that meetings are rich sources of nonverbal cues, revealing participants' priorities and aspirations (Lancefield, 2022). Executives can strategically utilize this information to communicate goals more persuasively by preparing adequately and fostering self-awareness. However, studies reveal that organizations often spend substantial time in unproductive meetings - with 71% deemed ineffective (Flynn, 2023) - highlighting the need for optimized practices. Poorly managed meetings can lead to significant „meeting fatigue", resource drain and disengagement (Petz, 2011). Quality of the meetings directly impacts employee satisfaction and team cohesion (Lancefield, 2022).

For over-decade project management literature has been exploring how Agile project management approaches can be successfully integrated into organizations to enhance their efficiency and effectiveness in managing projects (Patrucco, Canterino & Minelgaite, 2022). Agile is an umbrella term encompassing numerous methods and practices (Arora, et al., 2021). Scrum and Kanban are likely the two most commonly used methodologies within Agile project teams. Although both are rooted in Agile principles, they differ notably - particularly in their approach to project meetings. Scrum's structured roles and sprints contrast with Kanban's flexibility and self-organizing approach, making Kanban preferable for teams needing adaptability and autonomy (Alqudah & Razali, 2017). While the literature offers some insights into how Scrum and Kanban manifest differently in project team meetings, it lacks empirical evidence from real-world cases, especially within the software engineering industry. The study presented in this paper attempts to contribute to filling this gap and answer the following question:

How does Kanban approach improves effectiveness of project meetings in software engineering teams?

This research holds significant practical and theoretical importance, particularly within the context of software engineering teams where effective communication and collaboration are critical to project success. By identifying and examining particularities of Kanban approach's impact of project meetings, the study aims to provide actionable insights that can directly enhance team dynamics, decision-making, and overall productivity. Given the prevalence of unproductive meetings in many organizations, the findings offer valuable guidance for optimizing meeting practices, thereby reducing resource wastage and fostering a more engaged and cohesive workforce. Theoretically, this research contributes to the broader understanding of effective team management in technology-driven environments.

2. Literature review

The software engineering industry is experiencing significant growth, with its global market size projected to expand at a compound annual growth rate of 11.18%, reaching USD 89,282.13 million by 2027 (Business Growth Reports, 2023). As a project-based industry, its core activities revolve around the successful execution of projects, which are typically defined as a set of tasks to be completed within a specified

timeframe to achieve particular objectives (Malsam, 2023). In the context of software engineering, projects are manifested through collaborative efforts to develop, improve, or maintain software applications or systems. These encompass a range of activities, from conceptualization and design to software development, testing, deployment, and ongoing maintenance (Yasar, 2021). Software development projects, characterized by diverse computer science activities, focus on creating, designing, deploying, and maintaining software, often employing methodologies such as Agile and Waterfall (IBM, n.d.). Software development projects generally follow a structured lifecycle similarto standard project management frameworks, with phases including planning, design, requirements gathering, development, testing, deployment, and maintenance (Clark, 2024).

In project management, regular meetings - also called routine or general meetings - occur at fixed intervals to address ongoing operations, organizational updates, and strategic goals (Mullins, 2023). They serve as platforms for information sharing, coordination across departments, and decision - making that impacts the broader organization, and are considered different than project meetings. Project meetings focus on planning, executing, and monitoring individual projects, scheduled as needed throughout the project lifecycle and tailored to specific objectives, tasks, and milestones (Kerzner, 2022). Project meetings are more targeted, involving key stakeholders such as project managers, team leads, and relevant experts, and vary in duration and structure depending on project requirements (Mullins, 2023; Kerzner, 2022).

Project meetings are essential to successful project management, serving as a structured platform for collaboration, decision-making, and stakeholder engagement (Pinto, 2015). They address key aspects such as planning, execution, and monitoring, ensuring all voices are heard, which contributes to project success and stakeholder satisfaction (PMI, 2021). The scheduling of these meetings is strategically aligned with the project's lifecycle, milestones, and deliverables, providing regular opportunities to review progress, resolve issues, and make informed decisions (PMI, 2021). Involving stakeholders such as project managers, team members, clients, and sponsors, their agendas focus on project updates, risk management, and issue resolution, facilitating efficient discussions (Kerzner, 2022; Harvard Business Review, 2016). These meetings promote teamwork, foster collective ownership, and support problem-solving by enabling feedback and idea exchange (PMI, 2021). They also serve as mechanisms for performance monitoring, risk assessment, and resource management, ensuring project alignment with organizational goals.

Project team meetings are a critical aspect of software engineering (Beaudry, 2023). Team meetings are fundamental in enabling collaboration, communication, and coordination among engineers, project managers, and stakeholders (Hoda, Noble, & Marshall, 2008). In the complex environment of software development, these meetings highlight individual contributions, driving project success and high-quality outputs. They foster knowledge sharing among diverse disciplines - developers, designers, testers - by providing a structured platform for brainstorming, problem-solving, and aligning efforts (Pressman & Maxim, 2014). Effective meetings are crucial for clarifying objectives, updating progress, and making informed decisions, especially given rapidly evolving requirements (Hoda, Noble, & Marshall, 2008; Pressman & Maxim, 2014). Additionally, meetings cultivate team camaraderie, support mutual trust, motivation, and job satisfaction, which are vital for overcoming challenges and maintaining a positive team culture (MoldStud, 2024; Hoda, Noble, & Marshall, 2008).

Both effectiveness and efficiency are vital for successful meetings, yet they address different aspects: efficiency focuses on "doing things right," optimizing resource use, while effectiveness emphasizes "doing the right things" to achieve desired outcomes (IAPM internal, n.d.). Efficiency pertains to managing resources, time, and tasks, whereas effectiveness involves meeting project goals (PMI, 2021). Balancing both is crucial; overemphasis on efficiency can lead to missing goals, while prioritizing effectiveness without regard to resource use may cause delays or overspending (Zaluski, 2023). Incorporating continuous improvement philosophies like Kaizen can help maintain this balance through incremental changes (Imai, 1986; Alqudah & Razali, 2017). Clear goals, effective communication, and strategic planning - such as defining objectives, inviting essential participants, and logical agenda-setting - are key to productive

meetings (Porter & Baker, 2006; Parker & Hoffman, 2006). Rosenberg (2023) emphasizes that well-structured meetings should be both scheduled efficiently and aimed at achieving specific outcomes, with follow-up actions to ensure progress. Combining these principles enhances overall meeting effectiveness and efficiency.

Project team meetings are essential for maintaining alignment, managing expectations, and ensuring smooth project progression. Literature identifies key dimensions influencing meeting quality: frequency, type, and tools used, which vary based on project size, complexity, and team dynamics (Chen, 2020; Schwartz, 2023; Parker & Hoffman, 2006; Tanner & Dauane, 2017). Regular meetings for small teams typically include daily 15-minute standups to share progress and obstacles, fostering engagement and individual recognition. Cross-functional teams may meet more frequently to resolve specific issues, while broader team meetings - monthly or bi-weekly - share progress and future plans, depending on project needs (Chen, 2020).

Meeting types differ widely, each serving unique functions to enhance communication, coordination, and collaboration. For instance, kickoff meetings establish goals and roles; status updates track progress; retrospectives analyze successes and failures; and sprint planning sets work for upcoming cycles. Other important types include stakeholder updates, steering committee reviews, contingency planning, and daily scrums - all contributing to project success (Schwartz, 2023). Choosing appropriate meeting types aligned with project stages and objectives is vital for effective management.

Tools also play a crucial role in optimizing meetings. Parker and Hoffman (2006) propose step-by-step techniques for planning and facilitating results-oriented meetings, including crafting agendas, defining roles, managing time, and encouraging participation. They also emphasize effective communication, conflict resolution, and proper meeting closure with clear follow-up. The COVID-19 pandemic has shifted many meetings online, using platforms like Zoom, Teams, and Google Meet, which require additional tools to address challenges such as fatigue. Scientific studies recommend taking breaks, like the 20-20-20 rule, to reduce eye strain and mental fatigue, when every 20 minutes one takes a break and looks at something that is 20 feet away for at least 20 seconds(The Economic Times, 2023). Virtual collaboration tools - including Mural, Miro, Google Docs, and project management platforms like Trello - enhance real-time collaboration, making virtual meetings more productive and engaging. Optimizing meeting frequency, type, and tools ensures better coordination, communication, and project outcomes.

The existing body of literature on project team meetings is notably fragmented, posing a significant challenge in developing a comprehensive framework that effectively elucidates the governance of such meetings. These challenges are further compounded by the reality that project teams operate within a wide array of ecosystems - ranging from multinational organizations to startups - whose unique contexts can influence the applicability and relevance of any proposed model in real-world settings. Despite these complexities, it remains possible to derive certain valuable guidelines.

Building on this foundation, the model presented below synthesizes insights drawn from an extensive and diverse array of scholarly sources and practical frameworks related to project meetings. By integrating existing knowledge, we offer a structured approach to understanding and governing project meetings, providing a valuable tool to navigate the inherent complexities of different organizational environments.

Picture 1. Governance of project meetings

Source: Authors, based on literature review

As means to achieve project effectiveness and efficiency companies for more than a decade have been actively applying various Agile approaches, particularly in software development industry (Patrucco, Canterino & Minelgaite, 2022). While Scrum and Kanban are both considered valuable Agile methods, it has been suggested in scientific literature that Kanban may be considered more advantageous than Scrum, based on several key features that influence the choice between these methods (dos Santos, et al., 2018); Alqudah & Razali, 2017). Scrum is characterized as a prescriptive framework with well-defined roles and responsibilities, while Kanban offers greater flexibility, allowing for more adaptable workflow management (Alqudah & Razali, 2017). This flexibility benefits teams dealing with evolving processes or those seeking more autonomy in managing their work, as Kanban's self - organizing nature removes the need for predefined roles like Product Owner or Scrum Master, facilitating easier adoption, especially when teams prefer not to follow strict time-boxed sprints (Alqudah & Razali, 2017).

Kanban's approach to batch size and work in progress (WIP) is more adaptable, enabling smaller work increments that support faster delivery and continuous prioritization - often on a daily or hourly basis - in contrast to Scrum's longer sprint cycles (Alqudah & Razali, 2017). This feature aligns well with

environments requiring rapid iteration and responsiveness to changing priorities, reducing lead times through process flow optimization and visualizing workflows. While both frameworks aim to improve cost efficiency and quality, Kanban places a stronger emphasis on flow management and continuous improvement, leading to potential cost savings and higher quality over time (Alqudah & Razali, 2017).
The flexibility of Kanban, combined with its focus on flow and incremental delivery, makes it a compelling choice for teams looking to optimize their processes (Knaster, Pereira, & Shalloway, 2024). However, the selection ultimately depends on the specific context, project requirements, and team preferences. For instance, Scrum is often more suitable for organizations that favor structured roles and fixed iteration cycles, while Kanban suits those seeking adaptability and ongoing workflow improvements. A summarized comparison indicates that Scrum's prescribed framework involves defined roles, longer sprint cycles, and a focus on requirements prioritized by sprint length, whereas Kanban emphasizes continuous prioritization, smaller feature sizes, shorter lead times, and greater flexibility in team size and work batch. Both approaches have their merits, and the choice should align with the team's operational environment and project goals.

Project team meetings are vital for collaboration, decision-making, and monitoring progress, yet they often face challenges that hinder their effectiveness and impact project outcomes. Common issues include unclear objectives and agendas, which lead to unfocused discussions and inefficient use of time (Carnes, 1980); communication breakdowns caused by unclear messages, misinterpretations, or reliance on ineffective channels like email (Welch & Welch, 2018; Dennis, Fuller, & Valacich, 2008); dominant personalities that suppress diverse input and creativity (Mullen & Copper, 1994); and time constraints or over-scheduling, resulting in fatigue, disengagement, and low attendance (Rogelberg, Leach, Warr, & Burnfield, 2006). Additionally, a lack of clear ownership and deadlines allows tasks to fall through the cracks, risking missed deadlines and project failure (Farooq, Ullah, & Hameed, 2015). Unaddressed issues and unresolved conflicts further threaten project progress when action items are not tracked and managed properly. Farooq, Ullah, and Hameed (2015) stress the importance of accountability mechanisms—such as assigning ownership, setting deadlines, and follow-up—to ensure timely task completion and issue resolution. Addressing these challenges requires proactive leadership, emphasizing the importance of clear objectives, open communication, inclusivity, efficient scheduling, and strong accountability to enhance meeting effectiveness and drive project success.

3. Method

Grounded in pragmatic worldview, this qualitative case study set out to answer the question: How does Kanban approach improves effectiveness of project meetings in software engineering teams? This philosophical stance emphasizes practical outcomes and solutions to problems (Patton, 1990), focusing on "what and how to research based on the intended consequences" (Creswell, 2014, p. 11). Qualitative research aims to understand human experiences on social phenomena and offers valuable context - specific understanding. (Creswell & Poth, 2017). To answer research question and achieve research goal XY company (fictitious name for anonymity purpose) was chosen as a case. XY is a small US-based software development company founded in February 2022 in San Antonio, Texas. All seven employees, along with the founder, participated in semi – structured interviews. Interviews were taken in-person.

Table 1. Relevant demographic characteristics of the sample

Interviewee (pseudonym)	**Age**	**Role in the company**
Mountain	31	Management
River	39	Software development
Flower	37	Software development
Rock	33	Business analyst
Eagle	32	Quality analyst

Nest	29	Analyst
Roots	29	Project manager
Wind	37	Business analyst

Source: Authors

Overall goal of all interviews was to explore interviewees' insights regarding the Scrum and Kanban, with the objective of making their team meetings more effective and efficient. More specifically, interview frame consisted of questions such as: In your opinion, how have Kanban meetings contributed to a more effective workflow for the team? Would you recommend other teams consider transitioning to Kanban meetings based on your experience?

Data analysis was led by framework analysis approach (Goldsmith, 2021). This approach is especially suitable for applied policy or practice research when the aim is to answer specific questions within a bounded organizational or policy context by applying a pre-existing or emerging conceptual framework to systematically categorize and interpret data. This data analysis approach is natural extension of pragmatic worldview of this research and its main goal. Data analysis was inspired by data analysis procedure, typical for a framework analysis approach (see Goldsmith, 2021; Kiernan & Hill, 2018): familiarization, identifying a thematic framework, indexing, charting, mapping and interpretation. Researchers were given an opportunity to follow up the interviews when needed for additional clarity or elaboration. Follow-up interviews were implemented in-person as part of observation of meetings, as well as online (mainly with CEO). Company also gave access to relevant secondary data and opportunity to conduct observations. To sum up, interview data (including follow up interviews) was the main source of data in this research and for answering the research question. Observations and familiarization with secondary data was helpful to understand the context (case), determine its boundaries and understand better emerged themes.

Effectiveness and efficiency of meetings have been a focus at XY for some time. Company has recently transitioned from Scrum to Kanban, as means for improvement and higher effectiveness. This context provided favourable conditions for investigating effectiveness and efficiency of project team meetings in sector unrepresented in empirical research.

Table 2. Example of data collection and analysis approach cycle

Theme and objective	Approach	Analysis focus
Efficiency and meeting length: To evaluate the impact of Kanban on meeting efficiency, particularly in terms of time management and productivity	Participants were asked about. the length, structure, and focus of meetings using Kanban in comparison to Scrum.	Responses were analyzed to determine if. Kanban's streamlined approach led to shorter, more productive meetings, with examples of inefficiencies using Scrum serving as comparisons.
Challenges with the transition: To identify difficulties encountered during the shift and	Participants reflected on the transition's smoothness, retention of Scrum practices, and any persistent challenges.	The analysis uncovered specific transition challenges, how they were addressed, and potential future issues with fully adopting Kanban. 36 assess the effectiveness of the transition process.

Source: Authors

Informed consent was obtained from all of the interview participants. Interviewees were informed about anonymity, and confidentiality would be maintained throughout the research process, data would be stored securely and only used for the purpose of this research, and fictional names or acronyms would be used for the company name.

4. Results and discussion

The findings from the interviews at XY clearly indicate that adopting the Kanban approach has resulted in shorter, more focused meetings, aligning with existing literature that emphasizes Kanban's flexibility and its positive impact on team processes (Ikonen, et al., 2011; Tanner & Dauane, 2017). Participants consistently noted that meetings are now more streamlined, involving only essential team members, which has significantly improved time management and overall productivity. These observations contrast with the longer, often less effective Scrum meetings which XY used to have, exemplified by a mention of a 6.5-hour session, highlighting the need for a more concise and targeted approach - an insight that reinforces the literature's argument that Kanban's less prescriptive nature facilitates faster adoption and integration (Alqudah & Razali, 2017).

Several interviewees emphasized that Kanban's emphasis on visualizing progress through Kanban boards is a key advantage. Many noted that removing strict deadlines has allowed developers to work at their own pace, reducing pressure and fostering better quality work, which further supports the literature that advocates for flow-centric methods to improve adaptability and responsiveness (Tanner & Dauane, 2017). The continuous flow principle was described as enabling smoother task transitions and better handling of changing priorities and urgent issues. In fact, Kanban's focus on visual workflow management and limiting work in progress was highlighted by participants as instrumental in reducing lead times and enhancing collaboration, directly confirming the benefits proposed in prior research on flow management and operational efficiency (Alqudah & Razali, 2017). Moreover, the team's perception that Kanban's visual tools improve project transparency and facilitate better handovers aligns with the conceptual understanding of Kanban as a tool to foster greater team cohesion and communication.

A recurring theme among the interviewees was that shifting to Kanban alleviated some of the pressure and stress associated with Scrum's strict sprint deadlines. Without the constraints of timeboxed iterations, developers felt they could prioritize quality over rushing, which improved overall satisfaction and engagement - a finding consistent with the literature suggesting that Kanban's flexibility leads to less burnout and higher morale (Govindaras, et al., 2023; Alqudah & Razali, 2017). The transition was described as smooth, with only minor Scrum elements retained, and the shorter, more focused meetings reported as significantly boosting productivity. This aligns with the existing research indicating that Kanban's visual and flow-oriented practices can lead to more efficient, responsive workflows in dynamic environments (Dennehy & Conboy, 2018).

