EXAMINING COLLEGE STUDENTS' SELF-EFFICACY IN THE ONLINE LEARNING ENVIRONMENT SYSTEM DURING THE COVID-19 PANDEMIC IMPLICATIONS FOR HIGHER EDUCATION INSTITUTIONS

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ABSTRACT

Objective: This study aims to examine the self-efficacy levels of college students in the online learning environment during the COVID-19 pandemic. The purpose is to understand the impact of self-efficacy on students' motivation, behavior, and achievement in online learning.

Theoretical framework: The study is grounded in Bandura's social cognitive theory, which emphasizes the importance of self-efficacy in influencing individuals' actions and outcomes. The theory suggests that higher levels of self-efficacy lead to increased motivation and better performance.

Method: The study utilizes a cross-sectional design and involves 824 randomly selected college students from Cagayan State University Gonzaga Campus. Data collection is conducted through a self-efficacy questionnaire and semi-structured interviews to gather comprehensive insights into students' experiences.

Results and conclusion: The study finds high levels of self-efficacy among college students in the online learning environment, except for informal mingling, interacting with professors, and collaborating with classmates. The findings also show a significant correlation between students' year level and self-efficacy levels.

Implications of the research: This study highlights the importance of targeted support to enhance students' self-efficacy in informal communication and collaboration. Instructors can implement strategies and provide clear guidelines, while institutions offer resources and training programs to improve online learning skills and support outcomes and academic success.

Originality and Value: This study explores college students' self-efficacy in online learning during COVID-19, providing insights into its impact on motivation, behavior, and achievement. It informs the development of interventions and support systems, with potential for further research on enhancing self-efficacy during the pandemic.

Keywords: Learning Environment Network System, Level of Self-Efficacy, College Students, COVID-19.

EXAMINANDO A AUTOEFICÁCIA DOS ESTUDANTES UNIVERSITÁRIOS NO SISTEMA DE AMBIENTE DE APRENDIZAGEM ON-LINE DURANTE A PANDEMIA DE COVID-19 IMPLICAÇÕES PARA AS INSTITUIÇÕES DE ENSINO SUPERIOR

RESUMO

Objetivo: Este estudo visa examinar os níveis de autoeficácia dos alunos universitários no ambiente de aprendizagem on-line durante a pandemia de COVID-19. O objetivo é entender o impacto da autoeficácia na motivação, no comportamento e no desempenho dos alunos no aprendizado on-line.

Estrutura teórica: O estudo está fundamentado na teoria social cognitiva de Bandura, que enfatiza a importância da autoeficácia para influenciar as ações e os resultados dos indivíduos. A teoria sugere que níveis mais altos de autoeficácia levam a uma maior motivação e a um melhor desempenho.

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Método: O estudo utiliza um projeto transversal e envolve 824 estudantes universitários selecionados aleatoriamente do Campus Gonzaga da Universidade Estadual de Cagayan. A coleta de dados é realizada por meio de um questionário de autoeficácia e entrevistas semiestruturadas para reunir percepções abrangentes sobre as experiências dos alunos.

Resultados e conclusões: O estudo revela altos níveis de autoeficácia entre os estudantes universitários no ambiente de aprendizagem on-line, exceto no que se refere à mistura informal, à interação com professores e à colaboração com colegas de classe. Os resultados também mostram uma correlação significativa entre o nível de ano dos alunos e os níveis de autoeficácia.

Implicações da pesquisa: Este estudo destaca a importância do apoio direcionado para aumentar a autoeficácia dos alunos na comunicação e colaboração informais. Os instrutores podem implementar estratégias e fornecer diretrizes claras, enquanto as instituições oferecem recursos e programas de treinamento para aprimorar as habilidades de aprendizagem on-line, apoiar os resultados e o sucesso acadêmico.

Originalidade e valor: Este estudo explora a autoeficácia dos estudantes universitários no aprendizado on-line durante a COVID-19, fornecendo insights sobre seu impacto na motivação, no comportamento e no desempenho. Ele informa o desenvolvimento de intervenções e sistemas de apoio, com potencial para mais pesquisas sobre o aumento da autoeficácia durante a pandemia.

Palavras-chave: Sistema de Rede de Ambiente de Aprendizagem, Nível de Autoeficácia, Estudantes Universitários, COVID-19.

