

Instructional Strategies in the Digital Era: A Narrative Review of Trends and Implications for Student Satisfaction in Open and Distance Learning (ODL)

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ABSTRACT

The rapid expansion of digital transformation has significantly reshaped higher education, positioning Open and Distance Learning (ODL) as a central mode of instructional delivery across institutions worldwide. While digital technologies have increased access and flexibility, student satisfaction in ODL environments remains inconsistent, highlighting the importance of effective instructional strategies and learner readiness. This study aims to examine the evolution of instructional strategies in digitally transformed ODL environments and to synthesise theoretical perspectives explaining how instructional practices influence student satisfaction. This study employed a narrative literature review design to synthesise recent research published between 2020 and 2025. A structured literature search was conducted using Scopus, Web of Science, and Google Scholar databases. Studies were screened based on predefined inclusion and exclusion criteria, resulting in 26 selected studies that were analysed using thematic narrative synthesis.

The analysis focused on four core instructional dimensions (course design, instructor competence, learning interaction, and feedback quality), alongside the contextual role of student digital literacy. The findings reveal that structured course design, strong instructor presence, meaningful interaction, and timely feedback consistently influence student satisfaction in ODL settings. In addition, student digital literacy emerged as a critical moderating factor that enhances engagement and determines how effectively learners benefit from instructional strategies. The integration of theoretical perspectives, including Transactional Distance Theory (TDT), the Community of Inquiry (CoI) framework, Expectancy-Confirmation Theory (ECT), and the Unified Theory of Acceptance and Use of Technology (UTAUT), further explains how instructional mechanisms shape satisfaction outcomes in online environments. Overall, this study concludes that student satisfaction in ODL is shaped by the alignment between pedagogical design, technological systems, and learner capabilities. These findings highlight the importance of adopting integrated instructional and institutional strategies to support sustainable and inclusive digital learning environments in higher education.

Keywords: Instructional Strategies; Student Satisfaction; Open and Distance Learning (ODL); Student Digital Literacy; Higher Education

INTRODUCTION

The rapid rise of online technology has accelerated digital transformation, fundamentally changing higher education around the world (Bond et al., 2021; Wade, 2021; World Economic Forum [WEF], 2022). Institutions are forced to launch Open and Distance Learning (ODL) approaches at an extraordinary scale and speed (Gopal et al., 2021; Ho et al., 2021).

Although emergency distance learning initially appeared to be a temporary response, many higher education institutions have normalised digital and hybrid learning models as permanent components of their instructional strategy frameworks, reflecting a broader shift toward technology-integrated and flexible learning ecosystems

(Bond et al., 2021; Heilporn et al., 2021; Krishnan et al., 2023; Levinsson et al., 2024). These changes elevate ODL from primarily an option to a key pillar for accessibility, flexibility and long-term viability in higher education (WEF, 2022).

Across many national education systems, large-scale digitalisation initiatives have accelerated the integration of Learning Management Systems (LMS), virtual communication platforms, and online assessment tools into higher education practices. For example, universities in the United Kingdom expanded digital learning infrastructure through national digital education strategies that support blended and remote learning models (Wade, 2021). Similarly, higher education institutions in the United States adopted flexible and technology-supported teaching models to sustain instructional continuity and improve learning accessibility (Gopal et al., 2021).

In Australia, national digital learning frameworks encouraged universities to redesign instructional delivery through the integration of virtual learning environments and multimedia communication tools (Bond et al., 2021). In the Malaysian context, national education reforms have also promoted the widespread adoption of LMS platforms and online assessment tools, virtual communication platforms, and digital learning technologies to support flexible learning environments (Malaysian Investment Development Authority [MIDA], 2021; Ministry of Education [MOE], 2015; UNICEF Malaysia, 2023).

Problem statement

Although the expansion of technological infrastructure has improved access to ODL, the development of digital systems alone does not guarantee stable teaching quality or positive student experiences (Al-Fraihat et al., 2020; Maqableh & Alia, 2021). While digital tools support content delivery, student satisfaction continues to vary across institutions and academic programmes, indicating inconsistencies in the effectiveness of online instruction (Baber, 2020; Gopal et al., 2021). These variations suggest that technological availability alone is insufficient to sustain meaningful learning outcomes without appropriate pedagogical innovation (Bond et al., 2021; Martin & Bolliger, 2022).

Despite the widespread global adoption of ODL, previous studies frequently examine instructional components such as course design, interaction, or feedback in isolation, limiting understanding of how these elements function collectively within online learning environments (Krishnan et al., 2023; Martin & Bolliger, 2022).

Furthermore, although student digital literacy has been recognised as a critical learner capability influencing engagement and participation, its role in shaping the effectiveness of instructional strategies has not been comprehensively synthesised within narrative literature (Hu et al., 2024; Li et al., 2023; Wei et al., 2023). These unresolved gaps highlight the need for an integrated review that examines the combined influence of instructional strategies and student digital literacy on student satisfaction in contemporary ODL environments.

Research objective

Given the rapid digital transformation advancing alongside diverse student satisfaction outcomes, there is a clear call to incorporate the latest research on how instructional strategies influence satisfaction in ODL environments. While many empirical studies demonstrate strong links between instructional strategies and satisfaction, few have incorporated these insights into unified theoretical and contextual models.

Therefore, this narrative review aims to explore (1) the evolution of instructional strategies throughout digital changes in ODL, and (2) theoretical perspectives explaining the instructional mechanisms that shape satisfaction formation in online learning contexts. In addressing these, it aims to describe the instructional impact of digital transformation and synthesise evidence on the effectiveness of ODL environments.

To address these objectives, the following section reviews existing literature on digital transformation, instructional strategies, and student satisfaction in ODL environments. This review establishes the conceptual foundation necessary to understand how instructional practices evolve within online learning systems.

LITERATURE REVIEW

Digital transformation and the evolution of instructional strategies

Digital transformation has reshaped higher education teaching at its core (Bond et al., 2021; Wade, 2021). Universities today operate within online learning setups where LMSs, real-time communication tools and multimedia platforms form the comprehensive student learning experience (Luo et al., 2021). In Malaysian Higher Education Institutions (HEIs), growing use of digital platforms has pushed lecturers to rethink their instructional methods, adjust assessments and foster meaningful student interaction in virtual spaces (Atan et al., 2023; Hashim et al., 2023; Kaur & Chowdhury, 2022). This rapid shift to digital learning has drawn more academic attention to keeping students engaged online (Bond et al., 2021; Heilporn et al., 2021). Strong digital ecosystems demand instructional designs that stimulate interaction, teamwork and active participation to sustain worthwhile learning online (Heilporn et al., 2021; Yu, 2021).

However, previous studies consistently emphasise that technological advancements alone do not guarantee effective teaching (Al-Fraihat et al., 2020; Maqableh & Alia, 2021). Thus, digital transformation has changed the focus from simply delivering content to creating a complete learning experience (Bond et al., 2021; Wade, 2021). Today's instructional strategies must tackle asynchronous participation, multimedia communication and reduced face-to-face contact (Luo et al., 2021). Previous studies have shown that institutions aligning instructional strategies with their technological setups experience greater consistent student satisfaction in online spaces (Al-Fraihat et al., 2020; Gopal et al., 2021; Ho et al., 2021; Krishnan et al., 2023). Consequently, shifts in this strategies tie directly to this wider digital move.

Dimensions of core teaching strategies in Open Distance Learning (ODL)

Previous studies pinpoint key instructional elements that shape student experiences in ODL are course design, instructor skills, learning interactions, and feedback strength (Al-Fraihat et al., 2020; Bunsu & Abd Halim, 2023; Gopal et al., 2021; Martin & Bolliger, 2022). Together, these form the heart of effective online setups, guiding content structure, instructor support, student interaction and feedback loops (Bond et al., 2021; Maqableh & Alia, 2021).

