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Tailored Virtual Work Culture Curriculum Design for Enhanced Trainee Productivity and Global Employability Scheme

Nengak Iliya Sitlong
Computer Science Department, Federal University of Technology, Pankshin, Plateau State, Nigeria.

Pofung Dokbish Danung
Public Admin and Planning, Federal University of Technology, Pankshin, Plateau State, Nigeria.

Anna Njin Yillek
Administrative Department, Federal University of Technology, Pankshin, Plateau State, Nigeria.

Abstract

Electronic Work-Integrated Learning (eWIL) has gained prominence as a mechanism for aligning academic instruction with workplace competencies in digitally mediated contexts. This study examines the effectiveness of eWIL systems in achieving hard outcomes (employment readiness and digital skills), soft outcomes (engagement, inclusivity, and instructor support), and the relative strengths of fully virtual and hybrid delivery models. Survey data were collected from 60 participants and analyzed to capture perceptions of technology effectiveness, learning tools, instructional support, challenges, inclusive strategies, and prospects for future collaboration.

The findings demonstrate that eWIL systems are effective in supporting hard outcomes, with over 60% of respondents reporting improved job preparedness and digital competence. Learning management systems integrated with simulations and AI-based tools emerged as critical enablers of performance-oriented learning. However, constraints related to employer readiness for virtual supervision, digital infrastructure limitations, and misalignment between assessment methods and real-world tasks reduced the effectiveness of fully virtual eWIL environments.

Regarding soft outcomes, respondents reported generally positive perceptions of engagement, inclusivity, and instructor support, although responses varied across participants. Key challenges included accessibility barriers, limited supervisory feedback, and workload imbalance, which were more pronounced in fully virtual settings. In contrast, hybrid eWIL models were perceived to better facilitate social interaction, experiential learning, and personalized mentorship.Overall, while fully virtual eWIL offers scalability and flexibility, hybrid eWIL models provide a more balanced and resilient approach by enhancing employability outcomes, learner engagement, and inclusive practice. The study contributes empirical insights to eWIL scholarship and highlights the importance of hybrid designs for sustainable work-integrated learning in higher education.

Keywords: Electronic work-integrated learning; Employability; Digital skills; Hybrid learning; Inclusivity;

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1. Introduction

The digitization of higher education and workplaces has accelerated the adoption of electronic Work-Integrated Learning (eWIL) as a complement or substitute for traditional WIL placements. While eWIL promises flexibility and broader access to work-based learning, it also raises concerns about equitable access, digital inclusion, and the preservation of authentic workplace learning experiences. This paper proposes a multidisciplinary, inclusion-centered framework for designing, implementing, and evaluating eWIL curricula. The framework foregrounds both hard outcomes (e.g., employability indicators, technical competencies) and soft outcomes (e.g., engagement, belonging, and professional identity) and addresses stakeholder roles such as students, academics, and employers across the curriculum lifecycle. Recent studies following the COVID-19 disruptions document both the rapid shift to virtual WIL modalities and emergent concerns regarding employer perceptions, digital mentoring, and student engagement (Maietta & Gardner, 2022).

2. Related Works

The pandemic (2020–2021) produced the most rapid and large-scale conversion of placements to digitally mediated formats in modern higher education history. Multi-site investigations show that many institutions and employers either suspended placements or moved them online in 2020, producing a heterogeneous set of online internship and virtual placement models (fully remote, hybrid, simulated tasks, micro-projects (Matthew et al., 2021). This research documented a multi-site case study on how institutions and industry partners adapted practices, highlighting uneven access, variation in task authenticity, and ad hoc supervisory models during the emergency shift. Subsequent conceptual treatments trace eWIL as a continuum from simple remote supervision to fully integrated electronic WIL models with curricular scaffolding and assessment alignment (Glavas & Schuster, 2020). Remote modalities expanded access for geographically dispersed students and created new types of project work, but also revealed threats to experiential authenticity when placements lacked structured employer engagement or clear learning outcomes. Systematic thinking about design principles for eWIL has been proposed to preserve authenticity while leveraging the affordances of digital workspaces (Maietta & Gardner, 2022).

