

Advancing Training Transfer Among Academics in Private Higher Education Institutions: An Integrated Conceptual Model of Digital Readiness, Work Support and Self-Efficacy

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ABSTRACT

Private higher education institutions depend on academics' ability to translate professional development into sustained improvements in teaching, research and administration. Yet the application of training remains uneven, particularly when development is delivered virtually and must be enacted in digitally intensive work settings. This conceptual article develops an integrated model of training transfer among academics in Malaysian private higher education institutions. The model synthesizes recent evidence on training job-alignment, virtual training design quality, collaborative support, the learning environment and digital readiness. It positions self-efficacy as the central psychological mechanism through which these individual, design and contextual conditions influence transfer. Social Cognitive Theory explains how capability beliefs and social cues shape action, the Motivational Theory of Training Transfer connects relevance and opportunity to application, and the Unified Theory of Acceptance and Use of Technology clarifies the role of digital competence and facilitating conditions. Sixteen testable hypotheses specify direct and mediated relationships. A future cross-sectional survey of 379 academics from seven private universities in the Klang Valley is proposed, using a refined 49-item instrument and partial least squares structural equation modelling. The article contributes a context-sensitive explanation of why well-designed training may still fail to transfer when academics lack confidence, support, resources or opportunities to apply learning. It also offers a practical architecture for universities to align development with academic roles, strengthen transfer-oriented virtual design, create peer and supervisory reinforcement, and build digital readiness. Because no empirical data are reported, the model should be treated as a theory-driven agenda for validation rather than evidence of causal effects.

Keywords: training transfer; self-efficacy; digital readiness; private higher education; virtual training

1. INTRODUCTION

Universities invest in professional development because academic work changes continuously. Academics are expected to design inclusive learning, use digital platforms, undertake research, engage with industry, assure programme quality and perform administrative responsibilities. Participation in training, however, does not guarantee that new knowledge and skills become routine practice. Training transfer refers to the sustained and appropriate application of learning in the work setting. It is therefore the link between development expenditure and observable improvement in academic work. Recent studies continue to show that transfer depends on a combination of learner characteristics, instructional design and workplace conditions rather than on attendance alone (Bhat et al., 2022; Shukla et al., 2024; Suhaimy et al., 2023).

This issue is especially important in private higher education. Malaysian private higher education institutions operate in a competitive and regulated environment in which institutional reputation depends heavily on teaching quality, programme responsiveness and staff capability. Digital delivery has also become a normal component of academic development. The pandemic accelerated online teaching and exposed substantial differences in faculty readiness, digital competence, access to support and confidence in virtual practice (Adi Badiozaman et al., 2022; Bond et al., 2021; Turnbull et al., 2021). These differences are not temporary. Blended programmes, learning management systems, data-supported quality assurance and digitally mediated collaboration have made digital readiness a continuing condition of academic performance.

The contemporary evidence base also demonstrates that transfer is multi-level. Instructional relevance and design influence whether academics see training as usable. Supervisors, colleagues and mentors influence whether application is

encouraged and normalized. Organizational resources, time and recognition shape whether application is feasible. Individual digital readiness affects whether virtual learning can be completed and adapted to work. Across these influences, self-efficacy determines whether an academic believes that new behavior can be performed despite obstacles. Studies of online teaching, teacher technology use and workplace learning consistently connect efficacy beliefs with persistence, engagement and willingness to adopt new practices (Chou & Chou, 2021; Culp-Roche et al., 2021; Ma et al., 2021).

Existing training-transfer studies have examined many of these factors separately, but fewer models combine job-alignment, virtual design, collaborative support, learning environment and digital readiness in a single higher education framework. Research in institutions of higher education shows that supervisor and peer support matter (Yaghi & Bates, 2020), while research on ICT training demonstrates that usefulness, satisfaction and self-efficacy influence transfer intentions (Tzafilkou et al., 2023). The remaining conceptual challenge is to explain how these conditions operate together and why apparently favorable training does not always lead to application. This article addresses that challenge by placing self-efficacy between five transfer antecedents and training transfer.

The article has four objectives. First, it synthesizes recent literature relevant to training transfer in digitally intensive academic work. Second, it develops an integrated framework grounded in Social Cognitive Theory, the Motivational Theory of Training Transfer and the Unified Theory of Acceptance and Use of Technology. Third, it specifies sixteen direct and mediation hypotheses. Fourth, it proposes a transparent empirical design for validating the framework among academics in seven private universities in the Klang Valley. The resulting contribution is conceptual and methodological. It does not report completed survey findings and does not infer effects that have not yet been tested.

2. Research Context and Problem

Private universities use training to maintain programme standards, strengthen digital pedagogy, improve research capability and respond to changing learner expectations. The value of that investment depends on what happens after the programme. If academics understand content but cannot apply it because of misalignment, weak design, limited support, workload or inadequate digital capability, the institution records participation without obtaining performance improvement. Meta-analytic evidence indicates that the work environment is critical to the maintenance of newly acquired behaviour (Hughes et al., 2020). More recent studies likewise connect training transfer with opportunity, support, organizational culture and the perceived value of application (Chen, Lin, & Liu, 2024; Gemmano et al., 2022; Lathabhavan, 2024).

