# Factors Associated with Student Engagement in Online Learning During COVID-19 Pandemic: A Systematic Review

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**Abstract**
While extant literature reveals various factors associated with student engagement in online learning during the COVID-19 pandemic, the findings are inconsistent. A systematic review of the factors influencing student engagement in online learning during the pandemic will provide state-of-the-art knowledge of existing literature and offer future research directions. This study systematically reviews factors driving college student engagement in online learning during the COVID-19 pandemic. Performed in accordance with the guidelines of Preferred Reporting Items for Systematic Reviews and Meta-Analyses, a systematic search of four databases identified 50 eligible studies. The most prevalent factors associated with student engagement were student-related factors (e.g., student self-efficacy, emotion, motivation, attitude, personality traits, and student-student interaction). These were followed by instructor-related factors (e.g., self-efficacy and readiness, instructor warmth, support and motivation, instructor-student interaction, and organization), demographics (e.g., gender, age, college year, and ethnicity), learning technology and system-related factors (e.g., learning technology and perceived usefulness), course material and design-related factors (e.g., pedagogical approach, learning format, and learning activities), social factors (e.g., peer and family support), institutional support (e.g., college and university support), and environmental factors (e.g., learning environment and family health). These results provide a guide for future educational initiatives aimed at maximizing student engagement in an increasingly digital learning landscape, especially during exceptional times such as the pandemic. University resources should be directed at ensuring a smooth transition from face-to-face classroom experiences to remote learning during an emergency period. This should include insights from students on which online practices foster the greatest engagement, motivation, and learning.

*Keywords:* Student engagement, online learning, higher education, COVID-19, systematic review

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The COVID-19 pandemic upended traditional face-to-face modalities for education, forcing higher education institutions to migrate instruction online. During this time, higher educational institutions faced the challenge of engaging students in a manner consistent with face-to-face learning (Hollister et al., 2022; Wu & Teets, 2021). Any loss in student engagement could have detrimental effects, as this factor is linked to both greater academic success and positive mental health (Appleton et al., 2008; Miliszewska, 2007; Steele & Fullagar, 2009). Student engagement (SE) refers to the interrelationship between relevant resources, including effort and time, utilized by students and academic environments to maximize both student experience/learning outcomes (Trowler, 2010). The concept of student engagement derives from Astin's (1984) conceptualization of student involvement. He defined student involvement as "the amount of physical and psychological energy that the student devotes to the academic experience" (p. 298). Pascarella and Trenzini (1991) further articulated the term engagement, pairing it with student involvement and educational outcomes (Barkley & Major, 2020). Thus, presently, engagement "is the term usually used to represent constructs such as quality of effort and involvement in productive learning activities" (Kuh, 2009, p. 6). In the online learning context, we define "student engagement in online learning" as the level of engagement while using online learning platforms. Three dimensions of student engagement are incorporated in the definition: behavioral, cognitive, and emotional (Fredricks et al., 2004; Hu et al., 2016; Hu & Li, 2017). Behavioral engagement reflects student active participation in academic-related activities and their concentration and effort into tasks. Cognitive engagement is tied to a student's investment of mental energy and effort in thinking and learning to understand and master complex concepts and skills. Finally, emotional engagement includes positive feelings experienced when performing academic-related tasks (Fredricks et al., 2004).

Numerous studies have examined a wide range of factors influencing SE in online learning during the COVID-19 pandemic (Baloran & Hernan, 2021; Wester et al., 2021; Wu & Teets, 2021). Unfortunately, the findings across studies are inconsistent, contradictory, and limited to specific geographic regions and populations. For example, some studies reported a positive association between students' learning technology-related self-efficacy and SE in online learning (Maini et al., 2021; Adeshola & Agoyi, 2022; Kara, 2022). However, Heo et al. (2021) found the opposite. Similarly, conflicting results were reported about the role of gender in SE. For example, Wu and Teets (2021) and Li et al. (2023) reported a higher level of SE among female students compared to male students; however, these findings contradict the result reported by Owusu-Agyeman et al. (2021). Thus, despite a large number of studies addressing this issue, no systematic review has been carried out to summarize and synthesize the studies that have examined factors influencing SE. While a study conducted a systematic review to synthesize the findings on SE in Latin American higher education institutions during the COVID-19 pandemic (Salas-Pilco et al., 2022), the investigation centered solely on the characteristics of SE, but it did not explore the factors driving SE. There is a need for a systematic review of the factors associated with SE in online learning during the COVID-19 pandemic that provides state-of-the-art knowledge of existing literature in the domain and offers future research directions. Therefore, the current study aims to fill the gap by providing a broader examination of findings across all published global investigations to highlight factors driving college/university SE in online learning during the pandemic. More specifically, this systematic review contributes to the literature in several ways. First, it identifies the most prevalent factors associated with SE. Second, these factors are further classified into broader themes (e.g., student-

related and instructor-related factors) and subthemes (e.g., student-related subthemes may include students' self-efficacy, readiness, skills, personality traits, emotion, and motivation). Third, this investigation provides a guide for future educational initiatives aimed at maximizing SE in online learning during an emergency period. Finally, this study offers several directions for future research.

Overall, this investigation aims to increase understanding of the antecedent factors impacting SE in online learning during an emergency period. By shedding light on these central factors, the findings can help higher education instructors, administrators, instructional designers, and others involved in developing and implementing online learning to take the necessary actions to enhance student engagement. Maintaining adequate student engagement—particularly during unexpected/unplanned shifts to online instruction (i.e., public health emergencies)—is critical to driving student satisfaction and performance (Appleton et al., 2008; Miliszewska, 2007). Based on the above review, this systematic review aims to address the following research question:

> During the COVID-19 outbreak, what were the most prevalent factors associated with student engagement in online learning?

# Method

This review was performed in accordance with the guidelines of Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (Liberati et al., 2009).

### *Search Strategy*

A systematic search of four databases—Education Resources Information Center (ERIC), Education Research Complete (ERC), PsycINFO, and Web of Science (WoS)—was performed to obtain studies using a set of search keywords. The ERIC and ERC were chosen as they are two widely used databases for education research. The WoS, the world's leading publisher-neutral citation index, was chosen to locate multidisciplinary articles. Finally, we used the PsycInfo database to capture articles on the psychological and behavioral aspects of education. As shown in Table 1, various terms (e.g., e-learning, online learning, virtual learning, remote learning, or distance learning; student engagement, student involvement, student interest, student/learner/learning motivation, student attention; coronavirus or COVID or SARS-CoV-2; college, university, or higher education) were used in combination to search the databases. In addition, we used several Boolean operators to locate relevant studies. Additional filters were performed during the search, following the article inclusion and exclusion criteria discussed in the next section.

**Table 1**

*Key Terms or Boolean Operators Used for Search*

| Search | Search terms (Boolean operators) |
|---|---|
| 1 | "student engagement" OR "student involvement" OR "behavioral engagement" OR "cognitive engagement" OR "emotional engagement" OR "learning engagement" OR |

| | |
|---|---|
| | “learner engagement” OR “learning motivation” AND “predictor” OR “factor influencing” OR “determinant” AND “COVID” AND “college” OR “university” OR “higher education” AND "english"[Language] AND “peer-reviewed”[journal] AND “2020/01/01”[Date - Publication] : “2024/03/31” [Date - Publication] |
| 2 | “student engagement” OR “student involvement” OR “behavioral engagement” OR “cognitive engagement” OR “emotional engagement” OR “learning engagement” OR “learner engagement” OR “learning motivation” AND “predictor” OR “factor influencing” OR “determinant” AND “coronavirus” AND “college” OR “university” OR “higher education” AND "english"[Language] AND “peer-reviewed”[journal] AND “2020/01/01”[Date - Publication] : “2024/03/31” [Date - Publication] |
| 3 | “student engagement” OR “student involvement” OR “behavioral engagement” OR “cognitive engagement” OR “emotional engagement” OR “learning engagement” OR “learner engagement” OR “learning motivation” AND “predictor” OR “factor influencing” OR “determinant” AND “SARS-CoV-2” AND “college” OR “university” OR “higher education” AND "english"[Language] AND “peer-reviewed”[journal] AND “2020/01/01”[Date - Publication] : “2024/03/31” [Date - Publication] |

### *Criteria for Inclusion and Exclusion*

We systematically searched for studies published in peer-reviewed journals from January 2020 to March 2024. As shown in Table 2, this review included primary research and quantitative empirical studies published in English, which examined the factors associated with SE in online learning in higher education during the COVID-19 pandemic. We excluded qualitative studies, conceptual papers, non-peer-reviewed studies, conference proceedings, and grey literature as our systematic review aimed to conduct a systematic review of correlational and causal evidence to identify the factors associated with SE. All abstracts and full texts were screened and reviewed independently by two trained researchers.