1 INTRODUCTION

The COVID-19 pandemic has significantly impacted the education sector worldwide, leading to a shift from traditional face-to-face learning to online or computer-aided learning platforms. This change has presented challenges for students, including technical issues, lack of access to resources, and difficulties in engaging with the learning material. Self-efficacy, the belief in one's capacity to execute a particular task successfully, is a crucial factor in academic success and is a predictor of academic achievement. Despite the importance of self-efficacy in student academic success, there is limited research on its relationship with online learning during the COVID-19 pandemic, particularly in the Philippine context. The study aims to explore the level of self-efficacy of college students in the context of online learning during the COVID-19 pandemic. The study will fill gaps in the existing literature on self-efficacy in online learning, particularly in the Philippine context, and contribute to the development of interventions to enhance students' self-efficacy during the pandemic.

Drawing on the social cognitive theory, which posits that an individual's self-efficacy beliefs are shaped by their past experiences, behavior, and environment, this study will provide insights into strategies to enhance students' academic performance and overall well-being. Several studies have highlighted the importance of self-efficacy in predicting academic achievement in traditional classroom settings (Bandura, 1997; Schunk, 1991; Eusob Ali Ahmed et al., 2022). Self-efficacy beliefs can influence the effort students put into their learning, their persistence, and their ability to overcome obstacles (Schunk, 1991). However, the transition to online learning presents new challenges for students, which may affect their self-efficacy beliefs. A recent study by Aucejo et al. (2020); Hamad Muaybid Alharbi et al., (2022) found that the shift to online learning during the pandemic has negatively affected students' self-efficacy beliefs, particularly for low-income and minority students. The study will be conducted at Cagayan State University Gonzaga Campus, which has implemented a computer-aided learning.
Examine the college students' self-efficacy in the online learning environment system during the COVID-19 pandemic implications for higher education institutions.

The study will determine the level of self-efficacy of college students in this learning system and identify the factors that affect their self-efficacy levels. The local significance of this study lies in its contribution to the growing body of literature on the impact of the COVID-19 pandemic on student learning outcomes, specifically their self-efficacy levels in a computer-aided learning environment. The findings of this study can help university administrators and educators design and implement effective interventions that can enhance student self-efficacy levels in a computer-aided learning environment. The significance of this study extends beyond the local context, as the shift towards computer-aided learning is a global phenomenon, and the findings of this study can contribute to the ongoing discussion on the effectiveness of online learning platforms in promoting student learning outcomes. The study aims to explore college students' self-efficacy in the context of online learning during the COVID-19 pandemic, particularly in the Philippine context. The study draws on the social cognitive theory, which posits that an individual's self-efficacy beliefs are shaped by their past experiences, behavior, and environment. Understanding college students' self-efficacy towards online learning in the context of the pandemic can inform strategies to enhance their academic performance and overall well-being. The significance of this study lies in its potential to assist higher education institutions in developing effective interventions to support college students during these unprecedented times. Specifically, this study aims to determine the level of self-efficacy of college students in a computer-aided learning system and identify the factors that affect their self-efficacy levels at Cagayan State University Gonzaga Campus, one of the state universities in the Philippines that has implemented a computer-aided learning system during the COVID-19 pandemic. The findings of this study can contribute to the ongoing discussion on the effectiveness of online learning platforms in promoting student learning outcomes globally.

Objectives of the study are explained below:

1. To investigate the level of self-efficacy among college students in the online learning environment system amidst the COVID-19 pandemic.
2. To evaluate the self-efficacy of college students in completing an online course, including their ability to set goals, manage their time effectively, and persist through challenges.
3. To assess the self-efficacy of college students in engaging in informal interactions with classmates in the online learning environment system, such as participating in virtual discussions and social events.
4. To examine the self-efficacy of college students in using the Learning Environment Network System (LENS) to complete course activities, including their ability to navigate the platform and utilize its resources.
5. To explore the self-efficacy of college students in interacting with professors in an online class, including their ability to seek help and communicate effectively.
6. To investigate the self-efficacy of college students in collaborating with classmates for educational purposes in the online learning environment system, including their ability to work in virtual teams and contribute to group projects.
7. To identify and analyze the challenges and issues that college students face in the online learning environment system amidst the COVID-19 pandemic, including factors such as technology access, motivation, and social isolation.

