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A Causal Model of Online Student Connectedness of College Students in a Fully-Remote Setting in the Philippines

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Abstract
This study aimed to investigate the underlying component that contributes to the extent of online student connectedness of college students in Davao Region. The study surveyed 529 respondents from different higher education institutions in Davao Region through a randomized targeted online survey process. The data collected were analyzed using mean to describe the levels of the variables, Pearson product moment correlation analysis to establish significant relationships, and regression and path analysis to determine the causal relationships of the variables. Results of the study revealed that the level of classroom learning experiences, acceptance of change, online learning environment, and online student connectedness were all assessed to be at high levels. When analyzed as to the relationship that exists between variables, result suggests a significant correlation between classroom learning experiences and online student connectedness, acceptance to change and online student connectedness, and online learning environment and online student connectedness. Moreover, path analysis revealed the intricate relationships that exist between the classroom experiences, the online learning environment, student connectedness, and acceptance of change. These indirect effects emphasize that in order to improve student connectedness, it is crucial to take into account a variety of factors related to the educational experience.

Keywords
Classroom learning experiences, Acceptance of change, Online learning environment, Online student connectedness, Path analysis, College students, Philippines

INTRODUCTION
Online education has become a crucial feature of higher education (Adams, 2008). It sparks from massive advancement of technology and expansion of online learning resources (Harahap, Nasution, & Manurung, 2019) which changed the face of traditional learning experiences (Kintu, Zhu, & Kagambe, 2017). Significantly, the occurrence of COVID-19 pandemic has shaken educational sectors and forced the temporary closure of academic institutions around the globe (Dhawan, 2020). This has led to adoption of different online learning platforms that required learners to take online classes instead of the traditional classroom learning experience (Realyvásquez-Vargas et al., 2020). Online learning was termed to refer to the features that can generate teaching-learning approaches that is more student-centered, innovative and flexible (Dhawan, 2020).

Aside from the current pandemic condition, the growth of online learning enrollees at higher education is swayed by striving economy and heightened competition (Sheehy, 2012). The rise of the number of enrollees has further contributed to the success on online learning, specifically online student connectedness (Garrison & Arbaugh, 2007; Ouzts, 2006). Consequently, online student connectedness pertains to human engagement in computer-mediated learning condition which stimulates participation and communication while constantly forming social connections (Galambos, Abelson & Black, 1986). The success of online engagement further depends on the online connectedness with peers and teachers (Morrell, 2016). For instance, a study utilizing online MBA program suggests that with appropriate application, instructors can generate activities that encourage student connectedness and hence, motivate satisfaction and retention (Conner, 2019). In this premise, it is important to recognize different learning aspects that contribute to online connectedness.

In the Philippines, online and modular learning is among the prominent learning modalities that academic sectors devise to sustain education (CHED, 2020; DepEd, 2020). Part of learning or education is interaction with diverse learners which in itself a source of education. Understanding how learners engage and succeed in online learning environment is important given that online education was considered as crucial component of higher education institutions' long-term initiative (Sheehy, 2012). Since Philippines is a developing country, it is important to examine online connectedness of the learners as little literature can be found with the regards to this concept.

Students from industrialized countries all around the globe have used online learning throughout the years for completing learning experiences. Then, as the Covid-19 pandemic progressed, it evolved into a global platform to offer students a variety of alternatives to attend classes as a means of bridging the learning gap that arises from lockdown situations (Don, Rosli, Senin, Ahmad & Rahmat, 2022). It is within this premise that the researcher is very much interested to examine and investigate the underlying component that contributes to the extent of online student connectedness. The researcher has not come a similar study that dealt on conditions of the study in the local setting therefore the study generates new knowledge and will be useful on the academic set up.

Hence, the study intends to develop a causal model of online student connectedness among college students. Specifically, the study seeks to: (1) determine the condition of online learning environment as perceived by college students in terms of, relevancy, uncertainty, critical voice, shared control, and student negotiation; (2) ascertain the classroom learning experience of college students in terms of positive learning experience, teacher's support in learning, and active learning experience; (3) assess the level of acceptance of change among college students in terms of predisposition to change, support for change, change seeking, positive reaction to change, and cognitive flexibility; (4) and determine the extent of online student connectedness among college students in terms of comfort, social community, facilitation, and collaboration and interaction. In addition, this study also seeks to determine the significance of the relationship between variables, specifically the significance of the relationship as follows (1) online learning environment and online student connectedness; (2) classroom learning experiences and online learning connectedness, and (3) acceptance of change and online student connectedness. Lastly, this study deals with the causal model of online student connectedness of college students, specifically aims to ascertain whether the proposed causal model online connectedness fits within the data.

LITERATURE REVIEW

Online Classroom Learning Environment

Rapid development of technology influence higher education to gradually embrace online learning as a means to provide flexible access to education at any time and place (Castle & McGuire, 2010; Lee & Choi, 2011; Zimmerman, 2012). It breaks barrier to academic learning with resources almost accessible to anyone. Moreover, the rise of COVID-19 pandemic has changed the face of education in every country around the globe. Academic institutions are being pushed to make a rapid transition from conventional teaching methods to online learning (Sarwar et al., 2020). The new learning culture is starting to shift from traditional classrooms and schools to online education, which is more interactive, engaging and impactful. Learning online makes it easy for the students not to miss any content. In this premise, online mode has become a practical alternative owing to vast development in information technology.

In its earlier definition, refers to an open and distributed learning environment approach using internet technologies to facilitate online learning, instruction and learning process (Dabbagh & Bannan-Ritland, 2005; White, 2003). It consists of It can be termed as e-learning, e-training or web-based instruction (Colorado & Eberle, 2012). Online learning is associated with on-campus environment as evident on learners' academic performance (Roddy et al., 2017; McPhee & Söderström, 2012) and student satisfaction (Palmer, 2012). It also stimulates engagement with various learners. In fact, introverted students are more likely to participate in an online discussion compared with standing openly in a face-to-face lesson (Muljana & Luo, 2019). A parallel study revealed that students generally perceive online learning as a positive alternative to traditional classroom setting in terms of time management and efficiency (Khalil et al., 2020). The learners' participation in online class is supported by the lack of visual cues and that enable instructors to handle all students equally (Kara, Erdogdu, Kokoç & Cagiltay, 2019).

