

Online Learning and Student Engagement: A Psychological Perspective

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Abstract

The increased reliance on online and blended instruction in education necessitates an understanding of how this mode of delivery influences student engagement. Student engagement represents a multidimensional construct that emerges as a central concern in contemporary higher education, where declining engagement has become widespread (Banoor Rajabalee & Issack Santally, 2021). The online delivery of learning potentially affects engagement and learning outcomes, and its relationship with psychology and learning science is increasingly important. Engagement can take a broad definition encompassing behavioral, emotional, cognitive, and valence dimensions, or narrow ones confined to human action or merely psychological indicators. The coupling of engagement and online learning has been explored through several theoretical lenses, including self-determination theory (SDT), social presence theory, and the community of inquiry (CoI) framework (Morgan-Thomas & Dudau, 2019).

Keywords: Online Learning, Student Engagement, Blended Learning, Self-Determination Theory (SDT), Community of Inquiry (CoI) Framework.

1. Introduction

Recent developments in the aftermath of the COVID-19 pandemic have highlighted the significance of online learning as a mode of educational delivery (Morgan-Thomas & Dudau, 2019). Although major concerns arise surrounding online curricula, significant evidence asserts their potential for engaging learners and facilitating educational processes (Alabbasi, 2022). Unlike traditional classrooms, online environments require students to adopt new modes of engagement as data transfer proceeds in different forms and at varying paces. Engagement, understood as “the degree of attention, interest, curiosity, and involvement students show when they interact with their learning environment,” is pivotal for educational success. Engagement further manifests in behavioral, cognitive, and emotional forms.

Students educated in online environments engage differently compared to those in traditional settings. Course design, subject matter, and other stimuli contribute to these fluctuations. Online engagement also depends on instructor guidance, pedagogical strategies, degree of formative and summative assessment, quality and frequency of feedback, and extent of social and collaborative contact. Students often exhibit decreased initiative and active participation within digital settings, leading to sporadic engagement levels.

Factors influencing online student engagement remain a subject of scholarly inquiry. With the emergence of online education, researchers rapidly proposed models to elucidate new engagement dynamics. Features of online contexts became evident, guiding discussions on student behavior, engagement measurement, and pedagogical approach.

2. Theoretical Foundations of Student Engagement

Student engagement is a multifaceted construct essential for effective online learning and encompasses behavioral, affective, and cognitive dimensions. Definitions of behavioral engagement highlight involvement in academic tasks, such as attendance, assignment submission, and participation in class discussions (Wang et al., 2022). Affective engagement includes feelings related to the learning experience, such as interest, boredom, anxiety, and enjoyment (Morgan-Thomas & Duda, 2019). Cognitive engagement involves a deep understanding of subject material, critical thinking, and the development of organizational strategies to integrate concepts. These definitions underscore student engagement as a state of focusing attention on learning, varying over time and context, and influenced by the characteristics of both the learner and the learning environment. Self-Determination Theory (SDT) has been widely used to examine student motivation and engagement in educational contexts. According to SDT, three psychological needs—competence, relatedness, and autonomy—are essential to intrinsic motivation, which promotes learning, persistence, creativity, and psychological well-being (World English Journal et al., 2023). In the online learning context, the need for competence is satisfied by setting challenging yet attainable goals and receiving feedback on learning progress; relatedness is enhanced by acceptance and recognition from instructors and peers; and autonomy is fulfilled by having control over the learning process and being able to set one's own learning objectives. These interconnected factors explain how perceived competence, relatedness, and autonomy fulfill motivational needs associated with self-determination and intrinsic engagement.

2.1. Behavioral, Affective, and Cognitive Engagement

Student engagement—the extent to which learners participate in academic content—facilitates academic success, while disengagement can precipitate failure (Anderson, 2017). Several dimensions of engagement have been proposed in the literature, including (1) behavioral, (2) affective, and (3) cognitive (Morgan-Thomas & Duda, 2019). Collectively, they cover actions, emotional reactions, and thought processes. Emphasis varies depending on contextual factors. For example, digital technology alters learner–instructor dynamics and the accessibility of resources; thus, student engagement in online contexts warrants exploration.

Engagement is a multi-faceted construct. Behavioral engagement encompasses participation in academic tasks, such as time on textbooks, school attendance, and assignments submitted; affective engagement concerns emotional responses to participation opportunities; and cognitive engagement encompasses mental effort deployed to academic tasks. Behavioral engagement—understood as external inputs into learning and considered by some researchers as synonymous with engagement—may signal the presence of motivational and need-driven affective changes (either positively or negatively) and cognitive engagement.

