Modelling the Self-Efficacy of Online Learning among Filipino Adults

By

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Abstract

Self-efficacy in academics correlates with self-efficacy in using computers, a learning management system, and the use of the internet and information. With the help of structural equation modeling, the study's goal was to predict what would happen if the expected correlations between academic self-efficacy, computer usage efficacy, LMS effectiveness, online search efficiency, and online learning efficiency were accurate. In order to evaluate the envisaged model and the connections between the variables, an analytic survey approach was utilized. The researcher gathered 345 adult learners to participate in this study. The finding from the modeling was that self-efficacy in computer usage, learning management systems, and access to online resources was positively associated with online learning self-efficacy. Using data from this research, policymakers may better understand the connections between previously posited sets of linkages and, in turn, establish programs that improve online learning self-efficacy in light of those ties.

Keywords: Behavioral modeling; e-learning; online learning; structural equation model

1. Introduction

During the worldwide pandemic of COVID-19 (Elflein, 2020), every nation must adapt to a "new normal" in many domains, including education. Due to pandemic-related measures, over a billion pupils (almost 91% of the world's student population) were prevented from attending school as of March 1. (McCarthy, 2020). How can we educate the world's current student population while also battling COVID-19? This is a basic educational difficulty. The most recent reaction seems to be the same in many countries: online education.

During the current pandemic, educational institutions of all levels are scrambling to use different online digital platforms to perform all teaching activities. Teachers appear to perceive COVID-19 as a turning point—a shift from traditional classrooms to fully online or hybrid ones—in spite of the rapid changes and the challenges that have arisen (Li & Lalani, 2020). Of course, there are new challenges that most educational institutions throughout the world have never encountered before. Today's problems have a lot to teach us. With these system and environment considerations in mind, most educators and educational systems are eager to welcome the shift (Dignan, 2020). The opposite side of the coin—the learners—is as crucial to consider in order to improve adaptability. Whether or whether the students think they are ready for online learning is a matter of debate. Do you like to join the 30 million or so students? (UNESCO, 2020).

How students perceive their capacity to learn efficiently online is fascinating. Self-efficacy is a strong predictor of success in conventional learning environments and conditions, according to a recent study (Yang et al., 2019). It's exciting to speculate about how this will

play out in a virtual classroom setting. An individual has self-efficacy when they believe they are capable of completing certain online learning activities (Zheng et al., 2020). Self-efficacy within a certain task or topic is a notion of what a person believes about his or her own abilities, as opposed to what he or she really has (Yang et al., 2019). People who lack self-efficacy or feel they can't achieve in an online learning program are less likely to finish it, say experts in online education The insider claims that not everyone who wants to enroll will (Zheng et al., 2020). Learning management systems (LMSs), academics, computers, and the internet all play a role in building student confidence in their ability to succeed in online courses.

This study will use structural equation modeling to identify "factors that predict adult learners' online learning self-efficacy; (2) investigate whether academic and online learning self-efficacy is mediated by a) Computer Self-Efficacy, b) LMS Self-Efficacy, and, c) Internet and Information Seeking Self-Efficacy; and (3) formulate a statistically significant model." There may be some value in these results, which provide light on how adults' "self-efficacy in online learning" might lead to better academic achievement (in this case, anybody 18 years of age or over) in the future (Goldhagen et al., 2020).

2. Review of Literature

Numerous studies have sought to fill the hole left by the sudden transition to online learning owing to the scarcity of literature since the start of the global spread of the COVID-19 pandemic (UNESCO, 2020). It's been shown in recent research that the pandemic has created technological barriers to online learning, including issues with the availability, use, and competency of technological tools used in online learning. These pedagogical implications suggest that technology plays an increasingly important role in education today (Al-Kurdi et al., 2020; Martins et al., 2019; Wenceslao & Felisa, 2021). Disparities exist in students' confidence in their ability to exploit new technologies to overcome hurdles on their path. Academic self-efficacy may be connected to computer usage, internet access, information searching, and learning management, according to some research. Three of these factors have been associated with online learning self-efficacy in a previous research study (Alghamdi et al., 2020). This question can be better understood if the investigation is framed around these theoretical principles (see Figure 1).