Course design acts as the backbone of ODL (Kaur & Chowdhury, 2022; Martin & Bolliger, 2022). Well-defined learning objectives, orderly materials, easy LMS navigation and tight links between content and assessments enhance mental focus and cut confusion in digital spaces (Al-Fraihat et al., 2020; Gopal et al., 2021; Hashim et al., 2023; Kaur & Chowdhury, 2022). Studies link well-structured course layouts to higher levels of student satisfaction, particularly with logical flow (Baber, 2020; Gopal et al., 2021; Kaur & Chowdhury, 2022). Conversely, poorly structured designs and unclear instructions lead to disengagement and frustration (Ho et al., 2021; Maqableh & Alia, 2021).

In digital environments, instructors require more than subject knowledge because they must handle technology smoothly, respond quickly and guide effectively (Bunsu & Abd Halim, 2023; Krishnan et al., 2023). Empirical studies show that instructors who show digital competency can foster trust, understanding and involvement among students (Atan et al., 2023; Bond et al., 2021; Bunsu & Abd Halim, 2023). Next, their online presence through prompt replies, clear guidance and steady support ties to better satisfaction as well (Gopal et al., 2021; Krishnan et al., 2023; Levinsson et al., 2024).

Interaction remains a crucial determinant of engagement in ODL contexts (Bond et al., 2021; Martin & Bolliger, 2022). Student-instructor and peer interactions build social presence and joint knowledge building (Heilporn et al., 2021; Yu, 2021). Studies report that synchronous chat, group brainstorming and organised forums increase participation and engagement, thereby increasing satisfaction. (Hashim et al., 2023; Ho et al., 2021; Martin & Bolliger, 2022). However, the success of interactions depends on instructor guidance and students' ability to connect digitally (Li et al., 2023; Wei et al., 2023).

Feedback plays a crucial role in strengthening, understanding and maintaining student motivation (Gopal et al., 2021). Specifically, timely, constructive and personalised feedback enhance students' perceptions of learning support, strengthens self-confidence and enrich to a more positive learning experience in online learning environments (Al-Fraihat et al., 2020; Baber, 2020; Ho et al., 2021). In ODL settings, without face-to-face hints or cues, feedback becomes a key channel for sustaining communication and eases doubts (Hashim et al., 2023; Heilporn et al., 2021; Luo et al., 2021).

Student digital literacy in Open and Distance Learning (ODL)

The rapid pace of digital transformation in higher education has increased the role of student digital literacy in ODL preparation (Li et al., 2023; Wei et al., 2023). As instructional strategies now rely on LMSs, synchronous platforms, multimedia tools and online assessment systems, students need solid digital competencies to navigate, interpret and engage effectively in online learning spaces. (Bond et al., 2021; Hu et al., 2024; Law et al., 2025). As a result, student digital literacy stands out as a key contextual factor influencing student experiences in current ODL settings (Li et al., 2023; Yan-Li et al., 2022).

Student digital literacy generally includes the ability to access digital resources, evaluate online information, communicate through virtual platforms and participate in interactive learning activities (Bond et al., 2021; Li et al., 2023). In the context of higher education, it also includes self-management skills, adaptability to new technologies and the ability to manage asynchronous and synchronous communication channels effectively (Hu et al., 2024; Yan-Li et al., 2022). These competencies matter most where digital transformation makes instructional delivery rely heavily on technological mediation (Bond et al., 2021).

Importantly, student digital literacy works closely with instructional design in ODL settings. It links to teaching needs in these environments (Hu et al., 2024; Li et al., 2023). For example, interactive discussions, group projects, and multimedia tasks need students to have subject knowledge plus digital communication and problem-solving skills (Bond et al., 2021; Yu, 2021). If these skills are missing, the benefits of innovative instructional strategies may not fully happen (Wei et al., 2023). This interaction underscores the relevance of student digital literacy in the broader discourse on learning effectiveness in ODL (Hu et al., 2024; Li et al., 2023).

Therefore, in the era of digital transformation, student digital literacy is not about a foundational skill only. It is a key ability that affects how they participate, engage, and do assessments in ODL settings (Li et al., 2023; Wei et al., 2023). While instructional strategies remain crucial to the quality of instruction, they work best when students are ready with technology skills (Hu et al., 2024). Recognising this interaction provides a necessary foundation for further discussion of how digital transformation affects instructional strategies and student satisfaction.

Student satisfaction in Open and Distance Learning (ODL)

Student satisfaction in ODL has become a central indicator of instructional effectiveness in online learning environments. It is generally conceptualised as a multidimensional construct reflecting students' cognitive evaluation of learning quality and their emotional responses to instructional experiences (Al-Fraihat et al., 2020; Baber, 2020; Levinsson et al., 2024). In online learning contexts, satisfaction is shaped by perceptions of course organisation, clarity of instructions, interaction opportunities, feedback responsiveness, and the usability of digital learning platforms (Gopal et al., 2021; Ho et al., 2021).

Previous studies consistently demonstrates that student satisfaction is strongly associated with the quality of instructional design and the degree of interaction facilitated within digital learning environments (Gopal et al., 2021; Kaur & Chowdhury, 2022; Martin & Bolliger, 2022). When learning materials are logically structured and communication channels remain accessible, students report higher engagement and stronger confidence in achieving learning outcomes (Baber, 2020; Gopal et al., 2021; Hashim et al., 2023; Kaur & Chowdhury, 2022). Conversely, poorly structured courses and limited instructor presence often lead to frustration and decreased satisfaction, even when technological infrastructure is available (Al-Fraihat et al., 2020; Ho et al., 2021; Maqableh & Alia, 2021).