The move to online and blended professional development adds a second transfer boundary. A participant must first engage successfully with the virtual training environment and must then adapt what was learned to teaching, research or administrative work. Reviews of online teaching show that effective practice requires more than technological access. Course organization, interaction, teacher presence, institutional support and task-focused learning activities are central to quality (Martin et al., 2020; Murtagh et al., 2023; Rapanta et al., 2020). Faculty who are able to use digital tools may nevertheless struggle to create connected, pedagogically meaningful learning experiences. Conversely, a well-designed online course may not transfer if an academic lacks confidence or receives no opportunity to implement its content.

The study from which this article is developed identifies five plausible antecedents. Training job-alignment represents the perceived correspondence between programme content and academic tasks. Virtual training design quality captures structure, clarity, interaction, accessibility and practice. Collaborative support reflects encouragement and assistance from supervisors, peers and mentors. Learning environment refers to resources, time, experimentation, feedback, recognition and a culture of development. Digital readiness represents the competence and willingness needed to engage with training technology and use digital learning at work. These factors span the trainee, training and workplace domains highlighted in recent reviews (Arabi & Garza, 2023; Shukla et al., 2024).

The central research problem is therefore not whether each condition is desirable in isolation. It is whether these conditions predict self-efficacy and transfer simultaneously, and whether self-efficacy explains part of their influence. The problem is relevant to academics because their work is autonomous but interdependent. They often decide how to teach, research and organize their work, yet their choices remain constrained by programme requirements, platforms, workload, leadership and collegial norms. A model that ignores either agency or context is incomplete. The present framework treats self-efficacy as a mechanism that converts supportive conditions into confident action while retaining direct paths from the five antecedents to transfer.

3. THEORETICAL FOUNDATIONS

3.1 Social Cognitive Theory

Social Cognitive Theory (SCT), developed by Bandura (1986), explains behavior as the reciprocal product of personal cognition, action and environmental conditions. A central proposition of SCT is that individuals' beliefs about their capabilities influence how they initiate behavior, the effort they invest and their persistence when difficulties arise. Within training transfer, self-efficacy is particularly relevant because it concerns an individual's perceived capability to organize and perform the actions required to apply learned skills. Thus, self-efficacy provides an important cognitive mechanism through which training experiences and environmental conditions can influence subsequent behavior (Bandura, 1986). Recent evidence is consistent with this logic. Training participants with stronger efficacy and empowerment are more likely to use learning, while social support and enabling work conditions can strengthen the confidence required for application (Creon & Schermuly, 2022; Lathabhavan & Griffiths, 2024; Miirio et al., 2024).

For academics, mastery experiences may arise through practice during training, successful experimentation in a class or completion of a technology-supported task. Vicarious learning occurs when colleagues demonstrate an approach. Verbal persuasion occurs through feedback, mentoring and supervisory encouragement, while emotional and physiological cues may reflect anxiety, workload or technostress. These mechanisms provide a theoretical basis for understanding how virtual design, collaborative support, the learning environment and digital readiness may influence self-efficacy. SCT also supports the path from self-efficacy to transfer because academics who believe they can successfully enact a learned skill are more likely to initiate, refine and sustain its application (Bandura, 1986). In this sense, self-efficacy functions as an important psychological mechanism linking training-related and environmental conditions to training transfer.

3.2 Transfer Motivation Theory/Perspective

The motivational perspective on training transfer can be traced to Noe's (1986) work on trainee attributes and attitudes, which conceptualized motivation as an important influence on training effectiveness and introduced the concept of motivation to transfer. Noe (1986) argued that trainee characteristics, attitudes and motivational factors can influence learning and subsequent behavior change. This perspective was subsequently complemented by the transfer model of Baldwin and Ford (1988), which conceptualized transfer as the generalization and maintenance of learned knowledge and skills in the work environment and highlighted the roles of trainee characteristics, training design and work-environment conditions.

From this perspective, training transfer depends not only on whether individuals acquire knowledge and skills but also on whether they are motivated and able to apply what they have learned in their work. Perceived utility, task relevance, confidence, social expectations and opportunity can therefore influence motivation and implementation. Contemporary studies show that transfer improves when training is useful, intentions are clear and post-training conditions permit application (de Jong et al., 2023; Greenan, 2023; Kim & Lee, 2023). Salamon et al. (2022) further describes a positive resource process in which job resources, work engagement, opportunity and motivation reinforce transfer.

Training job-alignment is central to this perspective because an academic is unlikely to invest effort in content that appears detached from real responsibilities. Virtual design also matters because realistic practice and reflection can help trainees plan how new capabilities will be used. Arabi and Garza (2023) show that evaluation can redirect design toward performance and skills practice, while Fauth and Gonzalez-Martinez (2021) emphasize reflection and transfer-oriented activities in continuing online training. Collaborative support and the learning environment communicate expectations and make application less costly. These conditions can influence transfer directly and indirectly by strengthening motivation and efficacy. Therefore, the motivational perspective provides a theoretical basis for explaining why training characteristics and work conditions may affect academics' willingness and ability to transfer learning into their academic practice.

