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**Research Article**

# An Analysis Of The Literature On The Connection Between Student Engagement In The Educational System And Academic Achievement

Nouran Ajabnoor[1*], Zertaj Fatima[2]

[1*]Assistant Professor, Department of Management, Applied College, Jazan University, Jazan 45142, Saudi Arabia; nyusuf@jazanu.edu.sa
[2]Program Coordinator, Office Management Department, Applied College, Jazan University, Jazan 45142, Saudi Arabia; zahmad@jazanu.edu.sa

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**ABSTRACT**

Focusing on student engagement is necessary to create a sustainable educational system in the current environment, because of the abrupt shift in the educational system from traditional classroom learning to online learning platforms. Student engagement in educational systems refers to the degree of awareness, care, importance, expectations, and passion that students exhibit while continuing to study or prepare, which broadens the degree of motivation they have to study and continue their education. The idea that learning develops when students are analytical, keen, or energized and that learning cultivates to go through when learners are disinterested, dispassionate, agitated, or otherwise disengaged, is represented by the concept of "student engagement." Increasing student engagement with online learning is a common goal for higher education institutions. Developing student engagement and academic achievement through online learning in educational institutions is a problem for instructors considering the educational revolution. Ultimately, teachers can implement a shift in the educational system from conventional to online learning. This study aimed to conduct a literature review and evaluate studies using statistical techniques. For the literature review, a small number of focused, relevant studies were selected from a pool of publications. English-language publications from the EBSCO database covering the period from early 20201 to 2023 were quantitatively analyzed. Using a bibliometric approach including keyword co-occurrence analysis and co-authorship, this study explains the structure and evolution of the area. Initially, a keyword search of the EBSCO database returned thousands of papers. From these results, 617 potentially relevant studies were identified. After removing the duplicates, 183 papers remained. This indicates the chance for co-author and keyword co-occurrence according to the database search.

**Keywords:** Developing, Academic Achievement, and sustainable educational system.

## Introduction

In the rapidly evolving educational landscape, online learning has ushered in a new era of pedagogical possibilities and challenges (Gaftandzhieva et al., 2021). As the digital age continues to reshape how we access knowledge and acquire skills, understanding the dynamics underlying student engagement and academic performance in online learning environments has become paramount (Czerkawski & Lyman, 2016). Active participation, critical thinking, synthesis, and the application of materials to actual events are all components of student engagement. Students who are highly engaged often feel connected to the educational process, their peers, and the higher education institutions they attend, whereas online learning is the practice of obtaining knowledge from web-based sources.

Online learning, also known as e-learning, virtual learning, or network-based learning, refers to a broad range of technological applications (Estes, 2016). The proliferation of online learning platforms has fundamentally altered the traditional paradigms of education by offering unparalleled flexibility and accessibility to learners worldwide. However, with this transformation comes the need to understand how students' engagement with

virtual educational spaces influences their academic outcomes. This question has profound implications for educators, institutions and policymakers striving to design and implement effective online learning experiences.

The intricate relationship between student engagement and academic performance in online learning environments has been the subject of extensive research, scholarship, and discourse (Sahni, 2023; Salas-Pilco et al., 2022). However, the present aims to delve deeper into this domain by using two distinct yet complementary analytical methods: keyword co-occurrence network reviews and co-author analyses. This study explores this intricate terrain by employing a multifaceted approach that integrates keyword co-occurrence network analysis and co-authorship examination to unravel the critical interplay between these two essential facets of contemporary education. This study has three goals: to gauge student involvement levels in an online learning environment and examine the relationship between student engagement and academic success (Sahni, 2023).

## Literature Review

Online learning emphasizes digital communication and digital learning tools and is based on relatively modern methodologies such as online content presentation. However, the traditional approach focuses on face-to-face learning. With the onset of the COVID-19 pandemic and its ramifications leading to a complete restriction of people's movement for a substantial amount of time, online learning was the only visible solution for education. Owing to its rising importance and its status as an under-researched subject due to its unique nature, student participation in online learning requires further investigation (Lu, 2020).