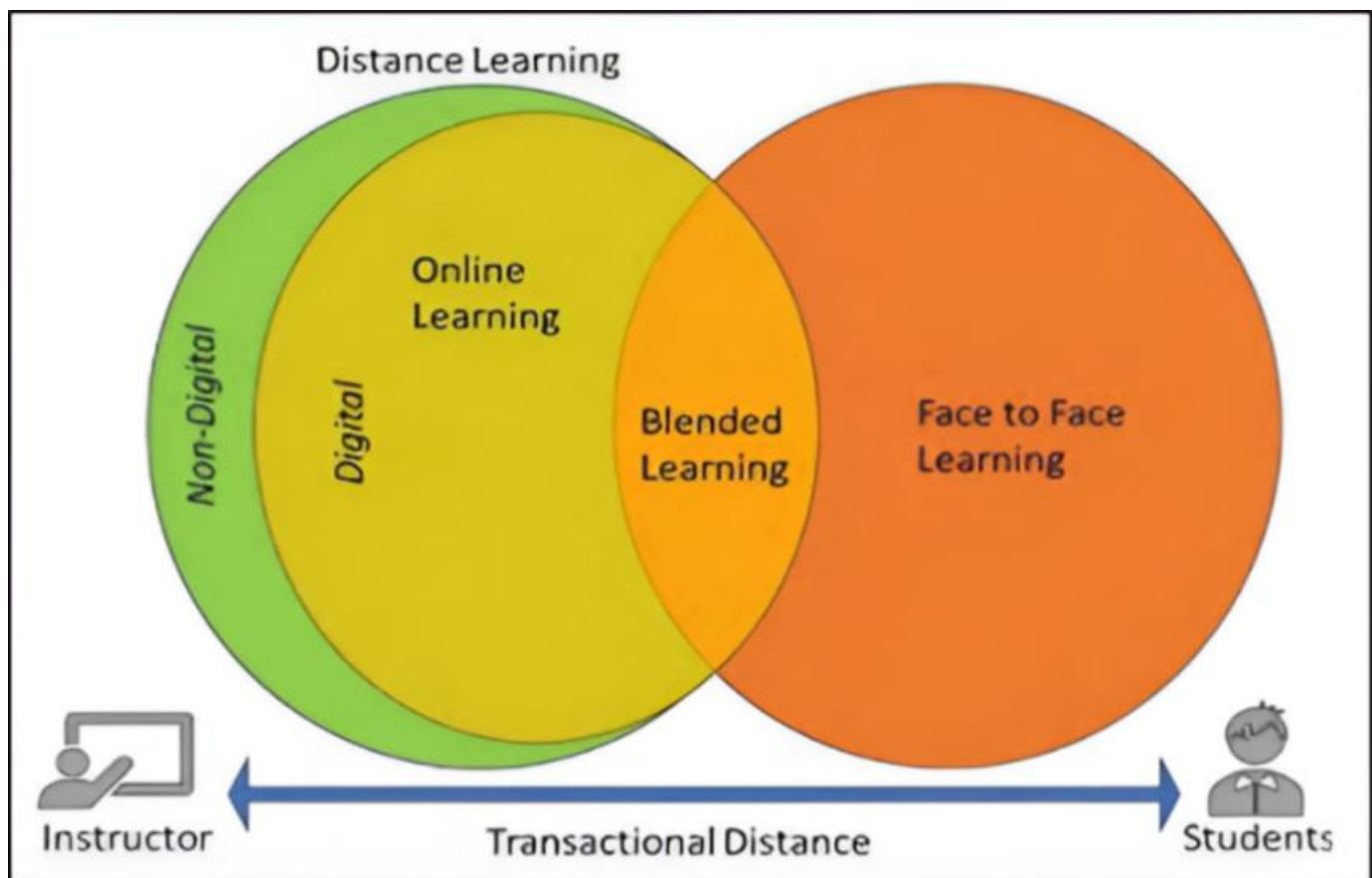
Furthermore, student satisfaction is influenced not only by instructional factors but also by learner readiness and technological capability (Hu et al., 2024; Law et al., 2025). Variations in digital literacy, access to reliable internet connectivity, and familiarity with digital learning platforms contribute to differences in satisfaction levels across institutions and student groups. These findings highlight the importance of integrating instructional quality with student capability considerations when evaluating learning outcomes in online educational environments (Al-Fraihat et al., 2020; Li et al., 2023).

Collectively, the reviewed literature highlights the interconnected roles of instructional strategies, student digital literacy, and student satisfaction in online learning environments. Building upon these conceptual insights, the following section outlines the methodological approach used to synthesise relevant studies and identify recurring instructional patterns.

Theoretical perspectives that support teaching effectiveness

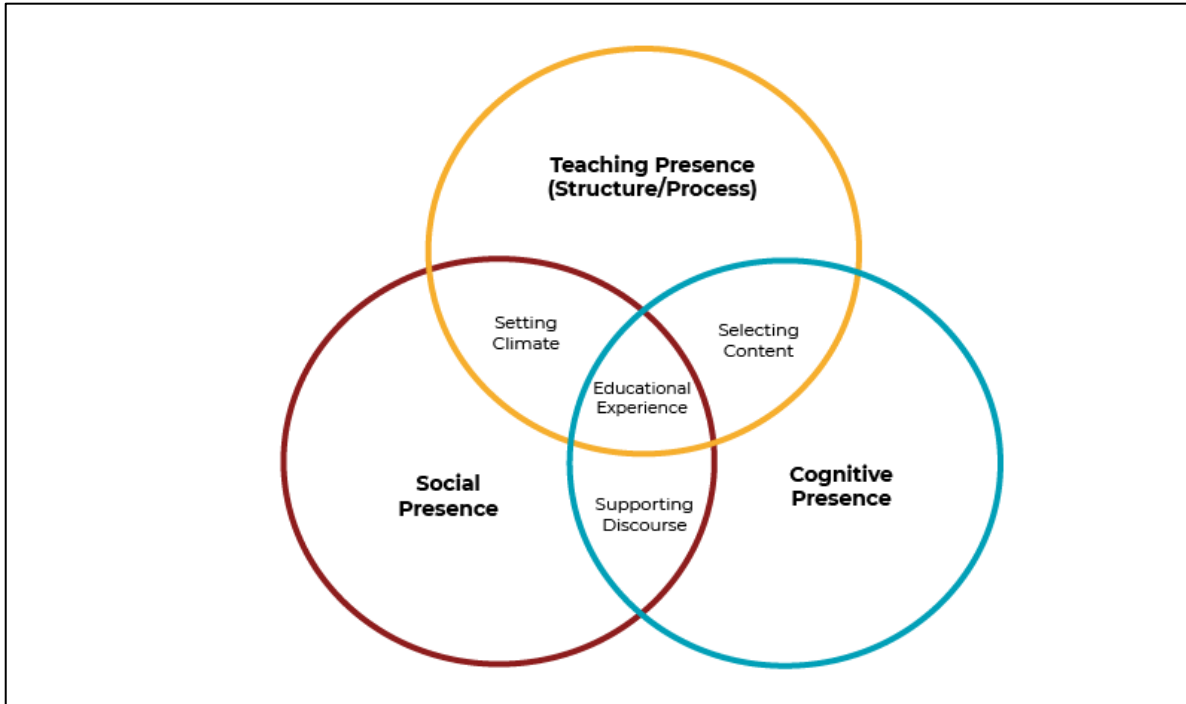
The relationship between instructional strategies and student satisfaction in ODL is supported by several complementary theoretical frameworks. Transactional Distance Theory (TDT) conceptualises distance as a function of dialogue, structure, and learner autonomy (Moore, 2013; Öztaş, 2023). In the ODL context, structured design and interactive dialogue reduce perceived distance and increase satisfaction (Hashim et al., 2023; Martin & Bolliger, 2022).

Figure 1: Transactional Distance Theory (source: Achuthan et al., 2024)