In addition to confirming many aspects of existing literature, these findings deepen our understanding of how Kanban's principles are practically applied and perceived in a real-world software development context. The team's positive response to shorter meetings, increased ownership, and greater inclusivity supports the broader argument that continuous flow and visualization foster not only operational efficiency but also higher team engagement - an area where literature calls for further exploration. Overall, the study illustrates that the transition to Kanban at XY has yielded measurable improvements in meeting effectiveness, collaboration, and team satisfaction, providing an in-depth practical illustration that complements the theoretical benefits identified in prior research. This insight advances our understanding of how Kanban's core principles can be operationalized effectively in software teams, reinforcing its potential as a tool for ongoing process improvement.

This study advances the theoretical understanding of Kanban's practical impact in software

development by empirically confirming its benefits in enhancing meeting efficiency, transparency, and team engagement. It extends existing literature by illustrating how flow-based and visualization principles operationalize in real-world settings to reduce stress, improve collaboration, and promote adaptability. These findings deepen insights into Kanban's role in fostering operational and psychological benefits, supporting its potential as an effective tool for agile process improvement.

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Outlaw motorcycle gang Satudarah in Norway: The case of deviance convenience at club membership

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Abstract

Deviant behaviors of motorcycle gangs in Europe are a growing threat to society. In this exploratory research, the Norwegian wing of the outlawed motorcycle gang Satudarah is investigated, and convenience theory is applied. Convenience theory is a crime-as-a-choice theory where reduced attractiveness of illegitimate activities relative to legitimate activities might cause greater a extent of compliance and conformance by individual members and outlaw gangs. This research is important, as reduced convenience will reduce the attractiveness and in turn lead to less extent of outlaw motorcycle gang members' deviance in society. Simply stated, you cannot fight something you do not understand, and you cannot fight someone you do not understand. Using the lenses of convenience theory, this research provides new insights into the outlaw motorcycle gang phenomenon. The primary information source was attendance at trials in criminal court where Satudarah members were prosecuted and convicted. The secondary information sources were the literature review, court verdicts, and media reports. The six identified convenience propositions – personal venture and gang ambition as motives, offender status, resource access, and market collapse as opportunities, and learning by differential association as choice attitude – can be addressed in future research in terms of actions relevant to reduce convenience. Convenience theory is a crime-as-a-choice theory where reduced attractiveness of illegitimate activities relative to legitimate activities might cause greater degrees of compliance and conformance by individual members and outlaw gangs. This research is important, as reduced convenience will reduce the attractiveness and in turn lead to less extent of outlaw motorcycle gang members' deviance in society. Simply stated, you cannot fight something you do not understand, and you cannot fight someone you do not understand. Using the lenses of convenience theory, this research provides new insights into the outlaw motorcycle gang phenomenon.

KEYWORDS: convenience theory; individual deviance; fear capital; crime motives; opportunity structure; willingness attitude.

1. Introduction

Membership in an outlaw motorcycle gang such as Satudarah is motivated by possibilities and threats, deviance is enabled by opportunities to commit and conceal wrongdoing, and willingness is based on an attitude of choice, as discussed in this article. Motives, opportunities, and attitudes of Satudarah members are discussed in this article based on reviewed literature, attendance at a trial, and archival analysis of the verdict document from the trial. As Agnew (2014: 2) formulates it: "crime is often the most expedient way to get what you want" and "fraud is often easier, simpler, faster, more exciting, and more certain than other means of securing one's ends".

Convenience is introduced to discuss that it is easier, simpler, faster, more exciting, and more certain to get what they want as members of the Satudarah motorcycle club. This article maintains that the concept of convenience (Gottschalk, 2017) and the theory of convenience (Gottschalk, 2025) may help understand the wrongdoing in outlaw biker gangs such as Satudarah. Convenience is a concept that was theoretically mainly associated with efficiency in time savings. Today, convenience is associated with a number of other characteristics, such as reduced effort and reduced pain. Convenience is linked to terms such as fast, easy, and safe. Convenience says something about attractiveness and accessibility. A convenient

individual is not necessarily neither bad nor lazy. On the contrary, the person can be seen as smart and rational (Sundström and Radon, 2015).

Deviance refers to "actions and behaviors that go against institutional expectations, norms, or the law in a given context" (Rintamäki et al., 2024: 1). Deviant behavior refers to "fundamentally counter normative behavior – that is, behavior that is at odds with societal expectations, informal norms, or written laws", where "it is the responses of the conventional and conforming members of society who identify and interpret behavior as deviant which sociologically transform persons into deviants", and "organizational deviance can therefore be defined as behavior judged by actors external to the organization as being in violation of established rules, norms, or other standards of behavior" (Piazza et al., 2024: 253). Deviance "is a central object of study for organizational scholars" where "much organizational research has examined individual deviance or how organizational deviance emerges" (Kim et al., 2025: 1). This article addresses the following research question: *What propositions in the theory of convenience seem relevant in the study of membership attractiveness at outlaw motorcycle gang Satudarah in Norway?* The research is important, as reduced convenience will reduce the attractiveness and in turn lead to less extent of outlaw motorcycle gang members' deviance in society. Simply stated, you cannot fight something you do not understand, and you cannot fight someone you do not understand. Using the lenses of convenience theory, this research provides new insights into the outlaw motorcycle gang phenomenon.
This article starts by a review of the literature addressing the phenomenon of outlaw gangs such as the Satudarah motorcycle club, focusing on selection, facilitation, and enhancement. Next, the method of discussing fourteen convenience propositions based on available information sources is presented, followed by results from identifying the most relevant convenience propositions in the case of membership at Satudarah in Norway.

2. Literature review

Outlaw biker gangs have mainly been studied in the Netherlands (Deuren et al., 2022a, 2022b, 2022c; Ruitenburg and Blokland, 2022), but also in Sweden (Mondani and Rostami, 2023), Australia (Bartels et al., 2019; Bright et al., 2022), and Switzerland (Haymoz et al., 2023). Several years ago, biker gangs were studied in Norway (Dean et al., 2010; Gottschalk, 2008, 2013, 2017) and as a transnational phenomenon (Gottschalk and Markovic, 2016). The outlaw biker gang Satudarah is headquartered in the Netherlands. The club colors on the back of Satudarah vests say Maluku. Maluku is an island in Indonesia. Unique is the fact that they are a multi-ethnic gang. Initially, the Satudarah people were ethnic Moluccans from the Maluku Islands in the Indonesian archipelago.

Outlaw biker gangs are increasingly viewed as a serious problem in society where many outlaw bikers have a criminal record for serious types of offenses. Deuren et al. (2022a, 2022b, 2022c) in the Netherlands found that gang membership and criminal behavior are linked by three causal mechanisms. The first mechanism is selection, where the most crime-prone are drawn to gang membership. Individuals who have demonstrated preference for crime and see no or little barriers in law and regulations, are both attractive to the current members and attracted by the outlaw lifestyle. The current members, when looking for new members in roles such prospects, actively recruit those who are similar to themselves. Deviant individuals are attracted to deviant groups. This is in line with the perspective of deviant association, where the deviant personality offender mind is not only a result of external labeling. The offender mind is a result of personal differential association suggesting that potential offenders make a rational choice where they associate with those who agree with them, and distance themselves from those who disagree. This perspective suggests that whether individuals engage in crime depends on their socialization within certain peer groups. The essence of differential association is that criminal behavior is learned, and the main part of learning comes from within important personal groups. Exposure to the attitudes of members of the club that reject legal codes influences the attitudes of the individual (McGloin et al., 2021; Wood and Alleyne, 2010). The second causal mechanism linking gang membership and criminal behavior suggested

by Deuren et al. (2022a, 2022b, 2022c) is facilitation. Attitudes in the selection process do here develop into capabilities in the facilitation process. Learning is facilitated within the gang. Learning from others is an active process. Differential association occurs in the organizational setting but does not as such increase the organizational opportunity to commit crime. However, crime learning makes it more convenient to favor law violations. Individuals embedded within structural units by differential association in an outlaw motorcycle gang (OMCG) become vulnerable to attitudes in favor of delinquent and criminal behavior. Differential reinforcement of crime convenience develops over time as individuals become motivated by various associations conducive to delinquency. The differential association perspective suggests that offenders associate with those who agree with them, and distance themselves from those who disagree (Sutherland, 1983). The choice of crime is thus caused by social learning from others with whom offenders associate (Hoffmann, 2002). The third and final causal mechanism is enhancement where criminal behavior can increase and intensify by new members entering the gang (Deuren et al., 2022a: 652):

> While future gang members may be already more crime-prone to begin with, the difference between gang members and non-gang members is further exacerbated once future gang members actually join the gang (...) A recent review of studies into the effects of gang membership concludes that street gang membership indeed tends to increase criminal behavior in juveniles, aggravating pre-existing differences between gang members and non-gang members, hence supporting an enhancement interpretation of the effect of gang membership on crime (…) Even when juvenile criminal history was controlled for in a multivariate logistic regression model, adult criminal history was still significantly associated with OMCG membership, suggesting an enhancing effect of OMCG membership on adult crime. The enhancement effect was particularly strong for drug offenses: compared to non-outlaw motorcyclists, OMCG members have fivefold higher odds of being convicted for a drug offense – which in the Dutch context pertains to the production, trafficking or (whole) sale of drugs rather than possession for individual use.

Deuren et al. (2022a) argued that there is an enhancement effect of joining one of the most criminal OMCGs, evidenced in a higher overall rate of registered crime for members of one of the most criminal OMCGs when compared to members of one of the least criminal OMCGs. They further argued that this enhancement effect will be stronger in entrepreneurial gangs since entrepreneurs discover and create innovative and changing opportunities. Criminal entrepreneurs actualize illegal opportunities in the shadow economy (McElwee and Smith, 2015). There has been a long history of deadly hostilities between major biker gangs such as Hells Angels MC and Bandidos MC. Violent antagonism towards each other has characterized the relationship. However, Mondani and Rostami (2022: 195) found some evidence of "direct collaboration in crime between members of two historical foes, Hells Angels MC and Bandidos MC". Members with multiple OMCG membership tended to have higher centrality and clustering. Members of both MC clubs had the highest levels of crime suspicions in the police, and most of the co-offending cases involved multiple membership individuals. Such individuals might be labeled criminal nomads as they collaborate with individuals from different organized crime groups. Organized crime groups exist to commit illegal activities with the purpose of securing power and profit. Often, material gain is a driving force behind organized crime. Organized crime is a term for illegal activities of groups run by criminals to engage in various kinds of crime. Organized crime can be transnational, national, or local. It can be organized in networks, hierarchies, and matrices, where the latter might be legal along the vertical axis, while illegal activities are organized along the horizontal axis. "Organized crime is an economic crime because its pivotal objective is capital accumulation" (Zabyelina, 2023: 15). Mondani and Rostami (2022: 196) in Sweden suggested that "the outlaw biker subculture has been portrayed as booze-fighters, criminal syndicates, and as secular sects":

> In the public imaginary, outlaw motorcycle clubs (OMC) have long been seen as consisting of tattooed, barroom brawling criminal men who ride motorcycles for fun (…) and posing a 'serious national domestic threat' (…) highly structured criminal organizations whose members engage in criminal activities such as violent crime, weapons trafficking, and drug trafficking, and whose members use their motorcycle clubs as conduits for criminal enterprises (…)

> 'extremely hierarchical' and traditionally being 'uncompromising' homogeneous criminal gangs involved in crime (…) sophisticated organized crime syndicates responsible for a large portion of the global illicit drug and weapon trades.

A subculture – such as OMC practices, rules, and principles of conduct – is a culture among members of a group of people within society which differentiates itself from the norms and values that dominate the society. The outlaw subculture tends to be homogeneous as opposed to cultural heterogeneity that typically tends to exist in varying forms in organizations and in society as a whole. The outlaw subculture might be extensive in terms of cultural breadth as well as being culturally embedded. Cultural breadth "reflects whether individuals have adopted a broad range of values, beliefs, and norms that span the organization's culture," while being culturally embedded "reflects whether individuals have adopted the core values, beliefs, and norms entrenched in the organization's culture" (Choi et al., 2023: 429).

3. Method

This article addresses the following research question: *What propositions in the theory of convenience seem relevant in the study of membership attractiveness at outlaw motorcycle gang Satudarah in Norway?* The research is important, as reduced convenience will reduce the attractiveness and in turn lead to less extent of outlaw motorcycle gang members' deviance in society. The research method is content analysis of primary and secondary information sources.

The primary information source is listening by attendance at trials in criminal court in Norway. The secondary information source is verdict documents from the trials (Borgarting, 2024; Oslo tingrett, 2023, 2024) and reviewed literature as discussed above, as well as news media reports. The content analysis of the various information sources leads to interpretation of statements to identify relevant convenience propositions. While convenience theory suggests fourteen convenience propositions, only some of them might be relevant. The convenience propositions are illustrated in Figure 1.

Motives are from possibilities or threats and for the member or the gang. For the member, the possibility is either to experience personal venture or to avoid personal strain. For the gang, the possibility is either to realize gang ambition or to avoid gang failure.

Opportunities from committing crime can derive from offender status and resource access. Opportunity to conceal crime can derive from social decay, control failure, or market collapse.
Attitude of willingness for deviance can derive from choice based on deviant identity, rationality, or learning, or the willingness can derive from justification of deviance and neutralization of potential feelings of guilt (Gottschalk, 2025).

Court room 250 was quite full when the trial started on Tuesday, November 21, 2023, at Oslo district court. In addition to all the defendants and their lawyers, and the prosecution, and the insulted, many spectators were present. Seven Satudarah people were charged with violence using weapons such as knives in a nightclub when prosecuted in court. Most of the spectators were obviously from a rivaling gang – the Young Guns – and a few were associated with Satudarah. Two individuals associated with the Young Guns were the insulted as victims. At lunch hour, some of the people in the court room got involved in verbal threats against each other. The judge then passed a verdict that spectators with a jail conviction less than five years ago needed to leave not only the court room but the court building. Suddenly twenty young men on the spectator benches stood up and left.

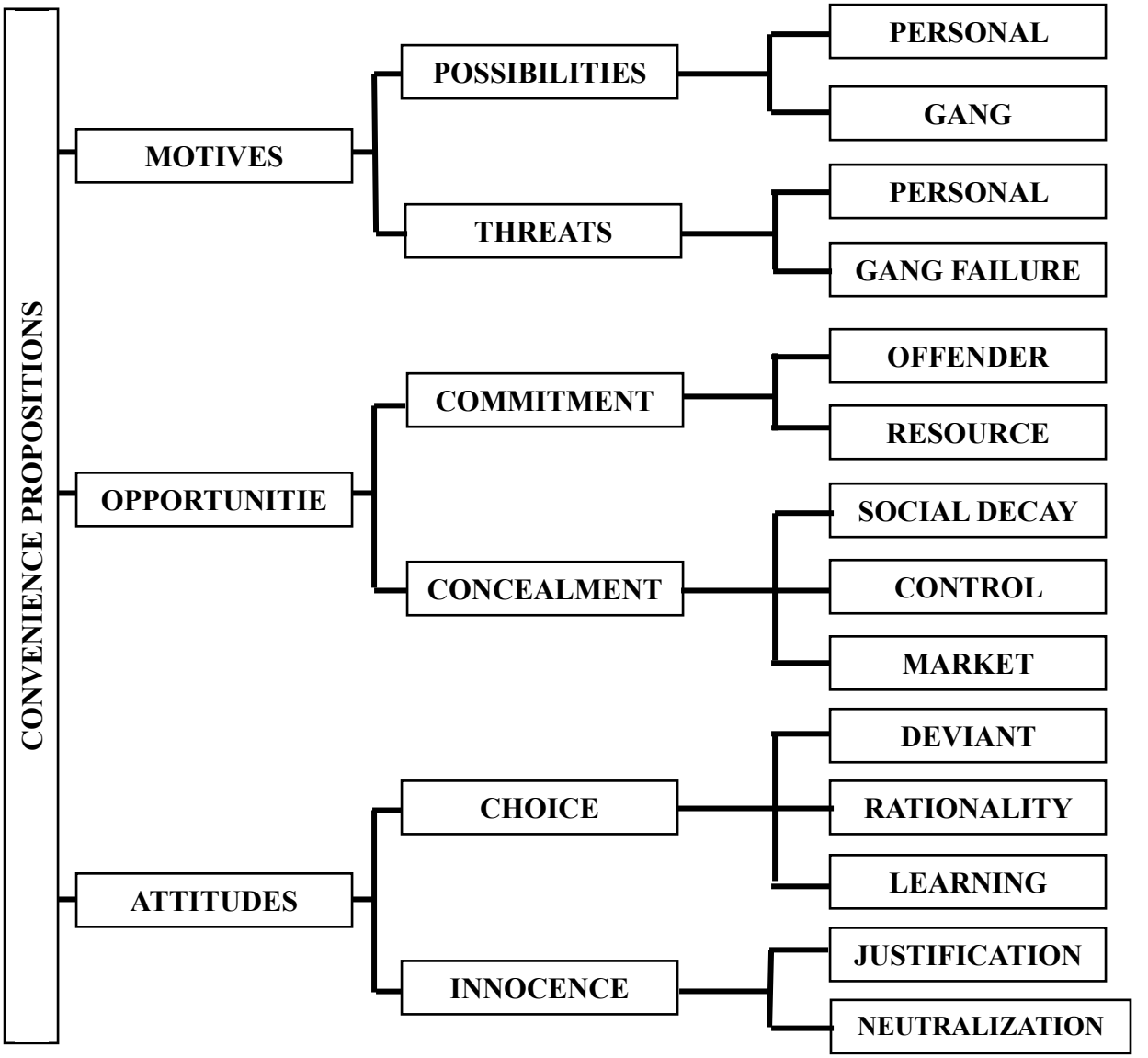

Figure 1 *Structural model of convenience theory.*

The trial in Oslo district court went on for ten days. After that, it was a matter of waiting for the judges to make their decisions and writing the verdict document. The verdict document was published on January 23, 2024, stating publicly that (Oslo tingrett, 2024: 57) "Qazam Akhtar, born 1990, 2 years. Sam Akhtari, born 2000, 1 year and 8 months. Khayam Akhtar, born 1984, 2 years. Kerar Haidar Shubar, born 2002, 1 year and 7 months. Wasif Ashfaq, born 2001, 1 year and 8 months. Usman Saeed, born 1984, 1 year and 6 months. Suleman Saeed Ahmed, born 1990, 1 year and 6 months".