According to one study, students' levels of passion, interest, and focus in their learning environment constitutes their level of engagement (Lu, 2020). In the traditional educational system, teachers employ a range of pedagogical strategies to foster student engagement in learning activities. These approaches encompass prompting students to attentively focus on the subject matter, diligently record notes and pose inquiries, and actively participate in learning (Gray & Diloreto, 2016). To engage students in the learning process, teachers will occasionally ask them to respond to questions. However, engagement tactics for learning are evolving with the use of technology-enhanced learning systems (TELS) in education. Therefore, increasing student participation in online learning settings remains challenging (Orji & Vassileva, 2020).

However, keeping students interested in learning online for an extended period has become difficult. Researchers have suggested engagement theory as a paradigm to engage students effectively through technology-assisted learning (Kearsley & Shneiderman, 1998). Expectation theory has also been presented as a model for learning in technology-based environments. According to this theory, utilizing modern technology in educational activities engages students more than applying traditional techniques. According to a previous study, maintaining student engagement throughout the learning process is crucial for fostering critical thinking, maintaining student attention, and providing efficient learning (Miliszewska & Horwood, 2006). Researchers have advocated for keeping students' attention focused through curiosity, interest, and intrinsic motivation. Focused, aware, and engaged learners are interested in their activities. By focusing on student-centric learning strategies, instructors can feed these internal sources of student engagement in the classroom (Dubey et al., 2023).

Changes in student participation over the course of the school year has been the focus of a sizable body of research on face-to-face education. These studies have demonstrated that various factors, including motivation, peers, teachers, learning activities, and social context, influence student engagement over time. Nevertheless, the evidence remains conflicting; some researchers have found that current participation in a course indicates participation in subsequent courses, whereas others have found that participation decreases with time.

Academic achievement is a general concept with multiple definitions depending on the program, topic of study, and educational level. A general conceptualization is a performance outcome that shows how well the goals of a task, activity, or course have been accomplished. Students' graded performance over several academic years is the basis on which most educational institutions determine academic achievement (Sagr et al., 2023).

Students' expression of their views, attitudes, and behaviors is referred to as student engagement. Student involvement stems from intrinsic motivation or individual needs that, according to Mandernach (2009), cause students to feel good about themselves and persist in their practices with self-assurance and perseverance. Prior research by Skinner et al. (1990) and Skinner and Belmont (1993) has demonstrated that students who behave in a way that promotes continuous and consistent learning are generally able to experience pleasant emotional states. Students' participation in learning activities also helps develop their engagement.

According to a literature review, the three elements of school engagement are behavioral, emotional, and cognitive. Cognitive engagement describes how students behave in a way that reflects their commitment to learning and integrates ideas and action readiness. Students' positive attitudes toward their instructors, peers, and school are indicators of emotional engagement. Encouraging school involvement is thought to increase the propensity to work. Student practices or actions connected to learning that occur in the classroom and result in good behaviors, such as following rules and not engaging in negative behaviors, are referred to as behavioral engagement (Wonglorsaichon et al., 2014).

Previous studies found that the domains of behavioral, emotional, and cognitive engagement are all positively correlated with students' academic achievement, and an analysis of these domains showed that almost all did as well. Furthermore, a moderator analysis indicated that gender, cultural values, and the mode of reporting engagement all affect the relationship between student engagement and academic achievement. Moreover, gender, cultural values, and reporting techniques for engagement affect the associations between behavioral, emotional, and cognitive involvement and academic accomplishment (Lei et al, 2018).

Research indicates a positive correlation between academic achievement and several factors such as emotional, behavioral, and cognitive involvement. In addition, a positive relationship between academic achievement and knowledge management has been reported. Therefore, recapitulating the study remains an important issue for discussion when analyzing student engagement and how it affects academic achievement and knowledge management (Nag et al., 2022).