In modern education, the principles of equity, diversity, and inclusion have become fundamental components rather than optional considerations. These concepts are now crucial for revolutionizing educational practices. The globally recognized Universal Design for Learning (UDL) framework has emerged as a key tool in addressing the varied requirements of students and facilitating this educational shift (Garrad & Nolan, 2023). Beyond its foundational principles, UDL represents a commitment to creating inclusive and accessible learning spaces in which every student, regardless of their background or abilities, has the opportunity to succeed (Baroni & Lazzari, 2022). By removing barriers to learning through adaptable approaches to representation, engagement, and expression, UDL facilitates equitable access and success for every learner on their educational journey (Chapman & Jackson, 2021)

The online environment has emphasized the difficulties faced by students with disabilities, including inaccessible content and inadequate support systems (Figard & Carberry, 2024). Without the necessary modifications, online learning platforms risk deepening the gap for these learners. As a result, rethinking online education to prioritize inclusivity and accessibility has never been more critical (Alshawabkeh et al., 2021). Personalized and flexible learning approaches are crucial for students with disabilities to help them navigate the challenges of online education. Their diverse needs require customized solutions to ensure equitable access to educational opportunities (Alsamiri et al., 2022). In this context,

one of the strategies for enhancing accessibility is the integration of the UDL framework. Through its threecore principles - multiple ways of engagement, representation, and action and expression - UDL ensures that learning experiences can be tailored to the different needs of students.

A dominant theme in the literature is that inclusive design must be embedded in any sustainable eWIL curriculum. The Universal Design for Learning (UDL) which foregrounds multiple means of engagement, representation, and expression is the most consistently recommended conceptual framework for operationalizing inclusion in online experiential learning(Altowairiki, 2024). Positive effects of UDL principles on accessibility, student participation, and learning outcomes when institutions provide faculty training and instructional design capacity. Recent reviews show that successful UDL implementation requires institutional investment (faculty training, instructional design teams) and intentional embedding of multimodal assessment in curricula (Frison, 2025).

In eWIL-specific discussions researchers emphasize applying UDL to: (a) design authentic tasks with multiple entry points so students with diverse digital skills can contribute; (b) offer flexible deliverables (e.g., written artefact, recorded demo, code repos) to demonstrate competence; and (c) provide scaffolded digital onboarding and accessible platforms. These practices reduce barriers for students with limited bandwidth, disabilities, or uneven prior workplace exposure (Utam et al., 2025).

2.1 Employer engagement, modality preferences, and capacity for digital supervision

Employers remain central to WIL quality, it was reported that mixed but evolving employer sentiment toward virtual placements showed strong preference for **hybrid** models going forward (i.e., a combination of remote and in-person elements), with employers citing concerns about fully virtual internships' ability to develop interpersonal and team-based skills(Fakhry et al., 2024). Empirical studies further show employers who invest in digital supervision toolkits, structured project briefs, and clearer assessment rubrics report higher satisfaction with student contributions (Klamn, 2024).

Studies of employer practice note pain points: mentoring time burden, difficulties in assessing remote students' tacit skills, and the need for institutional scaffolding (clear learning outcomes, co-assessment rubrics). Consequently, the literature repeatedly recommends co-design processes that include employers early in task design and assessment to ensure workplace relevance and supervision feasibility (Briant, 2024).

2.2 From WIL to eWIL

Work-Integrated Learning (WIL) has long been lauded for closing the gap between theory and practice and for improving graduates' transition to work. The COVID-19pandemic accelerated the move toward virtual placements and prompted scholars to reconsider core WIL assumptions in digitally mediated contexts(Cai et al., 2024).Evidence shows that many WIL experiences were abruptly terminated or converted to virtual formats in 2020, pushing employers and institutions to innovate remote WIL practices; these studies also document employer adaptation and emergent expectations from virtual WIL (Maietta & Gardner, 2022).