**Table 2**

*Study Inclusion and Exclusion Criteria*

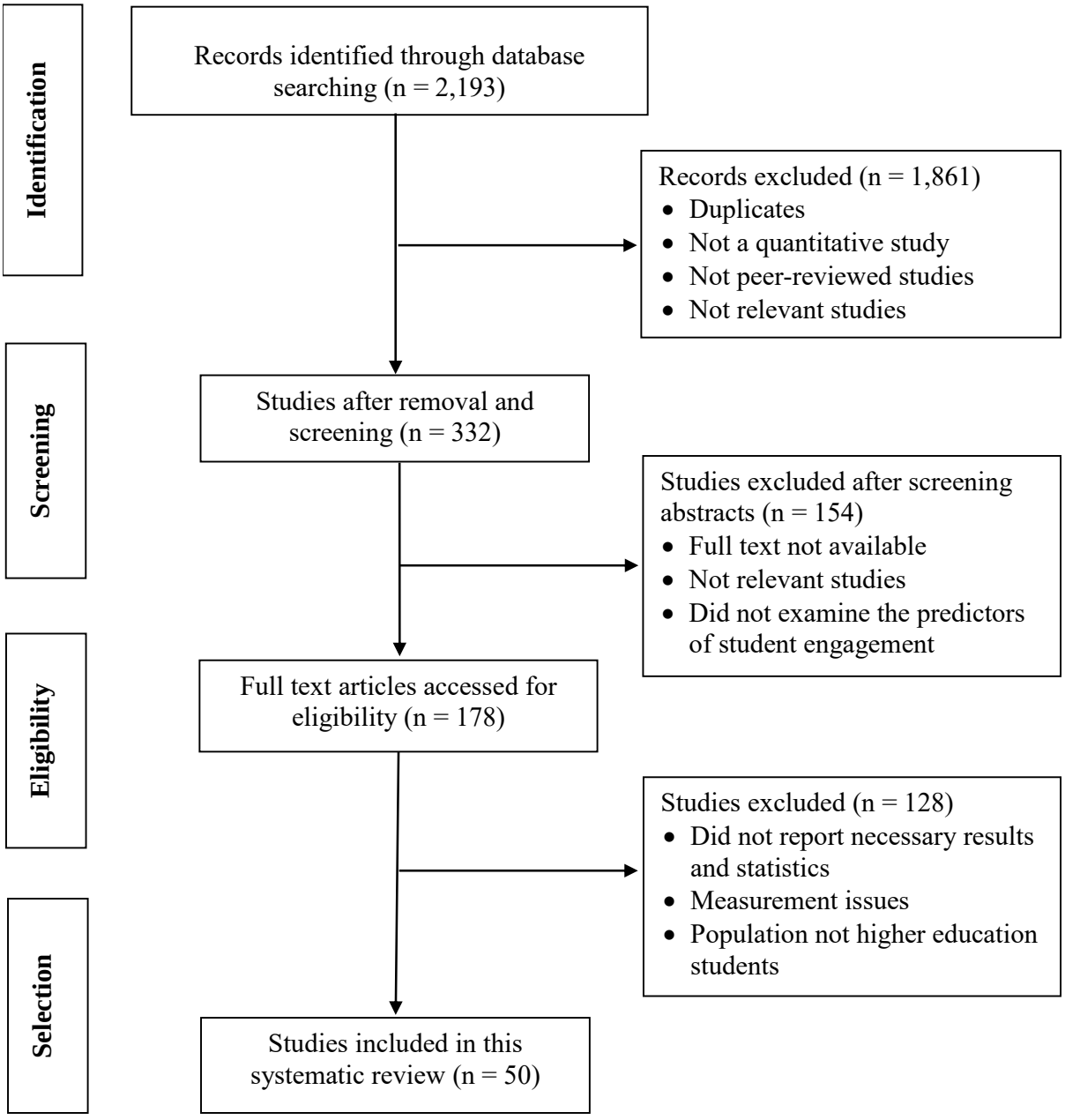
| Inclusion criteria | Exclusion criteria |
|---|---|
| • Studies examining the factors associated with SE in online learning in higher education during the COVID-19 pandemic<br>• Quantitative empirical studies<br>• Written in English<br>• Published in peer-reviewed journal | • Studies that did not examine the predictors of SE in online learning in higher education during the COVID-19 pandemic<br>• Qualitative studies<br>• Not written in English<br>• Published in non-peer-reviewed journal<br>• Books (textbooks), book chapters, conference papers, dissertations, and grey literature |

As depicted in the PRISMA flow diagram below (see Figure 1) which describes how records are identified, screened, and eligible for inclusion (Moher et al., 2010), the search strategy identified 1,403 records. After removing duplicates, qualitative studies, non-peer-reviewed studies, and non-relevant studies, 275 studies were further screened. Of these, 139 studies were excluded after screening the abstracts, as they were not relevant studies or did not examine the factors related to student engagement, and full texts were not available. The

remaining 136 full text studies were further assessed for eligibility. Of these, 104 studies were removed as they did not report the necessary results or had been measurement and methodological issues, and the study population was not higher education students. The remaining 50 studies met the inclusion criteria.

**Figure 1**

*PRISMA Flow Diagram Showing Search Strategy and Study Selection Process*



### *Data Extraction and Analysis*

The same two researchers who screened articles extracted data independently of one another. As presented in Table 3, the data extracted from the articles included title, author(s), publication year, data collection year, country, sample size, study objective, study design, dimensions of student engagement (e.g., cognitive, behavioral, and emotional), factors influencing SE, and key findings. We coded the information related to factors associated with SE and their associations with various dimensions of SE and identified broader themes and sub-themes, as presented in Table 4. All discrepancies in data extraction between the two researchers were resolved by discussion to reach consensus.

We analyzed the data using IBM SPSS Statistics 27. First, we summarized the characteristics of the studies included in our review using descriptive statistics. Then, we presented the frequencies of factors associated with student engagement in online learning and charts showing those factors by theme.

## Results

### *Description of Included Studies*

This systematic review included fifty studies from thirty-two countries, including nine from China, five from the USA, four from South Korea, four from India, three from Colombia, and three from Turkey (see Table 3). Thirty-five studies collected data from Asia, followed by eleven from Europe, ten from North America, five from South America, and four from Africa. Nineteen studies were published in 2021, thirteen in 2022, thirteen in 2023, and five in 2024. Most studies (n = 27) collected data in 2020. All studies, except a longitudinal investigation, were cross-sectional. In addition, the bulk of the studies (48 out of 50) employed the survey method (the remaining two projects utilized experimental methods). The studies included in this review totaled 45,601 student respondents, with an average sample size of 914.02 respondents (standard deviation = 2227.847), ranging from 16 to 14935.

**Table 3**

*Study Characteristics and Factors Associated with Student Engagement*

| Author(s) | Country | Sample size | Dimension/measure of student engagement | Factors associated with student engagement |
|---|---|---|---|---|
| Adeshola & Agoyi (2022) | Cyprus | 274 | Cognitive, behavioral, emotional | Student academic self-efficacy<br>student computer self-efficacy |
| Aldaghri & Oraif (2022) | Saudi Arabia | 148 | Skills, emotional, participation, performance | Instructor providing students with additional study materials, students' feelings (pleased) about attending online classes |
| Aldhaen (2024) | Bahrain | 442 | Cognitive, behavioral, affective | Instructor digital competency |
| Almusharraf & Bailey (2021) | South Korea | 329 | Agentic engagement | Collaborative learning orientation |
| Azila-Gbettor et al. (2023) | Ghana | 310 | OSE (learning engagement) | University support |