The three aspects of engagement, various interaction styles that can affect the engagement dimensions, and potential short- and long-term results are all combined in the author's theoretical framework for engagement in online learning. Moore identified three types of interactions: teachers, peers, and curriculum. These forms of interaction are mostly dependent on the elements found in the students' local environments or microsystems. Nevertheless, because technology and classroom settings are crucial to online learning, the writers include them as influential elements (Hollister et al., 2022).

The researchers examined the effects of instructor presence, learner interaction, student engagement, course structure, and organization on student satisfaction and perceived learning (Gray & DiLoreto, 2016).

Online learning also requires active learning participation. The concept of college student engagement was formally presented by Kuh, who also developed the concept of learning engagement in higher education. The National Survey of Learning Engagement has served as a vehicle for further promotion and dissemination. Various researchers have defined the term "learning engagement" in different ways. According to some academics, behaviors and emotions are included in learning engagement, which is described as student-initiated learning behaviors, efforts, academic task persistence, and emotional states during the learning process. Some researchers posit that social and academic engagement are components of learning engagement. As research progressed, academics came to recognize the three-dimensional distinction of learning engagement. According to Schaufeli, who developed a three-dimensional work engagement model and popularized the study of work engagement in student groups, learning engagement is a satisfying mental state connected to learning and comprising three dimensions: vitality, devotion, and concentration. According to Fredricks, learning engagement has three components: behavioral, cognitive, and emotional engagement (Hollister et al., 2022).

Students encounter a range of difficulties when participating in e-learning processes, particularly online education. These difficulties include low social engagement, emotional responses to an unfamiliar learning environment, and dealing with a wide range of technical tools, information, tasks, and disturbing activities that occur during the educational process. A lack of social interaction can also cause students' academic performance and cognitive engagement to decline (Campeanu et al., 2023).

Students can become more interested and perform better in their academic courses with the help of learning support in e-learning environments. Academic engagement is crucial in any learning environment, including hybrid, online, and in-person classes. According to research on higher education, academic engagement is frequently a good indicator of academic growth. According to a more inclusive and comprehensive view of student experiences, academic engagement arises from the dynamic interaction between students and the institutional environment. Academic engagement was examined in that study with greater emphasis on the experiences of students in formal and internal learning environments. Using technology to connect students, teachers, and the course materials can improve academic engagement and support student success (Kim et al., 2019).

## Theoretical Foundation

This study can be further understood with the help of self-determination theory (SDT), which also provides a robust and secure research foundation. SDT is a well-known framework in both psychology and education that can help understand how motivation, student engagement, and academic success are connected in the complex world of online learning (Chen & Jang, 2010). At its core, SDT posits that people have a natural psychological desire for independence, competence, and connection (Chiu, 2022).

SDT is an effective way to examine how these psychological needs affect student behavior and drive in online education, where students often need to determine what methods of learning are best to use. Students are more likely to be intrinsically motivated, actively engaged in their coursework, and ultimately successful in meeting their academic goals if they feel a sense of autonomy (i.e., they are in charge of their learning), competence (i.e., they believe they can master the subject), and relatedness (i.e., they have meaningful connections with their teachers and peers; Shah et al., 2021).

Thus, SDT is used as a framework in the present study to determine how these factors that motivate students, maintain their interest in learning, and affect their academic performance work together in the context of online learning. This provides insights into the dynamics constituting a digital learning experience.

As a macro-level theory of human motivation, SDT, was proposed by Deci and Ryan (Citation 1985) to explain the dynamics of human need, motivation, and well-being within a social framework. According to this theory,

every person has three psychological demands that are universal and drive them to either act or not act: relatedness (feeling linked and loved), competence (feeling competent and effective), and autonomy (feeling self-governed and self-endorsed). When these three psychological requirements are met, people feel more psychologically well-off; however, when these needs are not met, people feel more adrift, alone, and reactive. Students are actively driven to participate in learning tasks when these psychological requirements are sufficiently addressed in the pedagogical design (Rajabalee et al., 2020).