2.2. Self-Determination Theory and Motivation in Online Environments

Interest in the motivational processes underpinning student engagement is evident in the application of Self-Determination Theory (SDT) to online learning environments (Jacobi, 2018). SDT posits that motivation is best conceptualized as a continuum of behavioral regulation extending from amotivation, characterized by lack of intention or desire to act, to intrinsic motivation, which occurs when the behavior is performed for its own sake (Luo et al., 2021). Between these extremes lies extrinsic motivation, which can vary in the degree of autonomy experienced either self-imposed or externally imposed, and has been sub-divided into four forms: (a) external

regulation (avoiding punishment or seeking reward), (b) introjection (avoiding disapproval from significant others or self-enhancing contingent praise), (c) identification (acknowledging the personal value of a behavior), and (d) integration (doing it out of choice because the behavior is fully integrated into the self) (Luo et al., 2021). Specific factors within online courses that support motivation for learning include (a) instructional strategies that support choice and self-direction fostering autonomy, (b) goal-setting and the provision of clear guidance that enable achievement of success experiences bolstering perceived competence, and (c) co-construction of knowledge that secures social interaction and connectedness supporting a sense of relatedness. Online learners face particular challenges concerning self-regulation, accountability, and self-direction emphasizing the need for motivation.

2.3. Social Presence and Community of Inquiry

According to Garrison et al. (2000), a community of inquiry is a notion that came into existence in the early days of distance education. It plays a crucial role in the comprehensive learning process in any educational context, and encourages people to interact, communicate, collaborate, and share ideas, through which higher-order knowledge and understanding are created. In online environments, social presence and a community of inquiry gain prominence. Increasing knowledge and understanding is a basic learning objective for most educators; gaining the ability to effect change in society through knowledge and understanding enhancement is an advanced goal for some educators. Therefore, the mechanisms that underlie student engagement in online English as a foreign language (EFL) classrooms are of particular interest.

3. Online Learning Environments and Engagement Mechanisms

An online learning environment comprises course design and structure, instructor roles and facilitation, collaborative learning and peer interaction, together with feedback, assessment, and the pace of instruction. Course design and structure include autonomy in learning pace—one of the three basic psychological needs that, when satisfied, enhance students' motivation. Tomlinson's universal principles for designing online courses, including flexible pacing, online tools, interest-based materials, and self-camera provision, focus on the content through choice and personalization (Wang et al., 2022). Instructors' various and engaged roles reduce feelings of isolation and increase engagement; precious time is allocated to mentoring students one-on-one. Facilitating student-student dialogue and offering supportive phrases, for instance, help establish a warm context and maintain openness toward participation. Offering complementary channels for feedback, providing digital tools that reduce the time interference of writing mathematics, and sharing template examples of scientific writing to raise students' self-efficacy are also useful (Morgan-Thomas & Dudau, 2019).

3.1. Course Design and Structure

In the limited-time mode of online learning, course design and structure receive more emphasis in shaping engagement behaviour than similar factors do in face-to-face environments (Zammit & Willard, 2019). Beyond serving as the primary or sole means of providing information and instructions, the design of online teaching influences students' perceived media richness, colleague interaction, and active participation all of which are pivotal in maintaining engagement. Effectiveness hinges especially on a student-centred rather than teacher-centred focus, as determined by lecture-design criteria such as organisation, explicitness, feedback, and pacing (Morgan-Thomas & Dudau, 2019). Required components interact with flexibility asserted through optional assignments and reconnaissance queries.

3.2. Instructor Roles and Facilitation

Course design influences not only what students learn but how they engage. The relatively passive approach common in online learning—with content presented in pre-recorded videos followed by self-paced quizzes and tests—encourages students to adopt time- and performance-based behavioral goals, supporting shallow engagement strategies. Early theories of self-regulated learning described adopted strategies as increasingly constrained by widely varying personal characteristics, situational factors, and corresponding starting points (E Collins, 2017). Consequently, both learners and designers may base decisions on assumptions. Empirical data show that many students remain highly engaged in massive open online courses (Du, 2015); evening watch times indicate access through employer-supported laptops and that viewing location does not affect attendance, undermining preconceptions of workplace conflict and personal discipline. Interest-based motives may dominate elsewhere. Course design constrains personal characteristics and situational factors, yet many highly engaged learners invest effort despite weak institution- and technology-based influences. Design-and-role interactions therefore await multi-dimensional explanation.