| | | | | |
|---|---|---|---|---|
| Baloran et al. (2021) | Philippines | 529 | Skills, emotional, participation, performance | College year, course satisfaction in online learning |
| Bozan et al. (2024) | USA | 329 | OSE | Student–teacher relationship, learning confidence |
| Cleofas (2021) | Philippines | 202 | OSE (skills, emotional, participation, performance) | Self-care practices (physical care, supportive relationships, self-compassion and purpose, supportive structure, mindful relaxation) |
| Daniels (2021) | Canada | 98 | Cognitive, behavioral, emotional | Students' mastery-approach goals |
| Dubey et al. (2023) | India | 1137 | OSE (cognitive, behavioral, emotional) | Perceived usefulness, hedonic motivation, attitude toward online learning |
| Duron-Ramos et al. (2022) | USA, Mexico, El Salvador, Columbia, Peru, Dominican Republic | 1723 | Cognitive, behavioral, emotional | Orientation to happiness (pleasure, meaning, engagement) |
| El-Sayad et al. (2021) | Egypt | 330 | Cognitive, behavioral, emotional | Student academic self-efficacy, perceived usefulness, teaching presence |
| Fabian et al. (2022) | UK | 178 | Skills, participation | Transactional distance between student and student, perceived usefulness of the learning activities, e-learning capital |
| Fu et al. (2024) | China | 436 | Cognitive, behavioral, emotional | Mastery motivation climate |
| Gamage et al. (2021) | Sri Lanka | 120 | OSE | Mentor's ability to facilitate learning, mentors encourage mentees to be focused on their goals |
| Gherghel et al. (2023) | Japan | 1167 | Emotional, behavioral | Opportunities for social interaction |
| Gopinathan et al. (2022) | Malaysia | 142 | OSE | Digital collaborative tools, interactivity, motivation |
| Heidari et al. (2021) | Iran | 308 | Academic/study engagement (vigor, dedication, absorption) | Students' digital competence, digital informal learning |
| Heo et al. (2021) | South Korea | 1205 | OSE (learning engagement) | Student's self-efficacy in technology use (-), self-efficacy in time management, self-efficacy in an online learning environment |
| Huang & Wang (2023) | China | 14935 | Cognitive, behavioral, emotional | Autonomy satisfaction, competence satisfaction, relatedness satisfaction |
| Iqbal et al. (2022) | China | 338 | Cognitive | Self-awareness, self-motivation, regulate the emotions, social skills |
| Kara (2022) | China | 563 | OSE | Digital literacy, self-directed learning, motivation for learning |
| Kaspar et al. (2024) | Germany | 413 | Course engagement | Age, neuroticism, conscientiousness, openness, self-regulation skills, academic self-efficacy, digital media self-efficacy, COVID-19 anxiety (-) |
| Kedia & Mishra (2023) | India | 300 | OSE | Instructor-student interaction, social media use, family support, technical support, |
| Koob et al. (2021) | Germany | 559 | Study/academic engagement (vigor, dedication, absorption) | Digital learning format, social support, resilience, active self-care, academic self-efficacy, health concerns about family and friends |
| Ladino Nocua et al. (2021) | Colombia | 16 | Cognitive | Active learning activity |
| Li et al. (2023) | USA | 351 | OSE | Gender, race, conscientious, openness, sense of community, instructor's nonverbal immediacy, time management skills, digital skills, health status |

| | | | | |
|---|---|---|---|---|
| Lim et al. (2022) | Korea | 219 | Skills, emotional, participation, performance | Prior online learning experiences, instructor warmth and openness (teaching approaches and demeanors), instructor organization (activity preparedness) |
| Luan et al. (2023) | China | 615 | Behavioral, cognitive, emotional, social | Teacher support, peer support |
| Lux et al. (2023) | Canada | 422 | OSE | Stress/anxiety (-), social interactions, instructor strategy, technological accessibility, delivery mode flexibility |
| Maini et al. (2021) | India | 489 | OSE | Teachers' structured approach, teachers' technical readiness, teachers' self-efficacy, students' technical readiness, students' autonomy, students' self-efficacy |
| Mizani et al. (2022) | Indonesia | 324 | OSE | Student loneliness |
| Owusu-Agyeman et al. (2021) | Ghana | 425 | OSE | Online learning environment, instructional resources, institutional support system, type of device used by students, female (-) |
| Pham & Chau (2024) | Vietnam | 263 | OSE | Adaptive cognition, adaptive behavior, Anxiety |
| Poon et al. (2024) | Malaysia | 212 | OSE (cognitive, behavioral, emotional, social) | Expectation to adopt e-learning |
| Quigley et al. (2022) | UK | 301 | Skills, emotional, participation, performance | Conscientiousness, extraversion, neuroticism, agreeableness, openness to experience |
| Reflianto et al. (2021) | Indonesia | 117 | OSE (skills, affective, cognitive) | Online flipped learning scheme using Microsoft Team |
| Reynell van der Ross et al. (2022) | South Africa | 1663 | OSE (emotional, physical/participation, cognitive engagement in class, cognitive engagement out of class) | Psychological conditions of meaningfulness (study resources), availability (burnout risk), safety (student–leader–member exchange), study demands |
| Roque-Hernández et al. (2023) | Mexico | 1417 | OSE | Perceived instructor presence |
| Salta et al. (2022) | Greece | 360 | Behavioral, emotional | Human interaction (student–student, student–instructor, or student–tools interactions), college year (senior) |
| Shah et al. (2021) | Pakistan | 689 | OSE (skills, emotional, participation, performance) | Need satisfaction, need dissatisfaction (-) |
| Sharif Nia et al. (2023) | 9 countries | 6489 | OSE (cognitive, behavioral, emotional) | Course content, online interaction, eLearn acceptance |
| Sun et al. (2023) | China | 497 | Cognitive, behavioral, emotional | Perceived value of knowing learning goals |
| Tan et al. (2024) | Malaysia | 609 | OSE | Perceptions towards online learning |
| Vezne et al. (2023) | Turkey | 293 | Skill, emotional, participation, performance | Attitude towards attending online courses intrinsic goal orientation, extrinsic goal orientation |
| Wu & Teets (2021) | USA | 431 | Skills, emotional, participation, performance | Gender (female), first-year student status (-), underrepresented people of color (-) |
| Yang et al. (2021) | China | 377 | OSE (learning engagement) | Student online learning self-efficacy, students' subjective well-being |
| Zapata-Cuervo et al. (2023) | US, South Korea, Colombia | 523 | OSE | Self-efficacy, anxiety |
| Zhang et al. (2021) | China | 1119 | OSE (behavioral, emotional) | Students' adaptability, perceived academic emotion, negative academic emotion (-) |

| | | | | |
|---|---|---|---|---|
| Zhoc et al. (2022) | China | 965 | Cognitive, behavioral, emotional | Students' subjective well-being, suppression, reappraisal |

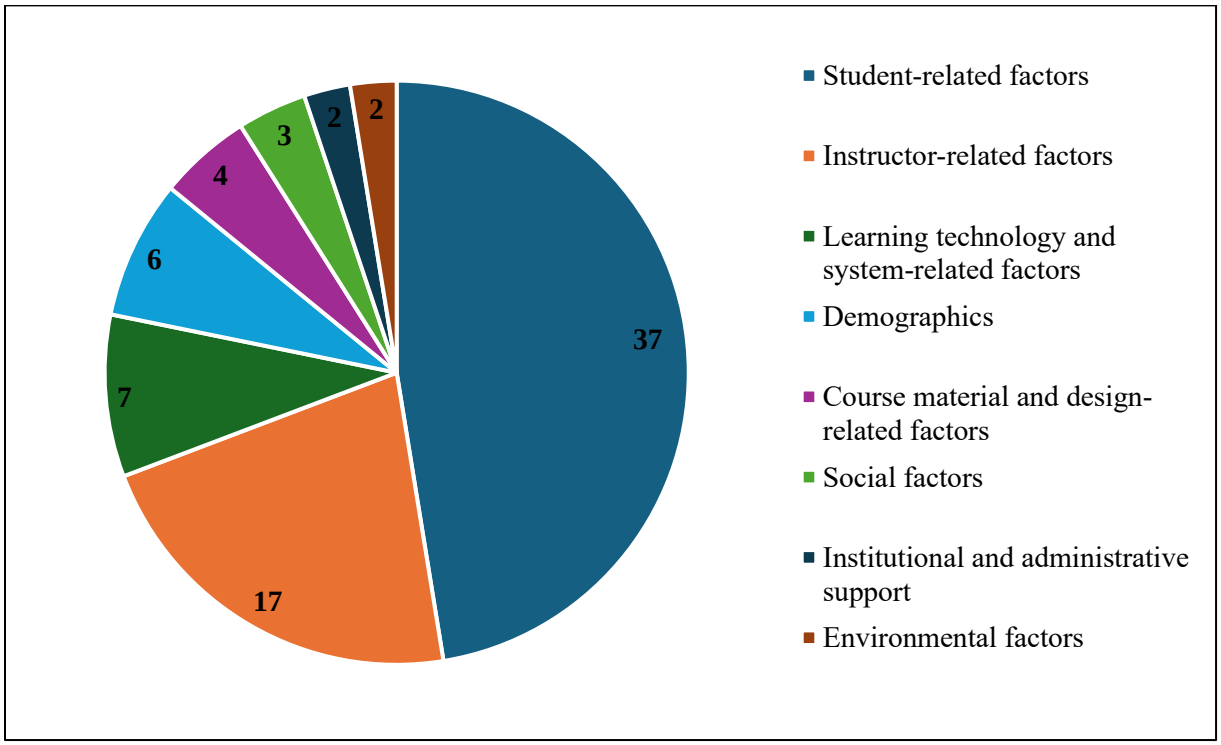
Note: OSE = Overall Student Engagement; Unless otherwise noted, all data were collected by cross-sectional survey, with the exception of Ladino Nocua et al. [heart rate assessment], Reflianto et al. [experiment], and Zhang et al. [longitudinal survey].