4. Results

The Satudarahs – the one-blood brothers – established themselves in Norway by threats of violence and actual violence (Blekkerud, 2024; Oslo tingrett, 2024; Pedersen, 2023). The motive for members was the possibility of power and influence over those who are positioned lower (Kakkar et al., 2020) by being part

of an outlaw group with fear capital. Fear capital is used to "strengthen their criminal status" (Poppi and Ardila, 2023: 415). The motive was personal venture by a risky and daring journey and undertaking as an adventure. The outlaw biker club had a motive of growing the fear capital over time by episodes such as shooting in the center of Oslo city and stabbing rivals outside a restaurant in the town of Lillestrøm (Bøhler, 2023; Mjaaland, 2023). The gang ambition was to establish themselves as rivals to existing outlaw biker gangs as well as rivalling Young Guns (Oslo tingrett, 2024). The motives of each individual member and the outlaw gang is illustrated in the dimension of motives in Figure 2. Possibilities rather than threats seemed to drive membership in the outlaw motorcycle gang. Members were motivated by the brotherhood in a gangster paradise (Khan-Østrem, 2023: 3):

> A gangster paradise offers money, brotherhood, and dinners. It is tempting, especially for those who have none of this. They failed to prevent the recruitment. This was the warning from the Swedish national police chief who recently visited Norway. He said that Norway must not make the same mistake as Sweden. He is not the only Swede who has waved a red flag.

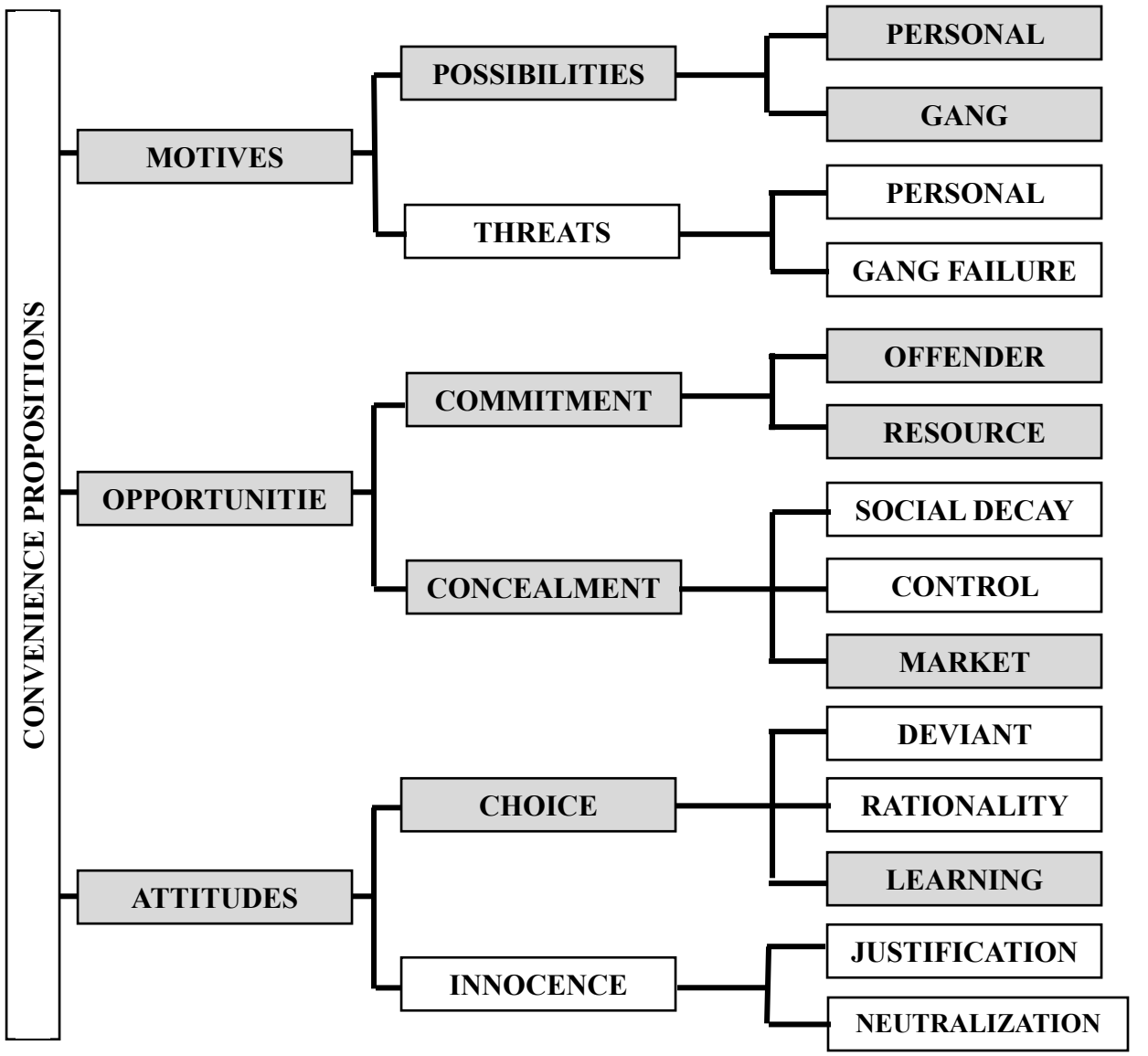

Figure 2 *Convenience propositions for deviance as Satudarah MC members*

The personal venture reflected a desire to change identity from being school dropouts and losers to becoming respected and feared individuals in the gang. Identity is how an individual sees himself or herself in relation to others (Ingram, 2023). The gang ambition reflected the desire by the outlaw club to establish itself in geographical areas such as nightclubs and in markets for narcotic drugs. The business idea seemed to be extortion by threat of violence against those who trade in drugs where Satudarah might claim protection money for protection against themselves and rivaling outlaw gangs. Then club members do not necessarily touch narcotics but instead know those who do and claim a fraction of the profits from the illegal trade. At goal achievement, ends simply justify means that represent crime.

Dutch police files of Satudarah and other outlaw gangs indicate the most frequent offense to be drugs, followed by weapons, extortion (with violence), assault, theft (with violence), threats (with violence), (attempted) murder, money laundering, arson, membership of a criminal organization, deprivation of liberty, and public violence (Blokeland et al., 2019; Deuren et al., 2022a, 2022b, 2022c).

The opportunity structure for individual deviance as suggested in Figure 2 was offender status and resource access. The status derived from the platform of Satudarah with its fear capital. While fear capital in the motive dimension is desired, fear capital in the opportunity dimension is explored and exploited. Fear capital is power that individuals and groups possess by acting on others' fear of reprisals, reactions, or actions from those individuals or groups. In management literature generally, fear is a topic. For example, "Machiavelli asserted that wise leaders want to be liked and feared by people" (Dion, 2020: 1032). Fear is an unpleasant, distressing, strain-causing, and debilitating emotional state caused by uncertainty and the threat of suffering, harms, danger, and death. Threat is a communicated expression of intention to create fear of negative consequences for the target. Fear capital is used to "strengthen their criminal status" (Poppi and Ardila, 2023: 415), where status refers to an individual's social rank within a formal or informal hierarchy, or the person's relative standing along a valued social dimension. Status is the extent to which an individual is respected and admired by others, and status is the outcome of a subjective assessment process (McClean et al., 2018). Status is a "socioemotional" resource that refers to "one's standing in, and identification with, a group" (Tyskbo and Wikhamn, 2023: 687). High-status individuals enjoy greater respect and deference from, as well as power and influence over, those who are positioned lower in the social hierarchy (Kakkar et al., 2020: 532):

> Status is a property that rests in the eyes of others and is conferred to individuals who are deemed to have a higher rank or social standing in a pecking order based on a mutually valued set of social attributes. Higher social status or rank grants its holder a host of tangible benefits in both professional and personal domains. For instance, high-status actors are sought by groups for advice, are paid higher, receive unsolicited help, and are credited disproportionately in joint tasks. In innumerable ways, our social ecosystem consistently rewards those with high status.

Access to resources is part of the opportunity structure in Figure 2. The resource is violence capital and fear capital where the two are linked to each other. A resource is an enabler to get something done. The Satudarah resource of violence causing fear enables access to territories such as a nightclub where those charged with security in the nightclub simply stepped aside when they see people from the gang approaching the nightclub. This was obvious in the surveillance videos from the nightclub that were shown in court. The resource of violence causing fear also enabled profit sharing with those trading in illegal goods and services.

A resource is an enabler applied and used to satisfy human and organizational needs. Fear capital is a resource of value. Other gang members are a resource off value. A resource has utility and limited availability. Satudarah people have in their context usually access to resources that are valuable (application of the resource provides desired outcome), unique (very few have access to the resource), not imitable (resource cannot be copied), not transferrable (resource cannot be released from context), combinable with other resources (results in better outcome), exploitable (possible to apply in criminal activities), and not

substitutable (cannot be replaced by a different resource). According to Petrocelli et al. (2003), access to resources equates access to power.

The criminal market structure is also part of the opportunity structure characterized by collapse in Figure 2. Satudarah does its business in markets with crime forces. Collapse represents a convenient situation for those motivated for crime (Chang et al., 2005). In many illegal markets, there are cartels that regulate the supply side. Cartel members agree not only on market division but also on prices to various customers (Goncharov and Peter, 2019). Satudarah in Norway was working its way into cartels (Blekkerud, 2024; Khan-Østrem, 2023; Mjaaland, 2023; Mohr, 2023; Pedersen, 2023; Pedersen and Bones, 2023a, 2023b; Stensaas et al., 2023; Stolt-Nielsen and Lysberg, 2023; Zachariassen, 2023).

Learning from others seems to be the main trigger for willingness to commit organized crime as illustrated in Figure 2. The offender mind is a result of personal differential association as suggested by Sutherland (1983). The differential association perspective suggests that offenders make a choice where they associate with those who agree with them, and distance themselves from those who disagree. This perspective suggests that whether individuals engage in crime depends on their socialization within certain peer groups. In an outlaw biker setting, interactions with deviant others promote criminal activity. The essence of differential association is that criminal behavior is learned, and the main part of learning comes from within important personal groups. Exposure to the attitudes of members of the organization that either favor or reject legal codes influences the attitudes of the individual. The individual will go on to commit crime when the person exposes himself or herself more to attitudes that favor law violation than to attitudes that favor abiding the law (Wood and Alleyne, 2010). Learning from others is an active process. Differential association can occur in the organizational setting but does not as such increase the organizational opportunity to commit crime. Rather, differential association belongs to the behavioral dimension of convenience theory, as crime learning makes it more convenient to favor law violation. Differential association by individuals can occur outside the organizational setting, such as exposure to law-violation attitudes early in life, exposure to law-violation attitudes over a prolonged period in different situations, and exposure to law-violation attitudes from people they like and respect. Once the appropriate attitudes have developed, young people learn the skills of criminality in much the same way as they would learn any other skills, which is by example and training (Wood and Alleyne, 2010).

5. Discussion

Members of outlaw biker gangs such as Satudarah are responsible for deviance in the form of violence, threats, weapons, extortion, theft, assault, and drugs. Most of them are convicted criminals. Violence against the police gave separate batch on the vest. Their motivation includes power and influence in the perceived gangster paradise. Their opportunity includes access to resources such as backup from other countries. They possess fear capital that is an unpleasant, distressing, stain-causing, and debilitating emotional state caused by uncertainty and the threat of suffering, harm, danger, and death. Assault refers to the act of causing physical harm or unwanted physical contact with another person. The attractiveness of a brotherhood leads to differential association where deviance is learned.

Among fourteen propositions in the theory of convenience, this research identified six propositions as relevant to Satudarah membership in Norway: personal venture and gang ambition as motives, offender status, resource access, and market collapse as opportunities, and learning by differential association as choice attitude.

When listening to the defendants in court, they were willing to explain themselves about their behavior, but they were not willing to answer questions about Satudarah. Just to illustrate the typical day in court, Friday, November 4 is presented here. The last defendant (7) was to testify and so was a police officer who was first on the scene at the nightclub. The judge stated: Then everyone is in place. Keep going until lunch. Suleman, you have the right not to explain yourself, also because your brother is being prosecuted as well. Suleman wanted to testify.

-I was scared when I was questioned by the police, so I gave the police a false statement. I said I was not present. I was at home that day, was picked up by my brother, then we drove to Lillestrøm. There were five of us in the car. Everything just happened suddenly. Saw a shirtless man. I ended up in the middle of the push. I fell, and then I kicked someone. I saw Muse run into the cluster of people. I tried to remove Muse from my brother. But I was just pushed away.
-Why were you picked up by your brother? The judge asked.
-Had no plans, just going out on a trip.
-Who drove the car?
-Kayam.
-I saw someone push away the security guards at the nightclub Solsiden. I heard someone screaming.
-You went in even though you experienced the situation as threatening, why? The judge asked.
-I cannot remember that. I grabbed people to keep me from falling. I cannot remember who it was. I had a bottle in my hand: A vodka bottle. I lost the bottle, inside the nightclub. I do not know what happened to the bottle, don't know if it broke. It was not my intention to hit anyone. I just did it. I kicked in response. I hit a hand. Then I was pushed away again. I had kicked twice. I saw Muse holding Khayam by the arm and head and hitting him. There were several strokes. Khayam tried to get away. Someone intervened and got Khayam out of the situation. All five of us left there together. I saw nothing more of Khayam that night.
-This case is about violence against Muse and against Raisi. Did you know them from before?
-No.
-Do you know all the other defendants?
-Yes.
-What can you tell me about Satudarah?
-No comment on that.
-Is Satudarah something you have heard about?
-I have no comment to that.
-Why did you bring a bottle of vodka in?
-Everything went so fast.
-Are you a member of Satudarah? Now we are going to show a contract. We see that it is "prospect" and relative Usman. It was signed in November 2022. Membership requirements cover a whole page. Have the police found any Satudarah effects at your place?
-No.
-Have you previously been convicted?
-Yes, for robbery ten years ago. No jail time after that.
Suleman Saeed Ahmed, 33 years old, defendant 7, completed his testimony. The judge thanked him and announced a break. After the break, the police officer who was first on the scene took a seat in the witness box. He was head of special efforts against criminal networks in the Lillestrøm area. While he was on another assignment late at night, he received a report of mass fight at the nightclub. The report said a bunch of foreigners.
-There was an injured person lying on the floor in only his underwear. All the perpetrators had run from the scene. Muse was loud, always problematic, and had to be removed. There is a known conflict with Muse in Young Guns and Satudarah. Special operations in Oslo police were notified. He who was lying injured on the ground was Raisi. We gained access to video and recognized several from Satudarah, including Akhtari. Khayam Akhtar was identified. Satudarah Oslo became visible in 2020, not always in uniform, acting as if they are in charge in nightclubs. They are often in Lillestrøm. Threaten security guards who become passive in their approach. Satudarah has a need to distinguish itself and consolidate their position in criminal markets. They have spent a lot of time acquiring violence capital and fear capital. Members pose with guns in photos in social media. They have a reputation of being very violent.

Many famous events can be assigned to Satudarah, such as Klingenberg Street and Solsiden. Many gang incidents have never reached the public domain.
-What is fear capital used for?
-To decide: Territories, drug trafficking. Khayam Akhtar was formerly Young Guns. He went out in bad standing. He now has a number of conflicts with, among others, Chaudrew Kadri. Muse has a low threshold to resort to violence, both at Satudarah and Young Guns. The two who were shot in Klingenberg Street are central to the Young Guns community. Faruq escaped to Italy. All Satudarah members have convictions. A few have motorbikes. Some don't even have a driving license.
-How many people are in Young Guns?
-It is tempting to say there is a core of 10 to 20 people.
-Satudarah could probably mobilize more people at that time. They have or had a clubhouse at Bjørkelangen.
-The history of Muse and violence is long, but only when he is intoxicated. When he's sober, he's perfectly fine.
The police officer had finished his testimony, and the judge thanked him. The judge said that it was now time to close the session early for the day. It was only noon, no lunch, and the trial would continue the following Tuesday.
In conclusion, the six identified convenience propositions in this research – personal venture and gang ambition as motives, offender status, resource access, and market collapse as opportunities, and learning by differential association as choice attitude – can be addressed in future research in terms of actions relevant to reduce convenience.

6. Conclusion, limitations, and future research

In this exploratory research, convenience theory with its fourteen propositions was applied to primary and secondary information sources to identify relevant propositions that might be explored in future research. The six identified convenience propositions – personal venture and gang ambition as motives, offender status, resource access, and market collapse as opportunities, and learning by differential association as choice attitude – can be addressed in future research in terms of actions relevant to reduce convenience. Convenience theory is a crime-as-a-choice theory where reduced attractiveness of illegitimate activities relative to legitimate activities might cause greater degrees of compliance and conformance by individual members and outlaw gangs. No study is without limitations, as is the case with this exploratory study which relies on a qualitative, single country empirical setting. Future research should expand the data collection to a wider group to explore further the value of applying convenience theory within crime-of-choice contexts. Deviant behaviors of motorcycle gangs in Europe are indeed a growing threat to society.

The study shows that convenience theory is a crime-as-a-choice theory where reduced attractiveness of illegitimate activities relative to legitimate activities might cause greater a extent of compliance and conformance by individual members and outlaw gangs. This research is important, as reduced convenience will reduce the attractiveness and in turn lead to less extent of outlaw motorcycle gang members' deviance in society. Simply stated, you cannot fight something you do not understand, and you cannot fight someone you do not understand.