2.3 Inclusion, accessibility, and digital pedagogy (UDL & related frameworks)

A consistent theme in recent literature is the centrality of inclusive design for digital learning. Universal Design for Learning (UDL) continues to be a leading framework for operationalizing accessibility and multiple means of engagement in online settings; UDL-aligned practices significantly support diverse learners when properly implemented(Kasemsarn & Sawadsri, 2024). However, authors note a research–practice gap where many e-learning/WIL initiatives adopt technology without fully embedding inclusion

principles such as multimodal representation, flexible assessment, and scaffolded support (Perusso, 2024).

A growing subfield addresses digital wellbeing which is the capacity to manage technology mediated boundaries, maintain mental health, and sustain productive engagement in remote work contexts(Glavas & Schuster, 2020). Researchers have introduced constructs such as *digital wellbeing literacy* and recommend curriculum elements that teach time-management, boundary-setting, and strategies to mitigate online fatigue. These components are critical in eWIL because unsupervised or poorly scaffolded remote placements can intensify workload ambiguity and stress, particularly for students juggling paid work or limited home study spaces (An et al., 2023).Practical solutions reported in the literature include scheduled synchronous check-ins, clear role descriptions, expectations documents, and institutionally provided mental-health signposting. These measures are correlated with higher student satisfaction and perceived safety in the workplace learning environment (Ostrognaj et al., 2024).

2.4 Employer engagement and graduate outcomes in eWIL

Recent empirical work examines employer attitudes toward virtual placements and the extent to which digital internships deliver employability gains(Utam et al., 2025). While internships (including virtual ones) remain positively associated with employability perceptions and soft-skill development, employer surveys and satisfaction metrics indicate concerns about the collaborative and interpersonal readiness of graduates who studied predominantly online particularly in domains where face-to-face teamwork is critical. Studies emphasize co-designed supervisory models and structured digital mentoring to mitigate these concerns (Fakhry et al., 2024).

2.5 Assessment of hard and soft outcomes in eWIL

Recent evaluations have stressed the need to measure both vocational outcomes (job offers, technical proficiency) and psychosocial/engagement outcomes (sense of belonging, self-efficacy, digital wellbeing). Newer conceptual pieces introduce constructs like digital wellbeing literacy and remote workplace readiness as part of eWIL assessment repertoires. These works argue for mixed method measurement bundles that combine employer ratings, student self-efficacy scales, artefact-based competency assessments, and qualitative reflections (Klamn, 2024).

Contemporary scholarship stresses the need for mixed-method assessment bundles linking objective indicators (task completion rates, job offers, and employer performance ratings) with validated self-report scales for engagement, belonging, and digital self-efficacy. Recent frameworks and studies propose combining artefact-based competency assessments (graded project deliverables, code reviews, and professional portfolios) with employer ratings and student reflective logs to capture both technical proficiency and professional identity development (Cai et al., 2024). This multipronged approach helps capture “hard” employability outcomes and “soft” psychosocial outcomes (belonging, communication skills, and digital wellbeing) (Frison, 2025).

Methodologically, researchers highlight the value of triangulation (student self-reports, employer reports, and objective artefacts) to mitigate bias from any single source and to surface discrepancies between student perceived gains and employer observations. Regression and mediation analyses are used to test whether inclusion features (e.g., UDL scaffolds) mediate the relationship between eWIL design elements and employability outcomes (Matthew et al., 2021).

2.6 Implementation challenges and contextual moderators

Across disciplines and jurisdictions the literature identifies recurring barriers to equitable eWIL implementation:

i. **Digital divide**: Students with unstable internet or limited devices are at risk of exclusion unless alternative arrangements exist (Matthew et al., 2021).

ii. **Variability in task authenticity**: Some online placements offered peripheral tasks (data entry, research summaries) rather than authentic, integrative workplace projects reducing learning transfer (Fakhry et al., 2024).

iii. **Employer capacity & incentives**: Smaller employers may lack resources for structured remote supervision and need clearer incentives or institutional support (Johnson , 2022).

iv. **Faculty/ID capacity**: Successful UDL implementation requires investment in faculty training and instructional design teams; otherwise, inclusive intentions fail at scale (Klamn, 2024).