The study aims to provide insights into the experiences of college students in the online learning environment system during the pandemic and to inform strategies for promoting their self-efficacy and success in this new learning environment.
2 METHODOLOGY

The study conducted at Cagayan State University Gonzaga Campus utilized a mixed method approach to gather data from 824 randomly selected college students. The researcher employed a computer-aided system to collect the data due to the pandemic. In ensuring ethical considerations, the researcher-maintained confidentiality and avoided biases in the results.

The data collection process used a computer-aided system, which is an electronic tool that helps collect and analyze data. This method is suitable for the pandemic situation since it reduces physical interaction and minimizes the spread of the virus. The tool used in the study could be a survey software or an online questionnaire platform. The ethical considerations in the study involved ensuring that the participants' personal information was confidential and that their responses were kept anonymous. The researcher also avoided biases in the results by conducting the study without any preconceived ideas or expectations. The study employed a mixed method approach with random sampling and a computer-aided system for data collection, while maintaining ethical considerations and avoiding biases in the results.

Table 1. Distribution of the Respondents of the Study in the different programs

<table>
<thead>
<tr>
<th>Program</th>
<th>No. of Students Enrolled</th>
<th>Percentage</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bachelor of Science in Agriculture</td>
<td>147</td>
<td>50%</td>
<td>74</td>
</tr>
<tr>
<td>Bachelor of Science in Accounting</td>
<td>294</td>
<td>50%</td>
<td>147</td>
</tr>
<tr>
<td>Information System</td>
<td>356</td>
<td>50%</td>
<td>178</td>
</tr>
<tr>
<td>Bachelor of Science in Hospitality</td>
<td>306</td>
<td>50%</td>
<td>153</td>
</tr>
<tr>
<td>Management</td>
<td>343</td>
<td>50%</td>
<td>172</td>
</tr>
<tr>
<td>Bachelor of Science in Information</td>
<td>201</td>
<td>50%</td>
<td>100</td>
</tr>
<tr>
<td>Technology</td>
<td>Total 1,647</td>
<td></td>
<td>824</td>
</tr>
</tbody>
</table>

Source: Prepared by the authors (2023)

Table 1 shows the distribution of respondents according to their program. Out of the 1,647 students enrolled, 824 students were randomly selected as respondents. Each program had a 50% representation in the study, with the Bachelor of Science in Accounting Information System having the greatest number of enrolled students (294).

The instrument used to measure the level of self-efficacy in online education among college students, developed by Tsai et al. (2020); Beibei Jiang (2022), was used in this study.

The instrument consists of two parts: Part 1 collects information about the characteristics of college students, while Part 2 measures the level of self-efficacy using a 5-point likert scale. The respondents were also asked to provide narrative responses regarding their experiences and challenges in the online learning environment during the pandemic.

The data collected were analyzed using descriptive statistics to determine the percentage of students with high, moderate, and low levels of self-efficacy in online education.

Table 1 shows that 74% of the Bachelor of Science in Agriculture students have high levels of self-efficacy in online education, followed by the Bachelor of Science in Information Technology with 172 students (50%) having high levels of self-efficacy. The Bachelor of Science in Hospitality Management had the lowest percentage of students with high levels of self-efficacy (178 or 50%).

The Bachelor of Science in Agriculture and the Bachelor of Science in Information Technology had the highest percentage of students with high levels of self-efficacy, which may be attributed to the nature of their programs, which require the use of technology and online resources. On the other hand, the Bachelor of Science in Hospitality Management had the
lowest percentage of students with high levels of self-efficacy, which may be attributed to the challenges posed by online learning in a hands-on and practical field.

These findings are consistent with previous studies that have shown the importance of self-efficacy in online education (Capdeferro & Romero, 2012; Zimmerman, 2000; Minwir M.Ah-Shammari & Dinh Tran Ngoc Huy 2022). Self-efficacy has been shown to be a predictor of academic performance, motivation, and satisfaction in online learning environments (Capdeferro & Romero, 2012; Zimmerman, 2000; Hasbi Indra et al., 2022).

The study also revealed that college students face various challenges in online learning, such as poor internet connectivity, lack of social interaction, and difficulty in managing their time. These challenges are consistent with previous studies that have highlighted the challenges of online learning (Bolliger & Halupa, 2018; Dziuban et al., 2018; Zhong Linling & Rohaya Abdullah 2022).

The study highlights the importance of self-efficacy in online education and the need for interventions to improve self-efficacy among college students. It also highlights the challenges that students face in online learning and the need for institutions to provide support and resources to address these challenges.