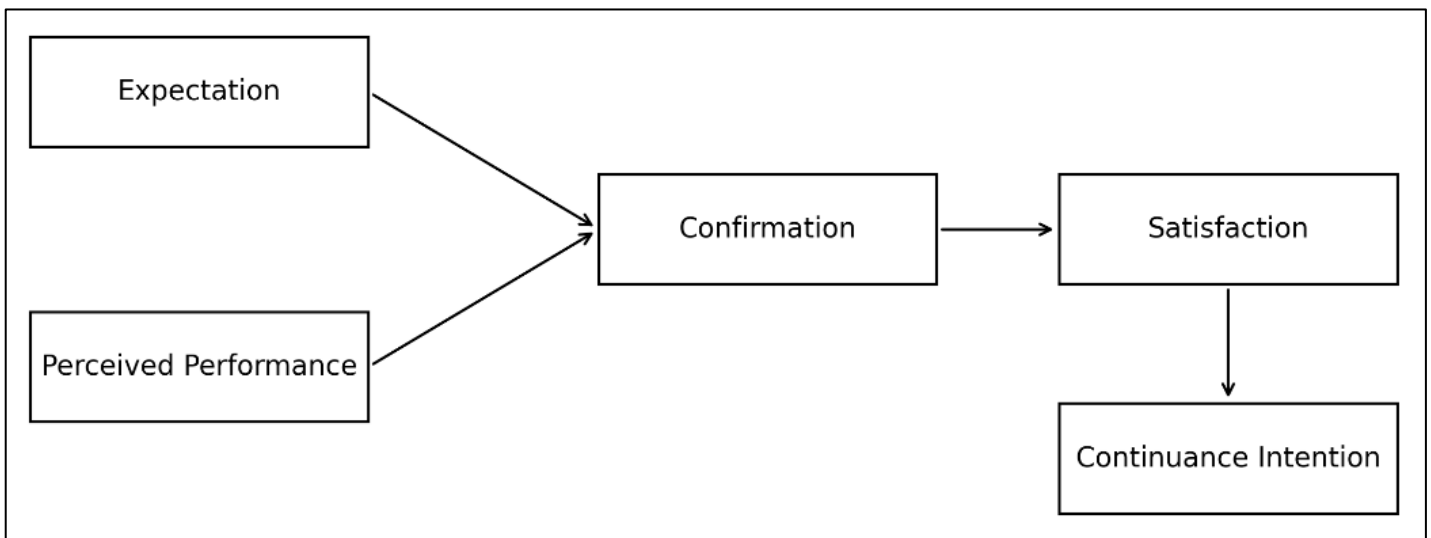
The Community of Inquiry (CoI) framework further emphasises the interplay between teaching presence, social presence, and cognitive presence (Garrison, 2000; Heilporn et al., 2021). Teaching presence is reflected in the organisation and facilitation of courses, social presence emerges through interaction, while cognitive presence develops through sustained engagement (Bond et al., 2021; Krishnan et al., 2023; Martin & Bolliger, 2022).

Figure 2: Community of Inquiry Framework (source: University of Waterloo et al., 2026)



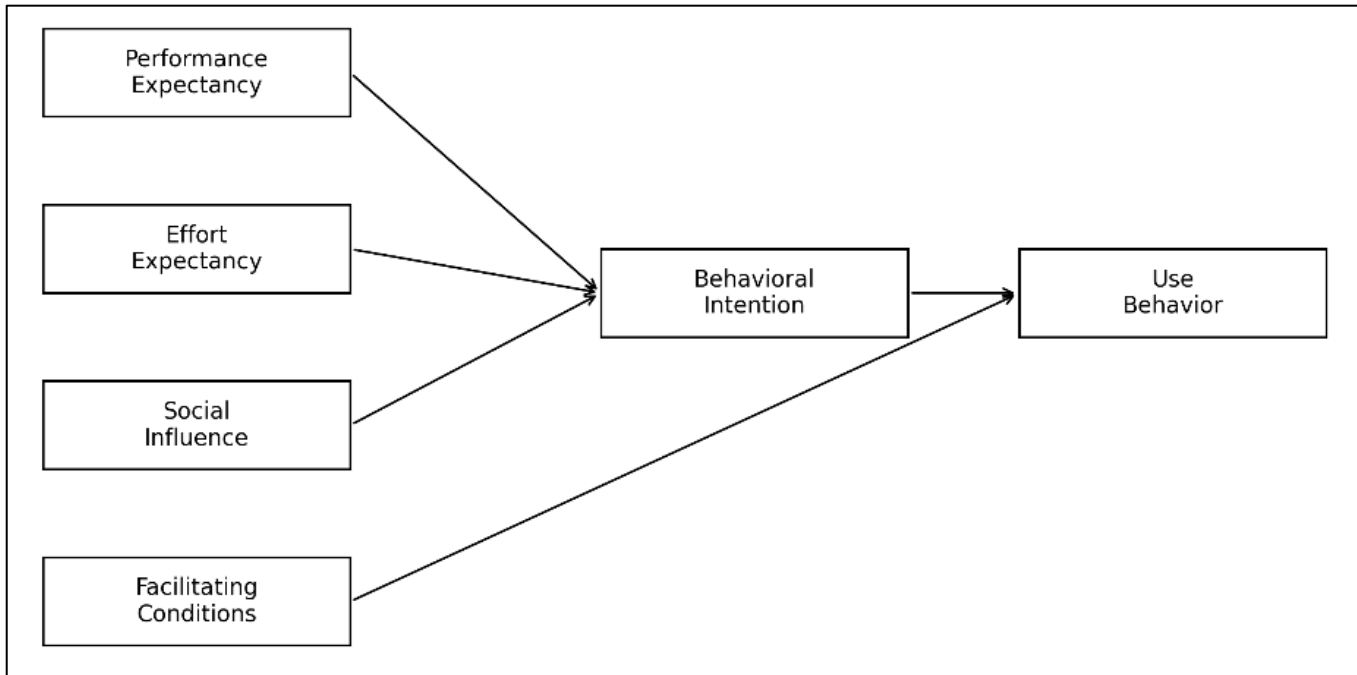
Expectancy-Confirmation Theory (ECT) explains satisfaction as a function of the alignment between expectations and perceived performance (Baber, 2020; Oliver, 1980). When online learning experiences confirm students' expectations regarding clarity, responsiveness, and engagement, satisfaction increases (Gopal et al., 2021; Ho et al., 2021).

Figure 3: Expectation Confirmation Theory (source: Author's)



Meanwhile, the Unified Theory of Acceptance and Use of Technology (UTAUT) highlights performance expectancy, effort expectancy, and enabling conditions as determinants of technology acceptance (Maqableh & Alia, 2021; Venkatesh et al., 2003). In the context of ODL, these perceptions of technology influence students' engagement with learning strategies and indirectly shape satisfaction outcomes (Al-Fraihat et al., 2020; Li et al., 2023). Students who perceive digital tools as useful and easy to manage are more likely to engage meaningfully in learning activities, thereby increasing satisfaction (Hu et al., 2024; Wei et al., 2023). These insights suggest that digital literacy serves as a foundational condition influencing how students experience digitally transformed learning strategies (Li et al., 2023; Wei et al., 2023).

Figure 4: Unified Theory of Acceptance and Use of Technology (source: Author's)



Collectively, these theoretical perspectives explain the effectiveness of instruction in digitally transformed ODL environments. The TDT and CoI framework emphasise instructional structure, dialogue, and instructional presence, while the ECT explains satisfaction through expectation confirmation. The UTAUT further highlights the role of technology perceptions in shaping student engagement. Overall, these frameworks suggest that student satisfaction in ODL is shaped by the interaction between instructional design, technology use, and student abilities.

Table 1 presents a summary of the key theoretical frameworks that support teaching effectiveness in ODL environments. The theories collectively explain how structured course design, interaction, learner expectations, and technology readiness influence student engagement and satisfaction.

Table 1: Summary of Theoretical Perspectives Supporting Teaching Effectiveness in ODL

| Theory | Key Constructs | Relevance to Teaching Strategies in ODL | Contribution to Student Satisfaction | Key References |
|--|--|--|---|---|
| Transactional Distance Theory (TDT) | Dialogue, Structure, Learner Autonomy | Supports structured course design and continuous instructor–student communication. | Reduces learning distance and improves engagement and satisfaction. | Moore (2013); Öztaş (2023); Hashim et al. (2023); Martin & Bolliger (2022) |
| Community of Inquiry (CoI) Framework | Teaching Presence, Social Presence, Cognitive Presence | Encourages interaction, collaboration, and active teaching presence. | Enhances meaningful learning experiences and student satisfaction. | Garrison (2000); Heilporn et al. (2021); Bond et al. (2021); Krishnan et al. (2023) |
| Expectancy Confirmation Theory (ECT) | Expectations, Perceived Performance, Confirmation | Emphasises clear instructions and timely feedback. | Satisfaction increases when learning experiences meet expectations. | Oliver (1980); Baber (2020); Gopal et al. (2021); Ho et al. (2021) |
| Unified Theory of Acceptance and Use of Technology (UTAUT) | Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions | Highlights the importance of technology usability | Positive technology experience supports | Venkatesh et al. (2003); Maqableh & Alia (2021); Al- |

| Theory | Key Constructs | Relevance to Teaching Strategies in ODL | Contribution to Student Satisfaction | Key References |
|---------------------------|---------------------|---|--------------------------------------|---|
| Use of Technology (UTAUT) | Enabling Conditions | and learner readiness. | engagement and satisfaction. | Fraihat et al. (2020); Li et al. (2023) |

METHODOLOGY

Research design

This study employed a narrative literature review design to synthesise existing research on instructional strategies and student satisfaction in ODL environments. A narrative review was selected due to the suitability for conceptual integration, theoretical interpretation and identification of emerging patterns across diverse educational contexts. Unlike systematic reviews that focus primarily on statistical aggregation, narrative synthesis allows for deeper interpretation of theoretical relationships and pedagogical mechanisms relevant to rapidly evolving digital and online learning environments.