Contextual moderators include discipline (STEM placements often require access to lab/hardware), national telework norms, and institutional partnerships with industry all of which shape feasible eWIL models (Maietta & Gardner, 2022).

2.7 Gaps and motivation for the proposed framework

Across 2020–2025 literature, three gaps persist: (1) insufficient integrated design frameworks aligning inclusivity with workplace authenticity in digital WIL (Cai et al., 2024); (2) limited multi-stakeholder empirical studies capturing both student and employer experiences (Utam et al., 2025); and (3) inconsistent assessment approaches that neglect soft outcomes or digital wellbeing(Fakhry et al., 2024). The proposed eWIL curriculum framework seeks to address these gaps by embedding inclusive pedagogy (e.g., UDL) and co-design processes into curriculum, supervision, and assessment strategies (Briant, 2024).

3.0 Research Methodology

This section details a reliable methodology for empirically evaluating the proposed eWIL curriculum framework using a structured questionnaire (plus supporting qualitative prompts). The design is appropriate for cross-sectional, multi-stakeholder studies involving students, academic coordinators, and employer supervisors in Federal University of Education, Pankshin, Plateau State, Nigeria.

3.1 Research aims and questions

Primary aim: To evaluate the effectiveness and inclusivity of the proposed eWIL curriculum framework from the perspectives of students, academics, and employers.

Key research questions:

i. To what extent does the eWIL curriculum facilitate employability (hard outcomes)?

ii. How does the eWIL curriculum affect student engagement, inclusion, and digital wellbeing (soft outcomes)?

iii. What challenges do employers report in supervising eWIL placements remotely, and which supports are most effective?

iv. How do different stakeholder groups rate the inclusiveness features embedded in the curriculum?

3.3 Study Design and Participants

a. Design: Cross-sectional survey with embedded open-text items for qualitative insight and optional follow-up interviews for thematic depth.

b. Population: (a) Twenty (20) Students who completed an eWIL placement in the previous 12 months; (b) 20 Academic coordinators responsible for eWIL modules; (c) Industry supervisors who hosted eWIL students.

c. Sampling: Stratified purposive sampling to ensure representation across disciplines (e.g., Computer Science, Electrical Engineering, and business Education), modes of eWIL (fully virtual, hybrid), and student demographics (including disability status, socio-economic indicators). Target N: minimum 20 students, 20 academics, 20 employers (adjustable by study scope).

3.4 Instrument Overview

The questionnaire comprises four modules:

a. **Demographics & context** (mode of eWIL, discipline, prior experience, access to devices/internet).

b. **Hard outcomes** (employability indicators): self-reported development of technical skills, attainment of tasks, job offers post-placement, supervisor-rated task performance. Items use 5-point Likert scales and objective indicators where available.

c. **Soft outcomes & inclusion measures**: Validated scales or subscales adapted for online WIL contexts:

i. Student Engagement Scale (adapted for digital placement contexts): Frequency and depth of participation.

ii. Sense of Belonging / Inclusion Index: Items on perceived inclusion, recognition, and voice in workplace tasks.

iii. Digital Wellbeing Literacy and Self-Efficacy: Capacity to manage digital boundaries, use tools, and maintain wellbeing. (See digital wellbeing literature for item inspiration)

d.**Employer & academic experience**: survey sections for supervisors and coordinators covering mentoring workload, perceived authenticity of tasks, technology readiness, and recommended supports (structured checklists + Likert items).

Open-text prompts solicit examples of successes, barriers, and suggested improvements. Optional consent for follow-up interviews should be offered.

3.5 Validation and Piloting

i. Content validity: expert review by a panel of WIL scholars, inclusion specialists (UDL practitioners), and employer partners.

ii. Pilot: 30–40 respondents across stakeholder groups to test item clarity, reliability (Cronbach's alpha target >0.7 for multi-item scales), and measurement invariance across subgroups.

iii. Ethical considerations: data confidentiality, informed consent, accommodations for respondents with disabilities, and options for telephone/synchronous completion where needed.