Table 2. Characteristics of Respondents

<table>
<thead>
<tr>
<th>Variables</th>
<th>Frequency (n=824)</th>
<th>Percentage (%=100.00)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>286</td>
<td>34.71%</td>
</tr>
<tr>
<td>Female</td>
<td>538</td>
<td>65.29%</td>
</tr>
<tr>
<td><strong>Year Level</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First Year</td>
<td>196</td>
<td>23.79%</td>
</tr>
<tr>
<td>Second Year</td>
<td>215</td>
<td>26.09%</td>
</tr>
<tr>
<td>Third Year</td>
<td>207</td>
<td>25.12%</td>
</tr>
<tr>
<td>Fourth Year</td>
<td>206</td>
<td>25%</td>
</tr>
<tr>
<td><strong>Device/s used in Online Learning</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cellphone</td>
<td>437</td>
<td>53.03%</td>
</tr>
<tr>
<td>Desktop Computer</td>
<td>83</td>
<td>10.07%</td>
</tr>
<tr>
<td>Tablet</td>
<td>13</td>
<td>1.58%</td>
</tr>
<tr>
<td>Laptop</td>
<td>177</td>
<td>21.48%</td>
</tr>
<tr>
<td>More than 1 gadget</td>
<td>114</td>
<td>13.83%</td>
</tr>
<tr>
<td><strong>Source of Internet Connection</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Postpaid Plan</td>
<td>27</td>
<td>3.28%</td>
</tr>
<tr>
<td>Prepaid</td>
<td>177</td>
<td>21.48%</td>
</tr>
<tr>
<td>Mobile Data</td>
<td>620</td>
<td>75.24%</td>
</tr>
</tbody>
</table>

Source: Prepared by the authors (2023)

3 RESULTS AND DISCUSSION

The characteristics of the respondents in this study provide insights into the demographics and online learning preferences of college students during the COVID-19 pandemic. The majority of the respondents were female (65.29%), which is consistent with other studies that found more female students enrolled in higher education institutions (Yurdugül & Odacı, 2020; Zhang Ying & Norhiza Binti Ismail, 2022). In terms of year level, the sample was evenly distributed among the first (23.79%), second (26.09%), third (25.12%), and fourth (25.00%) years of college, indicating a representative sample of the student population at CSU-Gonzaga. The most frequently used device for online learning was a cellphone (53.03%), followed by laptops (21.48%) and desktop computers (10.07%). These findings suggest that the availability and convenience of mobile devices have made them a popular option for accessing online course materials and participating in virtual classes (Sharma.
& Barua, 2021). The prevalence of mobile data (75.24%) as the primary source of internet connection for the respondents highlights the importance of reliable and affordable mobile internet services for supporting online learning.

The results of this study contribute to the existing literature on the impact of COVID-19 on higher education, particularly in terms of the shift to online learning. The findings suggest that college students in CSU-Gonzaga have adapted to the new online learning environment, despite the challenges posed by the sudden transition. However, the reliance on mobile devices and mobile data for online learning highlights the need for institutions to provide access to reliable and affordable internet services to support students in their academic pursuits (Khan et al., 2020; Yifeng Zhang et al., 2022; Salim et al., 2023). The characteristics of the respondents in this study provide valuable insights into the online learning preferences and needs of college students during the COVID-19 pandemic. The findings have implications for policymakers, educators, and technology providers who seek to support the continuity of higher education in the face of unprecedented challenges as gleaned in Table 2, the characteristics of the respondents. As gleaned from the result, many are female college respondents than male college respondents. Also, it shows in the table that second-year college students are the most respondent in the study. Most of the respondents use their cellular phone in their online learning, while some are using more than 1 gadget, desktop computer, tablet, and laptop. And finally, respondents are using mobile data, postpaid plans, and prepaid in their online learning.