This review focuses on studies published between 2020 and 2025, a period characterised by accelerated digital transformation in higher education. This timeframe was selected to ensure relevance to contemporary digital learning practices and to capture instructional adaptations that emerged during the transition from emergency remote teaching to structured online learning environments.

Literature search strategy

A structured literature search was conducted across three major academic databases (Scopus, Web of Science, and Google Scholar). These databases were selected due to their comprehensive coverage of previous studies in education, educational technology, and online learning research.

The search strategy employed Boolean operators and keyword combinations, including, “teaching/instructional strategies”, “student satisfaction”, “online learning/open and distance learning/ODL” and “student digital literacy”. Only selected articles written in English were included to ensure academic reliability and comparability across studies.

The study selection process followed a three-stage screening procedure. First, titles and abstracts were reviewed to determine relevance to the study objectives. Second, full-text articles were assessed using established inclusion criteria. Third, selected studies were evaluated for conceptual relevance and methodological clarity.

Studies were selected based on predefined inclusion and exclusion criteria to ensure conceptual alignment with the study objectives.

1. Inclusion criteria:

- Studies conducted in higher education settings
- Research examining online, blended, or ODL environments
- Studies addressing at least one instructional dimension: course design, instructor competence, learning interaction and feedback quality
- Studies reporting findings related to student satisfaction or students’ digital literacy

2. Exclusion criteria:

- Studies conducted in primary or secondary education settings
- Articles focusing solely on technical systems without pedagogical analysis

- Conference abstracts or editorial commentary

The initial search identified 283 records, of which 26 studies met the inclusion criteria after screening and were included in the final narrative synthesis. Duplicates were removed during the initial screening stage. The inclusion of 26 studies was considered adequate for identifying recurring conceptual patterns across diverse educational contexts. In narrative literature reviews, sample adequacy is determined by conceptual relevance rather than statistical quantity, ensuring that selected studies contribute meaningful insights to thematic interpretation. This systematic filtering ensured that only relevant and high-quality studies contributed to the narrative synthesis.

Although narrative literature reviews provide flexibility for conceptual interpretation and theoretical integration, this approach has unavoidable limitations. Unlike systematic or meta-analytic reviews, narrative synthesis does not generate statistical effect sizes or quantify relationships across studies. The interpretation of findings relies on thematic patterns identified across selected studies, which may introduce subjective interpretation bias. Nevertheless, this approach remains appropriate for examining emerging educational trends and synthesising complex instructional relationships within rapidly evolving digital and online learning environments.

Data analysis procedure

The analysis process followed a structured thematic synthesis approach. First, studies were categorised according to instructional dimensions (course design, lecturer competence, learning interactions, and feedback quality) that reflect the dominant instructional strategy constructs identified in recent ODL research (Bunsu & Abd Halim, 2023; Hashim et al., 2023).

Second, literature studies examining student satisfaction were analysed to identify conceptual definitions, measurement approaches, and reported determinants of student satisfaction in ODL settings (Levinsson et al., 2024; Martin & Bolliger, 2022). Attention was paid to patterns indicating consistent predictors and areas of variability across institutional contexts.

Third, theoretical perspectives including Transactional Distance Theory (TDT), Community of Inquiry (CoI) framework, Expectancy-Confirmation Theory (ECT), and the Unified Theory of Acceptance and Use of Technology (UTAUT) are mapped against empirical findings to determine how instructional mechanisms are conceptually explained. This theoretical mapping allows for the integration of instructional and technology perspectives within a unified interpretive framework.

Finally, the literature addressing student digital literacy is reviewed to identify its conceptual position relative to instructional strategies and satisfaction outcomes (Bunsu & Abd Halim, 2023; Hashim et al., 2023). Rather than viewing student digital literacy as an isolated predictor, this analysis considers its role as a contextual capability that shapes engagement and perceptions of assessment in online learning environments.

The following section presents patterns and thematic relationships identified across the selected studies through structured synthesis.

FINDINGS

Adapting instructional strategies in digitally transformed Online Distance Learning (ODL)

A synthesis of previous research reveals that digital transformation has not only changed the way education is delivered but has also fundamentally adapted instructional strategies in ODL (Bond et al., 2021; Wade, 2021). Institutions that previously considered online learning as an add-on have shifted to integrated digital ecosystems, requiring instructors to redesign instructional strategies to align with the ODL environment (Gopal et al., 2021; Hashim et al., 2023; Ho et al., 2021).

Based on the reviewed studies, effective instructional strategies in digitally transformed ODL are characterised by systematic course structuring, varied content delivery, interactive engagement mechanisms, and responsive communication practices (Krishnan et al., 2023; Martin & Bolliger, 2022). This shift reflects a shift from content delivery to experience design, where learning environments are intentionally structured to maintain cognitive, social, and instructional presence (Bond et al., 2021; Krishnan et al., 2023; Martin & Bolliger, 2022; Yu, 2021).

However, the synthesis also shows that digital transformation increases the complexity of teaching (Bond et al., 2021; Li et al., 2023; Maqableh & Alia, 2021). As reliance on technology increases, the effectiveness of instructional strategies becomes closely linked to platform usability, digital communication norms, and student engagement patterns (Bond et al., 2021; Hu et al., 2024; Wei et al., 2023). Therefore, adapting instructional strategies in the digital era requires technology integration and instructional enhancement (Bond et al., 2021; Martin & Bolliger, 2022). Table 2 summarises representative empirical studies examining the relationship between instructional strategies and student satisfaction in ODL contexts published between 2020 and 2025.

Table 2: Summary of Major Studies on Instructional Strategies and Student Satisfaction in Online Distance Learning (2020-2025)

| Author (Year) | Context | Teaching Dimensions | Key Finding | Theory |
|--------------------------|---|--------------------------------------|--|---------------|
| Bunsu & Abd Halim (2023) | Malaysian Higher Education Institutions | Lecturer Competence | Instructor digital competence significantly predicts student satisfaction. | TDT |
| Kaur & Chowdhury (2022) | ODL Malaysia | Course Design | A structured LMS design increases clarity and satisfaction. | ECT |
| Martin & Bolliger (2022) | Online Higher Education | Interaction | Interaction between students and teachers increases engagement and satisfaction. | CoI Framework |
| Hashim et al. (2023) | Malaysian Universities | Course Design and Interaction | Dialogue and structure reduce transaction distance and increase satisfaction. | TDT |
| Krishnan et al. (2023) | Digital ODL Context | Teaching Presence | A strong faculty presence is associated with higher cognitive engagement. | CoI Framework |
| Law et al. (2025) | Technology-Mediated Learning | Technology Feedback and Adoption | Effort expectations influence engagement and satisfaction. | UTAUT |
| Levinsson et al. (2024) | Post-Pandemic ODL | Feedback & Alignment of Expectations | Satisfaction depends on the confirmation of teaching expectations. | ECT |

Empirical evidence linking instructional strategies to student satisfaction

This synthesis revealed three consistent patterns across the reviewed literature between instructional strategies and student satisfaction in ODL contexts. Course design emerged as a fundamental determinant (Baber, 2020; Kaur & Chowdhury, 2022). Studies reported that clearly structured modules, coherent sequences of material, and transparent assessment criteria significantly improved students' perceptions of teaching quality (Gopal et al., 2021; Ho et al., 2021; Kaur & Chowdhury, 2022). Organised digital environments can reduce uncertainty and support self-directed learning, thus contributing to higher levels of satisfaction (Li et al., 2023; Wei et al., 2023).