### *Factors Associated with Student Engagement in Online Learning*

The majority of the reviewed studies examined student-related factors as predictors of student engagement in online learning (see Figure 2 and Table 4). Other significant influences that were associated with SE were instructor-related factors, demographics, learning technology and system-related factors, course material and design-related factors, social factors, institutional and administrative support, and environmental factors.

**Figure 2**

*Number of Studies by Factors Associated with Student Engagement in Online Learning by Themes*



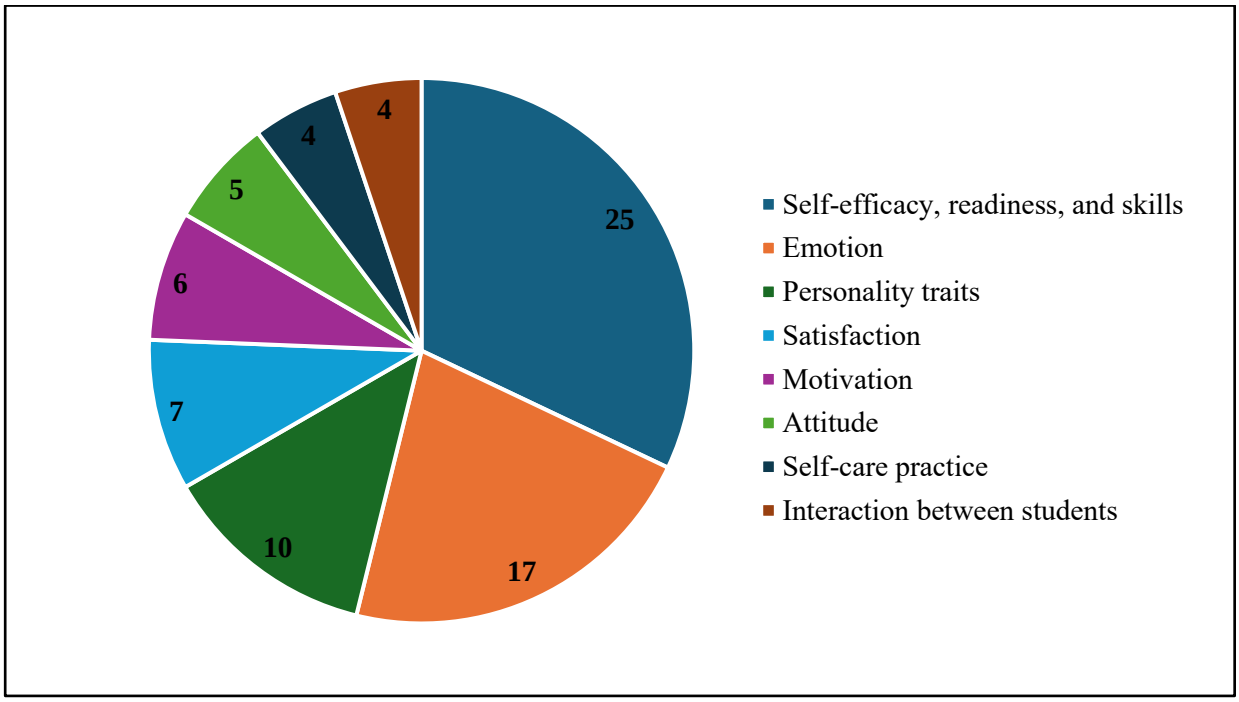

Note: some studies examined multiple themes.

Student-Related Factors

Thirty-seven studies examine student-related factors (see Figure 2) with many exploring multiple factors. Figure 3 presents the student-related factors impacting SE in online learning during the COVID-19 pandemic. Students' self-efficacy, readiness, and skills were found to be the most frequently demonstrated predictors of SE, followed by emotion, personality traits, satisfaction, motivation, attitude, self-care practices, and interaction between students. As presented in Table 4, numerous studies showed that different aspects of self-efficacy (e.g., academic, computer, digital, and technology) were significantly associated with student engagement. Academic self-efficacy (students' beliefs in their ability to accomplish learning tasks and confidence in their own skills to successfully perform these tasks) on OSE (Adeshola & Agoyi, 2022), behavioral and emotional engagement (El-Sayad et al., 2021), course engagement (Kaspar et al. 2024), and study engagement (Koob et al., 2021). Learning technology-related self-efficacy was positively associated with OSE (Maini et al., 2021; Adeshola & Agoyi, 2022; Kara, 2022; Li et al., 2023), course engagement (Kaspar et al., 2024) and academic engagement (Heidari et al., 2021). Conversely, Heo et al. (2021) found a significant negative relationship between self-efficacy in technology use and learning engagement. Other forms of student self-efficacy that were positively related to student engagement include students' self-efficacy in time management (Heo et al., 2021; Li et al., 2023), self-efficacy in an online learning environment (Heo et al., 2021), resilience (Koob et al., 2021), social skills (Iqbal et al., 2022), and self-directed learning skills (Kara, 2022; Kaspar et al., 2024). Moreover, students' adaptability or adaptive behavior (i.e., the ability to respond to changing, new, and uncertain conditions appropriately) was positively associated with SE (Zhang et al., 2021; Pham & Chau, 2024).

**Figure 3**

*Student-Related Factors Associated with Student Engagement in Online Learning*



Note: some studies examined multiple sub-themes.

Several studies focused on student emotions. While positive academic emotion (i.e., enjoyment) was positively correlated with student engagement (e.g., Aldaghri & Oraif, 2022; Duron-Ramos et al., 2022), negative academic emotion (i.e., anger, hopelessness, boredom, sadness, fear, anxiety) was associated with lower SE (Zhang et al., 2021; Lux et al., 2023; Kaspar et al., 2024). Research demonstrated that students' loneliness and anxiety with online learning negatively influenced their engagement in online learning during the COVID-19 pandemic (Zapata-Cuervo et al., 2023; Mizani et al., 2022). In contrast, Pham and Chau (2024) found a positive and significant influence of anxiety on SE. The regulation of emotions, which is defined as redirecting emotions and predicting repercussions before acting, and self-awareness (i.e., the ability to identify one's own and other's emotions) were positively related to cognitive engagement (Iqbal et al., 2022). Zhoc et al. (2022) examined the two emotion regulation strategies. They found that cognitive reappraisal positively influenced behavioral, cognitive, and emotional engagement, but expressive suppression was positively associated only with behavioral engagement.

Some studies revealed a significant influence of personality traits on SE. For example, Quigley et al. (2022) examined the Big Five personality traits as predictors of four types of engagement (i.e., participation, performance, skills, and emotional). Conscientiousness predicted all types of engagement, and extraversion predicted participation and performance. In addition, neuroticism was significantly related to engagement skills, performance, and emotional engagement, while agreeableness and openness to experience predicted participation and emotional engagement, respectively. Kaspar et al. (2024) reported a positive impact of conscientiousness, neuroticism, and openness on course engagement. Li et al. (2023) showed that conscientiousness and openness are positively associated with student engagement.

Numerous studies explored the impacts of pleasure, subjective well-being, and meaningfulness on SE in online learning during the COVID-19 pandemic. Aldaghri and Oraif (2022) found that students' feelings of pleasure about attending online classes were positively associated with skills, emotions, participation, and performance. Other research found that student orientation to happiness (i.e., pleasure, meaning, and engagement) was a significant predictor of behavioral, cognitive, and emotional engagement (Duron-Ramos et al., 2022). Students' subjective well-being (i.e., students' positive emotional and cognitive evaluations of online instruction, positive mood, vitality, and general interest) predicted higher learning engagement (Yang et al., 2021) and behavioral and cognitive engagement (Zhoc et al., 2022). Students' psychological conditions of meaningfulness, such as study resources (e.g., lecturer support, peer support, growth, and information accessibility), positively contributed to student engagement (Reynell van der Ross et al., 2022). In addition, self-compassion and purpose (experiencing meaning in life and accepting challenges) were positively correlated with online student engagement (Cleofas, 2021).

Research showed that student satisfaction was positively related to SE during the COVID-19 pandemic. For example, Huang and Wang (2023) examined the influence of three dimensions of students' psychological need satisfaction (autonomy, competence, and relatedness) on three dimensions of SE (emotional, cognitive, and behavioral). They found that autonomy and competence were positively related to all three dimensions of SE. In addition,

relatedness was positively associated with behavioral and emotional engagement. Conversely, the relationship between relatedness and cognitive engagement was negative. Shah et al. (2021) revealed that students' perceptions of their psychological need satisfaction and/or dissatisfaction positively influenced student engagement with online learning. Baloran et al. (2021) demonstrated a positive impact of course satisfaction in online learning on skills, emotions, participation, and performance engagement.