Recent empirical insight has begun addressing how design aligns with instructor roles in shaping engagement. Engaging environments boost video views and comments (Lu & Wu, 2019); evidence suggests lower views indicate opportunity rather than conditional restrictions (Lockwood & Mabbott, 2018)—essential design decisions favour templates, automated feedback, compulsory tasks, and desirable scheduling. Design influence also extends to peer interactions (Raspopovic, 2017). Instructors adopting traditional didactic styles devote minimal attention to clarity; unfacilitated platforms offer little interactive engagement; aligned course elements suggest goals reducing engagement range. Such patterns echo other mass learning settings; when and why instant completion persists despite clear design-function alignment also lacks comprehensive understanding.

3.3. Collaborative Learning and Peer Interaction

Because of the collaborative nature of many academic learning tasks at school and university, written exchange remains a central component in academic practice. Such exchanges, online or face-to-face, follow established norms and guidelines that reflect the discipline. The literature on both online and face-to-face environments suggests that increasing the number and variety of such communicative exchanges can enhance both learners' satisfaction and their academic success, both directly and indirectly (Douglas, 2019). Thus, to the extent that a course motivates students to engage in such written exchanges on a variety of topics in a variety of formats, it appears to enhance their overall engagement in the course.

3.4. Feedback, Assessment, and Pace of Instruction

Continuous and timely feedback is key to developing a sense of belonging and facilitating engagement with course material in online courses (Banoor Rajabalee & Issack Santally, 2021). Feedback provides information on performance, highlights discrepancies, and reinforces key concepts, which deepens understanding (Chen, 2015). Continuous assessment through quizzes and assignments can support engagement and performance and allows for personalized learning through differentiating tasks to suit learners' strands of progress. Additional interventions linked to learning are the provision of an estimated course-completion date and time devoted each week and regular notifications on upcoming deadlines, which keep students engaged and on track.

Immediate feedback also is important in the reinforcement phase of learning and appears to be an essential part of learning. The reinforcement phase corresponds to the practice of material to strengthen and enhance retention and understanding. Immediate feedback in this phase has been found to support retention and improve performance. Computer-based learning modules that allow for immediate feedback following completion, whether correct or incorrect, operationalize the concept of immediacy in feedback.

4. Psychological Factors Influencing Engagement

- Students' confidence in their capability to execute a task successfully is foundational to engagement, especially in an online context where they work independently (Xiao et al., 2024). Higher self-efficacy leads them to tackle more complex tasks, augmenting their skill acquisition (Wang et al., 2022). Perceived mastery experiences, whether applied to online courses or more broadly, continue to strengthen self-efficacy, prompting the adoption of adaptable rather than fixed goals (Alabbasi, 2022).
- Goal-oriented individuals who actively contemplate their objectives and establish appropriate task management strategies—particularly pertinent in sustained online courses—attain greater online engagement. Further observation of such students reveals a heightened meta-cognitive approach to engagement, directly regulating their commitment to the educational activity at hand.
- Sustained attention and arousal exert dual effects on cognitive performance, with excessive arousal inducing anxiety and detrimental impact. Thereafter, attention remains critical; cognitive load measurements indicate diminished engagement—both behavioral and affective—against high-load tasks.
- Daily travel relief, social interactions, and in-person engagements reduce stress. Online learning encourages individual focus and self-reliance in coping, augmenting reliance on informal support groups and peers, introducing extra burdens for individuals already dependent on such aid.

4.1. Self-Efficacy and Mastery Experiences

Accomplished learning has received increased attention in various educational settings and through different teaching and learning methods. Mastery experience, or successful accomplishment of learning activities, constitutes the most authentic and influential technique for enhancing self-efficacy (Huang et al., 2020). College students with higher levels of self-efficacy engage more actively and effectively in online learning environments compared to individuals with lower levels. Applicable online environments dynamically adapt and respond to learners' individualized learning needs and preferences. In traditional face-to-face learning environments, students tend to rate their self-efficacy as high or medium after. In online environments where learners can study at their own pace, self-efficacy tends to be overrated. Meanwhile, the frequency of course material consumption is correlated with students' perceived self-efficacy. Self-paced, mastery-based learning systems afford courses individualized selection and progression, where engagement can be understood as the on-time and sequential completion of learning objectives. Self-efficacy in such a setting can still be promoted and understood in a self-regulated way (P. Calaguas & Maria P. Consunji, 2022)