Instructor competence also plays a crucial role (Bunsu & Abd Halim, 2023; Krishnan et al., 2023). In online environments, instructor responsiveness, technological proficiency, and facilitation skills are strongly associated with positive student evaluations (Bond et al., 2021; Bunsu & Abd Halim, 2023; Krishnan et al., 2023). Students report higher satisfaction when instructors actively maintain a teaching presence through clear communication and timely guidance (Gopal et al., 2021; Krishnan et al., 2023; Levinsson et al., 2024).

Interaction is another consistent predictor (Martin & Bolliger, 2022; Yu, 2021). Both synchronous and asynchronous engagement opportunities encourage social presence and collaborative learning, which enhance satisfaction outcomes (Bond et al., 2021; Heilporn et al., 2021; Martin & Bolliger, 2022). Studies show that structured discussions, brainstorming sessions, and collaborative assignments enhance emotional connection and academic motivation (Hashim et al., 2023; Ho et al., 2021).

The quality of feedback further strengthens teaching effectiveness (Baber, 2020; Levinsson et al., 2024). Timely, constructive, and personalised feedback strengthens students' perceived understanding and support, contributing positively to satisfaction (Al-Fraihat et al., 2020; Gopal et al., 2021). Conversely, late or unclear responses weaken engagement and reduce the perceived value of teaching (Ho et al., 2021).

Overall, this synthesis confirms that instructional strategies remain a key determinant of student satisfaction in ODL (Al-Fraihat et al., 2020; Martin & Bolliger, 2022). However, variations in reported satisfaction levels suggest that these teaching effects are not standardise across student groups (Hu et al., 2024; Li et al., 2023).

Contextual influences on student engagement and satisfaction

In addition to direct instructional effects, this synthesis identified contextual and student-related influences that shape satisfaction outcomes (Li et al., 2023; Wei et al., 2023). Differences in digital readiness and technology adaptation appear to influence how students experience learning strategies (Hu et al., 2024; Wei et al., 2023).

Students with higher digital literacy demonstrate greater confidence in navigating LMS platforms, participating in discussions, and using multimedia resources effectively (Kaur & Chowdhury, 2022; Li et al., 2023). These competencies enable students to fully engage with interactive and technology-rich teaching approaches (Bond et al., 2021). Conversely, students with limited digital skills may encounter technological barriers that reduce engagement and undermine perceived teaching effectiveness (Ho et al., 2021; Maqableh & Alia, 2021).

These differences suggest that digital transformation introduces variability into learning outcomes (Li et al., 2023). While instructional strategies remain important, their effectiveness lies in the broader context of digital capabilities (Hu et al., 2024; Wei et al., 2023). Thus, this synthesis suggests that student satisfaction in ODL cannot be explained exclusively by learning input but must also consider student readiness in online environments (Al-Fraihat et al., 2020; Li et al., 2023).

While most studies consistently identified course design and instructor interaction as primary contributors to satisfaction, variations were observed in the emphasis placed on digital literacy and technological readiness across institutional contexts. Studies conducted in technologically advanced environments reported stronger associations between student digital literacy and engagement (Hu et al., 2024), whereas studies conducted in transitional learning contexts identified instructor responsiveness as the dominant predictor of satisfaction (Ho et al., 2021).

These differences suggest that the effectiveness of instructional strategies is shaped not only by instructional design but also by contextual readiness and technological maturity. The following discussion analyses these patterns through established theoretical frameworks to explain how teaching strategies shape student satisfaction in digitally transformed ODL environments.

DISCUSSION OF FINDINGS

Redesigning instructional strategies in the era of digital transformation

The findings of this narrative synthesis indicate that instructional strategies remain central to shaping student satisfaction in ODL environments. However, the effectiveness of these strategies cannot be understood in isolation from the broader digital ecosystem in which learning occurs (Bond et al., 2021; Wade, 2021).

Across the reviewed studies, a consistent pattern emerged showing that digital transformation has shifted instructional delivery from content-centred approaches toward structured and interaction-oriented learning design (Atan et al., 2023; Ho et al., 2021; Luo et al., 2021). This transition suggests that instructional strategies in online environments function not only as instructional tools but also as organisational mechanisms that support learner engagement and self-regulation.

The reviewed literature highlights the central role of structured course design as a cognitive scaffold that supports learner autonomy, particularly in asynchronous learning contexts. Multiple studies consistently reported that clearly sequenced materials, transparent assessment criteria, and accessible communication channels contribute to improved student engagement and satisfaction.

This finding aligns with Transactional Distance Theory (TDT), which posits that instructional structure and dialogue reduce perceived psychological distance between learners and instructors. Within online learning environments, structured instructional design appears to function as a stabilising mechanism that enhances predictability and reduces learner uncertainty, thereby facilitating sustained engagement.

In addition to course design, the review revealed that lecturer competencies have evolved to include not only subject matter expertise but also technological fluency and online facilitation skills (Bunsu & Abd Halim, 2023; Krishnan et al., 2023). Across multiple studies, instructor presence emerged as a critical factor influencing student perceptions of instructional support. This observation reflects the Community of Inquiry (CoI) framework, particularly the role of teaching presence in organising learning activities, encouraging conversation, and maintaining instructional direction. The findings suggest that instructor responsiveness, clarity of communication, and active facilitation are essential for sustaining meaningful interaction in online environments.

Furthermore, interaction and feedback mechanisms have become essential components of teaching effectiveness in ODL contexts. Unlike traditional face-to-face environments, digital learning requires intentional planning of synchronous and asynchronous interactions to maintain dialogue and collaborative engagement (Martin & Bolliger, 2022; Yu, 2021). Feedback practices, particularly timely and constructive responses, function as substitutes for non-verbal instructional cues, thereby supporting continuous learning dialogue (Gopal et al., 2021; Levinsson et al., 2024).

These findings collectively reinforce the theoretical proposition that meaningful interaction and communication reduce transactional distance and strengthen social and cognitive presence within digital learning communities. Consequently, effective instructional strategies in ODL environments require strategic coordination between pedagogical design and technological capabilities to sustain instructional quality and enhance student satisfaction (Al-Fraihat et al., 2020; Maqableh & Alia, 2021).

Overall, the synthesis indicates that digital transformation does not reduce the importance of instructional strategies but reinforces their role in maintaining instructional coherence and learner engagement. Rather than functioning independently, instructional design, interaction practices, and feedback mechanisms operate as interconnected components within an online instructional system.

This integrated perspective supports theoretical assumptions across both TDT and CoI framework, which emphasise the interdependence between instructional structure, dialogue, and learner engagement. While instructional strategies provide the structural and communicative foundation of online learning, their

effectiveness is further influenced by students' ability to engage with technological environments, highlighting the role of student digital literacy as a supporting capability in ODL contexts.