Student motivation for online learning (i.e., students' desire to learn in online environments) was found to be a significant driver of student engagement (Gopinathan et al., 2022; Iqbal et al., 2022; Kara, 2022). For example, intrinsic goal orientation (i.e., participation in a learning task for reasons such as mastery, curiosity, or challenge) was positively related to skills and emotional engagement. However, extrinsic goal orientation (i.e., participation in a learning task for reasons such as getting a good grade, performance, or competition) was only significantly associated with performance engagement (Vezne et al., 2023). Dubey et al. (2023) found a significant effect of hedonic motivation (i.e., perceived pleasure) on OSE.

Students' attitudes toward online learning and instructional materials significantly influenced SE. For example, students' attitudes toward online learning (Dubey et al., 2023), perceptions towards online learning (Tan et al., 2024), and online learning acceptance (Sharif Nia et al., 2023) were significantly related to OSE. While students' attitudes toward attending online lectures impacted on the skills and emotional dimensions of SE, their attitudes toward doing assignments and homework online influenced the skills and participation aspects of SE (Vezne et al., 2023).

Student–student interactions among individual students, opportunities for social interaction during online classes, or students working in small groups positively predicted higher levels of emotional engagement (Salta et al., 2022; Gherghel et al., 2023). Another study showed that low transactional distance between student and student (i.e., high-quality dialogues that are perceived to support students in their learning) increased student participation engagement (Fabian et al., 2022).

Student engagement was also influenced by students' self-care practices. Cleofas (2021) found that self-care practices such as physical care (e.g., exercising, eating healthy foods and hydration), mindful relaxation (active engagement in relaxation activities), and supportive relationships (interacting with significant others) were positively associated with OSE. Students' active self-care (ability to maintain daily self-care, structure, and planning in terms of sleep, work, or physical activity) was a significant predictor of study engagement (e.g., a positive, fulfilling state of mind such as high levels of energy, concentration, and involvement in study); dedication refers to being strongly involved in one's studies and experiencing a sense of significance, and absorption implies being fully concentrated on and immersed in one's study activities (Koob et al., 2021).

Other student-related factors that increased student engagement with online learning during the COVID-19 pandemic include prior online learning experiences (Lim et al., 2022), mastery-approach goals (i.e., students' learning to gain competency through mastering tasks) (Daniels et al., 2021), autonomy (Maini et al., 2021), collaborative learning orientation (i.e.,

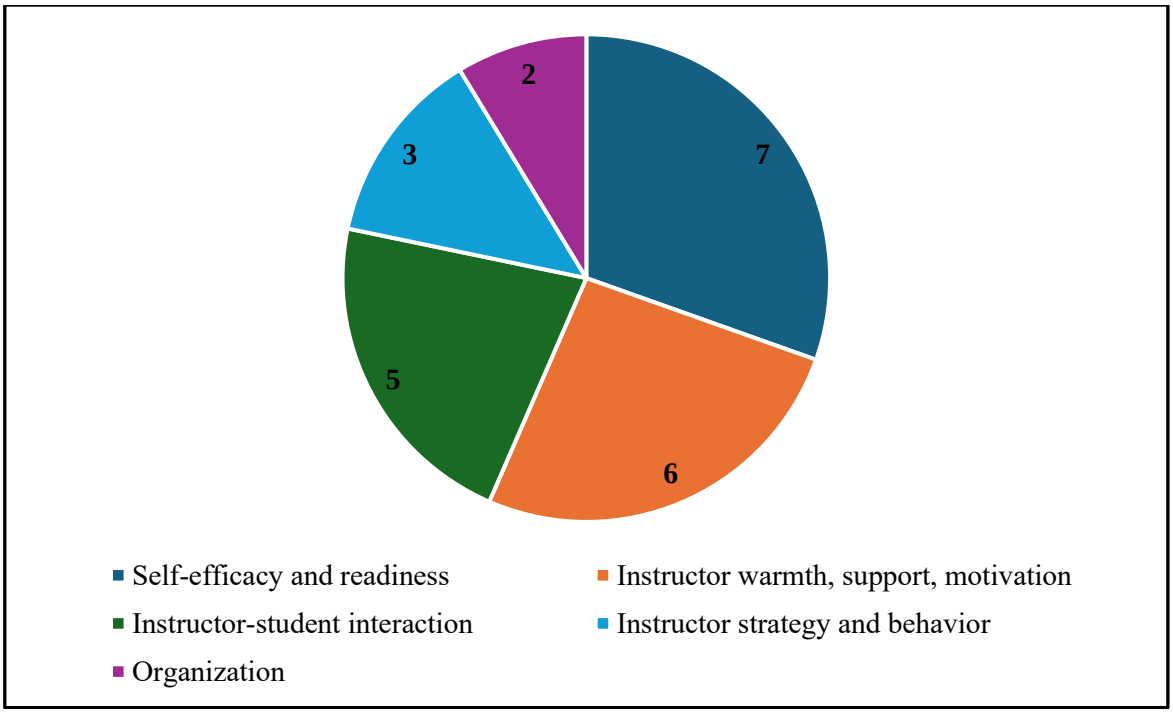
students working collectively to achieve learning goals) (Almusharraf & Bailey, 2021), supportive relationships (i.e., students' interactions with significant others) (Cleofas, 2021), sense of community (Li et al., 2023), and informal learning behaviors in their daily life while using digital technology (Heidari et al., 2021). Burnout risk (e.g., personal burnout, study-related burnout, and peer-related burnout) was negatively associated with student engagement (Reynell van der Ross et al., 2022).

Instructor-Related Factors

Seventeen studies examined the instructor-related factors (see Figure 2). Figure 4 shows the instructor-related factors associated with student engagement in online learning during the COVID-19 pandemic. Instructors' self-efficacy and readiness were frequently established determinants of student engagement. For example, the mentor's ability to facilitate learning and encourage mentees to be focused on their goals were significant factors that affected SE in online learning (Gamage et al., 2021). Instructors' self-efficacy (i.e., preparedness and confidence in the delivery of content), digital competency (Aldhaen et al., 2024), and technical readiness (i.e., efficacy and comfort or ease of use of learning technology) significantly affected SE (Maini et al., 2021). Research also revealed that instructor/teaching presence (i.e., instructor's ability to facilitate, support, and guide the student learning process) was positively related to SE (El-Sayad et al., 2021; Roque-Hernández et al., 2023).

**Figure 4**

*Instructor-Related Factors Associated with Student Engagement in Online Learning*




Note: some studies examined multiple sub-themes.

Interactions between instructors and students also served as a significant determinant of SE during the COVID-19 pandemic. Interactivity, the extent to which an educator expects communication from students while teaching (Gopinathan et al., 2022), and psychological safety or instructor–student exchange that occurs during learning activities such as lectures and communication in online forums (Reynell van der Ross et al., 2022) positively contributed to increased student engagement. In addition, instructor–student interaction (i.e., online dialogue between students and teachers) affected students' emotional engagement (Salta et al., 2022). Two studies reported a positive influence of instructor–student interaction on OSE (Kedia & Mishra, 2023; Sharif Nia et al., 2023).

Several studies investigated instructors' warmth, support, and motivation. Lim et al. (2022) found that instructors' encouragement of student participation and teaching approaches and demeanors (e.g., warmth and openness) positively affected emotional engagement. Teacher support was associated with behavioral engagement (Luan et al., 2023). In addition, students who were provided additional study materials by their instructors demonstrated a higher level of skill and participation engagement (Aldaghri & Oraif, 2022). Student-teacher relationships (i.e., instructors fostering student confidence and motivation, with the ultimate goal of positive learning outcomes) were positively related to OSE (Bozan et al., 2024). Furthermore, mastery motivational climate (i.e., students' perception of motivational climate in online learning) was linked to improved behavior, emotional, and cognitive engagement (Fu et al., 2024).

Studies showed that instructors' strategies and behaviors could impact OSE. For example, instructors' nonverbal immediacy (i.e., students' perceptions of instructors' vocal variety, facial expression, postures, and gestures) had a significant effect on OSE. Instructors' teaching strategy and delivery mode flexibility were associated with increased student

engagement (Lux et al., 2023). Instructors' organizational skills or a structured approach, such as activity preparedness and active learning favorably influenced OSE (Lim et al., 2022; Maini et al., 2021).

Course Material and Design-Related Factors

Only four studies examined course material and design-related factors (see Figure 2). Sharif Nia et al. (2023) found that students' perception of course content quality in online learning positively impacts OSE. Reflianto et al. (2021) reported that an online flipped learning scheme using Microsoft Teams increased OSE. In addition, learning format (Koob et al., 2021) and active learning (Ladino Nocua et al., 2021) were positively related to study engagement.