4.2. Goal Orientation and Meta-Cognitive Regulation

In online learning environments, goal orientation and meta-cognitive regulation play a key role in student engagement. Students who adopt a mastery goal orientation are more likely to engage in self-regulated learning, which, in turn, improves engagement (Liao et al., 2023). Moreover, meta-cognitive regulation is a major component of self-regulated learning and individuals with high levels of meta-cognitive regulation demonstrate better self-regulated learning skills. Encouraging students to adopt a mastery goal orientation and providing supportive instructional design can enhance their meta-cognitive regulation of learning, promoting engagement in online learning environments (Swafford, 2018). Indicators of engagement in online learning environments are ultimately linked to academic achievement in both face-to-face and online courses (Joseph-Edwards, 2019).

Self-regulated learning is particularly important in online learning contexts because students often experience higher levels of isolation compared to classroom settings and therefore require effective strategies to navigate these environments. Self-regulated learning involves the self-generated thoughts, feelings, and actions that students utilize to direct their learning toward the attainment of their goals. It emphasizes active engagement in the

regulation of one's learning, utilization of both internal and external resources, and the monitoring and control of cognitive, motivational, behavioral, and environmental aspects of one's learning.

4.3. Attention, Arousal, and Cognitive Load

When attention resources are depleted during a learning task, the task is de-prioritized, and the likelihood of mind-wandering increases (T. Wong et al., 2023). Online courses that lack interactivity, interest, or cognitive demand reduce attention, encourage mind-wandering, and lead to negative engagement behaviors. The online learning environment shapes student engagement during both synchronous and asynchronous tasks. Consequently, it is essential to design online courses that ignite interest, stimulate attention, and provide opportunities for expressing curiosity, so that engagement can be cultivated and maintained.

Attention and arousal are closely linked, shaping the breadth of focus, monitoring of an information landscape, a timing mechanism needed to iterate through successive processing stages, and delivering a dominant signal to working memory for action or retention. Attention therefore gates what enters cognitive processing, mediating the interplay between learning and engagement, task-load and cognitive dimension, and buffering the impact of pre-existing knowledge structure on perceived effort.

4.4. Stress, Coping, and Well-being in Online Contexts

Stress is a common phenomenon for learners and is often viewed through the lens of the (un)helpfulness of the experience. Stress can be labelled stressful or distressful when it negatively affects performance or interactions. Conversely, when the experience is perceived as an enabler of engagement, the same phenomenon is experienced as challenge or promote stress. The event-based theories of stress see stress as a risk or hazard associated with external load demands that exceeds available resources for coping (Quigley et al., 2022). This form of coping is essential part of learning when a positive stress level might challenge and enables to reach the next level of competence. Challenge and hindrance stressors are commonly distinguished in the literature. Challenge stressors are perceived as conducive to personal achievement and growth, for example new, complex or difficult tasks, accountability or performance expectations. Hindrance stressors on the other hand are perceived as obstacles to growth, for example red tape, job insecurity or conflict (Meulenbroeks & R. van Joolingen, 2022).

The demands of remote learning and the changes in how the institutions have adapted to it accompanied by individual characteristics influence stress perception of the learners. Stress perceptions functional or dysfunctional for remote course engagement and their role in influencing the relationship between course engagement and personality traits have been designated. The online course designed to support meaningful learning was implemented during COVID-19/remote education situation across different disciplines. Multi group SEM including as unequal sample sizes between regular and COVID groups to model learner engagement and the influence of personality traits and perceived stress was conducted. Only conscientiousness was consistently associated with course engagement across regular and COVID-19 learning. Stress perception showed a non-linear, inverted-U-shape modulation of the positive effect of conscientiousness on performance engagement across the learning modes.

5. Technologies and Personalization as Engagement Levers

Technologies play a fundamental role in modern online learning environments, both through the integration of structural models of engagement in pedagogical design and the provision of adaptive tools which help to refine and shape experience models over time (Morgan-Thomas & Dudau, 2019). These environments, including their content, must therefore be tailored to their audience—adapting, developing and evolving systemic patterns to support engagement and sibilant pedagogical approaches, and progressively enhancing a structured balance of competence, understanding, interest, and enjoyment (Wang et al., 2022). Technology also facilitates

the application of elements from behavioural, affective, and cognitive engagement systems across multiple learning experiences. Emerging patterns of usage and cumulative capacity for personalisation across online environments support parallel trajectories of resilience and character development. Three lever models shape these dynamics: adaptive learning and personalisation, multimedia, gamification, and interactive tools, and analytics, feedback loops, and behavioural insight.