4. Data Analysis

This section presents the results of the data analysis obtained from the sixty (60) stakeholders that participated in the eWILL experiment.

Table 1: Inclusivity Importance

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	14	23.3	23.3	23.3
	Disagree	6	10.0	10.0	33.3
	Neutral	8	13.3	13.3	46.7
	Strongly Agree	25	41.7	41.7	88.3
	Strongly Disagree	7	11.7	11.7	100.0
	Total	60	100.0	100.0	

Table 2: Technology Effectiveness

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	21	35.0	35.0	35.0
	Disagree	10	16.7	16.7	51.7
	Neutral	7	11.7	11.7	63.3
	Strongly Agree	14	23.3	23.3	86.7
	Strongly Disagree	8	13.3	13.3	100.0
	Total	60	100.0	100.0	

Table 3: Instructor Support

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	27	45.0	45.0	45.0
	Disagree	3	5.0	5.0	50.0
	Neutral	6	10.0	10.0	60.0
	Strongly Agree	16	26.7	26.7	86.7
	Strongly Disagree	8	13.3	13.3	100.0
	Total	60	100.0	100.0	

Table 4: Engagement Level

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	29	48.3	48.3	48.3
	Disagree	9	15.0	15.0	63.3
	Neutral	7	11.7	11.7	75.0
	Strongly Agree	6	10.0	10.0	85.0
	Strongly Disagree	9	15.0	15.0	100.0
	Total	60	100.0	100.0	

Table 5: Employment Readiness

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	21	35.0	35.0	35.0
	Disagree	9	15.0	15.0	50.0
	Neutral	10	16.7	16.7	66.7
	Strongly Agree	17	28.3	28.3	95.0
	Strongly Disagree	3	5.0	5.0	100.0
	Total	60	100.0	100.0	

Table 6: Challenge

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Accessibility tools are inadequate for visually impaired students.	19	31.7	31.7	31.7
	Internet connectivity is poor during online sessions.	6	10.0	10.0	41.7
	Lack of engagement from industry partners.	6	10.0	10.0	51.7
	Limited feedback from supervisors during internships.	15	25.0	25.0	76.7
	Workload balance between school and online tasks is difficult.	14	23.3	23.3	100.0
	Total	60	100.0	100.0	

Table 7: Support Suggestion

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	By ensuring all materials are accessible and flexible.	13	21.7	21.7	21.7
	Encouraging collaboration across disciplines.	5	8.3	8.3	30.0
	Including mentorship and personalized feedback sessions.	19	31.7	31.7	61.7
	Integrating industry-led workshops and guidance.	11	18.3	18.3	80.0
	Providing flexible scheduling and asynchronous options.	12	20.0	20.0	100.0
	Total	60	100.0	100.0	

Table 8: Tools Used

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	AI-based tools personalize learning experience.	16	26.7	26.7	26.7
	Canvas with integrated simulations improves engagement.	29	48.3	48.3	75.0
	Digital portfolios help track skills and performance.	1	1.7	1.7	76.7
	Slack and Trello enhance communication and task management.	4	6.7	6.7	83.3
	Zoom and Google Workspace have been most effective.	10	16.7	16.7	100.0
	Total	60	100.0	100.0	

Table 9: Inclusive Strategies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Co-designing courses with students and employers.	12	20.0	20.0	20.0
	Embedding reflection sessions and peer mentoring.	9	15.0	15.0	35.0
	Including cultural competence training.	18	30.0	30.0	65.0
	Offering virtual mentorship opportunities.	16	26.7	26.7	91.7
	Using analytics to track participation and equity.	5	8.3	8.3	100.0
	Total	60	100.0	100.0	

Table 10: Obstacles

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Cybersecurity risks in online learning systems.	5	8.3	8.3	8.3
	Difficulty aligning assessment with real-world projects.	7	11.7	11.7	20.0
	Employers lack readiness for virtual engagement.	22	36.7	36.7	56.7
	Limited digital infrastructure in some institutions.	12	20.0	20.0	76.7
	Resistance from staff unfamiliar with technology.	14	23.3	23.3	100.0
	Total	60	100.0	100.0	