3.3 Unified Theory of Acceptance and Use of Technology

The Unified Theory of Acceptance and Use of Technology (UTAUT), developed by Venkatesh et al. (2003), contributes to the digital technology component of the framework. UTAUT was developed by integrating eight prominent models of technology acceptance and identifies key determinants of technology intention and use, including performance expectancy, effort expectancy, social influence and facilitating conditions. In the context of digitally mediated training, these dimensions provide a useful basis for explaining why individuals differ in their willingness and ability to engage with technology-supported learning and subsequently use digital tools in their work.

Digital readiness captures the knowledge, confidence and willingness that allow academics to navigate platforms, troubleshoot basic problems and select appropriate tools. The construct is therefore broader than access because it concerns practical competence and adaptive use. From a UTAUT perspective, academics are more likely to engage with and use digital technologies when they perceive them as useful, manageable and supported by their social and organizational environment (Venkatesh et al., 2003). Consequently, digital readiness can be viewed as an important



individual condition that facilitates engagement with virtual training and subsequent application of digitally enabled skills.

Studies conducted during and after the rapid move online show substantial variation in teacher readiness. Howard et al. (2021) identify profiles based on technological pedagogical confidence, online presence and institutional support. Guillén-Gámez et al. (2022) find that digital competence varies with teaching experience and the types of resources used. Polly et al. (2023) similarly report differences in perceived competence and the usefulness of digital tools. These findings imply that digital readiness can shape both the experience of virtual training and the likelihood that digital skills will be transferred to academic work. Thus, UTAUT complements Social Cognitive Theory and the motivational perspective by explaining the technology-related conditions that may facilitate or constrain engagement with virtual training and subsequent use of digitally acquired skills.

3.4 Theoretical Integration

The three perspectives are complementary. Social Cognitive Theory explains capability beliefs and reciprocal influence. The motivational perspective explains why relevance, expectations and opportunity direct effort toward application. Technology acceptance logic explains how digital capability and facilitating conditions influence engagement with virtual tools. Their integration avoids reducing transfer to a single cause and is consistent with the integrative transfer logic proposed for higher education by Galoyan and Betts (2021). Training can be relevant but poorly designed, well designed but socially unsupported, socially supported but resource constrained, or technically accessible but psychologically intimidating.

The integrated model therefore specifies two routes. The direct route proposes that the five antecedents influence transfer through practical relevance, design features and contextual opportunity. The indirect route proposes that the same antecedents build self-efficacy, which in turn promotes application. Partial rather than complete mediation is expected because environmental resources and task alignment can facilitate behavior even when confidence changes only modestly. Conversely, self-efficacy may not overcome a total absence of time, access or managerial permission.

Table 1. Construct Definitions and Theoretical Anchors

Construct	Operational meaning	Primary theoretical logic	Recent evidence
Training job-alignment	Perceived correspondence between training content and teaching, research or administrative tasks.	Task relevance and perceived utility.	Bhat et al. (2022); Yaqub et al. (2021)
Virtual training design quality	Structure, clarity, accessibility, interaction, practice, feedback and appropriate pacing in virtual training.	Mastery experience and transfer-oriented design.	Arabi and Garza (2023); Fauth and Gonzalez-Martinez (2021)
Collaborative support	Encouragement, modelling, guidance and problem solving from supervisors, peers and mentors.	Social influence, modelling and reinforcement.	Sahoo and Mishra (2022); Yaghi and Bates (2020)
Learning environment	Time, resources, opportunity, autonomy, experimentation, feedback, recognition and learning culture.	Facilitating conditions and transfer climate.	Hughes et al. (2020); Lathabhavan (2024)
Digital readiness	Competence, confidence and willingness to use and integrate digital tools.	Technology acceptance and digital competence.	Falloon (2020); Guillén-Gámez et al. (2022)
Self-efficacy	Belief in one's capability to apply learning and manage implementation barriers.	Capability beliefs and persistence.	Ma et al. (2021); Miirio et al. (2024)
Training transfer	Sustained and appropriate application of learning to academic work.	Behavioural application and maintenance.	Shukla et al. (2024); Suhaimey et al. (2023)

Table 2. Synthesis of Recent Evidence Supporting the Framework

Evidence domain	Consistent implication	Illustrative recent sources
Design and relevance	Design quality, realistic practice, usefulness and reflective activities facilitate application.	Arabi and Garza (2023); Fauth and Gonzalez-Martinez (2021); Tzafilkou et al. (2023)
Support	Supervisor and peer support influence motivation, opportunity and transfer; peer support may be especially proximal.	Salamon et al. (2021); Wisshak and Barth (2022); Yaghi and Bates (2020)
Environment	Resources, opportunity, autonomy and learning culture shape sustainment and performance.	Gemmano et al. (2022); Hughes et al. (2020); Lathabhavan (2024)
Self-efficacy	Capability beliefs support persistence, online teaching and the use of trained behaviour.	Culp-Roche et al. (2021); Ma et al. (2021); Miirio et al. (2024)
Digital readiness	Technology competence and institutional readiness vary and affect continued digital practice.	Chou and Chou (2021); Howard et al. (2021); Polly et al. (2023)
Higher education	Faculty competence, connectedness and collegial conditions influence implementation in academic settings.	Adi Badiozaman et al. (2022); Leino et al. (2024); Yaghi and Bates (2020)

4. Construct Development and Hypotheses

4.1 Training Job-Alignment

Training job-alignment is the degree to which learning objectives, examples and practice correspond with the teaching, research and administrative tasks performed by academics. Alignment increases perceived usefulness and reduces the cognitive work required to translate general ideas into local action. Evidence across management training and occupational settings shows that trainee perceptions, instructional design and task relevance contribute to transfer (Bhat et al., 2022; Yaqub et al., 2021). In academic work, alignment also legitimises time spent on application because the new behaviour can be connected to recognised duties and performance goals.