Student digital literacy as a supporting condition

While instructional strategies provide the structural foundation for effective instruction, this narrative synthesis highlights student digital literacy as a critical capability that shapes how teaching practices are experienced in ODL environments (Li et al., 2023; Wei et al., 2023).

Across the reviewed studies, digital literacy consistently emerged as a contextual factor influencing students' ability to navigate learning platforms, communicate in virtual environments, interpret multimedia resources, and engage in self-directed learning tasks (Hu et al., 2024; Yan-Li et al., 2022). These competencies extend beyond technical operation and reflect learners' readiness to participate actively in online instructional processes.

A recurring pattern across the literature indicates that students with higher levels of digital literacy demonstrate greater confidence, adaptability, and persistence when engaging with online learning strategies (Li et al., 2023; Wei et al., 2023). Such learners are more capable of participating in interactive discussions, managing collaborative assignments, and utilising multimedia learning resources effectively (Bond et al., 2021; Yu, 2021).

Conversely, students with limited digital competencies often encounter technological barriers, cognitive overload, and communication difficulties, which may reduce engagement and weaken the perceived effectiveness of well-designed teaching strategies (Ho et al., 2021; Maqableh & Alia, 2021). These differences suggest that instructional effectiveness in digitally transformed learning environments is partly dependent on students' technological readiness.

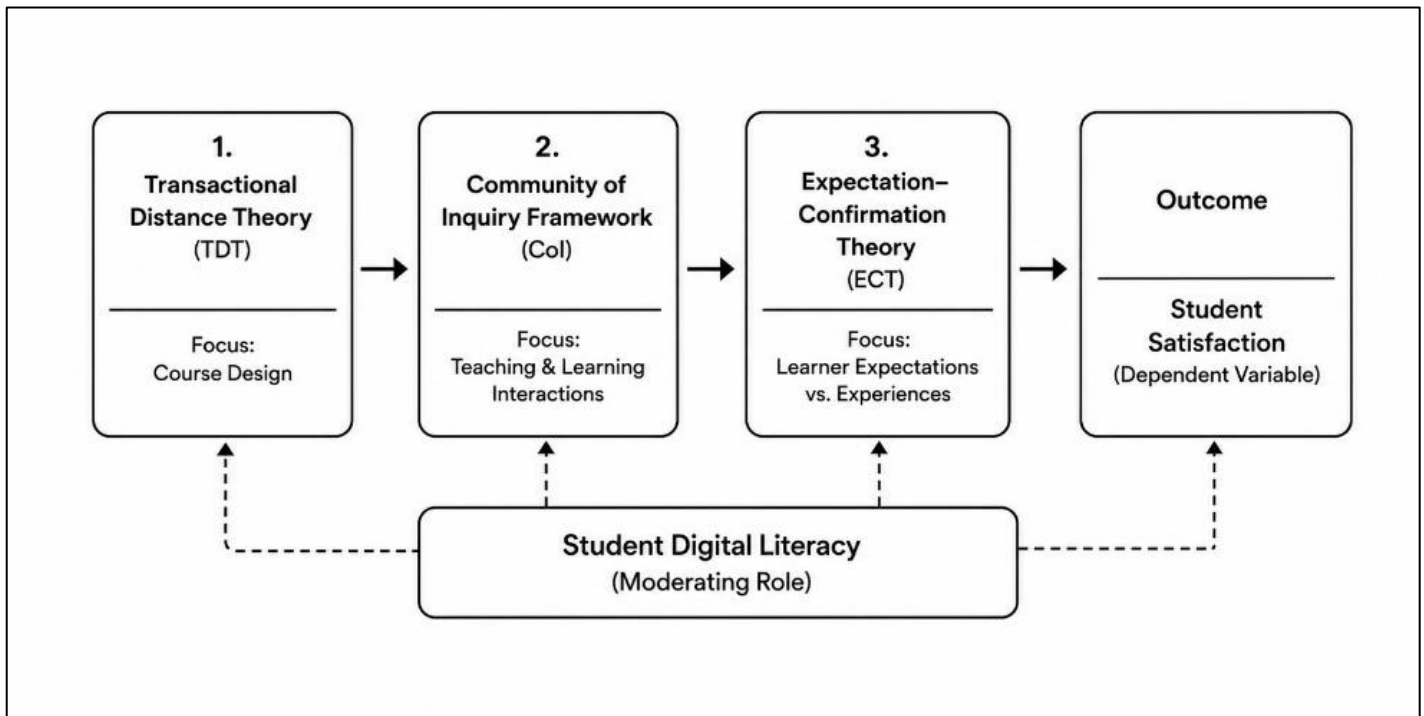
The role of student digital literacy as a supportive condition can be interpreted through the lens of the Unified Theory of Acceptance and Use of Technology (UTAUT), which emphasises the influence of perceived ease of use and performance expectancy on technology engagement. Students with higher digital competence are more likely to perceive digital tools as manageable and beneficial, which increases their willingness to engage actively with learning activities.

In addition, the Community of Inquiry (CoI) framework provides further explanatory support, as student digital literacy enables students to participate more effectively in collaborative dialogue, which strengthens social and cognitive presence within online learning communities. Collectively, these theoretical perspectives reinforce the view that digital literacy enhances students' capacity to engage meaningfully with structured learning environments.

Overall, the synthesis indicates that student digital literacy does not replace instructional strategies as the primary determinant of satisfaction but moderates the extent to which students can benefit from those strategies. Rather than functioning independently, student digital literacy operates as an enabling capability that enhances the impact of instructional design, interaction, and feedback practices.

Consequently, teaching effectiveness in ODL environments depends not only on the quality of instructional design but also on the extent to which students possess the competencies required to engage with digital learning tools. Based on this integrated interpretation, the conceptual model (figure 5) proposed in this study illustrates the dynamic relationships among digital transformation, instructional strategies, student digital literacy, and student satisfaction in ODL environments.

Figure 5: Conceptual model illustrating the relationships between digital transformation, instructional strategies, student digital literacy, and student satisfaction in ODL environments (source: Author's)



Implications for student satisfaction in Open and Distance Learning (ODL)

Integrating student digital literacy within a broader instructional strategy framework provides a more comprehensive understanding of how student satisfaction develops in ODL environments. Across the reviewed studies, student satisfaction was consistently influenced not only by the quality of instructional design but also by students' readiness to navigate online learning environments (Hu et al., 2024; Wei et al., 2023). This finding suggests that satisfaction in ODL should be conceptualised as a dynamic outcome shaped by the interaction between structured teaching practices and learner capabilities.

The synthesis of theoretical perspectives further clarifies this relationship. From the standpoint of Transactional Distance Theory (TDT), instructional structure and dialogue function as mechanisms that reduce perceived psychological distance between instructors and learners (Hashim et al., 2023; Öztaş, 2023). Students with stronger digital competencies are better able to engage in structured learning activities and sustain communication within digital and online environments, thereby enhancing interaction quality and contributing to higher satisfaction levels. This interpretation reinforces the argument that learner capability strengthens the effectiveness of structured instructional design.

Similarly, the Community of Inquiry (CoI) framework highlights the importance of sustained interaction and collaborative engagement in shaping meaningful learning experiences (Bond et al., 2021; Yu, 2021). The synthesis indicates that student digital literacy supports active participation in online dialogue, thereby strengthening social and cognitive presence within virtual learning communities. These processes enhance students' perceptions of instructional support and learning value, ultimately contributing to more positive satisfaction outcomes.