Online learning environment stimulates communication with other learners who constantly communicate with them. This kind of communication influence initiate the transfer of information and other learning resources, allowing learners to work unitedly and show support with one other (Banayo & Barleta, 2022). Despite the prevalent demand and benefits, online learning was perceived as not suitable for all learners (Basarmak & Mahiroglu, 2016) as it eventually resulted to low retention rates. Another research revealed a higher extent of dropout in online learning environments in comparison with conventional learning environment (Muljana & Luo, 2019), accompanied with lower completion rates for undergraduate degree being only 56% (Moore & Fetzner, 2009). This information holds the premise that the higher the incompletion and dropout rates suggest that the approach is ineffective and unsustainable (Liu, Gomez, & Yen, 2009; Willging & Johnson, 2009). Ghanaian students, for instance, considers online learning scheme as ineffective because of several challenges they encountered including lack of appropriate devices, lack of access to laboratories and fieldwork, and inadequate learning space at home (Adarkwah, 2021; Barrot, Llenares & Del Rosario, 2021). These students typically attributed financial constraints to their lack of access to the Internet, academic resources, and other materials required for online learning.

Similarly, typical online learning environments used to employ a "one size fits all" method of instruction, which exposes all students to the same teaching strategies (El-Sabagh, 2021). This type of learning does not take into account the different learning styles and preferences of students. Currently, the development of e-learning systems has accommodated and supported personalized learning, in which instruction is fitted to a students' individual needs and learning styles (Beldagli & Adiguzel, 2010; Benhamdi, Babouri & Chiky, 2017). A key component of individualized learning is the way that course materials are delivered. A well-designed, efficient, adaptable e-learning system also poses a difficulty because it is challenging to adjust to the various needs of online learners.

Some of the trends that are particularly noticeable in educational institutions throughout the world include the use of technology in the classroom. However, the concept that not every learner could provide and adapt to rapid advancements in technology further complicates the situation (Alvarez, 2020). In the Philippines, for instance, 1 of every 5 learners have difficulty adapting to new learning approaches aside from the fact that they cannot provide reliable internet connection (Baticulon, *et al.,* 2020). These educational innovations should be attentive to the needs of the moment and built on a greater understanding of remote learning. Hence, this suggests that while embracing online learning is prevalent, it cannot guarantee equal quality with the traditional classroom learning environment.

H1: *Online classroom learning environment has a direct effect on online student connectedness among college students.*

Classroom Learning Experiences

Learning experiences are important elements of their academic life as it determines their insights on the quality of school life (Kong, 2008). Different learning experiences has emerged over time alongside the growth and expansion of technology and classroom learning. Significantly, a central feature of classroom learning is the social and communicative engagement between the learners and the teachers, as well as among each learner (Ni, 2013; Roorda, Koomen, Spilt & Oort, 2011). Earlier study which is actually important at any academic condition indicates that building rapport with learners creates good classroom environment and helps maintain authority (Grubaugh & Houston, 1990). This is particularly essential especially that it help learners intact without conveying fear in learning.

Classroom learning environment pertains to the climate or atmosphere that influence learning (Karagiannopoulou, 2010) and a social system that stimulates teacher-student and student-student interactions (Bizimana, Mutangana & Mwesigye, 2022). Classroom environments are very necessary for students and for teachers. Everything from the color of the walls to the arrangement of the desks sends impressions to students and might have an effect on the approach a student learns. Classrooms are particular areas in schools where learning outcomes, such as comprehension and application of knowledge in daily life, are intended to be attained. These areas have a big impact on students' ability to accomplish these laudable objectives.

Classroom learning environment comprises two components: physical and human element. Physical features include all physical aspects that can be found inside the classroom, whereas human element involves instructors and learners (Akimova & Chikeneva, 2019; Malik & Rizvi, 2018; Usman & Madudili, 2019). These are important components as learners establish judgment the first time they enter the classroom. With various learning centers and activities, and the way the teacher communicates with the learners convey important purpose that classroom experience is more than just note-taking, but interactive and dynamic learning (Hannah, 2013). This pattern of interaction establishes a specific condition which generally links with learning environment.

Students of today ought to learn in environments that cater to both their individual and group requirements. In order to address this challenge, educational administrators are tasked to establish physical and cultural environments that are stimulating (Chukwuemeka, 2013; Usaini, Abubakar & Bichi, 2015). Moreover, it is crucial to know what teachers can do to encourage and support students' engagement. A particular study, for instance, suggests that teachers' feedback create the most positive and supportive classroom environment (Wisniewski, Zierer and Hattie, 2020). Feedback may have an impact on how students feel about school, which could enhance or detract from their school identity and behavioral engagement, which would then have an impact on their academic performance (Burns, Martin & Collie, 2019; Reschly and Christenson, 2012; Wang & Zhang, 2020). This suggests that academic personnel influence student engagement and in turn, affects classroom learning environment.

In addition, literature specifically cited classroom learning experience to be more dynamic with well-established modality which is not evident in online-based learning (Kemp & Grieve, 2014; Paul & Jefferson, 2019). It further provides learners with real-time face-to-face learning instructions that stimulates intellectual discussion (Salcedo, 2010). A similar study even highlights the importance of circular seating arrangement for small class size, insinuating that it stimulates public speaking and debate (Campbell, 2008), and promote active listening (Hannah, 2013). In this proposition, a good instructor is the one that has knowledge of classroom elements that hold crucial function in the success of the learners.

H2: *Classroom learning experience has a direct effect on online student connectedness among college students.*

Acceptance to Change

The closure of academic institutions due to the outbreak of COVID-19 pandemic propelled schools to shift and adopt online learning in order to continue access to education (Almaiah, Al-Khasawneh & Althunibat, 2020; Onyema *et al.*,

2020). This condition enables teachers to impose several learning strategies including modular and mediated learning, which approaches offers the possibility to learn from anywhere, anytime, in any rhythm, with any means (Cojocariu, Lazar, Nedeff & Lazar, 2014). Further, the demand for instruction has changed due to increased need of highly educated workforce which are anticipated to learn incessantly (Alavi & Leidner, 2001). To stay up with the pace and trend of the constantly demanding learning environment, it is now standard practice for academic organizations to go through transformation.

Any institution that wants to succeed must be able to adapt to change. When faced with significant changes an institution might choose to either embrace the changes or resist those (Ilyas, 2018). For example, it can be difficult for instructors and students accustomed with traditional in-person educational environments to demonstrate an abrupt willingness to embrace an online learning management system as an essential complement to in-person instruction.