Self-Efficacy is the conviction held by a person that he or she is capable of doing a specific action (Yang et al., 2019). A person's ability to stay motivated, perform effectively, and feel good about themselves are built on this fundamental belief system (Yang et al., 2019). People with poor self-efficacy are more likely to shy away from complex challenges. These duties might be seen as a threat to certain people. In addition, they establish lesser targets and show a lack of dedication to achieving them. They tend to dwell on their insecurities, the repercussions of their failures, and their shortcomings rather than thinking about improving methods. People who are confident in their abilities typically do the exact opposite of what they say they would (Yang et al., 2019). As a result, it has been used to study factors of success in health interventions, engineering education, nursing education, computer-based instruction, and online learning since its introduction (Cameron et al., 2018), as well as in the field of health care (Chan et al., 2020; Hussain et al., 2021) and the field of health care management and administration (Ooi et al., 2018), as well as in the field of health care management and administration and administration and administration (Bergey et al., 2019). Rogala et al. (2020) showed that domain or task-specific self-efficacy measures improve validity and predictive capacity, "i.e., learning a specific skill or subject." Self-efficacy for online learning has been linked to many elements in research studies. A person's digital self-efficacy includes their

ability to communicate over the internet and seek out information online. A system for tracking student progress toward learning outcomes (LMS) Students' self-efficacy is influenced by various factors, including their social networks, online experiences, and access to resources, feedback, and rewards (Zhu, 2019).

"General Academic Self-Efficacy (GASE)" student evaluations on their teaching performance (Yang et al., 2019). "GASE also includes self-regulated learning, which enables students to organize, control, and assess the execution of tasks, activities, and the development of learning products (Newman et al., 2019)." GASE has been the subject of comprehensive research (Rogala et al., 2020). "Students' GASE has already been shown to have a beneficial impact on their academic performance, motivation, and views of the usefulness of internet or online learning systems (Kuo et al., 2021; Vanslambrouck et al., 2019; Wang et al., 2020; Zhang et al., 2018), among others (Rogala et al., 2020)."

"Online Learning Self-Efficacy (OLSE)" An online, technological environment may be described by first stating (Yang et al., 2019) concept in education. "Choices of activities, effort invested, perseverance, interests, and successes" (Newman et al., 2019) will dictate the learners' "usage of self-regulatory processes" in the context of education (Kitsantas et al., 2019). As described by (Pradhan et al., 2020), the concept of technical self-efficacy may be used in conjunction with this. Consequently, "Online Learning Self-Efficacy is defined as a learner's conviction in the ability to create desirable behaviors that contribute to a desired educational outcome in and via an online, technological environment. This is defined as a person's conviction in their capacity to accomplish complicated technical tasks (Hayashi et al., 2020; List, 2019; Peechapol et al., 2018; Vanslambrouck et al., 2019; Zhu, 2019).

"Computer Use Self-Efficacy (CUSE)" many technical instruments may be used for various purposes; can one's confidence be based on these tools' limited, self-initiated use for more sophisticated activities, "e.g., starting a program or printing a file" (Alghamdi et al., 2020). Higher levels of computer self-efficacy, as defined by (Yang et al., 2019), are associated with greater student involvement in and performance on educational tasks (Cerezo et al., 2019). An increase in CUSE is associated with a reduction in computer anxiety (Azevedo & Gasevic, 2019; Chang et al., 2019; Tams et al., 2018). This, in turn, has a beneficial effect on academic achievement (Duchatelet et al., 2021; Li et al., 2021; Schlebusch, 2018). Learning intentions to utilize digital technology is also greatly influenced by CUSE (Ferdousi, 2019). Computers may enhance conventional learning methods and fill in information gaps, allowing students to become more self-sufficient in their learning (Lacka et al., 2021).

Task-specific constructs such as the Internet and Information-Seeking Self-Efficacy (IISE) have also been linked to online learning (Alghamdi et al., 2020). Two different studies (Aharony & Gazit, 2020) found that IISE significantly impacted overall educational results. (Aharony & Gazit, 2020) went on to say that IISE was more important than any other component for a successful information-seeking activity (e.g., procedural knowledge, system features).