Table 3. Self-Efficacy of College Students in Online Learning Environment System

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>Adjectival Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-Efficacy of College Students to finishing an Online Course</td>
<td>3.90</td>
<td>High</td>
</tr>
<tr>
<td>Self-efficacy in mingling informally with classmates</td>
<td>3.68</td>
<td>Moderate</td>
</tr>
<tr>
<td>Self-efficacy in doing activities in the CSU-Learning Environment Network System (LENS)</td>
<td>4.10</td>
<td>High</td>
</tr>
<tr>
<td>Self-Efficacy in interrelating with Professors in an Online Class</td>
<td>3.47</td>
<td>Moderate</td>
</tr>
<tr>
<td>Self-Efficacy in interacting with classmates for educational purposes</td>
<td>3.37</td>
<td>Moderate</td>
</tr>
<tr>
<td>Overall Mean</td>
<td>3.70</td>
<td>High</td>
</tr>
</tbody>
</table>

Source: Prepared by the authors (2023)

The results of this study suggest that college students have high levels of self-efficacy in finishing an online course and in using the Learning Environment Network System (LENS) to complete course activities in table 3. However, their self-efficacy in informal mingling with classmates, interacting with professors in an online class, and collaborating with classmates for educational purposes were rated as moderate.

These findings are consistent with previous research that has identified social and communication barriers in online learning environments. For example, a study by Lei and Gupta (2010); (Bo Zhao et al., 2022) found that students reported feeling less connected to their classmates and instructors in online courses, which can impact their motivation and engagement. Additionally, research has shown that students may struggle with online communication and collaboration due to a lack of nonverbal cues and real-time feedback (Palloff & Pratt, 2013; Rommel Al Ali & Fathi Abunasser 2022; Polii et al., 2023).

It is important to note that the overall mean of self-efficacy in the online learning environment system was high, indicating that college students generally feel confident in their ability to navigate and succeed in this learning environment. This finding is consistent with Bandura's (1977) social cognitive theory, which posits that self-efficacy beliefs play a key role in shaping human behavior and outcomes. The moderate ratings in certain areas suggest that there may be opportunities to support students' development of self-efficacy in these specific domains. For example, instructors could implement strategies to encourage informal communication and collaboration among students, such as discussion forums or group projects.
Additionally, providing clear expectations and guidelines for online communication and interaction could help students feel more confident in their ability to engage with professors and classmates.

Overall, these findings suggest that while college students generally have high levels of self-efficacy in the online learning environment system, there may be areas where targeted support and interventions could enhance their self-efficacy and success in this learning environment.

Table 4. The Level of Self-efficacy and its relation to Profile variables of College Students

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Profile variables of the College Students</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sex</td>
</tr>
<tr>
<td>Self-efficacy in finishing online courses</td>
<td>-.142</td>
</tr>
<tr>
<td>Self-efficacy in mingling informally with classmates</td>
<td>.088</td>
</tr>
<tr>
<td>Self-efficacy in doing activities in the LENS</td>
<td>-.099</td>
</tr>
<tr>
<td>Self-Efficacy in interrelating with Professors</td>
<td>-.143</td>
</tr>
<tr>
<td>Self-Efficacy in interacting with classmates</td>
<td>-.104</td>
</tr>
</tbody>
</table>

Source: Prepared by the authors (2023)

Table 4 presents the correlation coefficients between the level of self-efficacy and the profile variables of college students, including sex, year level, online device used, and internet connectivity. The values range from -1.00 to +1.00, where a negative value indicates a negative relationship, a positive value indicates a positive relationship, and a value of zero indicates no relationship between the variables. The results showed that the level of self-efficacy in finishing online courses was negatively correlated with sex (r = -.142) and internet connectivity (r = -.046), indicating that males and students with a postpaid plan for internet connection had higher self-efficacy levels in finishing online courses. On the other hand, the level of self-efficacy in finishing online courses was positively correlated with year level (r = .373**) and online device used (r = .146), suggesting that higher year level and the use of desktop computers and laptops are associated with higher self-efficacy levels in finishing online courses. The level of self-efficacy in mingling informally with classmates was positively correlated with online device used (r = .158) and internet connectivity (r = .116), suggesting that using devices other than cellphones and having mobile data for internet connection are associated with higher self-efficacy levels in mingling informally with classmates.

The level of self-efficacy in doing activities in the LENS showed no significant correlation with any of the profile variables of college students, indicating that the use of LENS is not associated with differences in self-efficacy levels among college students.

The level of self-efficacy in interrelating with professors in an online class was negatively correlated with sex (r = -.143), indicating that males had higher self-efficacy levels in interrelating with professors in an online class. Finally, the level of self-efficacy in interacting with classmates for educational purposes showed no significant correlation with any of the profile variables of college students, suggesting that self-efficacy levels in this dimension are not influenced by the students’ sex, year level, online device used, or internet connectivity.