Learning Technology and System-Related Factors

Seven studies investigated learning technology and system-related factors (see Figure 2). Research showed that accessibility of learning technologies (Lux et al., 2023) and technical support (Kedia & Mishra, 2023) enhanced OSE during the COVID-19 pandemic. Similarly, digital collaborative tools (i.e., tools or platforms used in online learning) had a significant and favorable influence on OSE (Gopinathan et al., 2022). Learning systems and technologies and types of devices used by students enhanced student engagement during the COVID-19 pandemic (Owusu-Agyeman et al., 2021). Perceived usefulness of online learning systems was positively related to behavioral engagement, cognitive engagement, emotional engagement (El-Sayad et al., 2021), participation (Fabian et al., 2022), and OSE (Dubey et al., 2023).

Demographics

Six studies reported demographic variables such as gender, education, age, and ethnicity as significant factors associated with student engagement. However, the evidence is contradictory. For example, female students demonstrated significantly higher participation engagement than male students (Wu & Teets, 2021). In addition, Li et al. (2023) reported a lower level of OSE among males than females. On the contrary, Owusu-Agyeman et al. (2021) indicated a lower level of OSE among female students compared to male students.

Student college year was associated with student engagement in a few studies. For example, the level of engagement in the second-year students' online learning was significantly different from that of third-year students (Baloran et al., 2021). Moreover, students who had already spent at least four years in their undergraduate studies reported higher levels of emotional engagement than those who were in the first (freshman) or second (sophomore) year of their studies (Salta et al., 2022). One study found that first-year students had lower performance engagement than non-first-year students (Wu & Teets, 2021).

Race was a significant predictor of SE during the COVID-19 pandemic. Wu and Teets (2021) found that Underrepresented People of Color (URPOC) students in the U.S. were less engaged (skills, participation, and performance) than non-URPOC students. On the contrary, Li et al. (2023) reported a lower level of OSE among white students compared to non-white students. Only one study reported the relationship between age SE; older students demonstrated a higher level of online course engagement compared to younger students (Kaspar et al., 2024).

Other Factors

Social factors such as family and peer support were significant predictors of SE during the COVID-19 pandemic (Kedia & Mishra, 2023; Koob et al., 2021; Luan et al., 2023). Two studies revealed that students who received support from colleges and universities during the pandemic demonstrated higher levels of OSE (Owusu-Agyeman et al., 2021; Azila-Gbettor et al., 2023). Owusu-Agyeman et al. (2021) showed that the online learning environment positively and significantly affected OSE. Reynell van der Ross et al. (2022) found a significant and positive relationship between study demands (i.e., time and study pressure) and OSE. A study demonstrated that health concerns about family and friends significantly influenced study engagement (Koob et al., 2021). Student usage of social media was positively associated with student engagement during the pandemic (Kedia & Mishra, 2023).

Finally, some studies included in this review reported two or more factors associated with SE (see Table 4). For example, eleven investigations (Aldaghri & Oraif, 2022; Bozan et al., 2024; El-Sayad et al., 2021; Gopinathan et al., 2022; Li et al., 2023; Lim et al., 2022; Lux et al., 2023; Maini et al., 2021; Reynell van der Ross et al., 2022; Salta et al., 2022; Sharif Nia et al., 2023) examined the impact of both student- and instructor-related factors on SE. Along with student- and instructor-related factors, other studies investigated learning technology and system-related factors (El-Sayad et al., 2021; Gopinathan et al., 2022; Lux et al., 2023), course material and design-related factors (Sharif Nia et al., 2023), study demand (Reynell van der Ross et al., 2022), and demographics (Salta et al., 2022; Li et al, 2023). Koob et al. (2021) explored student-related (e.g., academic self-efficacy, active self-care), course material and design-related (e.g., digital learning format), social (e.g., social support), and environmental factors (e.g., health concerns about family and friends). Kedia and Mishra (2023) have shown that instructor-related factors, learning technology and system-related factors, social factors, and media use are associated with SE. Fabian et al. (2022) focused on student-related and learning technology and system-related factors. Luan et al. (2023) investigated instructor-related and social factors. Owusu-Agyeman et al. (2021) reported the influence of institutional and administrative support, learning technology, and demographics on SE.

**Table 4**

*Factors Associated with Student Engagement by Themes*

| Themes and sub-themes | Factors associated with dimensions of student engagement |
|---|---|
| **Student-related factors** | |
| Self-efficacy, readiness, and skills | academic self-efficacy → OSE (Adeshola & Agoyi, 2022)<br>academic self-efficacy →BE, EE (El-Sayad et al., 2021)<br>academic self-efficacy → course engagement (Kaspar et al., 2023)<br>academic self-efficacy → study engagement (Koob et al., 2021)<br>computer self-efficacy → OSE (Adeshola and Agoyi, 2022)<br>learning confidence → OSE (Bozan et al., 2024)<br>digital competence → academic engagement (Heidari et al., 2021)<br>digital literacy → OSE (Kara, 2022)<br>digital media self-efficacy → course engagement (Kaspar et al., 2023)<br>digital skills → OSE (Li et al., 2023)<br>technical readiness → OSE (Maini et al., 2021)<br>*self-efficacy in technology use → learning engagement (Heo et al., 2021)*<br>e-learning capital → skills (Fabian et al., 2022)<br>online learning self-efficacy → learning engagement (Yang et al., 2021)<br>self-efficacy → OSE (Maini et al., 2021; Zapata-Cuervo et al., 2023)<br>self-efficacy in time management → learning engagement (Heo et al., 2021)<br>self-efficacy in an online learning environment → learning engagement (Heo et al., 2021)<br>resilience → study engagement (Koob et al., 2021)<br>self-directed learning → OSE (Kara, 2022)<br>time management skills → OSE (Li et al., 2023)<br>self-regulation skills → course engagement (Kaspar et al., 2023)<br>students' adaptability → OSE (Zhang et al., 2021)<br>adaptive behavior → OSE (Pham & Chau, 2024)<br>social skills → CE (Iqbal et al., 2022) |
| Emotion | positive academic emotion → OSE (Zhang et al., 2021)<br>*negative academic emotion → OSE (Zhang et al., 2021)*<br>emotion regulation → CE (Iqbal et al., 2022)<br>self-awareness → CE (Iqbal et al., 2022)<br>suppression (emotion regulation) → BE (Zhoc et al., 2022)<br>cognitive reappraisal (emotion regulation) → BE, EE, CE (Zhoc et al., 2022)<br>*student loneliness → OSE (Mizani et al., 2022)*<br>*anxiety → OSE (Zapata-Cuervo et al., 2023)*<br>anxiety (Pham & Chau, 2024)<br>*stress/anxiety → OSE (Lux et al., 2023)*<br>*COVID-19 anxiety → course engagement (Kaspar et al., 2023)*<br>students' feelings (pleased) about attending online classes → skills, emotional, participation, performance (Aldaghri & Oraif, 2022)<br>orientations to happiness: pleasure, meaning, and engagement → BE, EE, CE (Duron-Ramos et al., 2022)<br>students' subjective well-being → learning engagement (Yang et al., 2021)<br>students' subjective well-being → BE, CE (Zhoc et al., 2022)<br>psychological conditions of meaningfulness (study resources) → OSE (Reynell van der Ross et al., 2022)<br>self-compassion and purpose → OSE (Cleofas, 2021) |