"Learning Management System (LMS) Self-Efficacy (LMSSE)," e-learner satisfaction may be influenced by self-assessment of one's ability to use an LMS (Thongsri et al., 2020). An additional task-specific self-efficacy construct, LMSSE, was also found by Alghamdi et al. (2020), "although it has no beneficial impact on online learners, only on hybrid learners." On the other hand, researchers have examined its significance as a predictor of student outcomes. As a result, there are fewer LMS-related barriers, "as it is postulated to be more crucial to the

outcome than actual online participation" (Zheng et al., 2018). Because of this, according to (Yang et al., 2019), a student may finish the course on an LMS.
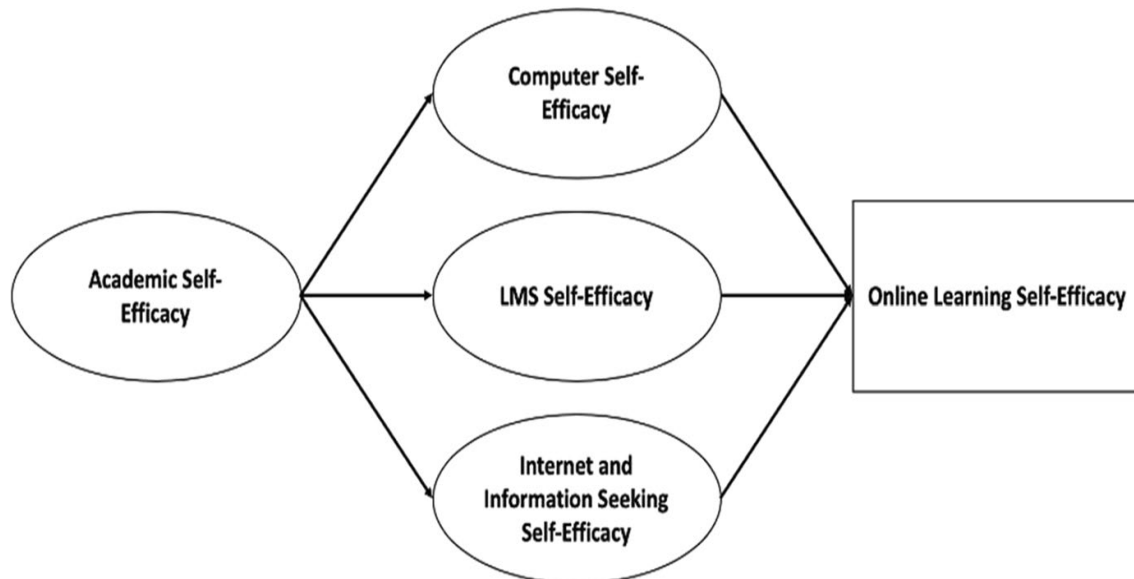

Figure 1. *How aspects affecting "adult learners' self-efficacy in online learning" might be shown conceptually*

3. Research Objectives

For this purpose, the study used structural equation modeling:

- Identify the level of self-efficacy of adult learners using the five self-efficacy measures

- Examine the characteristics that determine the self-efficacy of adult learners in online education.

- Examine the impact "on online learning self-efficacy of a) computer self-efficacy, b) LMS self-efficacy, and c) internet and information-seeking self-efficacy."

- Using structural equation modeling, develop a model with statistical significance.

4. Methods

4.1 Design

In order to evaluate the envisaged model and the connections between computer-, LMS-, general academic-, internet-and information-seeking self-efficacy, and online learning self-efficacy, an analytic survey approach was utilized.

4.2 Sample and Setting

Conducted in this study is a computer-based statistical power study (Marino, 2018). According to the calculation, with four predictors, a 0.96 alpha and an effect size of 0.86 (small to medium), the needed sample size was 225 people. A non-randomized convenience sampling process was used. Snowball sampling was used to find participants for a research survey by extending an invitation. According to the inclusion criteria, the research was only open to adult learners fluent in English and above 20 (based on definitions in Goldhagen et al., 2020).