Several studies have identified SDT as a suitable framework for motivating students in virtual learning environments. Initially, SDT may function as a theoretical structure that incorporates problems related to online education. SDT examines autonomy, relatedness, and competency as factors that influence motivation. These three concepts align with the characteristics of virtual education, including adaptable learning, computer-assisted communication and socialization, and difficulties in acquiring technical skills. Since online learners require support from teachers, peers, administrators, and technical staff, the idea of contextual support is helpful. A previous experimental study found that SDT can predict a range of learning outcomes, such as performance, persistence, and course satisfaction. SDT may help address issues related to online learning (Chen & Jang, 2010).

The education field has paid significant attention to SDT as a key motivating theory. However, gaps in knowledge on the development, potential paths, and unmet research needs in this area of study have become increasingly critical as the importance of online learning has grown. In addition to incorporating lecturers or a mixed sample of lecturers and students into future research, it is recommended that SDT be integrated with other theories and models. Researchers from other continents such as South America and Africa may be able to provide a more thorough and profound understanding of SDT in online university education. An increased inclusion of SDT components, including recognized regulation, external regulation, amotivation, and intrinsic motivation, is expected in SDT research (Rosli et al., 2022).

SDT has long been used in the framework of conventional education. Several studies have shown that, in various educational environments, engagement and the best possible learning are facilitated by both autonomous forms of extrinsic drive and internal motivation. More internal types of motivation and integration are encouraged in the classroom when basic psychological requirements for competence, relatedness, and autonomy are met. In turn, this encourages knowledge retention, lessens avoidance techniques, and stimulates deep cognitive processing of the subject matter being studied, all of which can boost academic achievement. Thus, that the frequent use of SDT in digital education research and issue resolution is not accidental. The major contribution of SDT to the advancement of learning through digital technologies was demonstrated by a study of research on digital education conducted over the past 15 years from this perspective. In addition,, the evolution SDT in this context was highlighted (Salikhova et al., 2021).

## Methodology

Bibliometric analysis is a branch of research that examines current trends in the literature of different fields (Kaushal et al., 2021; Nunkoo et al., 2020; Rosso, 2023; Yuan & Basha, 2023) and offers suggestions and inspiration for further investigation (Radha & Arumugam, 2021; Roy & Datta, 2023). Two network-based techniques that have been used extensively to examine the content of scientific articles are the citation network and keyword co-occurrence network (Jiang et al., 2019). Popular research has been conducted using citation networks based on how often citations have been cited. Citation networks focus on the relationships between referenced works as analyze the dissemination of scientific information in the field. However, citation networks do not highlight new literary trends. A keyword co-occurrence network investigates keywords in scientific articles to comprehend knowledge components. A summary of the key components of scientific publications is provided using keywords. A keyword co-occurrence network evaluates the relative importance of each component within the network and captures the relationships among various knowledge components. We used keyword co-occurrence network analysis to identify the central themes, conceptual relationships, and emerging trends, as this technique can aid in conducting a comprehensive literature review and forming hypotheses in the study of student engagement and academic performance in online learning. It also provides visual representations that can enhance data interpretation and communication (Weerasekara et al., 2022). To perform author co-citation network and keyword co-occurrence analysis, this study utilized open-source VOSviewer software to retrieve 183 articles from the EBSCO database (Radha & Arumugam, 2021).