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Slowing Down to Sustain: Exploring Slow Work and Well-Being Among Preschool Staff in Iceland

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Abstract

This study explores how the philosophy of slow work contributes to well-being and job satisfaction among preschool staff in Iceland. In light of increasing concerns about burnout and the fast-paced nature of educational environments, this study explores how educators understand and apply principles of slow work in their daily practices and the resulting outcomes. Drawing on ten semi-structured interviews with preschool employees participating in a slow work initiative, the research adopts a qualitative, interpretivist approach to capture lived experiences and organizational transformations. The findings reveal three interconnected themes, reflecting three levels of impact: intrapersonal perspective (personal transformation and professional well-being), intrapersonal perspective (creating calm and meaningful work rhythms), , and organization-wide perspective: slow work and organizational culture. Results indicate that slow work fosters psychological balance,

enhances focus, and promotes collective mindfulness, leading to improved well-being and stronger workplace cohesion. The study situates these insights within the Job Demands–Resources model and flow theory, highlighting slow work as a viable strategy for sustainable performance and organizational health in education. Implications include the need for leadership modeling, environmental support, and shared cultural language to sustain slow work practices.

Keywords: slow work; well-being; burnout prevention; preschool education

1. Introduction

Speed has become a defining characteristic of modern society and economic progress, and technological advances have created unprecedented opportunities, streamlined communication, and enhanced access to knowledge. Yet, alongside these benefits, projectification of environment demands for constant availability, rapid responses, and continuous connectivity, placing significant pressure on employees and workplaces (Minelgaite & Hinriksdóttir, 2022). The acceleration of work life often comes at the expense of well-being, reflection, and quality. As the World Health Organization (2010) notes, a truly healthy work environment must account not only for physical safety and efficiency but also for psychological and social dimensions that promote holistic well-being (Gudmundsdottir, Minelgaite, Gudmundsdottir, Leupold & Snorradóttir, 2021). In recent years, discussions around employee burnout have intensified both globally and in Iceland. A nationwide study by VIRK (2025) reported that one-quarter of Icelandic employees are at considerable risk of burnout mirroring global estimates of around 20% (De Hert, 2020). Similarly, Gallup's State of the Global Workplace report (2024) revealed that 41% of employees experience high levels of daily stress. OECD (2024) identifies excessive demands, insufficient resources, and limited autonomy as major contributors to burnout, while Moss (2021) highlights the escalating health burden of chronic work-related stress. These findings suggest that employee well-being and sustainable work practices are now pressing organizational challenges rather than individual concerns.

Among professions, teachers and particularly preschool educators are increasingly vulnerable to burnout (Sigursteinsdóttir, 2023; Einarsdóttir et al., 2019). Preschools, ideally nurturing spaces for children's growth and curiosity, have become sites of escalating work pressure, staff shortages, and emotional exhaustion. Although research has identified several factors influencing burnout, efforts to mitigate its effects have proven difficult (Demerouti et al., 2021). As Gunnarsdóttir (2023) emphasizes, prevention requires a comprehensive and proactive approach involving leadership commitment and collective participation. Within this context, organizations are increasingly seeking strategies that foster psychological balance and sustainable performance (Nielsen et al., 2017). According to the World Economic Forum (2025), 64% of organizations now consider employee well-being a key factor in attracting and retaining talent, and half plan to restructure work arrangements to promote flexibility and balance.

In this broader discussion, the concept of slow work has emerged as a promising approach to counteract the culture of haste. Rooted in the wider slow movement, which began with the Italian *slow food* movement in the late twentieth century (Foreword, 2003; Parkins & Craig, 2006), slow

work emphasizes quality, reflection, and presence over speed and volume. It advocates for mindful engagement, reduced multitasking, and deliberate pacing that prioritizes depth of thought and creativity (Silvestre et al., 2024). Rather than equating productivity with busyness, slow work reframes efficiency as the ability to produce meaningful, high-quality outcomes while maintaining balance and well-being. Studies have shown that such approaches can reduce stress, enhance concentration, and improve both psychological and physical health (De Bruin & Dupuis, 2004; Lamb, 2019).

Despite increasing global attention to workplace well-being, the application of slow work principles remains underexplored, particularly in educational contexts. Preschools represent an especially relevant environment for studying slow work, as these institutions operate at the intersection of care, education, and emotional labor. The preschool environment demands both professional sensitivity and sustained attention qualities that can be undermined by excessive workload and constant acceleration. Understanding how educators experience and practice slow work in preschool environment can therefore provide valuable insight into how organizations, particularly in education sector, may cultivate healthier, more balanced, and sustainable work environments.

The present study explores how the philosophy of slow work is understood and implemented among preschool staff in Iceland. It examines how slow work manifests in daily practices, how it influences well-being and job satisfaction, and what strategies employees use to integrate its principles into their work.

2. Literature review

The concept of slow work originates from the broader slow movement, which began in Italy in the late twentieth century as a cultural response to industrialization and acceleration. The movement's catalyst was Carlo Petrini's protest against a McDonald's restaurant near the Spanish Steps in Rome, leading to the founding of the slow food movement (Foreword, 2003). This act symbolized resistance to the culture of haste and the loss of connection to tradition, community, and quality. From this foundation, multiple related movements emerged, including slow living, slow cities, slow fashion, and slow journalism (Parkins & Craig, 2006; Legere & Kang, 2020; Le Masurier, 2015; Miele, 2008). Across these domains, the slow movement emphasizes deliberate living, mindfulness, and quality over quantity.

Applied to organisational environment, slow work challenges the prevailing paradigm of speed, multitasking, and continuous productivity. Honoré (2004) argued that slowing down does not mean doing less, but rather doing things better focusing on depth, connection, and creativity. Silvestre et al. (2024) define slow work as a conscious and intentional approach to labor that values presence and balance, encouraging individuals to engage deeply with their tasks while reducing unnecessary haste and cognitive overload. This approach aligns with research demonstrating that mindful and paced work can lower stress levels, enhance job satisfaction, and improve creative performance (De Bruin & Dupuis, 2004; Lamb, 2019). By encouraging reflection and pacing, slow work fosters a sustainable rhythm that can protect against burnout while supporting long-term motivation and engagement. The slow work philosophy is particularly relevant in contemporary

organizations facing rising levels of stress and burnout. Sull et al. (2022) describe a "toxic culture of speed" in which performance is conflated with constant availability. In contrast, slow work introduces a human-centered perspective emphasizing recovery, rest, and meaningful engagement elements that modern workplaces often neglect (Silvestre et al., 2024). By reframing productivity as quality of effort rather than quantity of output, slow work offers a model for sustainable performance that complements contemporary well-being frameworks.

The World Health Organization (2019) defines burnout as a syndrome resulting from chronic workplace stress that has not been successfully managed, characterized by exhaustion, cynicism, and reduced professional efficacy. It is associated with high workloads, role ambiguity, and limited autonomy (Bianchi & Schonfeld, 2023; Demerouti et al., 2021). Burnout leads to increased absenteeism, lower organizational commitment, and decreased productivity (Spector, 1997; Gunnarsdóttir, 2023). Research also highlights the emotional toll of burnout in care-oriented professions such as teaching and healthcare, where interpersonal demands are especially intense (Maslach et al., 2001; Sigursteinsdóttir, 2023). Icelandic studies mirror these global trends. VIRK (2025) found that over 12% of Icelandic employees are at high risk of burnout, and another 13% face moderate risk. Teachers and preschool staff are among the most affected groups, with more than one-third reporting severe burnout symptoms (Garðarsdóttir et al., 2024). High emotional demands, limited resources, and time pressure are key contributors to this pattern (Sigursteinsdóttir & Rafnsdóttir, 2022). These conditions make early education a critical site for exploring alternative organizational models that support psychological well-being.

Conversely, job satisfaction defined as the positive emotional response to one's job or work environment (Locke, 1976; Weiss & Brief, 2001) is a protective factor against burnout. Employees who experience autonomy, recognition, and alignment between personal values and organizational culture report greater satisfaction and commitment (Wright, 2006; Vilhjálmsdóttir & Gustavsdóttir, 1999). Job satisfaction is also positively related to well-being, motivation, and quality of performance (Allan et al., 2019; Kim & Beehr, 2018). Within educational settings, job satisfaction has been closely linked to teachers' perceived sense of purpose and connection with students (Jónsdóttir & Coleman, 2014). In this light, slow work can be viewed as both a preventive and restorative approach to burnout. By prioritizing depth and meaning, slow work encourages employees to reconnect with intrinsic motivation and purpose, thereby reinforcing job satisfaction. Research suggests that slower, more mindful work rhythms may also improve interpersonal relationships and overall workplace climate (Reina et al., 2023). Thus, slow work not only addresses the symptoms of burnout but also fosters conditions that enhance engagement, autonomy, and collective well-being.

The Job Demands–Resources (JD-R) model (Demerouti et al., 2001) provides a useful theoretical framework for understanding how slow work can influence well-being and performance. The model posits that every occupation has specific demands (e.g., workload, time pressure, emotional labor) and resources (e.g., social support, autonomy, skill variety) that interact to affect employee motivation and strain. When job demands exceed available resources, employees experience stress and potential burnout. Conversely, sufficient resources can buffer the negative impact of high demands and promote engagement. Later refinements of the model distinguish between hindrance

demands (obstacles that impede performance) and challenge demands (stimuli that encourage growth and learning) (Bakker & Sanz-Vergel, 2013). Within this framework, slow work can be understood as a process that reduces hindrance demands such as multitasking and time pressure while enhancing job resources, including autonomy, focus, and social support. By consciously slowing work pace, employees create psychological space for reflection, collaboration, and self-regulation, which in turn support engagement and creativity (Berg & Seeber, 2016; Silvestre et al., 2024). Gunnarsdóttir's (2021) model of well-being and performance builds on the JD-R approach by emphasizing the interplay between support and accountability. Her model suggests that empowerment and shared responsibility within clear professional boundaries enhance well-being and effectiveness. When employees are given both freedom and structure, they are more capable of managing demands sustainably. This balance aligns closely with the ethos of slow work, which integrates self-awareness and professional integrity into daily routines.

Slow work also intersects with flow theory (Csikszentmihalyi, 1990), which describes the psychological state of complete absorption in an activity where skill and challenge are balanced. Both frameworks emphasize engagement and intrinsic motivation. Slow work cultivates the environmental and psychological conditions necessary for flow by minimizing distractions and enabling employees to focus deeply on meaningful tasks (Nakamura & Csikszentmihalyi, 2014). In preschool contexts, where relational and cognitive demands are high, creating space for flow through slow work may enhance both employee satisfaction and the quality of pedagogical interactions. Although the slow movement has gained attention across diverse fields, empirical research on slow work within organizational and educational settings remains limited (Silvestre et al., 2024). Most existing studies focus on lifestyle choices or macro-level sustainability, with few exploring the practical implications for day-to-day work and well-being. In Icelandic contexts, where issues of stress, gendered work cultures, and long working hours are prominent while attributing personal life high priority (Júlíusdóttir et al., 2018; Minelgaite, Guðmundsdóttir, Guðmundsdóttir & Stangej, 2018), understanding how slow work principles can be meaningfully integrated into institutions like preschools is both timely and significant. By situating slow work within the JD-R framework and connecting it to concepts of flow, burnout, and job satisfaction, this study addresses a critical gap in the literature. It explores how slow work is experienced by preschool staff, how it influences well-being and professional identity, and how its principles can be operationalized in everyday practice.

3. Method

This study adopted a qualitative research design to explore how preschool staff in Iceland experience and implement the principles of slow work. Given the study's focus on subjective perceptions, meanings, and lived experiences, qualitative inquiry provided an appropriate framework for capturing depth and nuance (Merriam, 2009; Esterberg, 2002). The purpose was to gain insight into how employees interpret slow work in practice, how it affects their well-being and job satisfaction, and what strategies they use to sustain slower, more mindful approaches in their daily routines.

The research was situated within an interpretivist paradigm, recognizing that participants construct meaning through their social and professional contexts (Gichuru, 2017). Semi-structured

interviews were used to facilitate open dialogue, allowing participants to reflect on their own experiences while enabling the researcher to probe emerging ideas and clarify meaning. This approach supported a flexible yet systematic exploration of the central research questions (Merriam, 2009).

The study involved ten participants employed at an Icelandic preschool that had implemented a development project focused on slow work. Participants were selected using purposive sampling, a strategy that identifies individuals with specific knowledge or experience relevant to the research topic (Merriam, 2009). All participants had engaged with the slow work initiative to varying degrees, either through direct involvement in its implementation or through daily experience of its effects. The sample included both teaching and support staff, representing diverse roles, tenures, and educational backgrounds to ensure variation in perspectives.

To maintain confidentiality and protect participants' identities, all names were anonymized. In the presentation of results, participants are referred to as Participant 1 through Participant 10. Personal identifiers were removed, and the data were treated in accordance with standard ethical research practices. Data was collected through semi-structured interviews, each lasting approximately 30 minutes. Interviews were conducted between February and April 2025, either at the participants' workplace or in a private setting chosen for their comfort. Each interview followed a predefined guide aligned with the study's research questions but allowed for flexibility in order and emphasis depending on participants' responses. This structure ensured that all major topics, manifestations of slow work, perceived impacts on well-being and job satisfaction, and strategies for implementation were addressed while leaving room for elaboration and personal narratives.

All interviews were audio-recorded with participants' consent and subsequently transcribed verbatim. Throughout the data collection process, reflective notes were taken documenting initial impressions, emotions, and analytical thoughts. These notes later supported the interpretive depth of the analysis. Participants were informed about the study's purpose, voluntary nature, and confidentiality procedures before each interview commenced. The researchers had no prior relationship with the preschool, which reduced potential role-related influence during interviews. Interview transcripts were anonymized before coding, with names and contextual identifiers removed to prevent linking responses to specific individuals or settings. These steps helped mitigate bias and preserve participant confidentiality.

A thematic analysis approach was used following Braun and Clarke's (2006) framework. Transcripts were read repeatedly for familiarization, and initial inductive codes were generated. Coding and theme development were carried out and revisited to ensure consistency and coherence. Codes were then grouped into broader themes through an iterative process in which emerging patterns were continually reviewed against the raw data. Theme saturation was assessed by confirming that no new meaningful categories appeared in the later stages of coding. Finally, given the interpretivist orientation of the study, the researcher's potential influence on data collection and interpretation was acknowledged throughout the process.

4. Results

Research data analysis led to emergence of three interrelated themes, corresponding to different levels of impact and (organizational) outcomes, as a result of slow work project introduction to the workplace of participants. Namely, three emerged themes relate to changes in intrapersonal, interpersonal and organization-wide impacts. Intrapersonal perspective reflects transformation that participants observed within themselves; interpersonal perspective highlights change that have been noticed when looking at changed ways og co-functioning with other members of pre-school (colleagues, as well as children). The third level – organization-wide changes identify transformations that have been observed in regard to organizational culture.

4.1 Intrapersonal perspective: Transformation and Professional Well-Being

The first theme reflects participants' personal and emotional responses to adopting slow work practices. Most described the experience as transformative, noting improvements in both psychological and physical well-being. Initially, some viewed the project with skepticism, perceiving it as an abstract management trend. However, over time they realized it required active reflection and conscious behavioral change. Participants reported greater self-awareness and a stronger sense of agency in managing stress.

Participants frequently mentioned that slow work helped them regulate their emotional states and respond more calmly to challenges. Several noted that their stress levels had decreased and that they felt more capable of maintaining focus throughout the day. Participant 2 observed:

"At first, I thought it was just another idea we'd talk about and forget. But when I started paying attention to my breathing and pace, I realized it was changing how I worked and how I felt."

Others described tangible health improvements, such as reduced fatigue and fewer stress symptoms. They also reported taking more frequent pauses to reflect, breathe, or simply observe the environment. Participant 5 noted:

"I used to go home completely drained. Now I feel I still have energy left after work I'm calmer and more present with my family."

Participants also emphasized that slow work led to a redefinition of what it means to perform well. Instead of equating speed with competence, they began to associate professional quality with mindfulness, focus, and human connection. Participant 8 expressed this shift succinctly:

"I've learned that being busy doesn't mean being good at your job. Being truly present is what matters for the children, for colleagues, and for yourself."

This theme highlights that slow work functioned as both a personal and professional intervention. By fostering mindfulness and self-regulation, it allowed employees to recover a sense of control, meaning, and satisfaction in their work. The benefits extended beyond the workplace, contributing to improved balance, self-care, and emotional resilience in participants' personal lives.

4.2 Interpersonal perspective: Creating Calm and Meaningful Work Rhythms

Participants described the introduction of slow work as a turning point that altered the tempo and quality of daily routines, especially when in collaboration or when needed to achieve certain result with others. Before the slow work project introduction, participants' workdays were dominated by constant activity, time pressure, and sensory overload. Simple transitions such as helping children dress, organizing meals, or preparing for rest were identified as particularly stressful. Through the systematic introduction of slow work principles, staff restructured these moments to prioritize calmness, patience, and presence. Many participants emphasized that these small structural changes, such as taking fewer children into dressing areas at a time or adopting flexible mealtimes, significantly reduced stress. These changes also provided opportunities for deeper interaction and emotional connection with the children. The transformation was described not as a reduction in productivity but as an improvement in focus and quality. Participant 1 reflected on this shift:

"It used to be stressful I felt I had to rush every child. Now I see it as a moment to connect, not just to get things done. The children get to try for themselves, and it all feels calmer."

Others noted that the atmosphere of intrapersonal communications became quieter and more cohesive. Staff perceived that when they slowed their pace, the children mirrored that behavior, creating a self-reinforcing sense of calm. Participant 4 explained:

"We're not rushing anymore, and the children sense that. When we slow down, they relax too, and the whole day flows better."

Participants also observed that slowing down encouraged them to focus on quality rather than speed when working together. Many described feeling more deliberate and in control, which improved both performance and satisfaction. Participant 6 summarized this new awareness:

"Everything still gets done but now it happens with more intention, and that makes all the difference."

Overall, this theme illustrates that slow work created a calmer and more socially sustainable work rhythm. Participants experienced reduced tension, better concentration, and a renewed sense of meaning in their daily routines, which benefited both staff and children.

4.3 Organization-wide perspective: Slow Work and Organizational Culture

The third theme captures how slow work evolved from an individual practice into a shared cultural framework within the preschool. Over time, the concept of slow work became a collective reference point in everyday communication, shaping how employees interacted and collaborated as a result of altered organizational culture. The phrase "*that's not very slow work*" emerged as a gentle, nonjudgmental cue that staff used to acknowledge stress or excessive haste in the environment. Participant 3 described how this language promoted mutual awareness:

"When someone says, 'There's not much slow work happening here today,' everyone understands. It's not criticism it's a reminder that we can pause and reset."