Table 1. *Socioeconomic Status of Participants*

"Variable"	N=345	%
"Age (x̄±SD)"	"28.23±9.92"	
"Sex"		
"Female"	205	59.42
"Male"	140	40.58
"Occupation"		
"Full-time Student"	165	47.82
"Employed for wages"	153	44.34
"Self Employed"	10	2.90
"Out of work and looking for work"	10	2.90
"Out of work but not currently looking for work"	3	0.87
"Retired"	2	0.58
"A homemaker"	2	0.58
"Monthly Household income"		
"Under 40,000"	176	51.01
"40,000-59,000"	67	19.42
"60,000-99,999"	59	17.10
"100,000-249,000"	27	7.83
"250,000 and over"	16	4.64
"Ever studied via online or blended learning provided by a formal school or university"		
"Yes"	225	65.22
"NO"	120	34.78

"Note: *1 US dollar = 52.48 Philippine Pesos"

The study gathered 345 people to participate in the research, and the demographics are displayed in Table 1. Sampled adult learners were 28.33 (SD=8.81) years old, with 59.42 percent being female, 47.82 percent being full-time students or working for salaries, and having a monthly household income of less than 40,000 Philippine Pesos (PHP 40,000) monthly (51.01 percent). The vast majority of the adult learners in this study had studied in official educational institutions through online or hybrid learning.

4.3 Instrument

"The Demographics Participants' age, educational background, socioeconomic status, past online education experience, LMS usage, and Massive Open Online Courses (MOOCs) were obtained in the instrument's first section."

"General Academic Self-Efficacy (GASE) was assessed with a Rasch-tested inventory of four items (Nielsen et al., 2018), the GASE short form's dependability was acceptable for a wide range of pupils compared to Rasch measurement models, even though the scale only contains four items (Nielsen et al., 2018), accordingly, the researcher asked participants to assess themselves on a 5-point Likert scale" ranging from "strongly disagree" to "strongly agreed."

Computer Use Self-Efficacy (CUSE) This person's dependability (alpha =.98) was evaluated by administering a thirty-item assessment they developed in 2002. (Duchatelet et al., 2021). The CUSE employs a "six-point Likert scale spanning from strongly disagree to agree, with a score of one to six strongly." Items 3, 4, 5, 7, 10, 13, 14, 15, 17, 19, 21, 22, 23, 25, 26, 28, and 30 are all negatively expressed; "hence their scores will be reversed prior to analysis,

and the rectified scores will be summed." More favorable self-efficacy perceptions about computer usage are associated with better overall scores (Duchatelet et al., 2021).

"Learning Management System Self-Efficacy (LMSSE) As part of a 25-item survey, there are four subscales: 1) Information access; 2) Posting; 3) File management; and 4) Advanced features." When taking the survey, participants were given a four-point Likert-scale rating of how confident they were in each question. This instrument's dependability score was 93 percent (Thongsri et al., 2020). Learning management systems with a higher LMSSE score have better self-efficacy.

Information Seeking and Manipulation Self-Efficacy Scale (IISE) Information seeking and manipulation will be measured using an eight-item inventory with two subscales. The researcher used a five-point Likert scale to ask participants to assess the questions on the survey, ranging from strongly disagree to strongly agree" (Naveed & Mahmood, 2021).

"Online Learning Self-Efficacy Scale (OLSES)" There are 25 items in the OLSES (Zheng et al., 2020) "divided into five subscales, learning in an online setting (10 items; alpha =.90), time management (5 items; alpha =.87) and technology usage (10 items; alpha =.86)." Online learning self-efficacy was rated on a "6-point Likert scale, with one being the worst and six being the best, ranging from one being the worst and six to the best (Zheng et al., 2020), there was no significant difference between groups of students from varied backgrounds with and without online learning experience during the scale construction, calculated reliability coefficients for the examined self-efficacy measures are shown in Table 1 of this research."

The Likert scales for each variable varied since they were derived from separate investigations. A separate area on the form was created to isolate each scale in case of any misunderstanding. There is some evidence to support the notion that there might be biases in the Likert scale, such as responses based on social desirability (Kwak et al., 2021) or even compliant responses (Kreitchmann et al., 2019), "as discussed in even if the present move to online learning has yet to have a considerable impact on what is socially acceptable in the current scenario, it is suggested that prejudice may be overlooked."

4.4 Data Procedure

Suppose a person is using Google Drive's services. In that case, he/she has access to Google Forms, a free application that enables the person to gather data from internet users by publishing and emailing them a customized survey. The researcher utilized "Google Forms," a free online application. Before doing statistical analysis, the researcher verified for missing data. The linked Google Spreadsheet was then transferred to an MS Excel document.