*The figures mentioned below were created using VOS viewer software.*

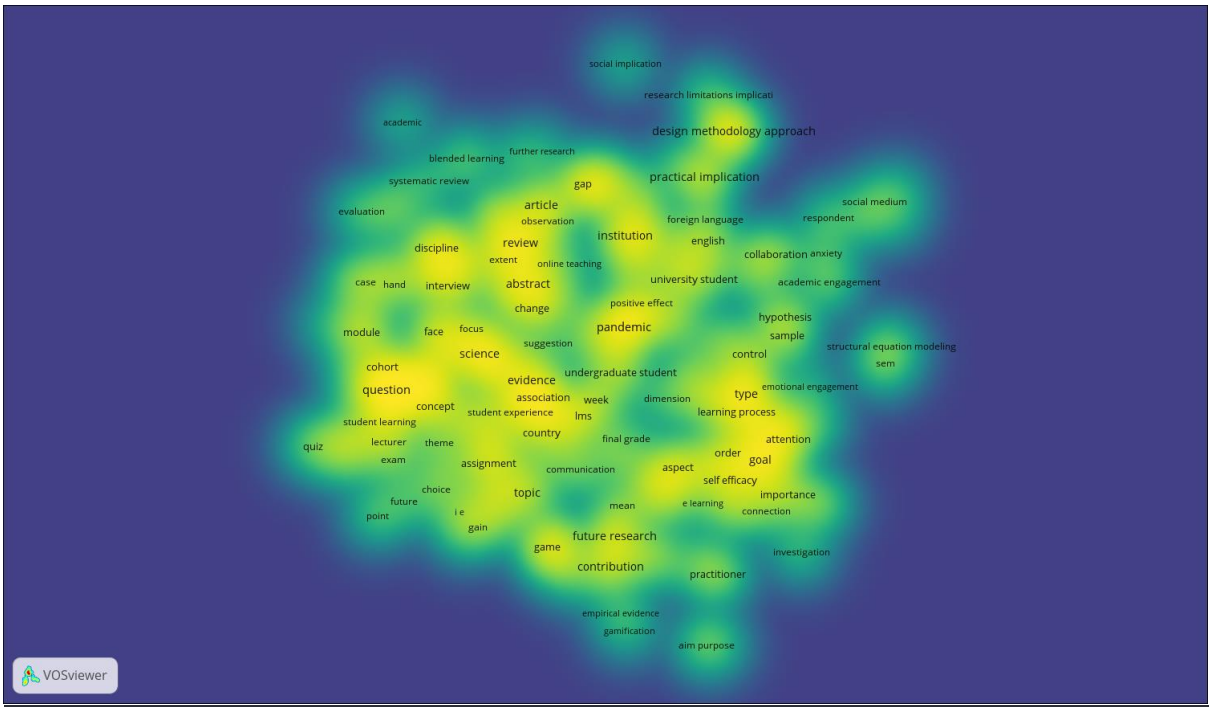
In the keyword network analysis, 4 clusters with 77 words have been formed as follows:

- Cluster 1 with 30 items
- Cluster 2 with 22 items
- Cluster 3 with 16 items
- Cluster 4 with 9 items

The total strength of the linkages between each keyword and the other keywords was calculated, as shown in Figure 5. We selected the terms with the strongest overall link profiles. Of 5028 related keywords, 299 were

identified that had a minimum of five keyword occurrences and zero keyword citations. The top 10 keywords based on overall link strength are listed in the Table below

| Keyword | Occurrences | Total link strength |
|---|---|---|
| Significant relationship | 5 | 3.42 |
| Moderating role | 5 | 3.36 |
| Previous study | 5 | 3.14 |
| Social medium | 6 | 2.78 |
| Final exam | 7 | 2.67 |
| Social implication | 5 | 2.23 |
| Research limitation implication | 8 | 2.14 |
| Anxiety | 6 | 2.13 |
| Academic | 5 | 2.13 |
| Foreign language | 6 | 2.11 |




Source: diagrammatic representation of the keywords relating to students' active participation

## Findings and Interpretations

This study examined the connection between student engagement and academic achievement in online learning. The results showed that student participation in educational activities significantly affects academic success. Active engagement fosters deeper understanding, knowledge retention, and critical-thinking skills. It also promotes a sense of ownership over one's learning, facilitates peer interaction and collaboration, and enables instructors to provide timely feedback–all of which are essential for effective learning and improved academic outcomes.