This shared vocabulary contributed to psychological safety, allowing employees to discuss stress or workload openly without conflict. It also helped to normalize self-care and collective responsibility for maintaining calm. Participants frequently mentioned that leadership support played a crucial role in sustaining this culture. Managers who modeled slow work behaviors such as taking breaks, listening attentively, and encouraging reflection were seen as instrumental in embedding these values. Participant 10 reflected:

"Our leaders don't just talk about slow work; they live it. That's what makes it real for everyone else."

Environmental and social changes reinforced this cultural shift. Noise reduction, simplified spaces, and the reorganization of staff areas fostered a more serene atmosphere. Staff interactions also became more collegial and collaborative, with informal conversations and shared reflection replacing hurried exchanges. Participants noted that these improvements extended beyond internal dynamics; communication with parents and external stakeholders became more thoughtful and empathetic. As Participant 7 observed:

"You can feel the difference in the whole organization, it's calmer, kinder, and more connected."

This theme demonstrates that the success of slow work depends not only on individual adoption but also on shared norms and supportive leadership. When embraced collectively, slow work becomes part of the organizational identity, shaping both work practices and relationships in sustainable ways.

5. Discussion

This study explored how preschool staff in Iceland experienced the implementation of slow work and how it influenced their well-being, job satisfaction, and workplace culture. The findings revealed that slow work reshaped the pace, rhythm, and emotional texture of daily life in preschool. The three key themes that emerged from research data correspond to different levels (intrapersonal, interpersonal, organization-wide) of impact that slow work project had on employees of researched organization. This finding, in line with existing literature on change management, suggests that

effective and sustained organizational change can only happen when all levels within organization are addressed (Cameron & Green, 2019). Specifically, above-mentioned three perspectives of impact manifested as: personal transformation and professional well-being (intrapersonal perspective), creating calm and meaningful work rhythms (intrapersonal perspective), , and embedment of slow work in organizational culture (organization-wide perspective) demonstrate that slow work operates as both a personal and collective process. It alters how individuals perceive their work, interact with others, and define professional success. The first theme illustrates that slow work acted as a countermeasure to the chronic acceleration characterizing modern educational environments. Participants described previous conditions of multitasking, time pressure, and sensory overload factors commonly associated with burnout (Maslach et al., 2001; Demerouti et al., 2021). The reorganization of routines around calmness, presence, and flexibility reduced psychological strain and increased focus. These outcomes align with the principles of the Job Demands–Resources (JD-R) model (Demerouti et al., 2001), which posits that when employees experience fewer hindrance demands such as excessive workload and time pressure and greater job resources such as autonomy and supportive communication their engagement and well-being improve.

By introducing slow work practices, the preschool effectively reduced hindrance demands and strengthened resources that nurture energy and engagement. The calmer, more deliberate workflow described by participants demonstrates how simple structural adjustments such as smaller groups and flexible scheduling, can yield meaningful well-being outcomes. These findings are consistent with prior research showing that restructured work rhythms can enhance concentration, performance, and psychological recovery (Sonnentag & Natter, 2004; Silvestre et al., 2024). Moreover, the experience of increased calm and connection suggests that slow work may contribute to *preventive well-being strategies* in education, where stress and emotional exhaustion are prevalent (Hjördís Sigursteinsdóttir, 2023; Ragna Benedikta Garðarsdóttir et al., 2024). By reframing work as an intentional and reflective process rather than a continuous rush, slow work supports a sustainable professional rhythm that benefits both educators and the children in their care.

The second theme revealed that participants experienced slow work as a process of self-reflection and transformation. They described becoming more conscious of their emotional states, learning to pause, and redefining productivity as presence rather than speed. This personal dimension reflects the psychological resources identified in the JD-R model, such as self-efficacy, mindfulness, and purpose, which buffer the effects of stress and enhance motivation (Bakker & Sanz-Vergel, 2013). Slow work encouraged staff to develop greater self-regulation the ability to manage emotional and cognitive responses under pressure, which is known to be essential for long-term well-being (Ryan & Deci, 2000). Participants reported feeling calmer, more patient, and more balanced both at work and in their personal lives. These outcomes are consistent with studies demonstrating that mindfulness-based approaches can reduce stress, improve resilience, and strengthen emotional intelligence in professional settings (Reina et al., 2023; Berg & Seeber, 2016). A key insight from this study is that slow work fostered a shift in professional identity. Participants began to view themselves not as task performers but as facilitators of calm and meaningful engagement. This reconceptualization parallels the idea of meaningful work that aligns personal values with professional purpose (Allan et al., 2019). Teachers in this study found that slowing down allowed them to reconnect with the deeper purpose of their profession: nurturing children's growth and well-

being. This transformation suggests that slow work can enhance intrinsic motivation by fostering alignment between individual purpose and organizational goals. Moreover, the emotional and physical benefits described by participants support existing evidence that work pacing and recovery influence health outcomes. Regular opportunities for rest and reflection reduce fatigue and support energy renewal (Sonnentag & Natter, 2004). Participants' descriptions of feeling "less drained" and "more present" exemplify the positive cycle of resource gain predicted by the JD-R model where increased well-being enhances engagement, which in turn reinforces well-being.

The third theme demonstrates that slow work achieved its full potential only when it became a shared cultural value. Over time, staff developed a collective language and understanding of slow work, using it as a gentle mechanism for feedback and emotional regulation. This collective adoption transformed slow work from a personal coping strategy into an organizational ethos. The creation of shared norms and open dialogue aligns with research on psychological safety the belief that employees can express concerns and needs without fear of judgment (Edmondson, 1999). By normalizing discussions about pace and stress, the organization fostered a culture of care and cooperation. Participants' use of the term "slow work" as shorthand for mindfulness and respect indicates a linguistic embedding of well-being principles into everyday practice. This cultural integration echoes Sigrún Gunnarsdóttir's (2021) model of well-being and performance, which emphasizes the balance between empowerment and accountability. Leadership support identified by participants as essential provided legitimacy and continuity, ensuring that slow work was not perceived as optional self-care but as a professional norm. The collective adoption of slow work also reflects elements of flow theory (Csikszentmihalyi, 1990; Nakamura & Csikszentmihalyi, 2014). Flow arises when individuals engage deeply in activities where challenge and skill are in balance. By reducing distractions and pressure, slow work created conditions conducive to flow, allowing educators to focus more completely on their interactions with children and colleagues. Participants' descriptions of "days that flow better" suggest an experiential state of absorption and satisfaction consistent with this theory. Thus, the cultural embedding of slow work fostered both individual engagement and collective harmony.

The findings hold several implications for educational and organizational practice. First, the success of slow work in reducing stress and enhancing satisfaction indicates that well-being initiatives can be embedded into everyday routines rather than introduced as separate interventions. Simple structural adjustments such as staggered schedules, smaller group sizes, or reflective pauses can create measurable psychological benefits. Second, the study underscores the importance of leadership modeling. When leaders demonstrate calm, prioritize well-being, and reinforce balance, employees are more likely to internalize these values (Nielsen et al., 2017). Leadership training that integrates slow work principles could thus enhance organizational health and retention, particularly in care and education sectors prone to burnout. Third, slow work highlights the potential for language and communication to shape culture. Shared terms and metaphors that frame well-being as a collective responsibility can normalize healthy work habits and improve team cohesion. The use of "slow work" as a shared reference point demonstrates how discourse can function as a soft control mechanism, aligning individual behaviour with collective values. Finally, this study suggests that workplace design and environment play an integral role in

supporting slow work. Attention to acoustic comfort, spatial organization, and aesthetic calmness reinforces psychological well-being (Vischer, 2007). The results indicate that in this preschool, environmental changes helped reinforce a cultural shift, indicating to staff that calm, and quality were areas of focus. Although the study offers valuable insights, several limitations should be acknowledged. The research was conducted in a single preschool, which limits the generalizability of findings. Participants were selected based on their involvement in a slow work development project and may have been more receptive to its principles than a broader sample. This purposive recruitment introduces a risk of positive selection bias and further limits the study's external validity. Additionally, several aspects of the findings are context dependent, particularly those shaped by leadership culture, staffing ratios, and local organizational practices. Other elements such as the emphasis on reflection, pacing, and relational mindfulness may hold relevance beyond this setting. Nonetheless, caution is advised when considering transferability to other educational systems or cultural contexts, where structural conditions and pedagogical norms may differ.

Future research could expand this inquiry by comparing multiple institutions or occupational sectors to examine contextual differences in slow work implementation. Longitudinal studies could explore how sustained slow work practices affect burnout rates, absenteeism, and retention over time. Quantitative approaches might complement qualitative findings by measuring outcomes such as stress biomarkers or job satisfaction indices. Moreover, examining the effects of slow work on children's learning environments and emotional development would provide further insight into its systemic benefits.

6. Conclusion

This study examined how preschool staff in Iceland understood and implemented the philosophy of slow work, and how these practices shaped their well-being, job satisfaction, and workplace culture. Drawing on qualitative interviews with employees engaged in a slow work initiative, the findings showed that slowing the pace of daily routines fostered calmer and more meaningful work rhythms, supported personal transformation and professional well-being, and gradually became embedded in the organizational culture. Interpreted through the lens of the Job Demands–Resources model and flow theory, slow work appeared to reduce hindrance demands such as time pressure and multitasking, while strengthening key resources including autonomy, focus, and relational connection. At the same time, the study highlights that the effects of slow work are closely linked to contextual conditions, including leadership practices, staffing patterns, and local organizational norms. The single-site design, small sample, and purposive recruitment limit the external validity of the findings, and caution is warranted when considering transferability to other educational systems and cultural settings. Nevertheless, the results suggest that slow work offers a promising approach for integrating well-being into everyday practice rather than treating it as a separate intervention. By intentionally restructuring routines, modelling calm and reflective behaviour, and cultivating a shared language around pace and presence, educational organizations may create more sustainable and health-promoting work environments. Future research across multiple sites, sectors, and time frames is needed to further investigate how slow work can be adapted, scaled, and sustained in diverse contexts, and to examine its broader implications for both staff and children.

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Oral Final Exams: Fairness, Anxiety, and Learning

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Abstract
Oral final exams remain an underused yet promising assessment method in higher education. This paper draws on findings from a two-year study at a public Icelandic university, examining how students experience oral exams in terms of anxiety, perceived fairness, and learning outcomes. Based on quantitative survey responses and qualitative reflections, the study explores how factors such as prior experience with oral exams, gender, and perceived anxiety shape students' attitudes and performance. The results indicate that, for many students, the oral format appeared to support deeper learning, encourage reflection, and reduce surface-level memorization. Students also highlighted the value of real-time dialogue and interaction with the examiner, which is especially important in a distance learning environment. However, the format also raised concerns about performance pressure and consistency in evaluation. Although average course grades were higher in the years with the oral exam, this pattern should be interpreted with caution, even if comparable studies have reported similar trends. Given the modest sample sizes and single-course context, the findings are indicative rather than generalizable. Overall, the study suggests that oral exams can serve as a meaningful complement to written assessments when implemented with transparency and pedagogical support. The paper discusses implications for designing oral assessments that are fair, transparent, and supportive of student learning.

Keywords: assessment methods, oral exams, anxiety, higher education, student experience, pedagogy

1. Introduction

Assessment plays a central role in shaping not only how students learn but also what they value in their education (Boud & Falchikov, 2005). In recent years, higher education has placed a growing emphasis on assessment practices that foster key 21st-century competencies, such as transferable skills, higher-order thinking, and the application of knowledge in real-world contexts (Vlachopoulos & Makri, 2024). As learner populations have become increasingly diverse and global challenges more complex, assessment practices in higher education are now evaluated not only for what they measure but also for how they shape the student learning experience (Gibbs & Simpson, 2005; Nallaya et al., 2024).

Traditional written assessments have been criticized for promoting surface learning and failing to capture students' actual abilities, prompting interest in more authentic and inclusive methods (Boud & Falchikov, 2005; Gibbs & Simpson, 2004; Vlachopoulos & Makri, 2024). Among these alternatives, oral exams have regained attention as both a traditional and innovative approach to evaluate student learning (Akimov & Malin, 2020; O'Riordan et al., 2025). Although oral exams historically served as a hallmark of academic rigor and direct engagement (Stray, 2001), contemporary approaches emphasise interaction, equity, and authenticity (McNeill et al., 2024; Nallaya et al., 2024). Oral assessments enable real-time questioning, deeper learning, and immediate feedback, thus addressing key limitations of traditional written formats (Knight, 2002; Mariano et al., 2024; Wiggins, 1989). Recent case studies further demonstrate that

interactive oral assessment can serve as an academically rigorous and authentic alternative that promotes deep engagement and reflective learning across diverse educational settings (Ward et al., 2023).

However, the oral format can induce significant anxiety among students (Akimov & Malin, 2020), and concerns have been raised about its fairness, reliability, and potential bias (Nallaya et al., 2024). As a result, increasing attention is being paid to how oral assessments are designed, implemented, and supported. Recent studies indicate that when appropriate pedagogical support and inclusive practices are in place, interactive oral assessments (IOAs) can reduce anxiety and improve outcomes for diverse student populations, including non-traditional and neurodivergent learners (Krautloher, 2024; O'Riordan et al., 2025).

Recent scholarship further supports the pedagogical shift toward authentic and learning-oriented assessment methods yet also highlights important gaps. Sokhanvar et al. (2021) argue that authentic assessments can enhance engagement, motivation, and employability by situating learning in real-world contexts and requiring students to demonstrate applied understanding. Halkon et al. (2024) similarly show that assessment formats incorporating oral components, such as viva voces and threshold exams, can promote deeper learning, reinforce academic integrity, and increase students' sense of agency. While these studies underscore the potential of interactive oral formats, they focus primarily on pedagogical outcomes rather than students' subjective experiences. Consequently, despite growing interest in oral and interactive assessment, limited empirical research has examined how students experience such formats, particularly in distance-learning settings. A more nuanced understanding of their emotional, cognitive, and practical implications is therefore needed.

This study contributes to this emerging field by examining interactive oral assessment in higher education and its alignment with pedagogical aims of fairness, inclusivity, and learning. Drawing on survey data from an Icelandic university, it addresses the research question:
How do university students experience oral assessment in terms of anxiety, perceptions of fairness, and perceived learning benefits?

2. Literature review

2.1 Traditional vs. authentic assessment in higher education

Assessment in higher education has traditionally relied on written, summative methods such as timed exams and research papers. These forms of assessment are often valued for their efficiency and scalability, particularly in large classes, and are commonly perceived as objective indicators of student achievement. However, scholars have long criticized traditional assessments for promoting surface-level learning and failing to capture students' capacity for higher-order thinking, application, and synthesis (Boud & Falchikov, 2005; Gibbs & Simpson, 2005).

One of the central critiques is that traditional assessments tend to reward memorization and reproduction rather than understanding, creativity, or critical thinking. These limitations have prompted a shift towards more authentic forms of assessment that mirror real-world tasks and require students to demonstrate transferable, applied skills beyond academic settings (Wiggins, 1989). Authentic assessment refers to evaluation methods that require students to apply knowledge and skills in real-world, meaningful contexts, often involving complex tasks, reflections, and problem-solving, rather than rote recall or decontextualised testing. It is grounded in constructivist pedagogy and emphasises performance, reflection, collaboration, and the demonstration of knowledge in context (Shaeri et al., 2021).

A growing body of literature further links authentic assessment to enhanced student motivation, autonomy, and engagement, particularly when it involves collaboration with external organisations or real-world partners (Hjálmarsdóttir & Kristjánsdóttir, 2017). Recent studies also demonstrate strong alignment between authentic assessment and the development of 21st-century competencies, including

communication, adaptability, teamwork, and problem-solving (Vlachopoulos & Makri, 2024). In addition, applied assessment tasks that mirror real-world challenges have been shown to reduce opportunities for academic misconduct while simultaneously fostering employability skills such as critical thinking, communication, and collaboration (Sotiriadou et al., 2019). Scholars have also demonstrated how structured, practice-based learning environments can promote the development of soft skills, including creativity, leadership, and complex problem-solving, through collaborative engagement with authentic tasks (Tigerstedt et al., 2024). Similarly, student-led presentation formats such as webinars have been shown to enhance engagement, ownership of learning, and the development of communication skills, particularly when used both as learning activities and assessment tools (Tigerstedt et al., 2023). These competencies are increasingly seen as essential outcomes of higher education, particularly in rapidly changing social and professional contexts.

Authentic assessments also align with key principles that support learning, such as active engagement, timely feedback, and opportunities for reflection. By emphasising learning processes as well as outcomes, they are more likely than traditional exams to promote deep learning (Gibbs & Simpson, 2005). Authentic, practice-based evaluation is increasingly considered more inclusive and equitable when designed thoughtfully. It allows students to demonstrate their learning in diverse ways and encourages engagement from learners who may not perform well in standardised written formats. Such approaches are particularly beneficial for non-traditional students and those with diverse educational needs, including learners with dyslexia or anxiety (McNeill et al., 2024; Nallaya et al., 2024; Tops et al., 2022). As a result, there is growing institutional and pedagogical interest in broadening the repertoire of assessment practices to better meet the needs of an increasingly diverse student body.

2.2 The pedagogical value of oral assessment

Oral assessment has a long-standing place in academic tradition, particularly in European universities, where viva voce examinations once served as a primary means of evaluating student learning (Stray, 2001). Although its prevalence declined with the rise of written, standardised testing, oral assessment has in recent years been reconsidered as a pedagogically valuable practice, especially within the broader movement toward authentic and inclusive assessment in higher education (McNeill et al., 2024; Nallaya et al., 2024).