Table 11: Future Collaboration

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Employers will co-develop flexible learning modules.	12	20.0	20.0	20.0
	Future collaboration will rely on shared digital platforms.	15	25.0	25.0	45.0
	Increased use of micro-credentials and blockchain verification.	7	11.7	11.7	56.7
	Joint innovation projects will strengthen partnerships.	15	25.0	25.0	81.7
	More employer participation in online assessment.	11	18.3	18.3	100.0
	Total	60	100.0	100.0	

Table 12: Recommendations

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Adopt universal design principles for inclusion.	11	18.3	18.3	18.3
	Continuous feedback loops for improvement.	16	26.7	26.7	45.0
	Include diversity and equity goals in curriculum design.	8	13.3	13.3	58.3
	Offer ongoing digital literacy programs.	8	13.3	13.3	71.7
	Support equal access to devices and connectivity.	17	28.3	28.3	100.0
	Total	60	100.0	100.0	

4. Discussion

4.1. Hard Outcomes Analysis

This refers to the tangible, measurable results such as employability, skill acquisition, system effectiveness, and performance readiness

Table 5 reflects the employment readiness which shows that **63.3%** of respondents *Agree or Strongly Agree* that the system enhances employment readiness, and only **20%** express disagreement, indicating a generally positive employability outcome. This suggests that eWIL particularly, when structured can deliver concrete labor-market aligned competencies.

4.2 Virtual vs Hybrid Interpretation

Fully virtual eWIL supports baseline employability through digital exposure. Whereas hybrid eWIL is likely to strengthen hard outcomes further by integrating physical workplace immersion, addressing gaps in real-world contextual learning.

Table 5 deduced with regards toTechnology Effectiveness, **58.3%** positive responses (Agree + Strongly Agree) were obtained.However, a combined **30%** negative perception (Disagree + Strongly Disagree) highlights uneven technology performance. This implies that hard

outcomes in fully virtual systems are **technology-dependent**, making infrastructure reliability a critical success factor. Hence there is the need for hybrid eWIL consideration to mitigate technological risk by distributing learning across physical and digital spaces.

4.3 Tools Used (Performance-Oriented)

Table 8 shows high reliance on canvas with simulations tools **(48.3%)** and AI-based tools **(26.7%)**which reflects strong alignment with skill tracking and performance analytics, but a reflects a very low use of digital portfolios **(1.7%)**, suggesting a missed opportunity for measurable competency documentation. The interpretation to this system is that fully virtual eWIL excels in scalable assessment and trackingplatforms. While hybrid systems can better integrate portfolio evidence with real workplace outputs, thus improving verifiable hard outcomes.

4.4 Soft Outcomes Analysis

Soft outcomes refers to attitudinal, behavioral, and experiential outcomes such as engagement, inclusivity, support, and confidence of eWIL system. Table 1 reflects the **Inclusivity Importance**which shows a strong **65% Agree/Strongly Agree**value that indicates inclusivity is highly valued.However, **21.7% Strongly Disagree/Disagree** reflects persistent equity concerns.This concern can be mitigated using Virtual eWIL for its ability to promote inclusion conceptually. Inclusivity can be complimented through hybrid eWIL that allows adaptive support mechanisms especially for students with diverse needs.

Table 4 depicts the Engagement Level in eWIL setting with **58.3%** positive engagement, but **30%** negative responses, suggesting inconsistent learner experience.Lower "Strongly Agree" responses (10%) indicate moderate, not deep, engagement. Hence, this situation means that fully virtual eWIL risks engagement fatigue due to screen dependency. However, hybrid eWIL improves soft outcomes by enabling social presence, peer interaction, and experiential learning. Furthermore, in Table 3, the instructor support concept reflects a strong **71.7% positive perception**that shows instructor presence remains a critical success factor.This confirms that human mediation is essential, regardless of delivery mode.This implies that fully virtual eWIL succeeds when instructor interaction is intentional and structured.Hybrid systems naturally enhance perceived support through multi-channel interaction.