Along with the mentioned advantages are the negative challenges that disturb the promotion of online learning in several countries (Ngampornchai & Adams, 2016). For instance, Nigerian universities' low level of acceptance of online learning resulted from their lack of awareness and knowledge on computer system, unreliable internet connectivity, and high-priced application (Folorunso, Ogunseye & Sharma, 2006). In Pakistan, the problem emerges from infrastructures and learners' limited access to computer, unskilled faculty members and traditional norms (Iqbal & Ahmad, 2010). A similar study in Ghana revealed that resistance to accept academic change was due to learners' feeling of isolation and computer knowledge (Addah, 2012). The similar challenges could be experienced by several learners in the country, particularly with those in rural provinces where access to internet and computer is limited.

Academic institutions who have introduced online education prior to the outburst of COVID-19 pandemic have minimal concerns with adapting to new normal conditions. In a literature, for instance, shown that the transition from a traditional learning environment to an unfamiliar one marks a period of instability for practically all students (Jackson, 2010). These challenges were anticipated especially with various courses like chemistry, drawing, and information and communication technology as the absence of laboratory and teaching tools deter the acquisition of quality education (Nuere & de Miguel, 2020). The same condition is perceived by part-time and full-time learners in Poland, where a study suggests that learners have moderate acceptance of new learning situation as they think of it as less effective and productive (Rizun & Strzelecki, 2020). If students lack confidence in the technology they are using or do not feel a sense of cognitive engagement and social connection, the result may affect negatively the students' adaptation to innovative transition brought about by academic learning condition.

As change is an inevitable component of life, as everyone can attest, accept it and look on it as a good thing. And as someone goes through a transition, he starts learning and being ready for many possibilities (de Luna & Encio, 2023). Change happens in patterns rather than in sparse. As such, studies have indicated that most attempts failed as a result of a variety of unaddressed and essential contributors to resistance (Mohamad, Hassan & Hamid, 2019; Rosenberg & Mosca, 2011). The statement asserts that more effort should be made to comprehend practical strategies for coping with the education sector's ongoing transition. Further, such assertion may directly permit ways to best practice of effective acceptance and implementation of change.

H3: *Acceptance of change has a direct effect on online student connectedness among college students.*

METHOD

Respondents
Population size is important component in determining the sample size of the study. This study's target respondents are 400 random college students currently enrolled in any higher education institutions (HEI) in Davao Region who have had experience in attending online classes, whether pure online or hybrid mode. Identification of the minimum or appropriate sample size is largely dependent on the careful and detailed planning of research (Delice, 2010). The purpose of this is to produce a result that is capable of detecting the smallest magnitude of the influence and the extent to which the study is relevant (Faber and Fonseca, 2014). Upon the approval of the Commission on Higher Education and its favorable endorsement to HEIs in the conduct of online survey, a total of 531 random college student respondents were culled out, representing various HEIs in Davao Region.

Inclusion criteria aiming to produce reliable and valid results include qualified respondents described in this researcher: college students who are currently enrolled in any HEIs within Davao del Sur, access to education under online or hybrid learning condition, and male or female of legal age. In contrast, exclusion criteria to guard against exploitation of vulnerable persons include a disqualified respondents described in this research are as follows: a minor who cannot give consent, an alien, and those academic locations which are outside the research locale. Respondents may decide to discontinue or withdraw his/her participation on the research as he/she deems necessary for whatever reasons and may or may not provide these reasons to the researcher for evaluation and reporting processes.

Measures
The study made use of existing scales in crafting for the survey instrument for this study. There are five scales used in obtaining information on the conditions undertaken in the study. For the first variable, online learning environment, the scale to be used is a 20-item survey questionnaire adapted from DeVaney, Adams and Elliott (2008). The second scale from Kong (2006) was used to measure classroom learning experiences of the respondents. It is composed of 15 items

distributed evenly to its indicators. Another scale to measure acceptance of change was adapted from Di Fabio and Gori (2016), containing 20 items. Lastly, to measure online student connectedness, the scale was lifted from Spanjers (2016), which contains 27 items. To score the scales, a five-point Likert scale was used to measure the responses. The following scale was used to interpret the data gathered and determine the level of the variables being measured in this study:

Scale	Range of Means	Descriptive Level	Interpretation
5	4.20 – 5.00	Very High	This means that the situation pertaining the variable is very high.
4	3.40 – 4.19	High	This means that the situation pertaining the variable is high.
3	2.60 – 3.39	Moderate	This means that the situation pertaining the variable is moderate.
2	1.80 – 2.59	Low	This means that the situation pertaining the variable is low.
1	1.00 – 1.79	Very Low	This means that the situation pertaining the variable is extremely low.

To ensure that the scales are fitting and reliable to address the purpose of the study, a prior pilot test of the scales was conducted, involving 50 random college students from UM Digos College. The following are the reliability values by Cronbach's alpha and McDonald's omega for each of the variables: classroom learning experience scale with α=0.916 and ω=0.921, both excellent; acceptance to change with α=0.916 and ω=0.918, both excellent; online learning environment with α=0.934 and ω=0.939, both excellent; and online student connectedness with α=0.879 and ω=0.893, both good.

Design and Procedure
The descriptive-correlational research design was used in the study. Instead of assuming cause and effect correlations, this method was done to describe the relationship between the variables. Descriptive-correlational researches are beneficial for articulating how one occurrence is associated towards another in circumstances when the researcher has no control over the independent variables, the variables that are thought to cause or impact the dependent or outcome variable (Lappe, 2000). Furthermore, quantitative non-experimental method is concerned with the procedures used to organize, describe and summarize data, while correlation design describes the statistical association between two or more variables (Creswell, 2002). The said approaches are appropriate for this study deals with the exploration of the causal model of student online connectedness of college students.

The rigor of this study can be manifested through the data collection. Hence, the following procedure was followed in the process of gathering data for the study: First, a formal permission to conduct the study was sought from the Commission on Higher Education XI, favorably endorsed by the Dean of the Professional Schools. Separate letters were prepared and forwarded to the school directors, deans, and presidents of HEIs in Davao Region, seeking their permission to allow the conduct of online survey involving their students in a random and Meta-targeted survey manner.

Permission from the respondents were sought in the digital informed consent form which served as the cover letter of the online survey in Google Forms. Upon consenting by ticking "I hereby consent in participating with this survey", students responded on the online survey questionnaire, thereby making it easy to collate all the data from them upon submission of the responses. All responses were automatically logged in the Google Forms' repository of the researcher's @umindanao account, which made it easier for data cleaning and exporting to JAMOVI software (The Jamovi Project, 2023).