From a pedagogical perspective, oral assessment offers several distinct advantages. Unlike written exams, oral formats enable real-time interaction between student and examiner, allowing for immediate clarification, probing questions, and dynamic assessment of understanding. This dialogic nature supports deeper learning by encouraging students to articulate reasoning, apply knowledge, and engage in reflective thinking (Knight, 2002; Wiggins, 1989). Mariano et al. (2024) further note that oral exams can make rote memorisation less central to performance by requiring students to articulate reasoning and demonstrate conceptual understanding. However, the extent to which oral formats reduce recall-based responses depends strongly on the design of the examination and the nature of the questions asked.

The oral format also aligns with principles of constructive alignment (Biggs & Tang, 2011), as it allows educators to assess not only content recall but also higher-order cognitive skills such as synthesis, evaluation, and argumentation. These skills are central to the goals of higher education and closely linked to 21st-century competencies (Vlachopoulos & Makri, 2024). Several studies have also emphasized the potential of oral exams to enhance student motivation and engagement. Akkaraju (2023) reports that students experienced oral assessment as a more meaningful demonstration of mastery and described greater personal investment in their preparation. Hazen and Hamann (2020) similarly found that oral formats can promote accountability and dialogue, while allowing examiners to tailor questions to students' responses and thereby individualize the assessment experience.

However, the pedagogical value of oral assessment depends heavily on thoughtful design and implementation. Without clear criteria, appropriate scaffolding, and examiner training, the format may

introduce inconsistencies or exacerbate performance anxiety (Akimov & Malin, 2020; Nallaya et al., 2024). This suggests that the benefits of oral assessment stem not only from the format itself but from the pedagogical and institutional structures that support it. As such, gaining a deeper understanding of how students experience the oral format in practice remains essential for realizing its potential as an equitable and learning-oriented form of evaluation.

2.3 Student experience: anxiety, fairness, and support

While oral assessment offers notable pedagogical advantages, students´ experience with the format can vary considerably. One of the most frequently reported concerns is performance anxiety, which can be heightened by the immediacy and interpersonal nature of real-time verbal evaluation. Several studies show that oral exams may provoke stronger stress responses than written assessments, partly because students feel less in control over pacing, question sequencing, and the social dynamics of the interaction (Akimov & Malin, 2020; Grieve et al., 2021). These challenges may be especially relevant for students who experience social anxiety, language-related barriers, or minimal prior experience with the oral assessment format (Grieve et al., 2021).

Concerns about fairness and reliability also feature prominently in literature. Fairness in oral assessment has been discussed in relation to transparency, consistency, and the potential for subjective or biased judgement. Oral exams are sometimes viewed as more subjective than written tests, as they do rely on real-time decisions and may be influenced by the examiner's questioning style or interactional cues (Iannone & Simpson, 2014; Nallaya et al., 2024). Students may also be concerned that factors such as non-verbal communication or tone of voice could unintentionally affect grades. As noted by Iannone and Simpson (2014), some students feel that the less predictable structure of oral assessments can create uncertainty about expectations and evaluation standards, particularly when criteria are not explicitly communicated.

To address these challenges, scholars emphasize the importance of transparency, structure, and pedagogical support in the design and implementation of oral evaluation. Clear rubrics, preparatory materials, example questions, practice opportunities, and structured feedback mechanisms have all been shown to reduce anxiety and strengthen perceptions of fairness (McNeill et al., 2024; O'Riordan et al., 2025). Supportive examiner behavior, such as active listening, reassurance, and constructive dialogue, can also foster a more positive student experience (Battaglia et al., 2024; Henderson et al., 2010).

Importantly, inclusive approaches to oral assessment benefit not only anxious students, but also those from non-traditional backgrounds or with specific learning needs. Research suggests that when properly scaffolded, oral exams can offer students with dyslexia, ADHD, or other learning differences an opportunity to demonstrate their knowledge more effectively than through written formats (Tops et al., 2022). This underscores that attending to the student experience is essential not only for individual wellbeing but also for ensuring that oral assessments function as equitable, inclusive, and pedagogically sound tools in higher education.

2.4 Inclusive and Interactive Oral Assessment (IOA)

In response to concerns about anxiety, fairness, and accessibility, some educators are now focusing on redesigning oral assessments to be more inclusive and pedagogically supportive. One of the most promising developments in this regard is the emergence of Interactive Oral Assessments (IOAs), a structured and dialogic approach to oral assessment that emphasizes transparency, scaffolding, and student-centered interaction (Krautloher, 2024; O'Riordan et al., 2025). Unlike traditional viva voce formats, IOAs are typically designed to minimize student anxiety and enhance engagement by framing the assessment as a collaborative conversation rather than a high-stakes interrogation. This shift in tone and structure allows students to clarify their thinking, respond to probing questions in a supportive environment, and demonstrate understanding through real-time reasoning (McNeill et al., 2024). IOAs are typically supported

by clear guidelines, preparatory activities, and practice opportunities. These supports help to level the playing field for students with varying levels of prior experience and confidence (O'Riordan et al., 2025).

A growing body of research suggests that IOAs can be particularly beneficial for diverse student groups, including mature learners, distance learners, and neurodivergent individuals. By prioritizing real-time dialogue and active listening, these assessments support diverse communication styles and reduce reliance on written literacy as the sole marker of academic ability (Krautloher, 2024; Tops et al., 2022). As such, IOAs align with broader aims of inclusive pedagogy and efforts to design assessments that accommodate diverse learners (Krautloher, 2024; Nallaya et al., 2024).

Furthermore, IOAs have been found to promote deep learning and critical reflection, especially when students are encouraged to connect concepts, explain reasoning, and engage in metacognitive thinking.

For example, O'Riordan et al. (2025) report that students assessed through IOAs felt more ownership over their learning and were more likely to identify gaps in their understanding, leading to improved academic outcomes and motivation. Nevertheless, the successful implementation of IOAs depends on institutional support, training for teachers, and consistent application of evaluation criteria (McNeill et al., 2024; Nallaya et al., 2024; O'Riordan et al., 2025). Carefully designed and well supported IOAs can offer a fair and academically rigorous alternative to traditional exams and strengthen the alignment between assessment and the student learning experience.

3. Methodology

This study draws on data collected over two consecutive academic years during the implementation of oral final examinations in an undergraduate course at the University of Akureyri. The purpose of the research was to examine students' experiences of oral assessment, with a focus on anxiety, perceived fairness, and learning outcomes. The study employed a mixed-methods survey design, combining quantitative items with an open-ended qualitative question.

The oral exam format was introduced by the course instructor, who is also the author of this paper. This dual role required careful consideration of potential bias and power dynamics. To minimize undue influence, several steps were taken: all survey responses were submitted anonymously, the survey was administered online, and participation was voluntary. Furthermore, an external examiner was present during all oral exams to support consistency, reduce subjectivity in evaluation, and mitigate the risk of instructor bias in the assessment process.

The same 15-item questionnaire was distributed in both years; however, the timing of the survey administration differed. In the first year, students completed the survey after final grades had been released, which may have shaped their responses based on satisfaction or disappointment with their performance. In the second year, the survey was administered immediately after students completed the oral exam but before grades were made available. This change was implemented to reduce outcome-related bias and obtain a more accurate reflection of students' immediate experiences with the oral format. Given this methodological refinement, responses from the second year are treated as more reliable for interpreting students' perceptions, although data from both cohorts contribute to the descriptive analysis.

Throughout both years, the study followed standard ethical principles for higher education research. Students were informed of the purpose of the study, assured that participation was voluntary, and advised that their responses would remain anonymous. All data were handled in accordance with institutional guidelines for confidentiality and the responsible conduct of research.

3.1 Research context and participants

The research was conducted in a third-year undergraduate course within the School of Business at the University of Akureyri. The course was delivered primarily online, with a diverse student population that included both on-campus and distance learners. Many students were balancing their studies with work and/or family responsibilities, making flexibility and support key pedagogical priorities.

The oral final exam was introduced as part of an ongoing effort to adopt more authentic and interactive

assessment practices. The exam was designed to evaluate students' conceptual understanding, ability to explain key theories, and capacity to apply course concepts to practical scenarios. Each exam lasted approximately 15 minutes and was conducted via Zoom. To ensure academic integrity in the online environment, students began the exam by displaying a valid photo ID and briefly showing their immediate surroundings on camera to confirm that they were alone and not using unauthorised materials. A virtual waiting-room setup ensured that only one student was admitted at a time, eliminating the risk of accidental intrusion.

Both the course instructor and an independent external examiner attended all oral exams. The external examiner's role was to help maintain consistency in questioning, strengthen fairness, and reduce the risk of subjective judgement associated with real-time evaluation. The examiner also documented student responses and contributed equally to the final grading. Student performance was assessed using a jointly developed rubric that outlined key criteria and expected elements for each question. The final exam grade represented the average of the instructor's and the external examiner's evaluations.

A total of 53 students were enrolled in the course during the fall semester of 2023, with 26 completing the post-exam survey, yielding a response rate of 49%. In the following year, fall semester of 2024, 67 students were registered for the oral exam, and 39 responded to the survey, resulting in a 58% response rate. Participant characteristics for both cohorts, including gender distribution and prior experience with oral assessment, are presented in Table 1. These response rates, 49% in 2023 and 58% in 2024, are relatively high compared to typical online surveys in higher education, which average around 33%, and are sufficient to support cautious but meaningful interpretation of student perceptions (Nulty, 2008). Participation was voluntary, anonymous, and had no influence on student grades.

Table 1 Participant Characteristics and Survey Response Rates for the 2023 and 2024 Cohorts

Cohort	n	Female n (%)	Male n (%)	Prior oral exam: yes n (%)	Prior oral exam: first oral exam n (%)
2023	26	19 (73%)	7 (27%)	15 (58%)	11 (42%)
2024	39	30 (77%)	9 (23%)	18 (46%)	21 (54%)

3.2 Survey design

The survey instrument was developed to explore students' experiences, perceptions, and preferences regarding oral assessment. It consisted of 15 items: 14 closed-ended questions and one open-ended question**,** designed to elicit both structured responses and qualitative reflections. The questionnaire was administered in Icelandic and distributed online via Google Forms.

The survey focused on three key areas:

1. Emotional experience and anxiety (e.g., "*How did you feel during the oral exam?*")
2. Perceived fairness, structure, and format (e.g., "*How did you experience the presence of an external examiner?*")
3. Learning experience and preferences (e.g., "*Would you prefer an oral or written exam?*")

Response formats included multiple-choice comparisons (e.g., "*better than a written exam*", "*same either exam type*", "*worse than a written exam*"), and three-point and five-point Likert scales. Two questions used a numerical rating scale from 1 to 10 asking students to evaluate (a) the overall execution of the oral exam and (b) their personal experience of completing it. The final item was an open-ended prompt inviting students to share additional comments or suggestions.

The survey was created by the course instructor and remained unchanged across both years to ensure comparability. Its face validity was supported by informal piloting conducted during the first year of implementation.

3.3 Data analysis

Data from the two survey administrations were analyzed using both descriptive and inferential statistical techniques. Closed-ended responses were exported from Google Forms into Excel, where frequencies, percentages, means, and standard deviations were calculated to provide an overview of students' experiences across key variables such as anxiety, perceived fairness, and exam preferences.

Where appropriate, independent-samples t-tests were conducted to examine differences between groups (e.g., by gender, prior experience with oral exams, or survey year). Before conducting t-tests, F-tests were used to assess homogeneity of variances. A significance level of $p < .05$ was applied throughout.

The open-ended question was analyzed using a basic inductive thematic approach. In total, 16 of the 26 respondents in 2023 and 31 of the 39 respondents in 2024 provided written comments in response to the open-ended question. Responses were read repeatedly, coded, and grouped into recurring themes following the general principles of Braun and Clarke (2006). This qualitative data provided contextual depth and helped illuminate students' emotional reactions, reflections on the assessment format, and suggestions for improvement.

Although the study is limited by relatively small sample sizes and the absence of experimental controls, the use of both descriptive and inferential methods, combined with qualitative insights, enhances the internal validity of the analysis. The consistent use of the same questionnaire across both years and the acceptable survey response rates (Nulty, 2008) further strengthen the trustworthiness and comparability of the findings.

4. Results

This section presents the main findings from the survey, structured around the three central dimensions of the research question: anxiety, perceived fairness, and student preference and perceived learning benefits. While data from both cohorts are reported, greater emphasis is placed on the 2024 responses due to the improved timing of survey administration.

4.1 Anxiety and emotional response

Across both cohorts, students reported a wide range of emotional reactions to the oral exam format. In the 2024 cohort**,** 28% of students indicated feeling less anxious than before a written exam, 39% felt more anxious, and 33% experienced no notable difference. These proportions were broadly consistent with the 2023 results, although a slightly larger share of the 2024 respondents reported reduced anxiety.

When asked how they felt during the exam itself, most students described feeling comfortable or neutral, while a smaller group reported heightened stress. Students without prior experience of oral exams, approximately 54% of the 2024 cohort, tended to report higher nervousness levels. However, this difference was not statistically significant ($p = .92$). However, in the 2023 cohort**,** the result approached significance ($p = .06$), suggesting a possible trend worth further exploration.

Independent-samples *t*-tests showed no significant difference in perceived anxiety between male and female students in either year ($p = .95$).

4.2 Perceptions of fairness and structure

Most students perceived the oral exam as fair and appropriately structured. When asked about the presence of an external examiner**,** the majority described it as neutral or even reassuring, with 46% of students in the 2024 cohort reporting that it had a positive effect on their experience. This figure was slightly higher in the 2023 cohort, at approximately 54%**.**

The 15-minute exam duration was generally viewed as appropriate, with all students in 2023 agreeing that the time allotted was suitable and 90% of students in 2024 expressing the same view. Similarly, students

regarded the number of questions as appropriate: 90% of respondents in 2024 indicated that the amount of questions was suitable, and all respondents in the 2023 cohort agreed.

Independent-samples *t*-tests found no statistically significant gender differences in perceptions of fairness or clarity of expectations. In the 2024 cohort, approximately 73% of students rated the exam implementation 8 or higher (on a 10-point scale), indicating a generally high level of satisfaction with the structure and delivery of the oral assessment. This aligns with the 2023 data, where most respondents similarly awarded high ratings, suggesting a consistent perception of fairness and an overall positive reception of the assessment format across both years.

4.3 Student preference and perceived learning benefits

To examine the relationship between students' exam format preference and their experience of the oral exam, independent samples *t*-tests were conducted. Students who preferred or were neutral to oral exams rated them more positively than those who preferred written formats. In the 2024 cohort, the mean rating for students favoring oral or neutral formats was 8.21, and the standard deviation was 1.39, compared to the average 3.67 (standard deviation = 2.58) among those who preferred a written exam ($p = 0.006$). A similar pattern was observed in 2023, with mean ratings of 8.72 (standard deviation = 1.18) versus 4.75 (standard deviation = 2.71), respectively ($p = 0.004$). These findings suggest a strong association between exam format preference and students' subjective experience of the oral exam.

To explore the potential impact of transitioning from a written to an oral final examination format on student achievement, average course grades were compared over four years. In 2021 and 2022, when the final exam was administered in written form, the average grades were 64.25 and 70.92, respectively. Following the introduction of an oral final exam format in 2023 and 2024, the average grades increased to 79.03 and 78.53. Table 2 presents the average course grades for the four years analysed, illustrating the increase in achievement following the introduction of the oral exam format.

Table 2 Average course grades over the four years analysed

Year	Assessment Type	Average Grade
2021	Written exam	66,78
2022	Written exam	70,92
2023	Oral exam	79,03
2024	Oral exam	78,53

To determine whether these differences were statistically significant, a series of independent samples *t*-tests were conducted. The results indicate that the shift to oral assessment coincided with a significant increase in student performance. Specifically, the average grade in 2024 (oral exam) was significantly higher than in 2022 (written exam), $t = 2.98$, $p = 0.0035$, as well as compared to 2021, $t = 4.63$, $p < 0.0001$. Similarly, the 2023 cohort (oral exam) outperformed both 2022 ($t = 2.98$, $p = 0.0036$) and 2021 ($t = 4.54$, $p < 0.0001$). No statistically significant difference was found between the two years using oral assessment (2023 vs. 2024), nor between the two years using written exams (2021 vs. 2022), with $t = 0.19$, $p = 0.8470$ and $t = 1.53$, $p = 0.1282$, respectively. These results suggest that the introduction of oral examinations may have had a positive effect on student performance in this course.

5. Discussion

This section discusses the main findings of the study in relation to the existing literature, organised around the three themes of anxiety, fairness, and perceived learning benefits. The aim is to situate the results within broader debates on oral assessment and to highlight implications for assessment design in higher education.

5.1 Anxiety and emotional response

The findings indicate that oral exams can provoke a range of emotional responses, from heightened anxiety to increased confidence and calm. A considerable proportion of students reported higher pre-exam anxiety compared with written formats, consistent with prior studies identifying oral assessment as a potentially stress-inducing method due to its immediacy and performative nature (Akimov & Malin, 2020; Grieve et al., 2021). At the same time, a notable share of students reported similar or lower anxiety levels, underscoring that emotional responses are not uniform across learners.

Importantly, students with prior experience of oral assessment tended to report lower anxiety, aligning with evidence suggesting that familiarity, scaffolding, and repeated exposure can help reduce uncertainty and enhance confidence (McNeill et al., 2024; Vlachopoulos & Makri, 2024). Several students described the exam experience as more comfortable than anticipated, emphasizing the conversational tone of the assessment. As one student noted, *"I was surprised at how calm I felt once the exam started. It was more like a conversation than an interrogation."* This pattern suggests that well-structured oral assessments, by providing clarity, scaffolding and a supportive examinering environment, may help reduce anticipatory anxiety and foster greater confidence once the assessment interaction begins (O'Riordan et al., 2025).

These results highlight that anxiety in oral assessment is shaped not only by the format itself but by factors such as prior experience, clarity of expectations, and the interpersonal dynamics of the examination.

5.2 Perceptions of fairness

Across both cohorts, most students perceived the oral exam as fair, transparent, and appropriately structured. The presence of an external examiner was frequently described as reassuring, reflecting earlier research emphasizing that examiner behavior, clarity of criteria, and consistency across candidates influence perceptions of fairness and legitimacy (Iannone & Simpson, 2014; Nallaya et al., 2024; O'Riordan et al., 2025).