| | |
|---|---|
| Personality traits | conscientiousness → participation, performance, skills, emotional (Quigley et al., 2022)<br>conscientiousness → course engagement (Kaspar et al., 2023)<br>conscientiousness → OSE (Li et al., 2023)<br>extraversion → participation, performance (Quigley et al., 2022)<br>neuroticism → skills, emotional, performance (Quigley et al., 2022)<br>neuroticism → course engagement (Kaspar et al., 2023)<br>agreeableness → participation (Quigley et al., 2022)<br>openness → course engagement (Kaspar et al., 2023)<br>openness to experience → EE (Quigley et al., 2022)<br>openness → OSE (Li et al., 2023) |
| Satisfaction | course satisfaction → skills, emotional, participation, performance, OSE (Baloran et al., 2021)<br>need satisfaction → OSE (Shah et al., 2021)<br>*need dissatisfaction → OSE (Shah et al., 2021)*<br>autonomy satisfaction → BE, EE, CE (Huang & Wang, 2023)<br>competence satisfaction → BE, EE, CE (Huang & Wang, 2023)<br>relatedness satisfaction → BE, EE (Huang & Wang, 2023)<br>*relatedness satisfaction → CE (Huang & Wang, 2023)* |
| Motivation | motivation → OSE (Gopinathan et al., 2022)<br>self-motivation → CE (Iqbal et al., 2022)<br>motivation for learning → OSE (Kara, 2022)<br>intrinsic goal orientation → skills, emotional (Vezne et al., 2023)<br>extrinsic goal orientation → performance (Vezne et al., 2023)<br>hedonic motivation → OSE (Dubey et al., 2023) |
| Attitude | attitude toward online learning → OSE (Dubey et al, 2023)<br>perceptions towards online learning → OSE (Tan et al., 2024)<br>attitude of attending online lectures → skills, emotional (Vezne et al., 2023)<br>attitude of doing assignment and homework online → skills, participation, performance (Vezne et al., 2023)<br>online learning acceptance → OSE (Sharif Nia et al., 2023) |
| Self-care practice | physical care → OSE (Cleofas, 2021)<br>active self-care → study engagement (Koob et al., 2021)<br>mindful relaxation → OSE (Cleofas, 2021)<br>supportive structures → OSE (Cleofas, 2021) |
| Interaction between students | student–student interaction → EE (Salta et al., 2022)<br>opportunities for social interaction → emotional (Gherghel et al., 2023)<br>low transactional distance between student and student → participation (Fabian et al., 2022)<br>social interactions → OSE (Lux et al., 2023) |
| Others | prior online learning experiences → performance engagement (Lim et al., 2022)<br>perceived value of knowing learning goals → BE, EE, CE (Sun et al., 2023)<br>adaptive cognition → OSE (Pham & Chau, 2024)<br>expectation to adopt e-learning → OSE (Poon et al., 2024)<br>students' mastery-approach goals → BE, EE, CE (Daniels et al., 2021)<br>students' autonomy → OSE (Maini et al., 2021)<br>*burnout risk → OSE (Reynell van der Ross et al., 2022)*<br>students' collaborative learning orientation → agentic engagement (Almusharraf & Bailey, 2021)<br>supportive relationships → OSE (Cleofas, 2021)<br>sense of community → OSE (Li et al., 2023)<br>health status → OSE (Li et al., 2023)<br>digital informal learning behavior → academic engagement (Heidari et al., 2021) |
| ***Instructor-related factors*** | |

| | |
|---|---|
| Self-efficacy and readiness | instructor's ability to facilitate learning → OSE (Gamage et al., 2021)<br>instructor's ability to encourage students to be focused on their goals → OSE (Gamage et al., 2021)<br>instructor's self-efficacy → OSE (Maini et al., 2021)<br>instructor digital competency → BE, EE, CE (Aldhaen, 2024)<br>instructor's technical readiness → OSE (Maini et al., 2021)<br>teaching presence → BE, EE, CE (El-Sayad et al., 2021)<br>instructor presence → OSE (Roque-Hernández et al., 2023) |
| Instructor warmth, support, and motivation | instructor warmth and openness (teaching approaches and demeanors) → EE, performance, OSE (Lim et al., 2022)<br>teacher support → behavioral (Luan et al., 2023)<br>instructor's encouragement of student participation → EE (Lim et al., 2022)<br>instructor providing students with additional study materials → skill, participation (Aldaghri & Oraif, 2022)<br>student-teacher relationship → OSE (Bozan et al., 2024)<br>mastery motivational climate → BE, EE, CE (Fu et al., 2024) |
| Instructor-student interaction | instructor-student interaction → OSE (Kedia & Mishra, 2023)<br>interactivity → OSE (Gopinathan et al., 2022)<br>student–instructor interaction → EE (Salta et al., 2022)<br>online interaction → OSE (Sharif Nia et al., 2023)<br>student–leader (instructor)–member exchange → OSE (Reynell van der Ross et al., 2022) |
| Instructor strategy and behavior | instructor strategy → OSE (Lux et al., 2023)<br>nonverbal immediacy → OSE (Li et al., 2023)<br>delivery mode flexibility → OSE (Lux et al., 2023) |
| Organization | instructor organization (activity preparedness, active learning activity) → OSE (Lim et al., 2022)<br>instructors' structured approach → OSE (Maini et al., 2021) |
| **Course material and design-related factors** | |
| Pedagogical approach and format | online flipped learning scheme using Microsoft Team → OSE (Reflianto et al., 2021)<br>learning format → study engagement (Koob et al., 2021) |
| Learning content **[** | course content → OSE (Sharif Nia et al. 2023) |
| Activity | active learning activity → CE (Ladino Nocua et al., 2021) |
| **Learning technology and system-related factors** | |
| Technology and tools | digital collaborative tools → OSE (Gopinathan et al. 2022)<br>learning systems and technologies) → OSE (Owusu-Agyeman et al., 2021)<br>technological accessibility → OSE (Lux et al., 2023)<br>type of device used by students → OSE (Owusu-Agyeman et al., 2021)<br>technical support → OSE (Kedia & Mishra, 2023) |
| Usefulness | perceived usefulness → BE, EE, CE (El-Sayad et al., 2021)<br>perceived usefulness → participation (Fabian et al., 2022)<br>perceived usefulness → OSE (Dubey et al., 2023) |
| **Demographics** | |
| Gender | gender (female) → participation (Wu & Teets, 2021)<br>*gender (male) → OSE (Li et al., 2023)*<br>*gender (female) → OSE (Owusu-Agyeman et al., 2021)* |
| Age | age → course engagement (Kaspar et al., 2024) |
| College year | college year (Baloran et al., 2021)<br>college year (senior) (Salta et al., 2022)<br>*college year (first-year) → performance (Wu & Teets, 2021)* |

| | |
|---|---|
| Ethnicity | *underrepresented people of color → skills, participation, performance (Wu & Teets, 2021)*<br>*White → OSE (Li et al., 2023)* |
| **Other factors** | |
| Institutional and administrative support | institutional support system → OSE (Owusu-Agyeman et al., 2021)<br>university support → OSE (Azila-Gbettor et al., 2023) |
| Social factors | social support → study engagement (Koob et al., 2021)<br>peer support → behavioral (Luan et al., 2023)<br>family support → OSE (Kedia & Mishra, 2023) |
| Environmental factors | online learning environment → OSE (Owusu-Agyeman et al., 2021)<br>health concerns about family and friends → study engagement (Koob et al., 2021) |
| Study demand | study demand → OSE (Reynell van der Ross et al., 2022) |
| Media use | social media use → OSE (Kedia & Mishra, 2023) |

Note: Italicized text indicates negative relationship. OSE = Overall Student Engagement, BE = Behavioral Engagement, EE = Emotional Engagement, CE = Cognitive Engagement.

# Discussion

This systematic review provides a comprehensive analysis of the most consistent factors associated with student engagement via online instruction during COVID-19. During this tumultuous period, the most consistent findings highlight a diverse array of student dynamics—self-efficacy, skills, emotion, personality traits, satisfaction, motivation, attitude, and student interaction—as the most prevalent predictors of student engagement. In particular, multiple student-related sub-themes emerged as driving student engagement across the fifty studies examined. Various aspects of self-efficacy (e.g., academic, computer, digital, and technology) emerged as the most common predictor of different forms of student engagement (e.g., behavioral, emotional, and cognitive). These findings show that at times like the COVID-19 pandemic, when social interactions are limited to virtual experiences, fostering students' feelings of self-confidence may help mitigate the challenges posed by a sudden transition from face-to-face classroom experiences to remote learning. Therefore, during such challenging periods, instructors and university administrators should focus on enhancing students' belief in their ability to accomplish learning tasks and confidence in their skills to perform them successfully. In addition, it is essential to evaluate students' competency and confidence in handling online learning technologies early in the semester, identify students with lower levels of competency through a survey or a focus group study, and enhance their technology self-efficacy by providing necessary accommodations.

While the bulk of the findings suggested positive relationships between various learning factors and student engagement, feelings of loneliness, negative emotion, and minority/female identification were linked to less engagement. Educators must be alert to the challenges facing these individuals and seek to address concerns effectively. In particular, being wary of psychosocial challenges students are facing, as well as combating structural barriers that impede student learning, should be the focus of such efforts.

Research suggests that students relied on instructors to create online environments that mimicked face-to-face encounters. This likely includes optimal student–student and student–

instructor interactions. To actively engage students in online learning, instructors should consider creating an interactive online learning environment that promotes student–student interaction by employing various strategies, including group projects, peer review, peer mentoring, online discussion forums, and collaborative tools. Student–instructor interaction can be enhanced through various learning approaches, including online discussions, personalized feedback, interactive tools, virtual office hours, etc.

Self-efficacy was again a critical factor influencing student engagement, with instructor self-perception of remote teaching skills driving outcomes, including student engagement. Instructors' self-efficacy and readiness in online learning during an emergency period can be enhanced by offering them professional development opportunities, training on learning technology and system, and virtual technology support.