Data Analysis
The data collected through the questionnaires were tallied and treated using the following statistical tools: *weighted mean* (with standard deviation) was used to describe the level of online learning environment, classroom learning experience, acceptance of change, and online student connectedness; *Pearson product-moment correlation coefficient* was used to ascertain the significance on the relationship between variables, after determining if the variables follow a normal distribution, or if the Kolmogorov-Smirnov test has a non-significant p-value; and *path analysis* was used to determine the causal relationships of the variables. All analysis were performed in JAMOVI software.

Ethical Considerations
The study was conducted contingent to the approval of the University of Mindanao Ethics Review Committee (UMERC) with approval number 2024-018. All ethical standards were addressed before the administration of the survey.

RESULTS AND DISCUSSION

Online Learning Environment as Perceived by College Students
Presented in Table 1 is the descriptive summary of the online learning environment in Southern Mindanao universities, as evaluated by college students. Outlined in the table are key components of the online learning environment which includes relevancy, uncertainty, critical voice, shared control, and student negotiation. The overall assessment of the online learning environment attained a mean score of 4.21 (SD = 0.561), with a descriptive value of *high*. This overall high descriptive level highlights how well students evaluated their online learning experiences in a variety of contexts, suggesting that Southern Mindanao Region educational institutions have a positive and encouraging online learning culture.

Table 1 Level of online learning environment in universities among college students (N=529)

Item	Mean	SD	Descriptive Level
relevancy	4.36	0.655	high
uncertainty	4.18	0.660	high
critical voice	4.28	0.666	high
shared control	4.11	0.704	high
student negotiation	4.10	0.753	high
Overall	**4.21**	**0.561**	**high**

Moreover, relevancy received the highest mean score of 4.36 (SD = 0.655) suggesting that the activities and content in their online learning environments are highly relevant to their learning objectives and career goals. Uncertainty ($\bar{x}$ = 4.18, SD = 0.660), critical voice ($\bar{x}$ = 4.28, SD = 0.666), shared control ($\bar{x}$ = 4.11, SD = 0.704), and student negotiation ($\bar{x}$ = 4.10, SD = 0.753) also obtained a descriptive value of *high*. The high assessments for each component imply that these contexts are successfully satisfying the needs of students in terms of relevance, engagement, and flexibility. These findings can help guide continuous attempts to improve the efficacy and quality of online learning, which ensures that it continues to be adaptable to the requirements and interests of students.

The results in Table 1 are consistent with the study of Muljana and Luo (2019) who assert that online learning environment stimulate learners comparable to the traditional face-to-face learning instruction. It was found to be more engaging, interactive, and impactful, and it is easy for the students not to miss any content. Banayo and Barleta (2022) further insinuated that online learning environment stimulates communication with other learners who constantly communicate with them. This kind of communication influence initiate the transfer of information and other learning resources, allowing learners to work unitedly and show support with one another.

Perceived Classroom Learning Experience Among College Students

Table 2 shows the descriptive statistics and descriptive levels of the classroom learning experiences as assessed by college students in universities in Southern Mindanao Regions. The overall mean score is marked at 3.95 (SD = 0.642), characterized as *high.* The overall high level of the classroom learning experience highlights how well the instructional approaches and learning environment in the universities of the Southern Mindanao Region work to promote a supportive atmosphere for learning. The result further reveals a *high* descriptive level for all indicators with teacher support in learning as the prominent indicator with a mean score of 4.12 (SD = 0.723), followed by positive learning experience ($\bar{x}$ = 4.04, SD = 0.674), and active learning experiences ($\bar{x}$ = 3.68, SD = 0.823). The high descriptive levels that are consistently seen for all assessed parameters demonstrate the effectiveness of approaches to instruction. According to the data, respondents believe their classrooms to be encouraging and stimulating, which is important for both academic success and personal growth.

Table 2 Level of classroom learning experiences among college students (N=529)

Indicators	Mean	SD	Descriptive Level
positive learning experience	4.04	0.674	high
teacher support in learning	4.12	0.723	high
active learning experiences	3.68	0.823	high
Overall	**3.95**	**0.642**	**high**

The result presented in Table 2 are consistent with those of the pronouncement of several researchers indicating that classroom learning experience is more dynamic with well-established modality of learning (Kemp & Grieve, 2014; Paul & Jefferson, 2019) which provide learners with real-time face-to-face learning instructions that stimulates intellectual discussion (Salcedo, 2010). Current learners require to be accommodated in learning environments that meet their needs as individuals and as a group. The goal of the classroom experience is to promote interactive and dynamic learning rather than rote memorization through the use of a variety of learning centers and activities, as well as effective communication between the teacher and students (Hannah, 2013). This pattern of interaction creates a certain circumstance that is typically connected to the learners' classroom learning experiences.

Acceptance of Change Among College Students

Shown in Table 3 is the descriptive statistics results in measuring the level of acceptance to change of college students in Southern Mindanao Region, outlining key indicators such as predisposition to change, support for change, change seeking, positive reaction to change, and cognitive flexibility. The overall mean score for acceptance to change was 3.89, described as *high*, and the standard deviation was 0.549. This overall score demonstrates that college students generally have a positive and flexible attitude toward change, indicating that they are prepared to participate in and gain from changing instructional approaches and environments.

Cognitive flexibility obtained the highest mean of 4.08 (SD = 0.631) indicating that the respondents are able to change their behavior and way of thinking in response to new information or changing conditions. The ability to adapt cognitively is essential for efficient learning and problem-solving. Moreover, all other indicators under acceptance to change indicates a *high* descriptive value, as mean score for change seeking were 4.03 (SD = 0.730), 3.86 (SD = 0.667)

for predisposition to change, 3.79 (SD = 0.711) for positive reaction to change, and 3.71 (SD = 0.708) for support for change. The substantial level of acceptance of change across all parameters is an indication of a student population that is adaptive, supportive of attempts for improvement, and proactive in looking for growth possibilities.

Table 3 Level of acceptance to change among college students (N=529)

Indicators	Mean	SD	Descriptive Level
predisposition to change	3.86	0.667	high
support for change	3.71	0.708	high
change seeking	4.03	0.730	high
positive reaction to change	3.79	0.711	high
cognitive flexibility	4.08	0.631	high
Overall	**3.89**	**0.549**	**high**

The result in Table 3 is consistent with those of de Luna and Encio (2023) emphasizing that change is an inevitable component of life. And as someone goes through a transition, he starts learning and being ready for many possibilities. Alavi and Leidner (2001) further insinuated that it is now standard practice for academic organizations to go through transformation to stay up with the pace and trend of the constantly demanding learning environment, hence, the need to continually prepare for change.