4.5 Data Analysis

In order to do statistical analysis on the sample, Microsoft Excel was used to calculate the mean and %. "Structural equation modeling (SEM) was used to analyze the impact of academic self-efficacy on computer self-efficacy, internet, information-seeking self-efficacy, and LMS self-efficacy to verify the conceptual model's validity." Additionally, the impact of self-efficacy in computer use, internet use, finding information, and a learning management system (LMS) on student confidence in online learning was examined using structural equation modeling (SEM). Second, Warp PLS from Script Warp Systems was used to do structural equation modeling. Modeling using partial least squares and structural equations was used for exploratory and predictive purposes (Maziriri & Madinga, 2018). P-values of 0.05 were utilized to determine the significance of the findings.

Table 2. *Self-efficacy scales "reliability coefficients" computed (n=345)*

	GASE	CUSE	LMS	ILSE	OLSEN
"Composite Reliability"	0.926	0.950	0.970	0.934	0.982
"Cronbach's Alpha"	0.892	0.944	0.968	0.919	0.981

4.6 Ethical Considerations

Respecting and protecting participants' rights to full transparency, non-maleficence, and privacy were top priorities for this study. A cover letter explaining the study's goals, procedures, participants' roles, and the researcher's responsibilities was given to each participant. This letter also explained how participants could opt out of the study and avoid being subjected to any form of bias or discrimination. Before administering the questionnaire, the researcher answered any queries the participants had and obtained their freely signed informed permission. The University's Institutional Review Board permitted us once the researcher obtained ethical clearance.

5. Results

Table 3. *Average total score of each self-efficacy scale*

"Self-Efficacy Scales"	Average total score ± SD
"General Academic Self-Efficacy (GASE)"	16.77±3.32
"Computer Use Self-Efficacy (CUSE)"	128.46±25.67
"Learning Management System Self-Efficacy (LMS)"	67.66±16.76
"Information and Internet Self-Efficacy (IISE)"	32.18±6.08
"Online Learning Self-Efficacy (OLSE)"	92.98±25.48

Note: "GASE (Highest Possible Score [HPS]: 20), CUSE (HPS: 180), LMSSE (HPS: 96), IISE (HPS: 40), OLSE (HPS: 132)"

Adult learners' average total scores on the five self-efficacy measures are shown in Table 3. The overall "academic self-efficacy measure and the information and internet self-efficacy scale had high average total scores. Computer usage self-efficacy is relatively high among adult learners. Learning management self-efficacy is also somewhat high.

Table 4. *"Each of the Self-Efficacy Scales has an average total score"*

	β	SE	P-value	f2
"GASE > CUSE"	0.45	0.05	< .01	0.20
"GASE > LMSSE"	0.31	0.05	< .01	0.10
"GASE > IISE"	0.42	0.05	< .01	0.18

"Note: β=Path Coefficient, SE=Standard Error, Cohen's f^2=effect size."

Table 4 shows that general academic self-efficacy influences computer usage, learning management and information, and internet self-efficacy.

Table 5. *"CUSE, LMSSE, and IISE all impact the OLSE of a sample of Adult Learners"* *(n=345)*

	β	SE	P-value	f2
"CUSE > OLSE"	0.19	0.05	< .01	0.12
"LMSSE > OLSE"	0.47	0.05	< .01	0.36
"IISE > OLSE"	0.32	0.05	< .01	0.22

"Note: β=Path Coefficient, SE=Standard Error, Cohen's f^2=effect size."

There are direct correlations between computer use self-efficacy, learning management self-efficacy, and informational self-efficacy on online learning self-efficacy, as shown in Table 5.

According to a final model that tested two assessment approaches, "self-efficacy in using computers, learning management, and the internet had statistically significant positive effects on overall academic self-efficacy (β=0.45). These three self-efficacy traits have a statistically significant influence on online learning self-efficacy. Findings reveal a statistically significant positive correlation between computer usage self-efficacy and online learning self-efficacy (β=0.19)." First, "learning management system self-efficacy was shown to have a statistically significant influence on online learning self-efficacy (β=0.47), a statistically significant positive predictor of online learning self-efficacy was also found to be information and internet self-efficacy" (=0.32).