In terms of the collective findings, our analyses suggest that there are various factors that mitigate the negative impact of the upending of traditional course delivery on student engagement. When students and faculty/staff faced an extreme public health crisis, the quality of learning technologies, student psychosocial outcomes (e.g., efficacy, subjective well-being, social support), and the dynamics of virtual instruction fostered student engagement. Presumably, technologies utilized for remote learning will continue to improve along with the digital skills of both instructors and students. However, universities must invest in workshops, tutorials, and outreach efforts to ensure student engagement can remain at adequate levels when instruction shifts (either planned or driven by crisis) online.

Our research showed that accessibility and preparedness of learning technologies and technical support played critical roles in enhancing student engagement during the COVID-19 pandemic. Thus, higher educational institutions should devote their resources to updating their learning management systems and offering training to their students, faculty, and staff on state-of-the-art learning technologies, including web-based learning platforms, collaboration and communication tools, and video conferencing applications to meet specific needs during an emergency period. However, it is essential to focus on the system quality by ensuring students' perceived reliability, usefulness, and ease of use of online learning systems (Pham et al., 2019).

In conclusion, higher educational institutions should focus on student-, instructor-, system/technology-, and course-related factors when developing and implementing effective online learning, especially in extraordinary situations such as the COVID-19 pandemic (Limbu & Pham, 2023).

## Limitations and Future Research Directions

Table 5 highlights topic areas that should be investigated more thoroughly. This investigation employed a systematic review approach to examining factors related to student engagement. However, we could not conduct a meta-analysis because of high heterogeneity across studies, measures, designs, and populations. Thus, future meta-analytic studies should consider determining the overall effect sizes that each significant predictor contributes to explain student engagement. In addition, this review excluded qualitative studies as it aimed to conduct a systematic review of correlational and causal evidence to identify the factors associated with

student engagement. Hence, future research should involve qualitative systematic reviews, such as thematic synthesis, to synthesize the findings of qualitative studies and provide a complete picture of key themes related to student engagement with online learning.

The studies examined in our review almost exclusively employed cross-sectional survey designs. Future investigations should investigate the potential long-term effects of different determinants on student engagement. Manipulating different digital environments via experimental analysis could help identify specific cause-effect relationships. Finally, the studies reviewed engaged in primary analyses of student engagement within specific institutions. Secondary analysis of data collected across a range of students may add more generalizable conclusions as to what drives student engagement across countries.

This systematic review included studies published from December 2020 to March 2024. Future research can replicate this study by extending the period and including the articles published after March 2024.

Across the studies examined, few distinguished between different student engagement dimensions (cognitive, emotional, behavioral). Future research should examine how different predictors contribute uniquely to these different elements of engagement. In terms of more descriptive data, focus group studies examining online student engagement would provide richer explanations/interpretations of what students found most challenging as well as most beneficial. Student engagement reflects a complex array of student motivation, skills, resources, and ideal environments. Having university students provide in-depth accounts of how specific factors contribute to their success (or lack thereof) offers insights on how best to improve online course instruction.

One of the critical areas is “learning technology and system quality.” This includes the technology employed, broader system infrastructure, and digital collaborative tools. As educational technologies further advance, it is critical to address the benefits and drawbacks of machine learning to student engagement. Our findings also indicate a relative lack of research exploring systemic/external factors driving engagement, including family, environment, role of institutions, administration, advisors, university helplines, and social norms. Adapting to university environments—independent of a pandemic—poses various social/psychosocial challenges to students (Hudd et al., 2000; Segrin & Flora, 2006). Identifying the most effective ways to mitigate the negative effects these factors have on student engagement is critical as more course offerings appear online. In particular, institutional and administrative support provided by the university, such as university counseling, career/advising services, and broader administrative services (e.g., student services and registrar offices), should be more thoroughly examined. In our analysis, we located only two studies addressing administrative support tied to aspects of online learning (Owusu-Agyeman et al., 2021). During a public health crisis, students have limited, if any, face-to-face contact with the broader administrative university community. How well these services are administered virtually may be key to maintaining student connection to both the broader university and specific course content.

Similarly, there were few studies addressing course material and design-related factors. Certain course content may be more adaptable to online environments, whereas other material

(i.e., performance-based offerings) may face challenges in online settings. In addition, how student engagement varies based on synchronous vs. asynchronous online instruction as well as the diversity of mediated channels (video, audio, text-based) employed, warrants further investigation.

Pre-Covid-19 longitudinal research highlights the critical role self-efficacy plays in driving student engagement as well as potentially mitigating the adverse effects of student burnout on student engagement (Maricutoiu & Sulea, 2019). The current systematic review adds to the literature by indicating the contribution of efficacy during a major public health crisis. Researchers must continue to explore how this factor affects not only student engagement but also other key factors driving effective learning environments (e.g., instructor skills/motivation and student well-being).

Finally, the preliminary identification of empirical investigations surprisingly showed only five studies conducted within U.S. contexts that investigated factors driving student engagement during the COVID-19 pandemic. At the same time, the lack of university student engagement during the pandemic has been documented within U.S. contexts (Hollister et al., 2022; Wester et al., 2021; Wu & Teets, 2021). In addition, no study had been conducted to examine the factors influencing student engagement in Oceania countries, including Australia and New Zealand. Given the highly publicized challenges to student engagement posed by the pandemic, it is unclear why a relatively limited number of studies from these geographic locations have addressed what contributes to these challenges. These gaps should be addressed in future research.

**Table 5**

*Topics for Future Research*

| Main topic | Sub-topic |
|---|---|
| Study design | o longitudinal study, experimental study, interventions, observational study<br>o secondary data, machine learning, artificial intelligence<br>o qualitative study (e.g., focus group/in-depth interview with students or instructors)<br>o objective and behavioral measures, different engagement measures, development of pandemic related measures<br>o comparative study to explore both students' and instructors' viewpoints<br>o testing engagement theories and models |

| | |
|---|---|
| Course material and design-related factors | o online learning models (e.g., synchronous, asynchronous, hybrid)<br>o diversity of mediated channels (e.g., video, audio, text-based)<br>o pedagogical approaches (e.g., peer learning, active learning, community-based learning such as e-service learning)<br>o collaborative learning (e.g., team/group work, online forum, group discussion, discussion models, group project, group project/case presentation)<br>o online class involvement (e.g., class activity, class game, formative quiz, creative thinking, brainstorming activities, learner-content engagement)<br>o virtual guest speakers, virtual field trips<br>o course attributes (e.g., interestingness, complexity, flexibility, length, quality)<br>o course design factors (e.g., usability, ease of use, layout, organization)<br>o assessment factors (e.g., methods, tools, individual vs. group-level, Bloom's taxonomy) |
| Administrative and support service quality | o academic advising services<br>o counseling and career services<br>o broader administrative services (e.g., registrar offices, helpline)<br>o access to academic resources (e.g., library services, bookstore, technology support, virtual computer lab, tutoring and writing center services)<br>o student health services (e.g., medical services, mental health services) |
| Learning technology and system quality | o system infrastructure (e.g., learning management system, video conferencing, digital learning resources, Web 2.0 technologies)<br>o system quality (e.g., software quality such as usability, accessibility, reliability)<br>o collaboration and communication tools<br>o technology acceptance theories and models |
| Instructor-related factors | o readiness, trust, digital media literacy, approach, responsiveness, feedback and communication |
| Student-related individual factors | o subjective wellbeing, health status, mental status, anxiety, emotion, loneliness<br>o readiness, experience, motivation, confidence, belief, value, enjoyment<br>o cultural values, cultural identity, cultural orientation, cultural differences (e.g., individualistic vs. collectivist)<br>o access to internet and personal computers at home |
| Institution | o type (e.g., private vs. public, four-year vs. community college vs. universities, small vs. big institution)<br>o student engagement across disciplines and courses |
| Demographic | o sociodemographic status<br>o disadvantaged populations; underrepresented people of color (URPOC) education level |
| Geographical | o student population (e.g., Eastern vs. Western culture; developed vs. developing countries; rural vs. urban; different regions) |
| External factors | o community, parents, family, government<br>o social norms<br>o learning environment |

# Conclusion

This investigation involved a systematic review of studies examining factors influencing university students' engagement via online instruction during COVID-19. Our comprehensive exploration of cross-country investigations indicates that the most consistent findings highlight a diverse array of student dynamics—skills, motivation, attitude, knowledge, and well-being—as critical to student engagement. Among the student-related factors, student self-efficacy emerged as the most frequent determinant of engagement. In addition, the research suggests that students likely relied on instructors to create online environments that mimicked face-to-face encounters. This likely includes optimal student-to-instructor and student-to-student communication.

**Declarations**

The authors declare no conflicts of interest in this research.

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The data used and/or analyzed in the current study are available from the author upon request.

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* = studies included in the systematic review.