Pedagogy, content, and technology form three interdependent levels of engagement in online environments. First, adaptive learning provides personalised content with embedded support, furnishing real-time diagnostics to inform instructional, self-regulated, and collaborative efforts. Engaging with aligned indicators nurtures self-efficacy, management, and community behaviours, fostering closer development of personalisation, structured, and colourful reinforcement models. Second, environments incorporating multimedia elements exhibit heightened visual, auditory, and affective appeal, stimulating curiosity, attentional, and serial behaviours even across minimal discretionary and peer-conditioned structures. Game-like features, consuming interactions, and rolling feedback activities further enrich aesthetic, expressional, and motivational dynamics. Third, broader behind-the-firewall behaviour-tracking systems produce time-synced longitudinal datasets which clarify and illuminate conditioning pathways through engagement trajectories and directly improve patterns such as continuous scroll monitoring.

5.1. Adaptive Learning and Personalization

Personalized learning in online education reduces dropout rates, promotes timely course completion, and supports student self-determination by giving them agency in selecting tasks and determining their pace (St-Hilaire et al., 2021). Many platforms also offer adaptive learning, which automatically determines a learner's level of understanding and adjusts subsequent learning materials accordingly (TAKÁCS et al., 2011).

5.2. Multimedia, Gamification, and Interactive Tools

Multimedia-rich learning environments can elevate motivation and satisfaction (Hsu, 2016). Courses that host collaborative projects, game-based activities, and role-playing tasks conducted with teams foster engagement at a higher level than conventional assignments (L. Hudiburg, 2016). Multimedia elements, when effectively applied, can be employed in course design to facilitate learning. The mere presence of multimedia tools does not guarantee better engagement or learning; indeed, excessive or poorly integrated elements may detract from capabilities. Miller outlines several principles for the effective design of multimedia—the multimedia principle, modality principle, and contiguity principle—that can influence decisions about their incorporation. The interaction between course design and multimedia thus remains a substantive consideration; supporting pedagogical vision and underlying engagement remain paramount.

5.3. Analytics, Feedback Loops, and Behavioral Insight

Online learning environments generate significant amounts of educational analytics data. New technologies allow for real-time data aggregation and analysis, prompting interest in transforming data into guidance for student behavior and institutional policy (Morgan-Thomas & Dudau, 2019). Data from virtual learning environments, massive open online courses, and web-based courses can yield insights into online student engagement at institutional, course, and section levels. Active engagement in online learning is related to course completion. Emerging learning analytics draw on academic, administrative, and behavioral information to map engagement patterns, identify risk, and promote academic success (Banoor Rajabalee & Issack Santally, 2021). Such patterns vary by context, instructional strategy, and student. Course-development analytics evaluate time on task, completion, resource access, and repetition of materials, revealing the influence of self-efficacy,

motivation, workload, and support. Knowledge of how students engage informs proactively supportive actions and tailored intervention strategies.

6. Equity, Access, and Inclusivity in Online Engagement

The COVID-19 pandemic exacerbated existing inequities in education globally, significantly influencing student access to quality online learning and engagement. As one potential consequence, widespread school closures throughout the world interrupted in-person instructional delivery in 2020, which jeopardized the continuity of education for approximately 1.6 billion learners across 200 countries. Even prior to the crisis, unequal access to reliable internet and digital technologies created a digital divide among students and households. Such inequalities have long impeded educational opportunities for students in low-income and rural communities and for students with disabilities. The considerable number of students worldwide who lack equitable access to the internet or interest in studying at home raises concerns about the quality of remote pedagogical support and students' opportunities for learning in the online domain.

Expanded global connectivity and access to online resources continue to transform educational practices and increase demand for online learning or blended approaches. Online learning typically provides opportunities for greater access to education such as flexible learning schedules, minimised commuting time, and provision of abundant up-to-date resources compared to traditional classroom instruction. However, uneven quality and validity of online resources also attract widespread concern. Students attending online classes may still need to purchase expensive textbooks for effective study, which further leads to extra time or even effort waste. Students now spend significantly longer time on various online platforms outside class hours yet they often feel more fatigued and disengaged than before. The gradual formation of hybrid online or blended study mode requires further investigation on how enabling or hindering online factors shape engagement and help-seeking behaviour.