"The modeling results show a positive predictive association (β = 0.45; p=0.01) between the GASE and the CUSE, the LMS, and the IISE (β = 0.31; p=0.01)." In addition, OLSES was shown to be positively predicted by CUSE (p=0.01), LMSSE (p=0.01), and IISE (p=0.02). "As seen in Figure 2, the final model for predicting online learning self-efficacy includes the correlations and path coefficients shown."

Fit of the final measurement model was satisfactory (Average path coefficient [APC] = 0.351, p0.001; Average R-squared [ARS]= 0.282, P0.001; Average adjusted R-squared [AARS]= 0.279, P0.001; Average block VIF [AVIF]= 1.833; Average full collinearity VIF [AFVIF]= 2.258; Tenenhaus Goodness of Fit [GoF]=0.415). 68% of the variation in online learning self-efficacy can be accounted for by the model.
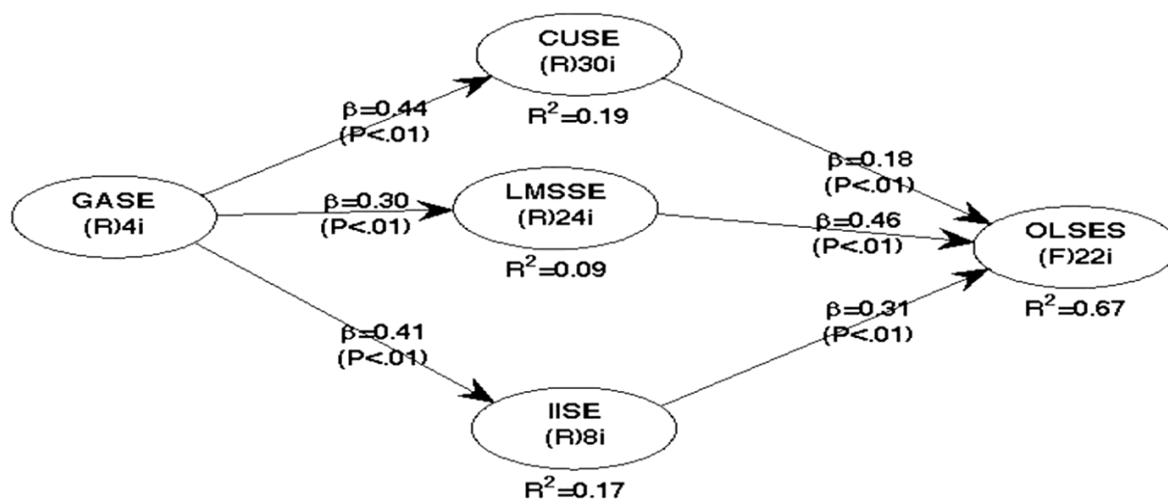

Figure 2. *"Online Learning Self-Efficacy Model the Final Prediction Tool"*

6. Discussion

This research aimed to determine what elements predicted adult learners' self-efficacy in online learning, the researcher conducted a literature study to determine how academic self-efficacy affects computer self-efficacy, LMS self-efficacy, and internet and information-seeking self-efficacy. The study next looked at how these interactions could affect online learning self-efficacy. The researcher developed a model that accurately predicts Adult Learners' self-efficacy in online education through structural equation modeling. It was aimed to determine what elements predicted adult learners' self-efficacy in online learning. The

researcher conducted a literature study to determine how academic self-efficacy affects computer self-efficacy, LMS self-efficacy, and internet and information-seeking self-efficacy. This research next looked at how these interactions could affect "online learning self-efficacy." The researcher developed a model that accurately predicts Adult Learners' self-efficacy in online education through structural equation modeling.

Additionally, LMSSE is a strong predictor of OLSE. It is the most accurate of the three. All learners nowadays, regardless of demographics, have a working knowledge of computers and equivalent devices and can "google" any subject easily. However, not all students have used a learning management system (LMS), and not all skills learned in one LMS can be used in another. This is in addition to the fact that LMSES hosts the most current learning systems. As a result, LMSSE may be a better predictor than either CSE or IISE. Finally, IISE is the second-best predictor of OLSE after just a small sample size "put out previous work for IISE that expands on the prior work laid out for IISE (Aharony & Gazit, 2020; Alquarashi 2016; List, 2019). Since online materials are so prevalent, this might result from how professors and students in online courses utilize them. Adult learners who are adept at using the internet to get accurate and relevant information are expected to get the most out of online learning experiences.