Students also viewed the 15-minute duration of the exam as suitable, and the number of questions as reasonable, with almost complete agreement in both years. Although some students expressed discomfort with being unable to revisit questions, an inherent characteristic of oral assessment, others viewed this as an incentive to develop deeper understanding. One student explained: *"It forced me to really understand the topic instead of relying on rehearsed answers"*

These findings suggest that, when oral exams are supported by clear rubrics, consistent questioning, and a calm examiner environment, students perceive them as fair and academically rigorous. This aligns with research on Interactive Oral Assessment (IOA), which emphasizes structure, transparency, and examiner training as critical conditions for fairness (McNeill et al., 2024; O'Riordan et al., 2025).

5.3 Student preference and perceived learning benefits

Preferences for oral versus written assessment varied across participants, but a consistent pattern emerged across both cohorts: students who preferred or felt neutral toward oral exams rated their experience significantly more positively than those who preferred written formats. This association between assessment preference and subjective experience is consistent with the broader literature on assessment alignment and learner fit, which suggests that students' attitudes toward an assessment format can meaningfully shape how they experience it (Akkaraju, 2023; Hazen & Hamann, 2020).

Students' qualitative comments further illuminate why many perceived the oral format positively. Several reported that the exam structure encouraged deeper engagement with course concepts, required them to articulate reasoning, and reduced reliance on memorization. As one student noted, *"I learned more because I had to understand the concepts deeply to explain them out loud."* This aligns with findings that authentic tasks requiring explanation and synthesis can foster deeper learning and metacognitive awareness (Hjálmarsdóttir & Kristjánsdóttir, 2017; Tigerstedt et al., 2023).

The comparison of course grades across the four-year period provides additional contextual insight. Average grades were higher in the two years following the introduction of oral assessment compared with the two years in which a written format was used. While these descriptive patterns may reflect increased engagement or deeper learning prompted by the shift to a more interactive assessment format, they cannot be interpreted as evidence of a causal effect. The improvement is consistent with research showing that authentic, dialogic and practice-based assessment formats can offer richer opportunities for students to demonstrate applied understanding (Halkon et al., 2024; Sokhanvar et al., 2021; Vlachopoulos & Makri, 2024; Ward et al., 2023), although cohort differences or contextual factors may also contribute.

Taken together, the quantitative and qualitative findings suggest that well-structured oral exams can serve as a meaningful learning opportunity for many students, particularly those who value interaction, explanation, and conceptual discussion. However, the strong association between prior preference and perceived experience also underscores that oral exams may benefit some learners more than others, reinforcing the importance of offering supportive structures and maintaining a balanced assessment strategy in diverse student cohorts.

6 Conclusion

This study explored student experiences with oral final exams in an undergraduate course. Findings suggest that oral assessment, when well implemented, can serve as a fair, engaging, and pedagogically valuable alternative to written exams. While emotional responses varied, many found the format less stressful than expected, particularly when supported with clear structure and examiner demeanor. The presence of an external examiner and transparent criteria contributed to perceptions of fairness. Students also noted that the format encouraged deeper learning through explanation and reflection.

Quantitative data showed a significant increase in average grades after the introduction of oral exams. Although this pattern may suggest greater engagement or learning, alternative explanations must be considered, including cohort-specific factors or the possibility that the oral format aligns more effectively with the needs of students who struggle with conventional written assessments. These results align with research on authentic assessment and inclusive pedagogy, which emphasize interaction, feedback, and alternative ways of demonstrating knowledge.

While oral exams may not suit all learners equally, this study supports their use as a complementary assessment method that promotes equity and deeper engagement. The findings are limited by the single-institution context, modest sample size, and reliance on self-reported perceptions. Further research should investigate long-term outcomes and explore how oral assessments function across disciplines and learner populations.

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Understanding how core leadership values are reshaped through work. experiences: Developing a positive opposites framework

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Abstract

Research across organizational psychology, leadership studies, behavioral ethics, and sustainability demonstrates that core work values are not fixed traits. Instead, they are shaped and reshaped through work experiences, organizational socialization, identity development, and exposure to real-world constraints and consequences. The aim of this paper is to fill an identified gap in the literature regarding mapping how our core leadership values are reshaped from undergraduate periods to career stages, through work experience. The transition from student to experienced employee represents a critical period for value change. Students' values are anticipatory and idealized, whereas employees values are shaped through accountability, ambiguity, and consequence. Leadership and organizational culture literature based on empirical findings from experienced employees often privileges innovation, adaptability, inclusivity, and purpose-driven leadership as universally desirable. This paper develops a positive opposites framework that conceptualizes the other end of these scales to respect the value of more stability-focused, tradition-oriented, performance-centric, pragmatic, and merit-based leadership as constructive counterparts to dominant leadership ideals. Drawing on contingency theory, institutional theory, organizational learning, and implicit leadership theory, the study integrates conceptual development with pilot empirical testing using Leadership 5.0 survey items across undergraduate students (n=50) and working professionals (n=50). The paper advances testable hypotheses and offers a context-sensitive understanding of leadership effectiveness, depending on where we are in our careers.

Key words: leadership values, Leadership 5.0, positive opposites framework

1) Introduction

Leadership and organizational culture research has increasingly emphasized innovation, adaptability, inclusivity, and ethical purpose as hallmarks of effective organizations. While these orientations have demonstrated benefits, especially within contemporary leadership approaches in the digital age with Leadership 5.0 in focus (Warner-Søderholm and Kuoppamäki, 2025). Their treatment as universal ideals risks overlooking contexts where stability, predictability, and operational control are more valued. Research across organizational psychology, leadership studies, behavioral ethics, and sustainability demonstrates that core work values are not fixed traits. Instead, they are shaped and reshaped through work experiences, organizational socialization, identity development, and exposure to real-world constraints and consequences. Differences in work values between students and experienced employees are not merely generational or dispositional. They are shaped by experiential learning, organizational norms, and identity reconstruction during early and ongoing work experiences. Indeed, identity construction theory predicts systematic value recalibration during early career transitions, while organizational socialization research highlights the disproportionate influence of early work experiences on long-term value trajectories.

The purpose of this study is therefore threefold. Firstly, we advance the discourse on Leadership 5.0 versus the Positive Opposites Framework. Secondly, we fill the gap in understanding how these two leadership paradigms are complementary and finally we offer empirical findings from a pilot study to empirically test how our values are re-shaped thorough work experiences. To this end we use Leadership 5.0 survey items in this pilot study to collect data from undergraduate students (n=50) and working professionals (n=50). Hence this article advances testable hypotheses and offers a context-sensitive understanding of leadership effectiveness, and how this is measured and valued, depending on where we are in our careers.

2. Literature Review

2.1 Work Experience and Leadership Expectations

Research on implicit leadership theories (ILTs) suggests that individuals hold cognitive schemas regarding what constitutes effective leadership, and that these schemas shape leader evaluation and acceptance (Lord et al., 1984; Lord & Maher, 1991). Importantly, ILTs are socially constructed and shaped by experience, education, and organizational exposure. Empirical evidence demonstrates that leadership expectations can change over time and in response to developmental experiences (Epitropaki & Martin, 2004). Newcomer Socialization and Changing Expectations literature offers other insights: Organizational socialization research provides direct evidence that expectations evolve as individuals enter and adapt to work environments.

Longitudinal studies of newcomers show that pre-entry expectations often shift once individuals encounter organizational realities such as formal structures, leadership practices, and performance demands (Louis, 1980; Wanous, 1992). Leadership expectations play a central role in newcomer adjustment and attitudes toward organizations (Kammeyer-Mueller et al., 2013). The body of literature relating to Career Stage Differences in Leadership Expectations offers further insights as research comparing students, early-career employees, and experienced workers demonstrates systematic differences in leadership expectations. Less experienced individuals tend to emphasize developmental support, inclusivity, and aspirational leadership, whereas experienced professionals increasingly value competence, fairness, structure, and results. These differences are commonly attributed to professional socialization and exposure to operational constraints. We see that the literature supports the argument that work experiences influence values through: Role-based identity transitions, feedback, and developmental challenge. Organizational climates and norms as well as salient moral, interpersonal, and environmental events. Implications are that this perspective explains intra-cohort value divergence, moves beyond generational explanations, integrates leadership, ethics, adaptability, and sustainability research and not least, highlights career experiences as leverage points for value development

Consequently, collectively, this literature supports the proposition that work experience is a meaningful driver of leadership expectations. As individuals gain experience, expectations may shift toward stability-focused, performance-centric, pragmatic, and accountability-oriented leadership, aligning directly with the Positive Opposites Framework advanced in this study. We now summarize key work values within leadership 5.0, then map the 5 specific positive opposites to L.5.0,

2.2 Literature review: Leadership 5.0

Leadership 5.0 posits an evolution in leadership logic as it responds to the demands of a rapidly changing, technology-driven world. Please see Figure 1 below for the conceptual mapping of the key themes from the Leadership 5.0 literature review below, developed by GenAI: ChatGPT5.2:

Figure 1. Conceptual mapping: the 5 pillars of Leadership 5.0.

2.2.1. Human-Centric and Emotional Intelligence Approach in a Tech-Driven World

Leadership 5.0 focuses on putting people first, because as organizations develop increased levels of automation, AI, and digital tools, they need to balance technology with human-centric leadership practices in order to maintain employee engagement (Avolio and Kahai, 2003). Hence, Leadership 5.0 integrates empathy, emotional intelligence, and human well-being into the core of leadership. Leaders must bridge the gap between technological innovation and human connection, to make sure that technology empowers, rather than replaces, people (Kane et al., 2015). Consequently, in the Leadership 5.0 framework, leaders are expected to show self-awareness, empathy, and people skills, as these are critical for building trust and motivating teams. Emotional intelligence is said to be of equal value as technical expertise (Goleman, 1998). This creates a balanced and people-friendly approach to leadership. In this way, self-awareness, composure, conflict resolution inspiring teams, and empathy are core components of emotional intelligence (EI).

2.2.2. Ethical, Purpose-Driven, and Sustainable Leadership

Leadership 5.0 is rooted in values-based leadership (George, 2007), prioritizing ethical decision-making, integrity, diversity, and inclusion in teams and a focus on long-term societal impact. Leaders may strive to take more purpose-driven decisions that benefit employees, communities, and the planet through ethical leadership as ethical leadership significantly impacts employee trust, organizational culture, and long-term sustainability (Brown et al., 2005). Through the

development of renewable energy-facilitated systems, such as circular processes that reuse, repurpose, and recycle natural resources, sustainable leadership prioritizes reducing waste and environmental harm. Hence, AI tools support such sustainability leadership. In this way, leaders who integrate sustainability into their strategies develop resilience and adaptability in their organizations, applying sustainability as a leadership and moral imperative (Bansal and Song, 2017; Carroll, 1991).

2.2.3. Inclusive and Collaborative Culture

Leadership 5.0 promotes a culture of continuous innovation, where leaders encourage experimentation, risk-taking, and creative problem solving. Leaders create environments where employees feel empowered to challenge the status quo and explore the latest ideas so that 5.0 ties innovation directly to human collaboration and purpose, ensuring that technology and creativity serve broader societal goals (Warner-Søderholm and Kuoppamäki 2025). By fostering diversity, equity, and inclusion (DEI), leaders actively create environments where diverse teams can thrive and contribute their unique perspectives (Shore et al., 2018; Cox and Blake, 1991). Colgate, (2025) claims that it promotes collaborative and coaching-based leadership, where decision-making is shared. In this way, employees at all levels are empowered to participate in shaping the organization's future. Consequently, L.5.0 moves beyond hierarchical models, embracing flatter, more inclusive structures that value input from all stakeholders and value belonging and engagement in cross-functional collaborative teams.

2.2.4. Future Readiness and Adaptability

While earlier leadership models may have focused on adapting to technology (e.g., Leadership 4.0), Leadership 5.0 integrates human values alongside technological innovation. With a future-ready focus, Leadership 5.0 prioritizes resilience and adaptability in a way that earlier models did not, preparing organizations for both the known and the unknown. According to Warner-Søderholm and Kuoppamäki (2025), when leveraging adaptability and future readiness mindsets, L5.0 managers can then enhance employee adjustment to new work environments. In this way they can improve connectivity among diverse work groups, support continuous learning, and build resilience to ongoing changes. In addition, a manager's own personal resilience, to manage continuous changes, alterations in work modes, and technological developments, will encourage productivity and well-being among employees, due to increased adjustment, connectivity, and resilience in a flexible work environment.

2.2.5. Innovation and Experimentation

Leadership 5.0 is designed for an uncertain and fast-changing world, emphasizing future readiness and the ability to navigate complexity. Leaders focus on building adaptive organizations that thrive amidst disruption and global challenges, such as climate change, geopolitical instability, and technological advancements. According to Warner-Søderholm and Kuoppamäki (2025), with systems thinking, leaders are able to focus on continuous learning for themselves and their teams to develop digital mindsets for future readiness. This is true at all phases of the adoption of innovation in organizations (Damanpour and Schneider, 2006). Leaders who create such psychologically safe environments do so through inclusiveness and

opportunities for experimentation According to Edmondson (1999). Creativity, curious mindsets, and innovation do thrive in environments that encourage calculated risks and celebrate experimentation, creative problem solving, and rapid prototyping

After offering the literature review above, taken with kind permission from Warner-Søderholm and Kuoppamäki (2025), as a map for the five pillars of Leadership 5.0, we now develop a conceptual model for the positive opposites framework: A framework to delineate what is at the other end of the scale from these 5 key values. In this way we can map when we are at a career stage and where we may place higher value on a stability-focused, reliability driven work culture, rather than an innovation and experimentation culture, for example.

2.3 Literature review: Positive Opposites Framework

The framework identifies constructive counterparts to dominant leadership ideals: innovation versus stability, adaptability versus tradition, human-centric versus performance-centric leadership, purpose-driven versus pragmatic leadership, and inclusive versus merit-focused culture. Figure 2 below presents the Positive Opposites Framework using the same visual design logic as the Leadership 5.0 model. The framework places Positive Opposites at the centre, surrounded by five dominant organizing logics: stability and reliability, tradition, performance-centricity, compliance, and merit focus.

Figure 2. Positive Opposites Framework. The figure illustrates core organizing logics that characterize stability-oriented leadership systems, positioned around the central concept of

positive opposites. Graphics by GenAI: ChatGPT5.2)

2.3.1 Stability and reliability Focus:

We observe that positive opposites of innovation and experimentation culture include a stability-focused, reliability-driven work culture, with the following key characteristics: consistency over experimentation, proven processes over new ideas, risk avoidance rather than risk taking, predictability and control, quality, safety, and efficiency

2.3.2 Tradition and stability focus:

We observe that the positive opposites of adaptability and future readiness culture include a tradition-focused, stability-oriented culture. Key characteristics include a preference for consistency over change, greater value placed on established methods over new trends And a preference for long-term reliability over rapid pivots. The positive aspects are higher clarity and predictability, respect given to proven experience and proven practices, trust is built through steady performance and so deep expertise is encouraged above adaptability.

2.3.3 Performance- centric focus

We see that the positive opposites of human-centric leadership include performance-centric or results-driven leadership. Key characteristics include emphasis on goals and measurable performance, focus on efficiency, productivity, and outcomes, reliance on systems, processes, and structure. Positive aspects of performance-centric focus rather than human-centric focus are that there are clear expectations and direction, achievement and excellence are rewarded, this ensures fairness through objective standards and builds discipline and focus

2.3.4 Compliance-focus

We observe that the positive opposites paradigm of ethical, purpose driven, sustainable focus are a focus on regulations and legal compliance. Characteristics of this value set include a focus on meeting regulations and standards without broader purpose-driven goals, teams that emphasize operational efficiency and profitability, who rely on structured, rules-based decision-making. Positive aspects of such team members' values include predictability and disciplined execution, legal and responsible operations, strong financial and operational resilience as well as practical and feasible decision-making

2.3.5: Merit-focus

Finally, we see that the positive opposites of an inclusive, collaborative focus are a focus on Merit and individual achievement, where key characteristics include individual ownership and autonomy, clear roles and personal accountability, and individual expertise-based decision-making. There are clear advantages to such a merit focus that empowers confident independent work. It is easier to ensure faster decision-making, skills and contributions are rewarded, so this provides clarity and focus for ambitious performance-based teams and individuals. Table 1 below provides a summary of these points

Table 1: Leadership & Culture: Positive Opposites

Traditional Quality measured by L.50	**Positive Opposites**	Expanded Description og Positive Opposites Framework
Innovation & Experimentation Culture	**Stability-Focused, Reliability-Driven Culture**	***Prioritizes proven methods, risk control, and consistent execution. Success is measured by predictability, efficiency, and minimizing disruptions. Encourages mastery of existing processes rather than frequent change.***
Adaptability & Future Readiness	**Tradition-Focused, Stability-Oriented Culture**	***Values long-established practices, continuity, and respect for organizational heritage. Operates with a steady, long-term mindset that avoids unnecessary upheaval.***
Human-Centric Leadership	**Performance-Centric, Results-Driven Leadership**	***Emphasizes metrics, objectivity, and measurable achievements. Leaders focus on clarity of expectations, structured accountability, and productivity.***
Ethical, Purpose-Driven, Sustainability-Focused Leadership	**Pragmatic, Compliance-Focused, Performance-Driven Leadership**	***Concentrates on meeting regulatory standards, ensuring operational efficiency, and delivering financial performance. Decisions are guided by practicality and feasibility rather than broader mission goals.***
Inclusive & Collaborative Culture	**Merit-Focused, Independent, Accountability-Centred Culture**	***Rewards strong individual contributions, values autonomy, and reduces reliance on group decisions. Success comes from expertise, ownership of outcomes, and efficient independent work.***

2.4. Hypotheses Development

The following hypotheses were developed from the extant literature:

H1: Working professionals will report higher endorsement of stability-focused and reliability-driven cultural orientations than undergraduate students.

H2: Working professionals will report higher endorsement of performance-centric leadership orientations than undergraduate students.

H3: Working professionals will report higher endorsement of pragmatic, compliance-focused leadership orientations than undergraduate students.

H4: Working professionals will report higher endorsement of merit-focused, accountability-cantered cultural orientations than undergraduate students.