6.1. Digital Divide and Accessibility

The digitization of education has generated significant interest in how online learning affects student engagement. Online programs can help institutions reach wider audiences but present substantial accessibility barriers that may unduly restrict participation for many potential learners. Broad socio-economic factors that limit both physical and cognitive access to information and communication technologies (ICTs) affect student engagement both in- and outside formal online courses.

College students who lack an ICT at home exert less effort in their studies than do students with such technology. At the high school level, students in affluent communities outperform their less-privileged counterparts in classrooms where ICTs are unavailable after-school access is limited. College educators can instruct under-prepared students in accessible online ways that nonetheless extend engagement through sustained exposure to additional practice and support. Very few instructors, however, engage in sufficiently detailed checks. Instead, the use of ICT remains decidedly unbalanced.

Even among post-secondary students, a substantial digital divide persists. Lowenthal and Lomellini (R. Lowenthal & Lomellini, 2022) find that fully three-quarters of students with disabilities, whether motor or other impairments, have enrolled in online courses, specifically seeking the asynchronous format these programs provide. Still, disabled participants in such courses record lower rates of attendance, engagement, retention, and completion than do non-disabled peers. Differing cognitive strategies and receiving diverse support also demand differential forms of graphical composition that remain infrequently utilized, typically insufficient to afford optimal.

6.2. Cultural and Linguistic Considerations

Students from culturally and linguistically diverse backgrounds may have different levels of access to learning opportunities than monolingual, dominant-language students. These differences interact with the form of course delivery to create inequities in socio-emotional and academic engagement (Xiao et al., 2024). Even when students possess required technology, their instructional participation can be constrained if the tools or resources do not match their proficiency in the language of instruction and/or if the cultural norms and values embedded within course materials do not resonate with their own. Learners who have not developed sufficient fluency in the language of instruction often experience anxiety related to potential negative evaluation from peers.

6.3. Inclusive Pedagogy and Universal Design for Learning

Despite technological advances and widespread internet access, educational inequities persist. The COVID-19 pandemic featured numerous experiences of isolation, disconnection, and a lack of belonging, further exacerbated by social disruption. Digital resources offered new ways to meet practical needs, replacing traditional practices with remote work, telecommuting, and virtual, hybrid, and fully online courses. This resulted in requests for training on securing supplies and attaining health and safety recommendations. Institutions less involved with online coursework experienced the most change, raising challenges in securing knowledge, supplies, and skills and complying with institutional norms.

For students, assets are not enough; current roles, peer networks, opportunities, and achievement are equally or more important. Achieving sufficient instructional gain during courses such as online learning and instructional design involves taking what is given, such as existing skills, products, and support, and constructing products that address asset type–domain type combinations. The latter includes recordings of previous sessions in any medium matched to current topics, classes or modules in courses already taken, learning-from-practice (informal experience), conversion of assets into online quizzes or games or other instructional forms, and other already possessed capabilities. Addressing the would-be supplement of opportunity type commute, which enhances access, large-scale opportunities further broadening scope require fewer resources, are more portfolio complementary, survive communally productive settings, and stay stable rather than fluctuating or shifting gain priority, velocity, or title. (Morgan-Thomas & Dudau, 2019)

7. Methodological Considerations in Studying Engagement

A recent meta-analysis of 190 studies (Wang et al., 2022) identified diverse engagement factors across five categories: instructors, learners, content, technology, and environments. Instructors were deemed fundamental; their own engagement and use of strategies such as humor or professional development—together with proficiency in resolving technical issues—were found to enhance remote-teaching effectiveness. Learners, including peers, displayed greater motivation and engagement when needs for autonomy, competence, and relatedness were fulfilled. Involvement in goal setting and lesson design promoted a sense of control; in contrast, negative attitudes toward instructors and course content reduced engagement. Preferences for face-to-face over online learning were prevalent. Among academically self-regulated learners, those who set goals, monitored progress, and actively sought assistance engaged more; peers contributed by reinforcing a learning community. Consequently, concluded that learner-centred design, interactive content, guidance on autonomous learning, peer support, and instructor presence are critical for fostering online engagement.

Engagement dynamics differ across the online educational continuum, reflecting individual and collective characteristics and emphasizing the value of sustained perspective. Morgan-Thomas and Dudau (Morgan-Thomas & Dudau, 2019) identified at least two engagement types during the e-learning cycle—“hogs,” who engage extensively, and “possums,” who monitor participation throughout without committing. These roles

shift according to course complexity and develop in tandem with study cycles. Beyond the e-learning context, longitudinal examinations indicate divergent engagement patterns in various disciplines at multiple educational stages, highlighting the significance of materialism, connectedness, and peer recognition.