Moreover, students and educators who are used to traditional in-person instructional settings may find it challenging to suddenly accept an online learning management system as a necessary addition to in-person instruction. For instance, in the study of Folorunso, Ogunseye and Sharma (2006), they found that Nigerian universities' low level of acceptance of online learning resulted from their lack of awareness and knowledge on computer system, unreliable internet connectivity, and high-priced application. The problem emerges from infrastructures and learners' limited access to computer, unskilled faculty members and traditional norms (Iqbal & Ahmad, 2010). However, Ilyas (2018) implied that any academic institution that wants to succeed must be able to adapt to change. When faced with significant changes an institution might choose to either embrace the changes or resist them. With positive perspective on acceptance to change as assessed by college students, it can be surmised that this willingness to adapt shows promise for introducing innovative teaching practices and changes at the educational institutions of the Southern Mindanao Region

Online Student Connectedness Among College Students
The level of online student connectedness as assessed by college students in universities in Southern Mindanao was illustrated in Table 4. The overall mean score for online student connectedness was 3.54 (SD = 0.587), described as *high*. The high overall score highlights students' generally favorable perceptions of their connectedness, which is indicative of the institutions' efforts to sustain a helpful and coherent online learning environment.

Table 4 Level of online student connectedness among college students (N=529)

Indicators	Mean	SD	Descriptive Level
school attitude	3.57	0.504	high
communication	3.47	0.878	high
acceptance	3.57	0.650	high
Overall	**3.54**	**0.587**	**high**

Acceptance and school attitude both obtained a mean score of 3.57, with standard deviation score of 0.650 and 0.587, respectively, and descriptive value of *high*. This suggests that college student respondents felt strongly included and accepted in the online academic community and exhibit strong positive feeling and commitment to their educational institutions. The result further indicates that respondents have a positive perception of their schools despite the difficulties that can come with learning online, which is important for encouraging a sense of involvement and belonging in the academic environment. Meanwhile, communication obtained the least mean score with 3.47 (SD = 0.878), while also rated as *high*. This indicator represents efficient channels and engagements for communication inside the online learning environment. The comparatively greater diversity may be the result of variations in how courses are structured to support classroom interactions or in how students have used communication tools and channels.

The results presented in Table 4 are consistent with Ni (2013) and Rovai (2022) pronouncements indicating that online connectedness increases student learning engagement which consequently influences positive outlook on online learning content. The degree to which students experience a connection may be influenced by their own intrinsic motivation to engage with students online. Glisan and Trinin (2006) posits that the connection that learners generated is perceived to be equally important as face-to-face classes. In fact, the results of Table 4 demonstrate that institutions in the Southern Mindanao Region have been successful in promoting a high degree of connectivity among students in regardless of the inherent difficulties associated with online learning. The established connection is a helpful tool in providing profound knowledge of the subject matter by active discussions and engagements of the learners (Santovec, 2004). In this sense, student engagement has been shown to be significantly influenced by the idea of online connectedness and belonging among students.

Correlation Analysis Results

On the relationship between online learning environment and online student connectedness

Result on the analysis of the correlation between online learning environment and online student connectedness of college students within universities in the Southern Mindanao are shown in Table 5. The null hypothesis was rejected since the combined r-value of 0.478 from the measurements, with p<.001, indicates a slightly positive correlation between variables. Furthermore, it is observed that relevance, uncertainty, critical voice, shared control, and student negotiation indicates a positive correlation with online student connectedness at an r-value of 0.465, 0.390, and 0.407, at p<.001.

The correlation between the online learning environment and school attitude reveals that relevancy (r = 0.327, p < .001), uncertainty (r = 0.294, p < .001), critical voice (r = 0.373, p < .001), shared control (r = 0.445, p < .001), and student negotiation (r = 0.446, p < .001) are all significantly related to how students perceive and feel about their school. This suggests that college students tend to have a more positive attitude toward their educational institution when they find the information relevant, feel that their perspectives matter, are able to navigate the inherent ambiguities of online learning, and have some degree of control over the way they are learning.

Table 5 Correlation analysis between online learning environment in universities and online student connectedness of college students

		relevancy	uncertainty	critical voice	shared control	student negotiation	Overall
school attitude	Pearson's r	0.327 ***	0.294 ***	0.373 ***	0.445 ***	0.446 ***	0.465 ***
	df	529	529	529	529	529	529
	p-value	< .001	< .001	< .001	< .001	< .001	< .001
communication	Pearson's r	0.277 ***	0.215 ***	0.307 ***	0.345 ***	0.429 ***	0.390 ***
	df	529	529	529	529	529	529
	p-value	< .001	< .001	< .001	< .001	< .001	< .001
acceptance	Pearson's r	0.300 ***	0.252 ***	0.325 ***	0.351 ***	0.419 ***	0.407 ***
	df	529	529	529	529	529	529
	p-value	< .001	< .001	< .001	< .001	< .001	< .001
Overall	Pearson's r	0.343 ***	0.285 ***	0.380 ***	0.429 ***	0.497 ***	0.478 ***
	df	529	529	529	529	529	529
	p-value	< .001	< .001	< .001	< .001	< .001	< .001

With regards to communication, the correlations implies that effective communication within the online learning environment of college students is significantly associated with relevancy (r = 0.277, p < .001), uncertainty (r = 0.215, p < .001), critical voice (r = 0.307, p < .001), shared control (r = 0.345, p < .001), and student negotiation (r = 0.429, p < .001). These results highlight how important it is to create online learning environments that encourage sincere and significant interactions between students by acknowledging their perceptions of the relevance of their education, as well as their capacity for self-expression and participation in the learning process, which significantly impact their capacity to communicate competently in an online space.

Lastly, acceptance also demonstrate a significant positive correlation with the analyzed indicators of the online learning environment, including relevancy (r = 0.300, p < .001), uncertainty (r = 0.252, p < .001), critical voice (r = 0.325, p < .001), shared control (r = 0.351, p < .001), and student negotiation (r = 0.419, p < .001). These correlations highlight how important it is to design an online learning environment where students feel that their education and opinions matter, and that they have some influence over the learning process. These elements all help students feel accepted and a part of the online learning community.