Alignment should strengthen self-efficacy when tasks practised in training resemble tasks encountered at work. Successful rehearsal supplies mastery information, and relevant examples help academics anticipate obstacles. It should also influence transfer directly because immediately applicable content lowers implementation costs. Accordingly, H1 proposes that training job-alignment positively influences self-efficacy, and H6 proposes that training job-alignment positively influences training transfer.

4.2 Virtual Training Design Quality

Virtual training design quality refers to the structure, clarity, accessibility, interaction, practice opportunities, feedback and pacing of online professional development. It is not equivalent to visual attractiveness. High-quality design focuses attention on performance goals, sequences complex content, creates opportunities to practise and makes application visible. Fauth and Gonzalez-Martinez (2021) show that transfer-oriented online design benefits from reflective activity, and Dixit and Sinha (2022) demonstrate the value of concrete tools and techniques that support workplace implementation. Arabi and Garza (2023) likewise connect evaluation evidence with iterative improvement of training design.

Well-designed virtual training can increase self-efficacy by providing progressive mastery, understandable instructions and feedback. It can directly support transfer by offering realistic examples, application plans and reusable resources. Poor interaction or inaccessible platforms may produce the opposite effect even when content is relevant. H2 therefore proposes that virtual training design quality positively influences self-efficacy, while H7 proposes that it positively influences training transfer.

4.3 Collaborative Support

Collaborative support is the practical and socio-emotional assistance provided by supervisors, colleagues, mentors and professional communities before, during and after training. Support may include encouragement, modelling, problem solving, feedback, sharing resources and protecting time for implementation. Yaghi and Bates (2020) demonstrate that supervisor and peer support shape transfer in higher education. Salamon et al. (2021) show that supervisor support interacts with participation conditions to influence motivation and transfer, while Sahoo and Mishra (2022) connect organisational antecedents with self-efficacy and the desire to learn.

Collaboration supplies vicarious experience and verbal persuasion, both of which should strengthen self-efficacy. It also creates a social norm that application is expected and safe. Studies indicate that peer support can be particularly important because colleagues are available at the point of implementation and understand local constraints (Salamon et al., 2021; Wisshak & Barth, 2022). H3 proposes a positive relationship between collaborative support and self-efficacy. H8 proposes a positive relationship between collaborative support and training transfer.

4.4 Learning Environment

The learning environment comprises organisational resources and norms that enable sustained application. It includes time, tools, access to systems, opportunity to perform, autonomy, experimentation, feedback, recognition and a culture that values learning. Work-environment evidence indicates that transfer is difficult to sustain when opportunities and reinforcement are absent (Hughes et al., 2020). Cultural and contextual studies similarly show that learning norms influence application, motivation and performance (Brion, 2020; Gautam & Basnet, 2021; Gemmano et al., 2022; Yaghi et al., 2025).

A supportive learning environment should strengthen efficacy by giving academics repeated opportunities to practise and by treating early mistakes as part of development. It should influence transfer directly because resources and time are objective conditions for use. Lathabhavan (2024) finds that autonomy and opportunity help connect intrinsic motivation with transfer, and Kuo and Tien (2022) identify mechanisms through which learning can move from training to work. H4 therefore proposes that the learning environment positively influences self-efficacy. H9 proposes that the learning environment positively influences training transfer.

4.5 Digital Readiness

Digital readiness is an academic's competence, confidence and willingness to use digital tools for learning and work. It includes navigating a learning management system, managing files and communication, resolving minor technical problems, judging tool suitability and integrating technology into teaching, research or administration. Falloon (2020) argues that teacher digital competence must connect technical capability with pedagogical and contextual judgment. Digital readiness is therefore not a fixed personal trait. It can be developed through targeted practice, accessible support and meaningful use.

The higher education literature shows that online readiness is related to prior experience, institutional conditions and perceptions of teaching competence (Adi Badiozaman et al., 2022; Howard et al., 2021). Technological self-efficacy also helps reduce technostress and supports continued online teaching (Chou & Chou, 2021). Digital readiness should consequently strengthen self-efficacy and remove practical barriers to transfer. H5 proposes that digital readiness positively influences self-efficacy, and H10 proposes that digital readiness positively influences training transfer.

4.6 Self-Efficacy and Training Transfer

Self-efficacy is the belief that one can apply training successfully across relevant work tasks and manage obstacles that arise during implementation. It differs from general confidence because it is tied to a course of action.