4.5 Challenges and Obstacles: Outcome Constraints

Key Hard-Outcome Barriers includes employers lack of readiness for virtual engagement **(36.7%)** from Table 5 and limited digital infrastructure (20%) from Table 6 directly weaken skill authenticity, assessment validity and Industry alignment. The key soft-outcome barriers includes accessibility tools inadequate for visually impaired students (31.7%), limited supervisor feedback (25%) and workload imbalance (23.3%) which undermines confidence, sense of belonging and motivation. Hence, comparatively fully virtual eWIL is more exposed to both infrastructure and engagement risks than hybrid eWIL which buffers these challenges by enabling face-to-face mentoring and contextual feedback.

Table 7 depicts support suggestions and Table 9 Inclusive Strategies both suggest system optimization support needs such as mentorship and personalized feedback (31.7%), accessible and flexible materials (21.7%) and flexible scheduling (20%). The inclusive Strategies suggested in by the research are cultural competence training (30%), virtual mentorship (26.7%) and co-design with employers and students (20%). This can be interpreted thus; soft outcomes improve significantly when human-centered and inclusive design principles are embedded in hybrid eWIL to allow these strategies to be implemented more holistically.

4.6 Future Collaboration and Sustainability

From Table 11 the future collaboration strong emphasized is theshared digital platforms **(25%)** and joint innovation projects **(25%),** this indicates a shift toward ecosystem-based WIL models rather than isolated placements. The trajectory is that fully virtual eWIL system enables scalability and cross-border collaboration while hybrid eWIL offers greater partnership depth and trust-building, strengthening long-term outcomes.

Table 13: Overall Comparative Summary

Dimension	Fully Virtual eWIL	Hybrid eWIL
Hard Outcomes	Moderate–High (tech-dependent)	High (context + tech synergy)
Soft Outcomes	Moderate, uneven	Strong and more consistent
Inclusivity	Conceptually strong, practically challenged	More adaptable and responsive
Engagement	Variable	Higher and sustained
Employer Readiness	Lower	Higher
Sustainability	High scalability	High impact

5. Conclusion

The findings indicate that while fully virtual eWIL systems are effective in delivering scalable and measurable hard outcomes, their soft outcomes are constrained by engagement, accessibility, and employer readiness challenges. Conversely, hybrid eWIL systems demonstrate superior performance across both hard and soft outcome dimensions, leveraging the strengths of digital technologies while preserving the experiential depth of physical workplace interaction. As such, hybrid eWIL emerges as a more resilient and inclusive model for sustainable work-integrated learning.

References

Alsamiri, Y. A., Alsawalem, I. M., Hussain, M. A., Al Blaihi, A. A., & Aljehany, M. S. (2022). Providing accessible distance learning for students with disabilities in Saudi Arabia. *International Journal of Advanced and Applied Sciences, 9*(1), 34–40. https://doi.org/10.21833/IJAAS.2022.01.005

Alshawabkeh, A. A., Woolsey, M. L., & Kharbat, F. (2021). Using online information technology for deaf students during COVID-19: A closer look from experience. *Heliyon, 7*(5), 7(5), 12-15. https://doi.org/10.1016/j.heliyon.2021.e06915

Altowairiki, N. (2024). Blended learning and the universal design for learning: Practical implications and students' perceptions. *Innovations in Education and Teaching International, 2*(1), 1–15. https://doi.org/10.1080/14703297.2024.2416496

An, N., Vesty, G., & Cheong, C. (2023). Defining Digital Wellbeing Literacy in Remote Work Integrated Learning. *Australasian Journal of Information Systems, 27*(3), 5-21.