Retention, achievement, and performance are further influenced by engagement. Watts et al. observed non-linear and heterogeneous online-objective prioritization across higher-education levels; a focus on content-and-auto-and assignment-participation dimensions, rather than on interpersonal and auto-only elements, correlated with diminished first-year retention and lower overall GPA. Multiple perspectives on temporal development throughout the educational journey are thus necessary to understand the nature of measured engagement and its relationship with key learning outcomes—a recognition that equally applies to e-learning, despite the distinct features of the medium.

7.1. Measurement of Engagement Across Dimensions

As online learning proliferates, measuring student engagement across its behavioral, cognitive, and affective dimensions is paramount (Morgan-Thomas & Dudau, 2019). It typically entails gauging relationships with peers, instructors, learning materials, and institutions, often using indicators such as attachment, bonding, and connectedness. Online engagement in particular is assessed via participation in forums, chats, or collaborative documents, as well as social and cognitive presence. Attention to both quantity (e.g., number of postings) and quality (e.g., level of comments) is vital. Research on students' attachment individualism and collectivism further informs institutional practices related to course structure and content, and emphasizes issues surrounding social norms and equity.

On a broader level, measurements of the learning environment are used. The National Survey of Student Engagement (NSSE), developed for higher education, explores participation and perceived quality in undergraduate settings, identifying motivational and contextual influences. Tools specifically for terms are available at the course level (Banoor Rajabalee & Issack Santally, 2021). To promote student engagement, institutions thus favor proactive approaches, guiding design, facilitation, and norms that foster commitment. Monitoring behavioral, cognitive, and affective engagement across multiple frameworks—including structural elements of the course, levels of individual student engagement, and self-regulated learning—enhances understanding of student involvement.

7.2. Experimental and Quasi-Experimental Approaches

Research on student engagement in online learning mainly adopts experimental or quasi-experimental methodologies. Dixon's Online Student Engagement (OSE) model, focusing on students' experiences, skills, participation, performance, and emotions, has been empirically validated (Banoor Rajabalee & Issack Santally, 2021). Kahu reviews behavioral, psychological, sociocultural, and holistic engagement models, recognizing the OSE model as congruent with online engagement. Gelan et al. measure online engagement through login frequency, demonstrating that higher regularity correlates with greater success. Ma et al. apply learning analytics to track activity patterns and measure the impact of instructor roles on engagement: student participation in forums is not directly linked to performance, as learning activities are prioritized until exams. Activity-based learning centres on active participation, experimentation, and exploration of different learning activities (Morgan-Thomas & Dudau, 2019).

7.3. Longitudinal Perspectives and Sustainability of Engagement

Sustaining student engagement is critical in online higher education, and research confirms that effective engagement requires creating dialogue and connection among students and between students and instructors (Morgan-Thomas & Dudau, 2019). Attachment and bonding relationships not only maintain motivation but

also help mitigate dropout rates. Furthermore, engagement patterns differ by educational level and learning context, which can influence global academic achievement. Supporting self-regulated learning and recognizing students' learning styles helps promote participation and persistency in online courses. Finally, engagement is associated with motivation, achievement, and the formation of independent research capabilities, reiterating the need for continual strategies to preserve involvement throughout the educational continuum (Wang et al., 2022). In online synchronous learning, engagement is informed by a broad spectrum of factors that are organized into five interconnected categories: instructors, learners, content, technology, and environment. Instructors are fundamental and must themselves be engaged, often necessitating professional development aimed at enhancing remote pedagogy and fostering technological fluency. Learners consist both of individuals and cohorts; their drive for engagement corresponds to needs for autonomy, competence, and relatedness. Involving learners in goal formulation and lesson planning enhances their sense of agency and consequently promotes higher levels of engagement. Attitudes toward instructors, content, and online learning in general further influence engagement. Self-regulation is paramount for online learners, who actively establish objectives, conduct progress monitoring, and seek assistance as required. Peers remain a significant source of engagement, actively contributing to the emergent learning community.