Research on online teaching shows that prior experience and perceived capability are associated with stronger teaching efficacy (Culp-Roche et al., 2021; Ma et al., 2021). Leino et al. (2024) further show that connectedness with students predicts lecturers' online teaching self-efficacy, illustrating how social experience can strengthen capability beliefs.

In transfer research, self-efficacy promotes initiation, persistence and recovery after setbacks. Transformational trainers can influence transfer through psychological empowerment (Creon & Schermuly, 2022), and performance self-efficacy is linked with training design, motivation and transfer (Miirio et al., 2024). H11 therefore proposes that self-efficacy positively influences training transfer.



H12 to H16 propose that self-efficacy mediates the effects of training job-alignment, virtual training design quality, collaborative support, learning environment and digital readiness on training transfer, respectively.

Table 3. Summary of Proposed Hypotheses

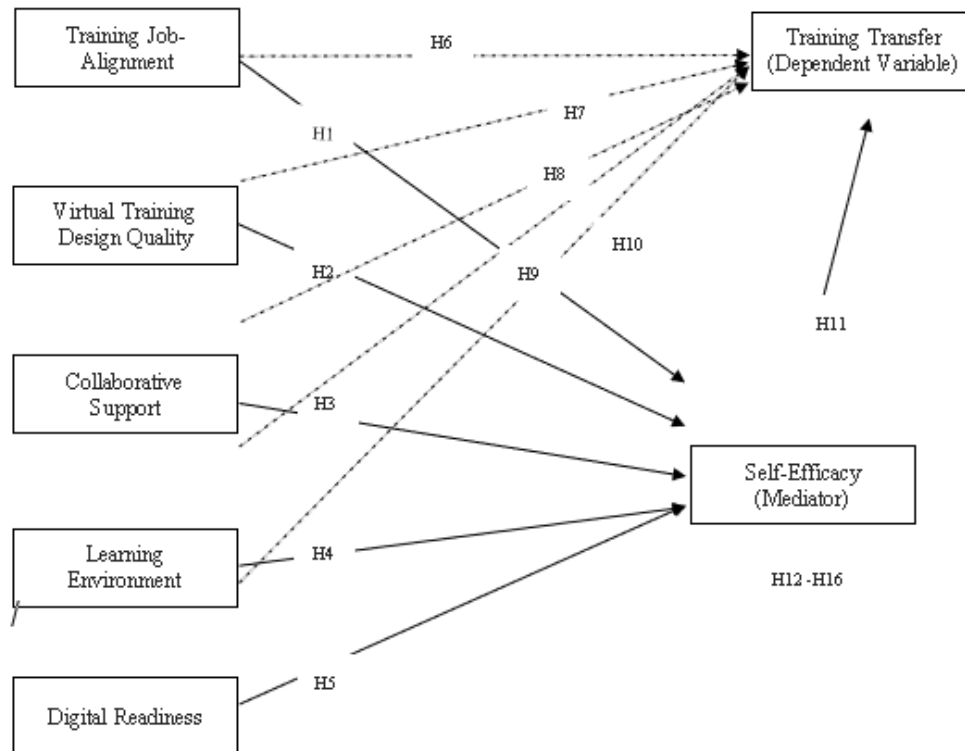
Code	Hypothesis
H1	Training job-alignment positively influences self-efficacy.
H2	Virtual training design quality positively influences self-efficacy.
H3	Collaborative support positively influences self-efficacy.
H4	The learning environment positively influences self-efficacy.
H5	Digital readiness positively influences self-efficacy.
H6	Training job-alignment positively influences training transfer.
H7	Virtual training design quality positively influences training transfer.
H8	Collaborative support positively influences training transfer.
H9	The learning environment positively influences training transfer.
H10	Digital readiness positively influences training transfer.
H11	Self-efficacy positively influences training transfer.
H12	Self-efficacy mediates the relationship between training job-alignment and training transfer.
H13	Self-efficacy mediates the relationship between virtual training design quality and training transfer.
H14	Self-efficacy mediates the relationship between collaborative support and training transfer.
H15	Self-efficacy mediates the relationship between the learning environment and training transfer.
H16	Self-efficacy mediates the relationship between digital readiness and training transfer.

5. Integrated Conceptual Framework

Figure 1 presents the integrated framework. The five antecedents are treated as distinct but correlated constructs. Their direct paths to self-efficacy test capability-building effects. Their direct paths to training transfer test whether relevance, design and contextual facilitation influence application beyond efficacy. The path from self-efficacy to transfer represents the central psychological mechanism. The five indirect effects test whether capability beliefs carry part of each antecedent's influence to transfer.

The framework is deliberately parsimonious. Motivation to transfer, work engagement, perceived usefulness and opportunity could also be modelled, but including every plausible mechanism would reduce interpretability and require a substantially larger design. The present model focuses on self-efficacy because it provides a theoretically coherent bridge across training, social, organisational and technological domains. Future studies can compare this mediation model with alternatives or examine sequential mechanisms.

Figure 1. Integrated Conceptual Framework of Training Transfer



Note: Solid arrows identify antecedent-to-self-efficacy and self-efficacy-to-transfer paths. Dashed arrows identify the five direct antecedent-to-transfer paths. Indirect effects H12-H16 operate through self-efficacy.