The result presented in Table 5 supported the previous research results made by other related academic studies. Online learning environment is significantly correlated with online student connectedness. Bolliger and Inan (2012) initially thought the essential role of connectedness in online learning environment because of its potential influence to learners' learning motivation. They further insinuated that learners who feel socially involve believe that they established close relationship with other learners. Al-Hashmi (2021) affirmed this notion citing that the connectedness to learning reflects strong learning bonds that encourage students to willingly participate and engage with the online learning activities. This insight suggests that in order to improve students' sense of connectedness and overall satisfaction with their online learning experience, it is important to create an online learning environment that is participatory, engaging, and sensitive to their needs and preferences. This highlights the cumulative effect of these environmental factors on students' overall sense of connectedness.

On the relationship between classroom learning experiences and online student connectedness

Presented in Table 6 is the computed r-value on the classroom learning experiences and online student connectedness of college students in Southern Mindanao Region. The combined computed r-value of 0.589 denotes a strong correlation and

p<.001, the result indicates a strong relationship between classroom learning experiences and the overall measure of online student connectedness. The result further suggests that the null hypothesis was rejected.

Additionally, classroom learning experience demonstrate a positive correlation with school attitude, communication, and acceptance, with r-values of 0.586, 0.527, and 0.429, respectively, with p<.001 making them significant. The study's null hypothesis was rejected due to the variable relationship test, which reveals a crucial link between classroom learning experiences and the overall measure of online student connectedness. This indicates that students' perception of connectedness in an online learning environment is enhanced greatly by the cumulative influence of positive learning experiences, teacher support, and active learning experiences in the classroom.

Table 6 Correlation analysis between classroom learning environment and online student connectedness of college students

		positive learning experience		teacher support in learning		active learning experiences		Overall	
school attitude	Pearson's r	0.482	***	0.517	***	0.521	***	0.586	***
	df	529		529		529		529	
	p-value	< .001		< .001		< .001		< .001	
communication	Pearson's r	0.404	***	0.490	***	0.470	***	0.527	***
	df	529		529		529		529	
	p-value	< .001		< .001		< .001		< .001	
acceptance	Pearson's r	0.385	***	0.384	***	0.351	***	0.429	***
	df	529		529		529		529	
	p-value	< .001		< .001		< .001		< .001	
Overall	Pearson's r	0.482	***	0.534	***	0.514	***	0.589	***
	df	529		529		529		529	
	p-value	< .001		< .001		< .001		< .001	

The results presented in Table 6 supported the previous research results made by other related academic studies. Liu et al., (2016) posited that connectedness is an essential component of classroom learning environment. Significantly, a central feature of classroom learning is the social and communicative engagement between the learners and the teachers, as well as among each learner (Ni, 2013; Roorda, Koomen, Spilt & Oort, 2011). These results indicate the establishment of instructional strategies that place an emphasis on dynamic, encouraging, and engaging classroom environments in order to strengthen online learners' feeling of connection. The findings are also consistent with the assertions of Hehir, Zeller, Luckhurst and Chandler (2021) highlighting the use of internet and integration of digital resource, as it maintains social engagement and connection which equates to students' sense of control over learning and connectedness. By collaborating, interacting, and participating in individual activities and by generating meaning with peers and instructors, learners build meaningful or relevant information and abilities.

On the relationship between acceptance to change and online student connectedness
Table 7 reveals the correlation analysis on the acceptance to change and online student connectedness of college students in Southern Mindanao Region. Using Pearson's correlation coefficient, the combined computed r-value of 0.512 signifies that acceptance to change is strongly correlated with the overall measure of online student connectedness at p<.001.

The result presented suggests that the null hypothesis was rejected. Additionally, online student connectedness demonstrates a positive correlation with predisposition to change, support for change, change seeking, positive reaction to change, and cognitive flexibility, with r-values of 0.514 (p<0.05), 0.429 (p<0.05), and 0.407 (p<0.05), respectively, making them significant. The result implies that college students are aware of the different learning aspects that contribute to online connectedness which further contributes to a positive response to changes. The study's null hypothesis was rejected due to the variable relationship test, which reveals a significant correlation between acceptance to change and online student connectedness. This signifies that acceptance to change holds an essential role in enhancing college students' sense of connectedness in an online context.

The result presented in Table 7 supported the previous research outcomes. Acceptance to change plays a pivotal role in establishing online connectedness and prompt learning engagement among college students in online learning environment. Hehir et al. (2021) emphasizes the use of internet and integration of digital resource in maintaining social engagement and connection which equates to students' sense of control over learning and connectedness. Additionally, Helfaya (2019) cited that college students are observed to exhibit a favorable perception in the implementation of online learning if they are proficient in different learning platform and have received sufficient support from instructors and their academic institutions.

A similar study has revealed that the level of acceptance to learning transition has significantly influence student connectedness (Mulyono, Suryoputro & Jamil, 2021). The relationship was influenced by contributing components including the perceive usefulness of online learning platforms (Dumpit & Fernandez, 2017) and ease of access of learning-related information (Klein, Junior, Barbosa & Baldasso, 2018). Rajeb, Wang, Man and Morett (2023) highlighted that acceptance of online learning by students can be defined as a general measure of their comfort level with engaging in the online learning process. It is a well-established idea that serves as a reliable gauge of how well the online learning process works. Literature cited that one of the concerns in students' acceptance to change emerges from infrastructures and their limited access to computer, unskilled faculty members and traditional norms (Iqbal & Ahmad, 2010). The similar challenges could be experienced by several learners in the country, particularly with those in rural provinces where access to internet and computer is limited. However, to stay up with the pace and trend of the constantly demanding learning environment, it has now become a standard practice for academic organizations to go through transformation, including sudden implementation of online learning structure.

Path Analysis
The path analysis results in JAMOVI as presented in Table 7, with an emphasis on baseline model, show a substantial chi-square (χ^2) score of 894, degrees of freedom (df) of 6, and a p value of <.001. Given that the p-value deviates from the null hypothesis, which holds that the model fits the data well, this significant chi-square statistic implies that the model does not provide a perfect fit to the data. A strong chi-square value in path analysis frequently indicates differences between the observed data and the model's predictions, indicating the need for additional research into the model's specifications or the exploration of different models that may be able to more accurately represent the underlying data structure.

Table 7 Model Tests

Label	X^2	df	p
Baseline Model	894	6	< .001

Show in Table 8 are the variations of the endogenous variables in the proposed path model as explained by the respective exogenous variable. The R^2 values given in the estimates show how much of the variance in the dependent variables can be attributed to each of the predictors in the path model. As shown in Table 8, roughly 33.4% of the variations of classroom learning experience as an endogenous variable is explained by the exogenous variables affecting it.