Baroni, F., & Lazzari, M. I. (2022). Universal design for learning at university: Technologies, blended learning and teaching methods. *Studies in Health Technology and Informatics, 297*(3), 541–548. https://doi.org//files.eric.ed.gov/fulltext/EJ1264277.pdf

Briant, S. (2024). *Bridging theory and practice: Exploring work-integrated learning (WIL) in architecture from the profession's perspective (Doctoral dissertation).* Queensland University of Technology. https://doi.org/10.5204/thesis.eprints.249159

Cai, I., Wen, Q., & Lombaerts,, K. (2024). How Universal Design for Learning (UDL) is related to Differentiated Instruction (DI): The mediation role of growth mindset and teachers' practices factors. *Social Psychology of Education, 27*(3), 3513–3532. https://doi.org/10.1007/s11218-024-09945-9

Chapman, L. A., & Jackson, A. M. (2021). Accessibility matters: Universal design and the online professional practice doctorate. Impacting Education. *Journal on Transforming Professional Practice, 6*(3), 1–6. https://doi.org/10.5195/ie.2021.184

Fakhry, H., Nicho, M., Bataineh, E., & Girja, S. (2024). The Evaluation of Internship in the Digital Information Age: A Case Study . *International Journal of Online Pedagogy and Course Design (IJOPCD), 14*(1), 1-25. https://doi.org/10.4018/IJOPCD.333630

Figard, R. A., & Carberry, A. R. (2024). A law of diminishing returns: Quantifying online accessibility for engineering students with disabilities in the wake of the COVID-19 pandemic. *IEEE Transactions on Education, 67*(3), 434–442. https://doi.org/10.1109/TE.2023.3326760

Frison, D. (2025). Higher The Digital Transformation of Work-Integrated Learning Programmes. *Higher Education in Post-Covid19.* Vanna Boffo, Regina: FUP Press. https://doi.org/10.36253/fup_referee_list

Garrad, T. A., & Nolan, H. (2023). Rethinking higher education unit design: Embedding universal design for learning in online studies. *Student Success, 14*(1), 1-8. https://doi.org/10.5204/ssj.2300

Glavas, C., & Schuster, L. (2020). Design principles for electronic work integrated learning (eWIL). *The Internet and Higher Education, 47*(1), 100-120. https://doi.org/10.1016/j.iheduc.2020.100760

Johnson , K. W. (2022). An Exploration of Employer Participation in Internships and Other Work-Based Learning Experiences . *Journal of Career and Technical Education , 37*(1), 4-18.

Kasemsarn, K., & Sawadsri, A. (2024). Universal Design for Learning (UDL) in Heritage Education: A Multimedia Approach to 'Phra Aphai Mani'. *Heritage, 7*(10), 5907-5931.

Klamn, R. (2024). A SCOPING REVIEW OF INCLUSIVE ONLINE HIGHER EDUCATION: LEVERAGING UDL PRACTICES. *Athabasca University, 2*(1), 46-54.

Maietta, H., & Gardner, P. (2022). US Employer Response to COVID-19: Actions Taken and Future Expectations of Virtual Work-Integrated Learning . *International Journal of Work-Integrated Learning, 23*(3), 427-444.

Matthew, T. H., Changhee, L., Zi , C., & Anthony , H. (2021). Studying and improving online internships in the midst of the COVID-19 pandemic. *Center for Research on College-Workforce Transitions (CCWT) University of Wisconsin-Madison, 3*(1), 34-57.

Ostrognaj, T., Bristow, C., Zandes, S., Ilic, D., & Howard, B. (2024). Virtual Health Promotion Work-Integrated Learning Placements: A COVID-19 Consequence or Preparation for the Future. *Health promotion practice, 25*(4), 509–514. https://doi.org/10.1177.15248399231180560

Perusso, A. (2024). Electronic work-based learning (eWBL): a framework for Studies in Higher Education . *Journal of Social Science Studies, 6*(1), 112-123.

Utam, I. S., Ghufron, A., & Tiwi, I. (2025). Universal Design for Learning in Online Education: A Systematic Review of Evidence-Based Practice for Supporting Students with Disabilities. *International Journal of Learning, Teaching and Educational Research , 24*(3), 94-116. https://doi.org/10.26803/ijlter.24.3.5