6. PROPOSED EMPIRICAL METHODOLOGY

6.1 Research Design and Setting

A quantitative, cross-sectional explanatory design is proposed to estimate associations among the seven latent constructs. The unit of analysis is an individual academic employed at a selected private university in the Klang Valley. Eligible participants should have completed at least one formal professional development activity, whether face-to-face, online or blended, within the preceding twelve months. A defined recall period will reduce variation in the training episode considered by respondents. Participants should be instructed to answer with reference to their most recent substantial programme.

With an estimated combined population of 28,570 academic staff across private higher education institutions (Malaysia's *Statistics of Higher Education 2021*), a target of 379 usable responses is retained (Krejcie and Morgan, 1970) because it provides conservative coverage at a 95 percent **confidence** level and 5 percent margin of error for that finite population. It also exceeds the minimum statistical power estimate reported in the study. To accommodate incomplete responses and nonresponse, approximately 420 invitations should be distributed proportionately across institutions.

6.2 Sampling

Proportionate stratified sampling by institution is recommended. Where complete staff lists are available, simple random selection should be used within each institutional stratum. This approach reconciles representativeness with the multi-institutional design and is stronger than unrestricted convenience recruitment. If staff lists cannot be released, institutions should distribute randomly generated invitations or apply transparent quotas, and the resulting limitation should be reported. Recruitment materials should state the purpose, voluntary nature, expected completion time, confidentiality safeguards and eligibility requirements. No supervisor should know whether an individual academic participated. The questionnaire should not collect unnecessary identifiers. Institutional response rates and sample composition should be reported so readers can judge potential nonresponse bias. Early and late respondents may be compared on key demographics and construct means as a practical diagnostic.

6.3 Instrument Development

The study provides seven reflective constructs with seven items each, producing a 49-item instrument. Training transfer covers application across teaching, research, administration and professional development. Self-efficacy assesses confidence, problem solving, goal achievement and obstacle management. Job-alignment captures relevance and immediate applicability. Virtual design covers structure, clarity, interactivity, accessibility, examples and pacing. Collaborative support covers supervisors, colleagues, mentors and knowledge sharing. Learning environment covers resources, time, experimentation, recognition and reflection. Digital readiness covers digital competence, troubleshooting, adoption and integration. The item pool should undergo expert review by specialists in human resource development, higher education management, digital learning and measurement. Experts should examine construct relevance, wording, overlap and cultural clarity. Cognitive interviews with five to ten academics should test interpretation and response processes. A pilot of approximately 30 to 50 academics should then assess administration, completion time, missing data and preliminary reliability. The duplicated digital-readiness item in the original project instrument should be replaced with a distinct item on selecting appropriate digital tools for academic work.

Table 4. Proposed Measurement Specification

Construct	Codes	Items	Content coverage	Model
Training transfer	TT1-TT7	7	Application and visible contribution across academic tasks	Reflective
Self-efficacy	SE1-SE7	7	Confidence, goals, problem solving and obstacle management	Reflective
Training job-alignment	JA1-JA7	7	Relevance and immediate applicability to academic roles	Reflective
Virtual training design quality	VD1-VD7	7	Structure, clarity, interactivity, accessibility and pacing	Reflective
Collaborative support	CS1-CS7	7	Supervisor, peer, mentor and institutional support	Reflective
Learning environment	LE1-LE7	7	Resources, time, experimentation, recognition and feedback	Reflective
Digital readiness	DR1-DR7	7	Digital competence, troubleshooting, adoption, selection and integration	Reflective

6.4 Data Collection and Ethics

Data collection should begin only after institutional ethical approval and permission from participating universities. Electronic informed consent should precede the questionnaire. Participants should be able to exit without penalty. Data should be stored on access-controlled systems, separated from any contact information and retained according to the approved protocol. Because perceptions of management support and work conditions may be sensitive, reporting should avoid institution-level identification unless explicit permission and sufficient cell sizes are available.

Procedural remedies for common method bias should be built into the survey. The predictor, mediator and outcome sections can be psychologically separated with neutral instructions. Items should use clear language, balanced ordering and assurance that there are no correct answers. A marker variable or measured method construct may be considered if questionnaire length permits. Statistical diagnostics alone should not be presented as proof that common method bias is absent.

6.5 Data Analysis

SPSS may be used for data screening and descriptive analysis, while SmartPLS may be used for partial least squares structural equation modelling. Screening should include missingness, careless responding, implausibly short completion times, univariate distributions, outliers and collinearity. Demographic characteristics and training formats should be

reported with frequencies, means and standard deviations. The decision to retain or exclude cases must be documented before hypothesis testing.

The measurement model should be evaluated before structural paths are interpreted. Indicator loadings should generally exceed 0.708, although a weaker item may be retained when content validity and composite reliability remain adequate. Internal consistency should be examined with Cronbach's alpha, rho_A and composite reliability. Convergent validity requires adequate average variance extracted. Discriminant validity should be assessed using the heterotrait-monotrait ratio and inspection of cross-loadings. Collinearity should be examined with variance inflation factors.