3. Method

3.1 Design and Sample

A cross-sectional survey design was employed. Participants included undergraduate students (n=50) and working professionals (n=50). Aside of professional experience the demographic profiles in both groups were similar. Student respondents were mainly Bachelor-level students attending business or technical programs. Professional survey respondents were mainly individuals working for technical firms or in technical functions in non-technical firms. Seniority of the people surveyed was between Manager and Director levels, with an average work experience of between 5-20 years.

3.2 Measures

Leadership and culture orientations were measured using Leadership 5.0 survey items.

Data Collection Scale Items

The sampling method applied in this pilot survey is convenience sampling. Convenience sampling is a non-probability research method where participants are chosen based on their proximity, availability, and ease of access, making it quick and inexpensive. While useful for preliminary research, this method carries a considerable risk of bias and limits the generalizability of the findings, as the sample may not be representative of the broader population. To mediate this bias risk, a specific empirical setting was selected: namely, the sample was narrowed down to the managers or undergraduate students in technical management fields. After implementing minor amendments indicated during the pre-data collection focus group interview stage (minor changes to wording for international clarity), the complete questionnaire was sent to the response group. Two demographic items were included to meet the GDPR data collection guidelines regarding anonymity and confidentiality. These were 1) function within the organization/ study program and 2) gender. As no personal information was collected, an Ethics Committee approval was not deemed necessary for the survey. An overview of the research flow is depicted in Figure 4.

Data collection and analysis were split into five phases: sample collection, summary of survey results, conceptual analysis, statistical analysis, and discussion and conclusions. The five phases are summarized in Figure 3 below (from Warner-Søderholm and Kuoppamäki (2025).

Values for each of the five items were aggregated to the construct level to understand distribution as part of this pilot study. Then, the data were analysed to check face validity. With such a small sample, one cannot make assumptions, yet the novel initial findings indicate that the survey method provides relevant research constructs and has a high level of face validity. As an indicator for the appearance and clarity of the survey methods, the use of words like leadership, inclusivity, and collaboration in the construct definitions and indicators support this view.

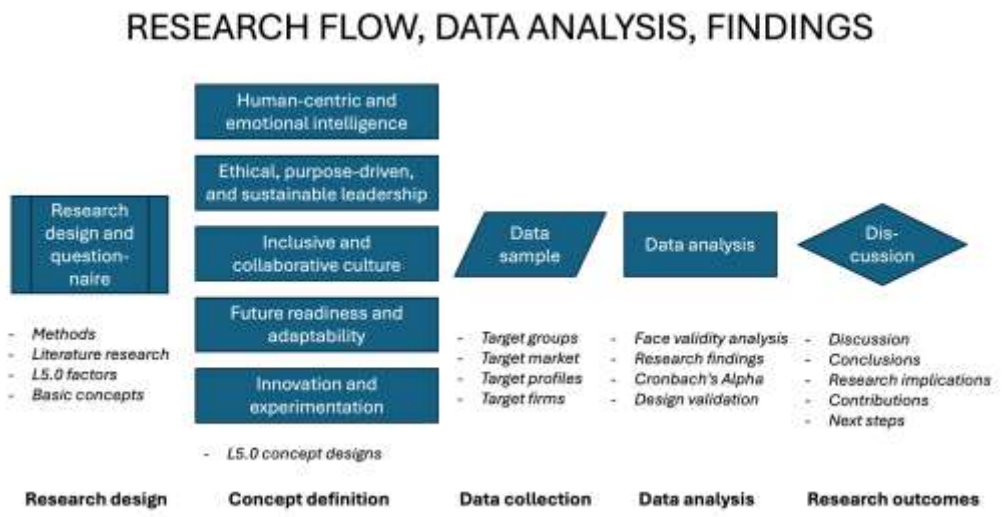

Figure 3. (from Warner-Søderholm and Kuoppamäki 2025)

Internal consistency was assessed in previous studies and showed high internal consistency and

validity. The overall Cronbach's Alpha was α = 0.948, indicating excellent reliability. Cumulative alpha values increased as more items were added, confirming consistent measurement of the same construct. Removing any item slightly decreased the alpha, suggesting that all items contributed positively to the scale. These results demonstrate that the questionnaire items are highly homogeneous and measure a common underlying dimension. Please see figure 4 below (from Warner-Søderholm and Kuoppamäki, 2025).

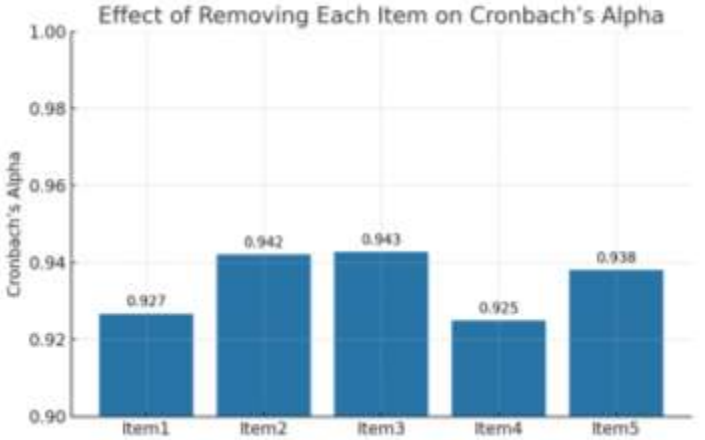

Figure 4. (from Warner-Søderholm and Kuoppamäki 2025)

In the first comparison of data from our two groups in this present study, an aggregate score was established for both groups. The model is building on prior L5.0 research (Warner-Søderholm & Kuoppamäki, 2025). Each response for a dimension of a given concept represents a value between 1-7 on a Likert scale. The respective values start with 1 = for disagreement with all statements and conclude with 7 = for agreement with all statements. Consequently, the maximum for the sum of responses for any concept is 350, i.e. the maximum score of 7 for each of the 50 respondents in either of the professional and student groups. This is calculated as 7*50=350. Purpose of the aggregate score is to understand how close the responses for any given concept are to the maximum score. To achieve this, the actual scores for all dimensions measured in a concept are added together and then divided by the maximum score. The result is multiplied by the number of dimensions in the concept to render the maximum score and the aggregate score comparable. E.g. for the third concept in the working professional's data the sum of responses received is 241. Dividing 241 by 350 yields 241/350 = 0,69. Multiplying the result by 7 (number of dimensions) returns 4,83 as the aggregate score. This tells us that the survey responses yield a value of 4,83 for the third concept in the working professionals' data vs. a maximum score of 7.

4. Results

Results for students and working professionals were summarized in figure 5 and figure 6 below. High scores in the bars in the charts represent high scores in the L5.0 concepts as follows in the table below on the left side. Lower scores suggest greater value placed on the positive opposites of these values, namely on the right -hand side of table 2 below:

Table 2: summary of high L5.0 scores vs higher Positive Opposites scores for 5 factors:

	L5.0 high scores indicate higher:	**Positive opposites scores indicate higher:**
F1	**Human-Centric and Emotional Intelligence Approach**	**Performance- centric focus**
F2	**Ethical, Purpose-Driven, and Sustainable Leadership**	**Compliance-focus**
F3	**Inclusive and Collaborative Culture**	**Merit-focus**
F4	**Future Readiness and Adaptability**	**Tradition and stability focus**
F5	**Innovation and Experimentation**	**Stability and reliability Focus**

Figure 5 depicts concept aggregates for bachelor students. The data analysis shows *Human-centric Leadership and Emotional Intelligence Items* returning the highest score with a very high 5.95 of a maximum of 7, followed by *Inclusive and Collaborative Culture Items* with 5.81. Both *Future readiness and adaptability Items* and *Ethical, Purpose-driven, and Sustainable Leadership Items* yielded 5.11 as an aggregate score. *Innovation and Experimentation Items* scored lower in the student sample, indicating a higher value placed on *Results and Merit* Focus as the positive opposite.

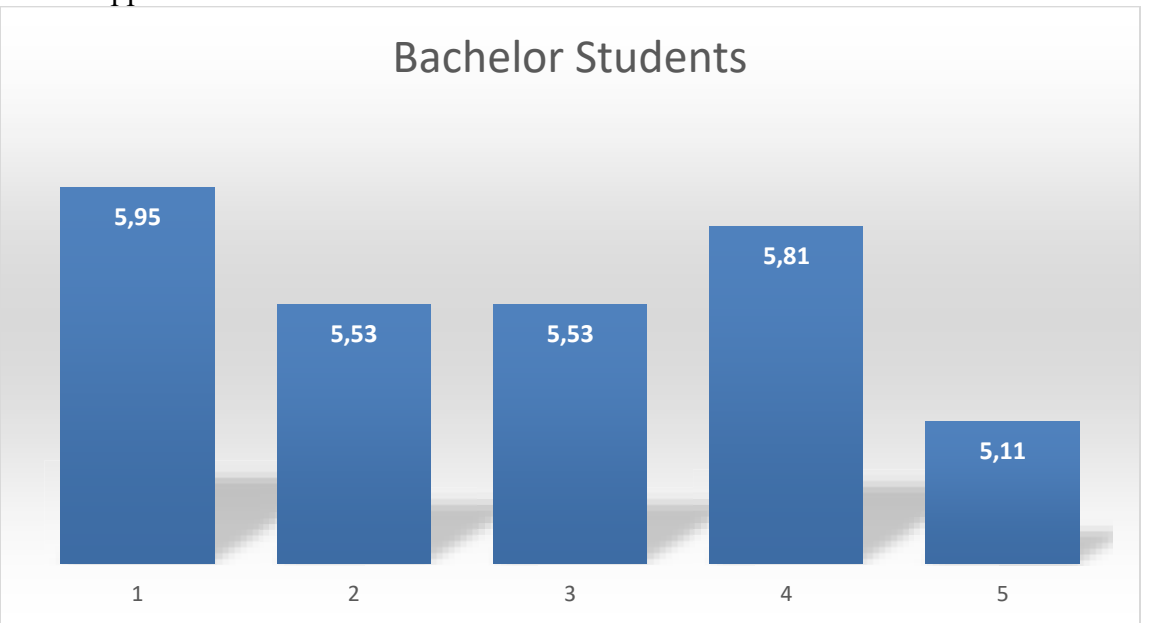

Figure 5: Aggregate scores for Bachelor Students

Figure 6 shows concept aggregates for the working professionals. The data shows *Future Readiness and Adaptability Items* returning the highest score with an aggregate value of 5.39 vs. possible maximum value of 7 for 100% support, followed by *Human-centric Leadership and Emotional Intelligence Items* and *Innovation and Experimentation Items* with the second highest results at 5.11. Scores for *Inclusive and Collaborative Culture Items* were lower, suggesting a stronger focus on the positive opposite of *Compliance Focus* at 4.97. Scores for *Ethical, purpose-driven, and sustainable leadership items* scored lowest overall at 4.83 – suggesting a priority is given to *Performance-Centric* values, emphasizes metrics, objectivity, and measurable achievements. Leaders focus on clarity of expectations, structured accountability, and productivity. Leaders may have a balanced focus to concentrate on meeting regulatory standards, ensuring operational efficiency, and delivering financial performance. Decisions are guided by practicality and feasibility rather than broader mission goals*:*

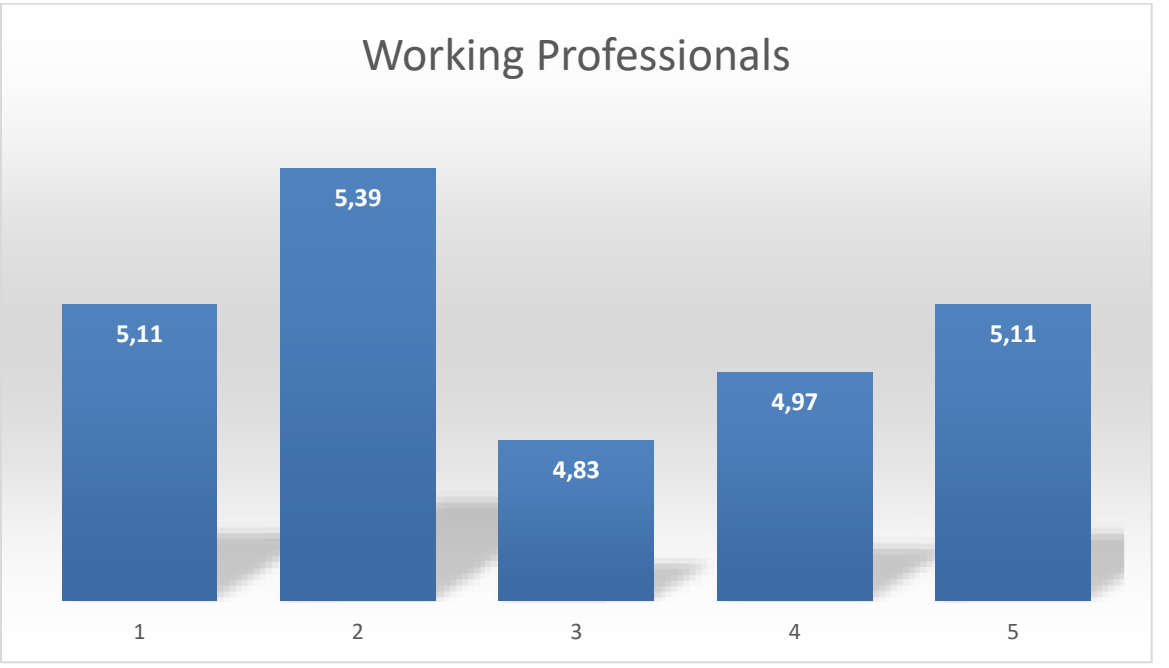

Figure 6: Aggregate scores for Working Professionals

5. Discussion

Findings suggest leadership effectiveness depends on contextual alignment rather than universal ideals, and that work experience impacts to what degree we value soft values such as Human-centric leadership orientations, as younger professionals, or if we may value performance-centric as senior professionals more. In comparison, surveyed students yielded overall higher scores on all L5.0 values, compared to working professionals, with all concepts returning values above 5. The top score is 0.59 higher than the highest working professional's score. This signifies an overall higher student support for the 5.0 leadership values. Working professionals on the other hand yielded scores moving slightly closer to the positive opposite scores of *Stability and Reliability Focus, Tradition and Stability Focus, Performance- Centric Focus, Compliance-*

Focus and Merit-Focus. While the student panel shows highest support for soft values like *Human-centric Leadership* and *Inclusivity*, working professionals preferred more business outcome focused items like *Future Readiness* as well as *Innovation and Experimentation*. This suggests a focus towards concrete and delivery-oriented factors among business professionals compared to more aspirational and attitude focused items among students. With increasing business experience, respondents appear to migrate from intention and expectation towards delivery and target orientation. Figure 7 below presents a visual comparison the exploratory study's comparative results**:**

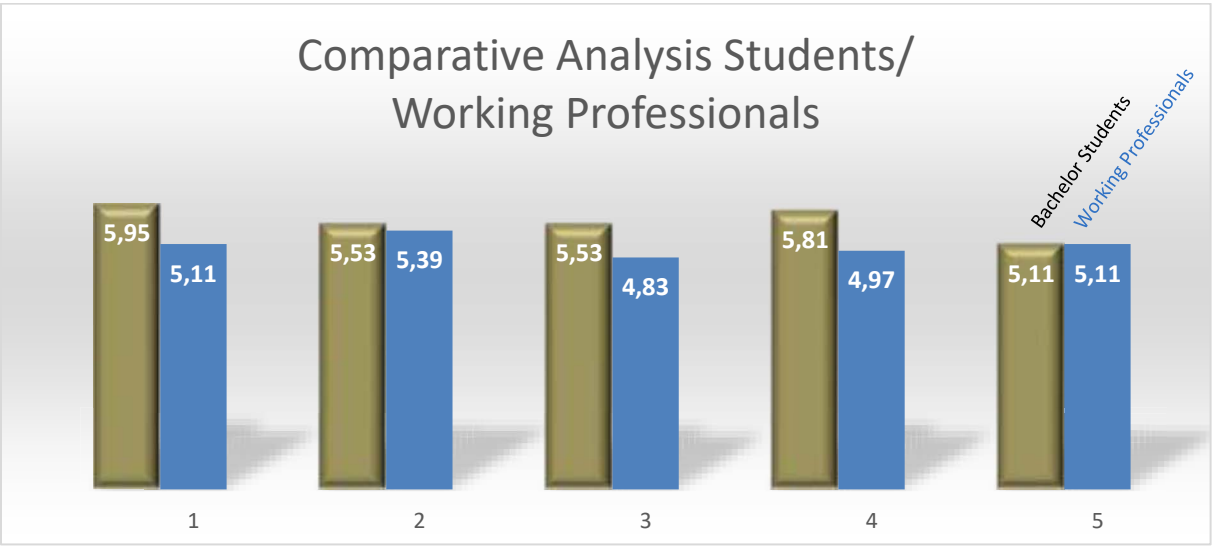

Figure 7: Comparative analysis Scores for Bachelor Students and Working Professionals
The following table presents the hypotheses developed from the extant literature earlier in this study and the results of the hypotheses testing:

6. Conclusion, limitations, and future research

Leadership effectiveness emerges from alignment between context, career stage, and leadership orientation, rather than adherence to universal ideals. Findings suggest that leadership orientation preferences differ by career stage, supporting the Positive Opposites Framework. The study contributes to leadership theory by empirically supporting a context-sensitive view of leadership effectiveness. Future research should empirically test the proposed relationships. Given the pilot sample size, findings should be interpreted cautiously. Future research should replicate results with larger samples and longitudinal designs. Even given these limitations, the framework contributes to leadership theory and can provide practical guidance for leaders understand opposites in personal values and can be complementary with project teams including newly qualified professionals and experienced colleagues.

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Generative AI Disclosure

The authors used generative AI tools (ChatGPT 5.2and co-pilot) during the preparation of this manuscript for language editing (clarity, grammar, and readability), development of graphics in key figures and for high-level feedback on early draft structure and argumentation. All substantive content, interpretation, and final editorial decisions were made by the authors, who also reviewed and verified the manuscript for accuracy, completeness, and proper citations.