8. Practical Implications for Practice

Designing Engaging Online Courses

Online course design encompasses a wide variety of factors and strategies intended to motivate, foster a learner-centered environment, and encourage optimal course participation. An effective instructional framework consists of multiple interconnected components whose organized presentation leads directly to the establishment of learner engagement. Identifying the course-design elements that educational practitioners can most effectively leverage to enhance student engagement in online courses is important for all instructors operating fully or partially in virtual environments. Insights from the co-disciplinary literature and educator experiences indicate that the most conclusive patterns in online course design reinforce either the social, cognitive, or teaching pillar of Garrison, Anderson, and Archer's (2000) community-of-inquiry framework.

The importance of social presence and early establishment of instructor feedback is broadly observed in the literature on online student engagement (Vance Aguiar, 2017). Get-to-know-you introductions are employed to make personal connections and model desired behavior. Pacing, clarity, and depth of feedback on assignments establish instructor presence and promote cognitive engagement (Morgan-Thomas & Duda, 2019). Weekly assignments with invitational prompts and an emphasis on inquiry over information have considerable impact on the student engagement within introductory online courses. Regular reflection and, in the case of low-risk prompts, free-to-pass queries facilitate ongoing engagement. Instructor-designed large and small group activities create a visible community and opportunities for peer interaction, connection, and encouragement of learner-to-learner exchanges.

8.1. Designing Engaging Online Courses

Designing online courses that promote student engagement requires strategically fostering interaction and connection within the course content and delivery (Morgan-Thomas & Duda, 2019). Research has demonstrated that a focus on student engagement can help develop effective online courses and practices (Banoor Rajabalee & Issack Santally, 2021). When students are genuinely engaged, they interact with course content more deeply, thereby enhancing their learning experience and retention. Designing activities that support and enhance genuine engagement can also reduce drop-out rates.

8.2. Facilitating Engagement Through Instructional Coaching

Among the determinants of online learning, institutional coaching can impact student engagement by developing positive motivational environments. A study found that coaching students and instructors in collaborative classroom management improved motivation, self-efficacy, and engagement in higher-education settings. Coaching incentives that enhance cooperation help align institutional and student objectives. Academic coaching, coupled with self-regulation interventions, represents an effective way to reach students individually and collectively while promoting self-efficacy, resource efficiency, and adaptive engagement (Denisse Miranda Martinez, 2015).

A motivational climate promoting cooperation, rather than competition, fosters a mastery-oriented goal structure and supports students' engagement by enhancing connections among instructor, institution, and learner. Current change objectives at institutional levels influence the passion, motivation, throughput, and engagement of students and instructors alike. Institutions are encouraged to coach both teachers and students to develop supportive educational climates—factors that nurture appreciation toward the learning institution (Jacobi, 2018).

8.3. Policy and Institutional Support

Many institutions have struggled to implement research-based strategies and incentives to foster student engagement. Community colleges face further challenges, yet, online courses are rapidly increasing at all types of institutions (Vance Aguiar, 2017). In turn, understanding how competencies foster engagement and learning in online environments is crucial, especially since engagement among online students has received relatively little attention compared to blended or face-to-face learning (Banoor Rajabalee & Issack Santally, 2021). Institutions are implementing policies to enhance engagement and satisfaction in higher education. The demand for postsecondary education continues to grow, but persuading undergraduates to enroll and complete degrees is difficult. Online courses are one response to increasing demand, yet persuading students to actively participate remains challenging (D. PhD Dexter, 2015). Students do not believe engaging in online courses is universally valuable; the worth of interactivity varies depending on an individual's professional goals.

On the other hand, online engagement is a pressing concern for many institutions. Worldwide, 32 million learners are attending postsecondary institutions. Educating these individuals is essential for economic recovery and [ad70f06e5d-9a10-46e1-8cd2-377dbff2bf37ment](#). Retaining online students hinges on the institution's grasp of online engagement, motivation, self-management, and time-management strategies. Online engagements may include synchronous and asynchronous exchanges. Online institutions resort to providing learning opportunities outside the class.

9. Conclusion

Educational institutions of all types are faced with digital learning challenges. COVID-19 forced institutions to continue education amid closure, quarantine, and remote instruction. This illustrated the significance of digital learning and the role of technology. Given that digital learning is not new, examining studies about student engagement in online courses aids in understanding how physical, social–emotional, and virtual aspects of learning fit and support meaningful learning, bolstering student engagement (Banoor Rajabalee & Issack Santally, 2021). Engagement is defined as the investment of physical, emotional, and cognitive resources into learning (Morgan-Thomas & Dudau, 2019) —simply put, how students connect and interact in learning. Tyler and Boelen categorize such connections into three dimensions: behavioral, affective, and cognitive, and outline how these dimensions support content and process learning respectively.

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