Table 8 Variations on endogenous variables as explained by exogenous variable in the path model

Variable	R^2	95% Confidence Intervals		Wald X^2	df	p
		Lower	Upper			
classroom learning experience	0.334	0.269	0.399	266	1	< .001
acceptance to change	0.542	0.483	0.597	629	2	< .001
student connectedness	0.391	0.326	0.455	341	3	< .001

Moreover, acceptance to change (ACCPCHNG) exhibits a higher R^2 of 0.542, indicating that the model accounts for 54.2% of the variation in students' acceptance of change, with confidence intervals ranging from 0.483 to 0.597. With confidence intervals ranging from 0.326 to 0.455, the model explaining 39.1% of the variance in online student connectivity is represented by the student connectedness (STUDCONNECT) as seen in the R^2 value of 0.391.

Presented in Table 9 are the results of the parameter estimates of direct effects of the path model. The online learning environment (ONLEARNENV) and other factors have significant correlations, as shown by the parameter estimates for direct effects in the path model. With a high degree of significance (p <.001), the estimated direct influence of the online learning environment on the classroom learning experience (p1) is 0.661, showing a strong positive influence. Similarly, the online learning environment substantially predicts acceptance to change (p2), having an estimate of 0.510 (p <.001). Given a probability value of 0.256 (p <.001), the model also shows a significant correlation between the learning experience in the classroom and acceptance of change (p 3). The classroom learning experience (p5), acceptance of change (p6), and online learning environment (p4) all have a substantial direct impact on students' connectedness, demonstrating a multitude of influences on students' connectedness in the online learning environment.

Table 9 Parameter estimates of direct effects of the path model

Label	Dep	Pred	Estimate	SE	95% Confidence Intervals		β	z	p
					Lower	Upper			
p1	CLASSEXP	ONLEARNENV	0.661	0.0405	0.5815	0.740	0.578	16.32	<.001
p2	ACCPCHNG	ONLEARNENV	0.510	0.0352	0.4414	0.579	0.522	14.50	<.001
p3	ACCPCHNG	CLASSEXP	0.256	0.0308	0.1953	0.316	0.299	8.31	<.001
p4	STUDCONNECT	ONLEARNENV	0.113	0.0512	0.0124	0.213	0.108	2.20	0.028
p5	STUDCONNECT	CLASSEXP	0.377	0.0403	0.2983	0.456	0.413	9.36	<.001
p6	STUDCONNECT	ACCPCHNG	0.202	0.0535	0.0972	0.307	0.189	3.78	<.001

Table 10 provides an extensive understanding of the indirect effects within the path model, illustrating how different parameters interact to influence student connectedness.

Table 10 Defined parameters for the indirect effects of the path model

Label	Description	Parameter	Estimate	SE	95% Confidence Intervals		β	z	p
					Lower	Upper			
IE1	ONLEARNENV ⇒ CLASSEXP ⇒ ACCPCHNG ⇒ STUDCONNECT	p1*p3*p6	0.034	0.010	0.014	0.054	0.033	3.365	<.001
IE2	ONLEARNENV ⇒ CLASSEXP ⇒ STUDCONNECT	p1*p5	0.249	0.031	0.189	0.310	0.239	8.121	<.001
IE3	ONLEARNENV ⇒ ACCPCHNG ⇒ STUDCONNECT	p2*p6	0.103	0.028	0.048	0.158	0.099	3.655	<.001
IE4	CLASSEXP ⇒ ACCPCHNG ⇒ STUDCONNECT	p3*p6	0.052	0.015	0.022	0.081	0.056	3.438	<.001

As shown, the first indirect effect (IE1) is estimated at 0.034 having a significant p-value (p <.001), illustrating the journey connecting online learning environment to classroom learning experiences and acceptance of change, eventually influencing student connectedness. With a β of 0.033 and a z-score of 3.365, this effect illustrates how classroom experiences and students' willingness to adapt to change work together to compound the effects of a positive online learning environment on student connectedness. It emphasizes how complex instructional environments are and how, through indirect paths, the online context could have a big impact on how connected students are. With an estimate of 0.249 (p <.001), the second indirect effect (IE2) describes how the online learning environment influences student connectedness, as mediated by classroom learning experiences. With a z-score of 8.121 and a high β of 0.239, this path points to a significant mediated relationship in which student connectedness and the online learning environment are linked by the standard of classroom experiences. It highlights how crucial classroom experiences and instructions are to improving students' sense of connectedness when they are learning online.

The third path (IE3), evaluated at 0.103 (p <.001), explains the indirect effect of the online learning environment on student connectedness through acceptance to change. This effect shows how students' preparedness and support for change somewhat mediates the online learning environment's influence on students' connectivity, with a β of 0.099 and a z-score of 3.655. It illustrates how adaptable students are in an online learning environment, where their willingness to adjust can have a big impact on how connected they feel.

Finally, with an estimate of 0.052 (p <.001), the fourth indirect effect (IE4) depicts the link of classroom learning experience to student connectedness through acceptance of change. This pathway, which has a z-score of 3.438 and a β of 0.056, shows how classroom experiences gradually affect students' acceptance of change and, in turn, their sense of connectedness. It draws attention to the connections between the dynamics of the classroom, how adaptably pupils handle change, and how interrelated they all are in the online learning environment.

When taken as a whole, these indirect effects shed light on the intricate relationships that exist between the classroom experiences, the online learning environment, student connectedness, and acceptance of change. They emphasize that in order to improve student connectedness, it is crucial to take into account a variety of factors related to

the educational experience. They highlight the significance of encouraging change acceptance, strengthening classroom experiences, and providing supportive online environments as important components of a cohesive and compelling online learning environment.

The path model presented in Figure 1 provides a complex representation of the ways in which different aspects of the learning process interact and foster student connection in the setting of online learning. The online learning environment, which emerges as a fundamental component that significantly influences both classroom learning experiences and students' acceptance of change, is at the center of this interaction. The model is in harmony with the literature cited by Sabbagh (2021), which emphasizes that an engaging online learning environment improves classroom experiences while also helping students develop an adaptive perspective and a willingness to accept change. This flexibility, in turn, seems to be an essential component in fostering a feeling of belonging among students, suggesting that students' capacity to adapt to and participate in the dynamic nature of online learning is correlated with their sense of integration in the online learning environment.

Additionally, the path model emphasizes the direct and indirect ways that classroom experiences and the online learning environment influence students' sense of connectedness. This confirms the pronouncements of Dimitrellou and Hurry (2019) indicating that the model points to the way that certain school characteristics and processes may contribute to student connectedness. The framework further suggests that learners have a need to belong in places or platforms where they spend significant time, including classroom and online learning environment (Garrad & Page, 2022). The immediate effect of these educational facets on student connectedness is highlighted by the direct effects, but the indirect effects show a more nuanced relationship in which classroom experiences and acceptance to change play a partially mediating role in the online learning environment's influence on connectedness.