The current study provides an interpretation based on the following. A literature search was conducted using the EBSCO database. From a pool of 617 research articles, 192 were selected. After removing duplicate files, 183 research papers were ultimately included in the current study. The selected papers were imported to the software Publish or Perish to convert the files to a format that allowed for a keyword network analysis to be conducted using VOSviewer. To determine research productivity in a different domain, keyword analysis is the most beneficial aspect (Deka & Sarmah, 2020).

In conclusion, as we explored the complex dynamics of student engagement and academic performance in online learning through a keyword co-occurrence network review and co-author analysis, the relevance of SDT became evident. Furthermore, an exhaustive literature review clearly indicated that the core SDT principles of autonomy, competence, and relatedness underscore the pivotal role of intrinsic motivation in shaping student behavior and achievement in digital learning environments. By weaving together motivational factors, collaborative networks, and thematic patterns, this comprehensive study revealed the underlying psychological mechanisms that drive student engagement and, subsequently, academic success. As we navigate the evolving landscape of online education, these insights can help inform the creation of more student-centered and effective digital learning experiences by fostering autonomy, competence, and relatedness, thereby propelling learners toward heightened academic achievement in online education.

## Conclusion and Implications

The results of this study highlight the importance of content relationships in predicting students' sense of engagement and belonging in online learning settings. Students are more likely to feel engaged and connected to the learning process when they perceive significant links between the course content and their experiences and interests. In addition, this study emphasizes how a sense of belonging mediates the link between fruitful content relationships and student engagement. Thus, students' motivation to actively engage in educational activities increases when they feel they belong to an online learning community.

The findings of this study imply that robust student–teacher and student–student interactions should be prioritized by online learning platforms (Bergdahl, 2022). This not only motivates students to actively participate in the learning process but also promotes a sense of belonging. Effective relationships can increase students' feelings of support and connection, whether with classmates or instructors, and eventually increase their willingness to participate in educational activities.

Additionally, the broader conclusions of this study imply that the application of technology in online learning may significantly affect student involvement and academic outcomes. Deep learning techniques are more frequently used by students who use the internet and web-based materials, which suggests that they are more cognitively engaged with the subject matter. They also perform better on established measures of student engagement such as the perception of academic difficulty, active and collaborative learning, contact with professors, and the presence of a friendly campus climate.

These results support the idea that technology-enhanced learning can promote greater student involvement, a sense of community, and improve learning outcomes. They emphasize the significance of creating online learning environments that foster connections and a feeling of community among students, as well as between students and instructors, in addition to properly delivering knowledge. Such a strategy can help optimize the positive effects of technology on education and support the development of more successful and relevant online learning opportunities.

The results of the present study are consistent with an array of prior studies demonstrating the critical role student involvement plays in determining remote learners' academic achievement. Regarding online learning, several models of student engagement can be used depending on the context of teaching and learning and the chosen learning design. The application of learning behaviors becomes important when it comes to contributing to the computation of student involvement in setting activity-based learning systems, as was shown in this study. Furthermore, it is evident that in these situations, educational activities that qualify for continuous assessment are pertinent elements to consider when determining students' successful participation (Rajabalee et al., 2020).

### Future research

Finally, this study specifies that further research can be conducted through a bibliometric analysis using R Programming. Bibliometric analysis can provide insights into the current state of a certain field or subject. For the benefit of upcoming readers and researchers, it is important to be aware of the limitations of this work in addition to its useful information. Only papers on the EBSCO database were used as the main source for this inquiry. Other databases, such as Dimensions, Microsoft Academic, Scopus, Web of Science (WoS), and Google Scholar, may be useful for future bibliometric studies. Future researchers should also use other software tools such as SciMAT, BibExcel, CiteSpace, and R packages to visualize enormous volumes of data in several settings. Based on the data from 2020 to 2023, this study showed that the information above provides readers, academic professionals, and researchers with a more realistic picture of student engagement, online learning, and academic performance. This bibliometric analysis encourages investigation and integration of established research streams (Sahudi et al., 2022).

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