Furthermore, insights from Expectancy-Confirmation Theory (ECT) and the Unified Theory of Acceptance and Use of Technology (UTAUT) provide additional depth explanatory by emphasising the role of expectation alignment and technology perceptions in shaping satisfaction (Baber, 2020; Levinsson et al., 2024). Students who perceive digital tools as useful and manageable are more likely to engage positively with instructional activities and evaluate learning experiences positively. This alignment between perceived performance and expectations reinforces satisfaction formation within online environments.

Collectively, the integration of these theoretical perspectives suggests that student satisfaction in ODL should not be viewed as a direct outcome of instructional input alone but as the result of interconnected instructional and learner-related processes. Instructional strategies provide the structural and communicative foundation for learning, while student digital literacy determines how effectively these strategies are experienced.

Consequently, student satisfaction emerges from the alignment between instructional design, interaction processes, and learner readiness within online learning environments (Al-Fraihat et al., 2020; Li et al., 2023). These findings provide important implications for instructional design practices and institutional strategies aimed at enhancing student satisfaction in ODL environments.

The insights obtained from the discussion not only enhance theoretical understanding but also generate important practical and institutional considerations. Accordingly, the following section outlines the pedagogical and policy implications arising from the synthesised findings.

IMPLICATIONS AND FUTURE RESEARCH

Pedagogical implications

The findings of this narrative synthesis provide important pedagogical implications for improving instructional practices in ODL environments. Across the reviewed studies, instructional effectiveness was consistently associated with the integration of structured course design, instructor competence, meaningful interaction, and timely feedback (Al-Fraihat et al., 2020; Gopal et al., 2021; Martin & Bolliger, 2022). These instructional components function collectively to support learner engagement and satisfaction, suggesting that effective teaching in digital environments requires a coordinated approach rather than isolated instructional interventions.

From a pedagogical perspective, institutions should prioritise the development of structured digital course design that enhances clarity, coherence, and navigational accessibility within LMS. Clear sequencing of instructional materials and transparent assessment criteria can reduce learner uncertainty and support autonomous learning behaviours (Ho et al., 2021; Kaur & Chowdhury, 2022). This recommendation aligns with Transactional Distance Theory (TDT), which emphasises the importance of structured learning environments in reducing psychological distance and improving learner engagement.

In addition to course design, instructors should strengthen their digital teaching competencies, particularly in facilitating synchronous and asynchronous communication and providing constructive, timely feedback (Bond et al., 2021; Bunsu & Abd Halim, 2023; Krishnan et al., 2023). The ability to maintain consistent teaching presence is essential in online environments where physical interaction is limited. This implication reflects the assumptions of the Community of Inquiry (CoI) framework, which highlights teaching presence as a critical component supporting meaningful interaction and sustained learning engagement.

Furthermore, the implementation of interactive and collaborative learning strategies should be supported by scaffolding mechanisms that accommodate varying levels of students' digital readiness (Martin & Bolliger, 2022; Yu, 2021). The synthesis indicates that students differ in their ability to navigate digital platforms and engage in online learning tasks (Hu et al., 2024; Wei et al., 2023).

Therefore, instructional innovation should balance technological complexity with accessibility to ensure that learning activities remain inclusive and supportive of diverse learner capabilities. This balanced approach enhances the likelihood that digital transformation contributes positively to student satisfaction rather than creating additional barriers to engagement (Al-Fraihat et al., 2020; Maqableh & Alia, 2021).

Collectively, these pedagogical implications highlight the importance of aligning instructional design, communication practices, and learner readiness to sustain engagement and satisfaction in online learning environments.

Institutional and policy implications

Beyond classroom-level practices, the findings of this narrative synthesis highlight important institutional and policy implications for sustaining effective teaching in digitally transformed ODL environments. Across the reviewed studies, digital transformation was consistently described not only as a technological shift but as a systemic institutional change requiring coordinated planning, governance, and resource allocation (Hashim et al., 2023; Maqableh & Alia, 2021). This observation suggests that successful digital transformation depends on institutional readiness to integrate technological infrastructure with pedagogical development and organisational support systems.

From an institutional perspective, sustained investment in digital infrastructure must be accompanied by structured professional development programmes that strengthen instructors' digital teaching competencies and online facilitation skills (Atan et al., 2023; Krishnan et al., 2023). The synthesis indicates that technological tools alone are insufficient to improve learning outcomes unless instructors are equipped with the pedagogical and technological knowledge required to utilise digital platforms effectively. Institutional leadership therefore plays a critical role in fostering continuous professional learning environments that support instructional innovation and adaptive teaching practices.

In addition to faculty development, institutional strategies should incorporate systematic mechanisms to assess and support student digital literacy. The findings of this synthesis consistently demonstrate that variations in students' digital readiness influence engagement patterns, assessment participation, and overall satisfaction in ODL environments (Hu et al., 2024; Yan-Li et al., 2022). Implementing diagnostic assessments and targeted digital support initiatives can help institutions identify learning gaps, reduce inequities in student experiences, and promote more inclusive participation in online learning environments (Li et al., 2023; Wei et al., 2023). Such initiatives may include orientation programmes, digital literacy workshops, and structured technical support services designed to enhance students' readiness for online learning.

At the policy level, the findings suggest that national and institutional digital education frameworks should emphasise coordination between instructional design, technological infrastructure, and learner capability development. Rather than focusing exclusively on technological expansion, sustainable digital transformation requires integrated policy approaches that simultaneously address learning quality, system usability, and student preparedness.

This integrated perspective reinforces the need for long-term strategic planning that aligns educational technology investments with pedagogical objectives and student support mechanisms (Maqableh & Alia, 2021; Wei et al., 2023). Collectively, these institutional and policy implications highlight the importance of adopting coordinated governance strategies that support sustainable digital transformation and equitable learning experiences in higher education.

Future research directions

Despite the positive aspects of this narrative synthesis, several limitations require attention. First, the review relied on published selected studies, which may introduce publication bias. Second, the selection of English-language publications may have excluded relevant studies from other linguistic contexts. Third, as a narrative review, this study did not employ meta-analytic techniques, limiting the ability to estimate statistical effect sizes. Future research may address these limitations through systematic or meta-analytic approaches.

Future research should extend current findings by examining moderation and mediation relationships involving learner-related variables, particularly student digital literacy, to better understand how instructional strategies influence student satisfaction. Longitudinal studies are also recommended to examine changes in satisfaction over time as institutions adapt to digital transformation.

In addition, comparative and cross-cultural research may provide deeper insights into contextual differences across institutions and learning environments. Finally, future studies should conceptualise digital literacy as a

multidimensional construct and explore the role of emerging technologies, such as Artificial Intelligence (AI) and learning analytics, in shaping instructional design and student satisfaction in online learning environments.

While these future research directions highlight opportunities for continued scholarly inquiry, the present study provides an integrated conceptual perspective that contributes to understanding teaching effectiveness in online learning environments.

CONCLUSION

Digital transformation has fundamentally reshaped higher education, positioning ODL as a central mode of instruction. This narrative synthesis confirms that course design, instructor competence, interaction, and feedback quality remain critical determinants of student satisfaction. However, the findings further demonstrate that instructional effectiveness in ODL depends on the alignment between pedagogical practices, technological systems, and learner capabilities.

Student digital literacy emerges as an essential moderator that strengthens engagement with teaching strategies and supports positive learning experiences. These findings contribute to the literature by advancing an integrated conceptual perspective that views student satisfaction as the outcome of interconnected instructional design and learner readiness processes. Future developments in digital education should therefore emphasise coordinated alignment between instructional strategies, technological infrastructure, and student capabilities to ensure sustainable and inclusive learning environments.

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