These findings highlight the importance of considering the profile variables of college students when examining the level of self-efficacy in different dimensions of online learning. The results suggest that certain variables such as sex, year level, and online device used may
influence self-efficacy levels in specific dimensions of online learning, which can have implications for instructional design and student support services.

3.1 Issues and Challenges in Online Learning by the Respondents

The interviews revealed that the challenges and issues reported by the students impacted their learning experience negatively. For instance, technical issues such as unstable internet connection and difficulty in accessing online classes and materials affected their ability to participate in real-time activities and complete assignments. Additionally, challenges related to digital literacy and communication with teachers and classmates negatively impacted their ability to engage in meaningful discussions and receive feedback on their work. Finally, time management was a significant challenge for students, as they struggled to balance online courses with other responsibilities such as work and family commitments.

From conducted interviews with 10 college students who had experienced online learning during the pandemic. Thematic coding of the interview transcripts identified the following themes as the most commonly reported issues and challenges in online learning: (1) Technical issues (All of the students reported experiencing technical issues during online classes, including unstable internet connection, difficulty accessing online classes, and downloading materials); (2) Digital literacy (where the majority of the students reported struggling with the new online learning environment, particularly with communication with teachers and classmates due to lack of familiarity with technology), and lastly, (3) Time management (All of the students reported difficulty in managing their time effectively during online courses, particularly finding a suitable and quiet place to work.)

The findings from our interviews are consistent with previous research on the challenges and issues in online learning. For instance, Alqahtani and Rajkhan (2021); Yuming Xu et al., 2022 found that technical difficulties, digital literacy, and time management were the main challenges faced by students in online learning. Similarly, Wang et al. (2021); Anisa Moza Sabilla et al., (2022) found that unstable internet connection, difficulty in accessing online materials, and lack of interaction with teachers and classmates were the most common challenges experienced by students in online learning.

Further, this highlights the importance of addressing the challenges and issues faced by students in online learning, particularly during the pandemic when online learning has become the norm. To overcome these challenges, collaboration between institutions, teachers, and students is essential. Institutions can improve digital literacy by providing training and resources to students, while teachers can provide technical support and promote effective time management skills. Students can also take responsibility for their learning by ensuring they have a suitable and quiet place to work and seeking support when needed. Overall, addressing these challenges will contribute to a positive learning experience for students and help them achieve their educational goals.

4 CONCLUSION

The study showed that college students have a high level of self-efficacy in the online learning environment system despite the challenges posed by the COVID-19 pandemic. The findings suggest that institutions of higher learning need to provide targeted support and resources to enhance students' digital literacy and provide reliable internet connectivity to facilitate effective online learning. Additionally, the study highlighted the need to focus on improving self-efficacy in specific domains such as informal mingling with classmates, interacting with professors, and collaborating with classmates for educational purposes. The study also revealed that the year level of college students influences their level of self-efficacy,
suggesting the need for targeted interventions to enhance self-efficacy among different levels of students.

This study provides valuable insights into the self-efficacy levels of college students in an online learning environment network system and the challenges they face. The results have significant implications for higher education institutions, as they suggest the need to prioritize digital literacy and reliable internet connectivity while providing targeted support and resources to enhance self-efficacy in specific domains. Further research is necessary to explore additional factors that influence self-efficacy in online learning environments and to develop effective strategies to promote student success in this mode of instruction.

The study's findings provide important recommendations for higher education institutions, with practical, theoretical, and managerial implications. Firstly, central administration should require frequent supervision of students' online performance by deans, department chairs, program coordinators, and faculty members to ensure that all tasks and activities are accomplished before grades are given. This will help maintain accountability and ensure that students receive a quality education. Secondly, higher education institutions should continue to provide orientation to students on the different commands of their learning environment network systems. This will enable them to effectively interact with professors and classmates in the online platform, enhancing the overall learning experience. Thirdly, institutions should conduct ongoing monitoring of the effectiveness of the learning environment network system. This will help improve the online learning experience for students, even if the pandemic is no longer present, and promote a sustainable mode of learning. Finally, higher education institutions should consider adopting blended learning when face-to-face classes resume. Future researchers should investigate the analysis of face-to-face classes versus online learning to identify the potential benefits of blended learning. These recommendations have practical implications for institutions in ensuring quality education, theoretical implications for advancing the understanding of effective online learning, and managerial implications for promoting sustainable modes of education.

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