Structural evaluation should report standardized path coefficients, bootstrap confidence intervals, effect sizes, explained variance and predictive relevance. Direct effects H1 to H11 and indirect effects H12 to H16 should be estimated with at least 5,000 bootstrap resamples. Mediation exists when an indirect effect confidence interval excludes zero. The size and sign of direct and indirect paths should be used to distinguish complementary, competitive, indirect-only or no mediation. Results should not be described as causal because the design is cross-sectional.

Robustness analysis should compare plausible alternatives. These may include a model without mediation, a full mediation model and a model controlling for academic rank, tenure, prior online training experience and training format. Measurement invariance and multigroup comparisons may be explored if subgroup sample sizes are adequate. Predictive assessment should use out-of-sample procedures where possible.

Table 5. Proposed PLS-SEM Evaluation Criteria

Evaluation stage	Primary diagnostic	Decision guidance	Citation(s)
Measurement model	Indicator reliability	Preferably ≥ 0.708 . Indicators below this level should be considered carefully based on theoretical and content-validity considerations rather than automatically deleted.	Hair et al. (2019, 2022); Hair & Alamer (2022)
Measurement model	Internal consistency reliability	Generally, ≥ 0.70 . Values substantially above 0.95 may indicate item redundancy. A range of approximately 0.70–0.90 is generally preferred.	Hair et al. (2019); Sarstedt et al. (2022)
Measurement model	Convergent validity	AVE ≥ 0.50 , indicating that the construct explains at least 50% of the variance in its indicators.	Fornell & Larcker (1981); Hair & Alamer (2022)
Measurement model	Discriminant validity	Preferably < 0.85 for conceptually distinct constructs. < 0.90 may be acceptable for conceptually similar constructs. HTMT confidence intervals can also be examined.	Henseler et al. (2015); Hair & Alamer (2022); Sarstedt et al. (2022)
Structural model	Collinearity	Preferably < 3.0 . Values between 3.0 and 5.0 warrant attention and theoretical justification; values above 5 may indicate a more serious collinearity concern.	Hair et al. (2019, 2022)
Structural model	Direct effects	Examine signs, magnitude and statistical significance. A bootstrap confidence interval that does not include zero supports a statistically significant effect.	Hair et al. (2019, 2022)
Structural model	Mediation	Mediation is assessed using the bootstrapped indirect effect and its confidence interval. If the confidence interval excludes zero, the indirect effect is supported. Direct and indirect effects should be interpreted jointly.	Hair et al. (2019, 2022); Nitzl et al. (2016)
Structural model	Explanatory power	Report on the proportion of variance explained by the endogenous construct. Interpretation should consider the research context and model complexity, rather than relying only on universal cut-offs.	Hair et al. (2019, 2022)
Structural model	Effect size	Assesses the change in R^2 when a predictor is omitted. Conventional reference points are 0.02, 0.15 and 0.35 for small, medium and large effects, respectively, but contextual interpretation is recommended.	Cohen (1988); Hair et al. (2019)
Predictive assessment	Predictive relevance	$Q^2 > 0$ indicates predictive relevance under the traditional cross-validated redundancy approach. The magnitude should be interpreted cautiously.	Hair et al. (2019); Shmueli et al. (2019)

Evaluation stage	Primary diagnostic	Decision guidance	Citation(s)
Predictive assessment	Out-of-sample prediction	Compare PLS-SEM prediction errors with an appropriate benchmark, such as the linear-model benchmark. Lower prediction error indicates better predictive performance.	Shmueli et al. (2019); Hair et al. (2022)

7. Theoretical Contributions

The first contribution is the integration of five antecedent domains that are often studied separately. Training job-alignment and virtual design represent the learning intervention. Collaborative support and learning environment represent the social and organizational setting. Digital readiness represents the participant's capacity to engage with digitally mediated development. Placing these domains in one model allows their relative explanatory value to be assessed and reduces the risk of attributing failure only to the trainee or only to the institution.

The second contribution is the positioning of self-efficacy as a cross-domain mechanism. Existing studies link efficacy with online teaching, training motivation and transfer, but the present framework asks whether efficacy carries the influence of all five antecedents. This matters theoretically because the sources of efficacy are not purely personal. Design can create mastery, colleagues can provide modelling, the environment can create opportunities and digital readiness can reduce anxiety. Efficacy is therefore both an individual belief and an outcome of social and organizational experience.

The third contribution is contextual. Academics perform multiple knowledge-intensive roles and exercise considerable discretion in how new practices are adopted. Training transfer in this setting may differ from transfer in tightly standardized jobs. Teaching, research and administrative application also compete for time. By framing transfer across academic responsibilities, the model extends higher education evidence beyond leadership training and links professional development with digital readiness and virtual design.

The fourth contribution is methodological clarity. Conceptual articles sometimes present hypotheses without showing how constructs will be measured or how mediation will be tested. This article connects hypotheses to a refined item pool, a defined sample, measurement-model criteria and a transparent analysis sequence. That alignment improves falsifiability and enables replication in other Malaysian regions or national systems.

8. Practical Implications

Universities should begin with transfer requirements rather than with training calendars. Before commissioning a programme, academic leaders should identify the work behaviors expected after training, the situations in which they will be used and the evidence that will demonstrate application. This information can be translated into role-relevant examples for teaching, research and administration. Job-alignment is strengthened when participants can select a real work problem and leave with an implementation plan.