It has been demonstrated that classroom experiences itself directly increase students' sense of connectivity, indicating that supportive interactions and engagements take center stage in helping students feel more connected and involved in their educational process. When taken as a whole, these paths depict an educational ecosystem in which the digital environment, classroom dynamics, and the development of an adaptable mindset are interlaced to improve the sense of belonging and community among college online learners.
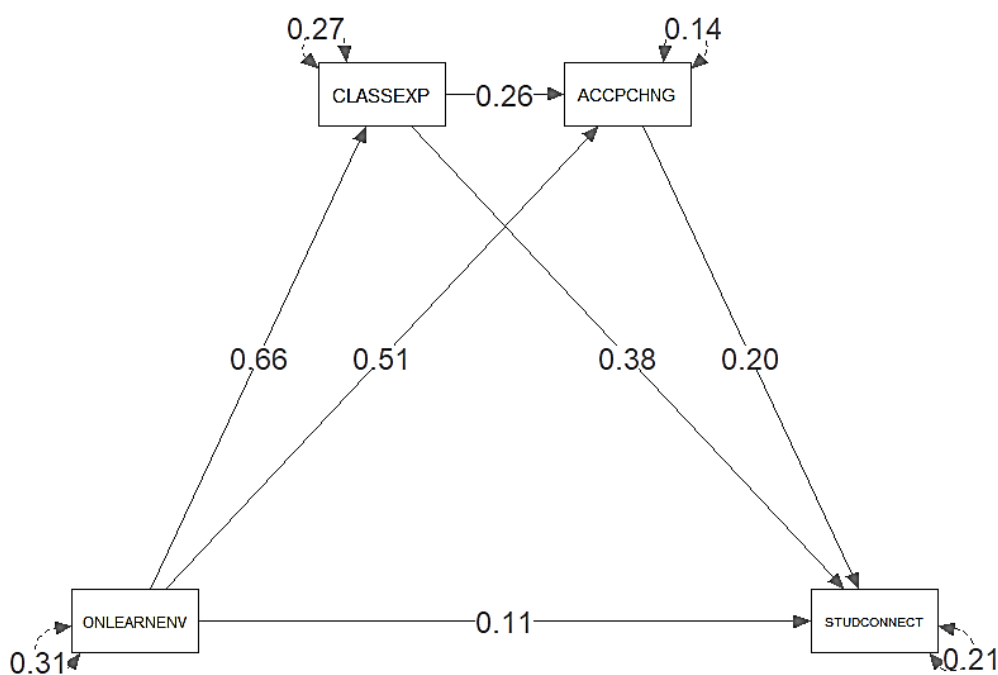

Fig. 1 The developed path model showing the causal relationships of variables on online student connectedness

CONCLUSION

Based on the study's findings, the level of classroom learning experience, acceptance to change, and online learning environment is high as assessed by the college students in Davao Region.

The findings further indicate that classroom learning experience, acceptance to change, and online learning environment were correlated with online student connectedness. It suggests that improving the online learning environment, creating a culture of acceptance of change, as well as establishing a good learning environment in the classroom are essential to increasing online student connectivity. These elements act as the fundamental frameworks around which successful online learning environments can be constructed. Through understanding and addressing on these correlations, academic institutions and instructors can modify their strategies to better assist students in the digital sphere, which will ultimately result in increased student satisfaction, engagement, and academic performance in online learning settings. Moreover, this underscores the significance of adopting comprehensive approaches that incorporate pedagogical methodologies and technology frameworks to establish a diverse and inclusive online learning environment.

The result suggests that college students in the Davao Region perceive their classroom learning experience, acceptance to change, and the online learning environment to be at a commendable level. It is noteworthy that the

assessment being positive highlights how well institutional efforts and educational initiatives meet the requirements and preferences of students in the region. Moreover, it suggests a nurturing learning atmosphere that is favorable to adopting technology breakthroughs and adjusting to changing approaches to instruction. With the goal of consistently improving educational standards and promoting a culture of continuous improvement among students in the Davao Region, these positive assessments serve as a strong basis for future innovations and improvements in instructional approaches.

For the causal model, the results revealed that classroom learning experience, acceptance of change, and online learning environment all have a substantial direct impact on students' connectedness, demonstrating a multitude of influences on students' connectedness in the online learning environment. As a result, these findings highlight how complicated the variables affecting students' connectedness in the virtual learning environment are. The quality of the online learning environment, the classroom learning experience, and the ability to accept change all have a direct and major impact on how connected students feel to one another. This draws attention to how different facets of education are interrelated and stresses the necessity of an extensive approach for encouraging student involvement and connectedness in online learning environments. In order to provide an online learning environment that is both helpful and enriching and promotes students' academic performance and well-being, educators and institutions should give priority to initiatives that address these essential components.

RECOMMENDATIONS

The results of this study can serve as foundation for various initiatives and interventions that may be implemented in academic institutions to strengthen learning approaches and foster a community of connectedness among students. Academic administrators should take into account strategies such as improving methods of instruction and student interactions in the classroom, encouraging change acceptance through technological integration training and resources, improving the online learning environment with intuitive platforms and strong technical support, putting support services like counseling and mentoring in place, and regularly assessing and modifying learning methods to meet changing student needs. Institutions may foster a more welcoming, encouraging, and dynamic learning environment that improves student satisfaction, involvement, and fulfillment with online education by providing higher emphasis to these approaches.

The result of this study is also beneficial for students striving to attain quality education through various learning approaches while nurturing positive connectivity with peers and instructors. Given the correlation between online student connectedness and classroom learning experience, acceptance of change, and the online learning environment, it is imperative for students to prioritize several actions. They should continuously participate in online learning environments to promote connectivity with classmates and instructors, support change to adapt to developing methods of instruction and technologies, and actively participate in instructional activities for optimal learning experiences. Students can improve their overall educational experience and learning outcomes by intentionally including these practices into their educational journey.

Lastly, subsequent researchers may use the variables employed in this study to evaluate if they also influence the online connectedness of students in other regions. It is also recommended that future researchers should continue exploring factors and variables that impact students online learning connectedness. Examining the effectiveness of different approaches and practices focused at strengthening online student connectivity may provide educators and institutions with invaluable perspectives to maximize the online learning experiences.

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