Using this approach, the researcher has been able to quantify how GASE is linked to CSE, LMSSE, and IISE in terms of their positive predictive value. Academic self-efficacy has been shown to impact online learning activities, as shown by previous research (List, 2019; Neilsen et al., 2018). These linkages may be attributed to the belief that was utilizing computers, LMS, and the internet for information searching are required duties in the online educational environment. Adult online learners' OLSE scores are predicted by CSE, LMSSE, and IISE scores. These connections show that Alquar-Rashi (2016) drew people together. Online learning may be affected by the predicted relationship between computers, LMS, and internet information searching. Computers, learning management systems (LMS), and internet-based research may all be seen by online students as tools for achieving a common goal: education. "Overall, the model closes the literature gap by giving empirical proof on previously solely hypothesized linkages and offers a theoretical basis for developing OLSE by increasing CUSE and/or IISE and/or LMS." (Alghamdi et al., 2020). If students' self-efficacy in online learning is less than ideal, the model might help instructors discover viable mediation pathways for their specific use cases. "A high level of self-efficacy, as stated by (Yang et al., 2019), leads to more outstanding goal commitment to the task at hand, which makes the model useful for interventions on several technology-related online learning impediments" (Abuhammad, 2020; Al-Kurdi et al., 2020; Babbar & Gupta, 2021; Martins et al., 2019; Wenceslao & Felisa, 2021).

The study's limitations need to be acknowledged to keep things in perspective. The research findings cannot examine cause-and-effect correlation since it is cross-sectional and non-experimental. As a result, future research must adopt experimental designs in a prospective, serial, or long-term time frame. Despite having a large enough sample to be statistically significant, the study's generalizability was compromised by the ease with which the volunteers were recruited from all across the country. However, the survey was primarily performed through online means may have decreased this bias while simultaneously disenfranchising other participants. Researchers may examine how the model relates to real academic achievement in the future. Research is still needed on the impacts of structural and environmental elements, such as computer usage, information searching, learning management systems (LMS), and self-efficacies in online learning. The present generation of students is less likely to be acquainted with an LMS in general and less with the specific LMS that a particular

school utilizes. It is recommended that educators apply the model to enhance OLSE by educating learners about computer usage, information-seeking through the internet, and a complete overview of the LMS used before exposing them to online learning, as shown by the correlations." Because LMSSE is the most significant "contributor to OLSE in this model," it is advised that you concentrate on the walkthrough above.

7. Conclusion

GASE's link to "CUSE, IISE, and LMSSE, and CUSE, IISE, and LMSSE's relationship to OLSE were previously only theoretically suggested." Focusing on CUSE, IISE, and LMSSE rather than just OLSE, this study adds to the existing body of knowledge on how to help students improve their OLSE scores. The goal of this study was to help the country's educational sector better grasp the factors contributing to students' perceptions of their online learning effectiveness. It is concluded that greater academic self-efficacy positively predicted computer usage, information searching, and the use of an LMS. Online learning self-efficacy was most strongly predicted by LMS self-efficacy, followed by information seeking and computer usage self-efficacy. The findings show that the factors were statistically significant predictors of self-efficacy in online learning. PLS-capacity SEMs to assess relationships of complicated conceptual models are shown by the model's ability to predict OLSES with a statistically significant effect size. Academic administrators, curriculum experts, educators, and policymakers are encouraged to use this model as a guide to help students develop their online learning self-efficacy. With the current COVID-19 pandemic, this model may be utilized at the national or worldwide level to analyze online learning as a springboard for enhancement, particularly when the global adoption of online learning has significantly been opened up. Educational leaders may increase "online learning self-efficacy by boosting computer usage, learning management systems, and internet and information-seeking self-efficacy." Adult learners' perceptions of their potential to succeed in online learning may be significantly swayed by the interdependence of "these three additional domain-specific self-efficacies (Kasapoğlu, 2020)." It is possible to expand the scope of online and remote education research and practice by enhancing adult learners' online learning self-efficacy.

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