Virtual programmes should be designed for practice, feedback and reflection. Short content segments, guided demonstrations, authentic academic cases, peer discussion, application assignments and accessible job aids are more likely to support transfer than long presentations. Designers should test platform accessibility and provide a low-risk orientation for unfamiliar tools. Chen, Smith, and Stidham (2024) emphasize the multidimensional nature of effective online teaching, while Watermeyer et al. (2022) show how institutional barriers can limit the work of learning technologists. Design quality therefore requires both pedagogical and operational coordination.

Collaborative support should be made explicit. Supervisors can discuss intended application before training, protect time for practice and review progress afterwards. Peer learning circles can allow academics to compare adaptations, troubleshoot and share evidence. Mentors can model how a technique works in a real course or research process. Support should avoid surveillance. Its purpose is to reduce implementation friction and make experimentation legitimate.

A supportive learning environment also requires workload and resource decisions. Academics cannot transfer training when every available hour is allocated to existing duties. Institutions can create small protected implementation periods, provide access to platforms and data, recognize tested innovation and treat reflective review as part of work. Studies of training sustainment and culture indicate that reinforcement and opportunity are central to long-term application (Hughes et al., 2020; Nielsen & Shepherd, 2022). Evaluation can also examine whether non-technical skills are maintained in practice, as demonstrated by Nielsen et al. (2023).

Digital readiness should be assessed developmentally rather than as a deficit label. Faculty may be confident with communication tools but less prepared for learning analytics, multimedia design or digital research workflows. Tiered support, just-in-time guides and peer demonstration can target specific needs. Experiences during emergency remote teaching show that technology skills and pedagogical presence must be developed together (Carrillo & Flores, 2020; Watermeyer et al., 2021).

Finally, evaluation should move beyond satisfaction. Immediate reaction data can inform design, but transfer evaluation requires follow-up evidence. Universities can collect implementation logs, examples of redesigned teaching, peer observation, research workflow changes or administrative improvements. Where feasible, trainee reports should be complemented by artefacts or supervisor and peer observations. Recent public-sector evidence also shows the value of relating evaluation factors directly to measured transfer (Gonzalez Ortiz de Zarate et al., 2024). The goal is not to punish non-transfer. It is to identify whether the barrier is relevance, design, confidence, support, opportunity or digital capability.

9. LIMITATIONS AND FUTURE RESEARCH

The framework has several limitations. First, it is conceptual and does not provide empirical estimates. The proposed relationships are plausible and evidence-informed, but they remain hypotheses. Second, a cross-sectional survey cannot establish temporal order or causal effects. A stronger validation programme would collect predictors before training, self-efficacy immediately after training and transfer several weeks or months later. Repeated measures would also distinguish initial application from sustained transfer.

Third, the model relies mainly on self-report measures. Self-reports are appropriate for beliefs and perceived conditions, but training transfer should be triangulated where feasible. Future studies can include work samples, platform records, peer observation or supervisor ratings. Fourth, the model treats academics as one population. Disciplinary norms, contract type, academic rank, workload, institution size and programme modality may influence transfer. Multigroup or multilevel designs can examine these conditions after measurement invariance is established.

Fifth, the framework focuses on self-efficacy as a single mediator. Future research can compare motivation to transfer, work engagement, psychological empowerment and perceived usefulness as alternative or sequential mechanisms. Blume et al. (2023) show that individual differences and supervisor support can interact in hybrid training, while Kuo and Tien (2024) demonstrate that emotions may shape transfer. These findings suggest that boundary conditions deserve direct examination.

Finally, the Malaysian private higher education context limits immediate generalization. Replication should include public universities, colleges, other regions and different national systems. Comparative research can determine whether competitive pressure, governance, culture or digital infrastructure changes the relative importance of the five antecedents. Qualitative interviews would complement structural estimates by revealing how academics negotiate application in specific teaching, research and administrative situations.

10. CONCLUSION

Training transfer among academics is not a final step that occurs automatically after a course. It is a process shaped by what is taught, how it is designed, whether colleagues and leaders support application, whether the work environment provides resources and whether academics possess the digital readiness and self-efficacy to act. The integrated framework brings these conditions together and specifies sixteen testable relationships.

For Malaysian private higher education institutions, the model provides a practical diagnostic. Weak transfer may signal poor job-alignment, virtual design that prioritizes delivery over practice, insufficient collaborative support, a constrained learning environment or uneven digital readiness. Self-efficacy explains how these conditions can become confident action, but confidence cannot substitute for real opportunity. Empirical validation with a rigorous sample and transparent PLS-SEM analysis is the next step. Until then, the article offers a theory-driven agenda rather than a claim of completed findings.

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Ethical Approval

Ethical approval will be obtained from the relevant institutional review body before participant recruitment and data collection. This conceptual article reports no human-participant data.

Conflict of Interest

The authors declare no conflict of interest.

Data Availability

No empirical data were generated or analyzed for this conceptual article. The proposed questionnaire specification is summarized in Table 4 and should be refined and validated before use.

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