Investigating the effect of online testing anxiety on learners' self-efficacy and the moderating role of coping strategies

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ABSTRACT

Online testing is one of the most worrying problems for learners for unforeseen reasons. This research aimed to investigate the influence of online anxiety on self-efficacy under the moderating effect of coping in private universities in Vietnam. The study used a random survey method to survey 344 students in eleven universities in Ho Chi Minh city This study uses a convenience sampling method. The results showed that online anxiety had a positive effect on self-efficiency, coping had a positive effect on self-efficiency, and coping had a moderator in this relationship. Research results contribute to the theoretical basis of the relationship between online anxiety, coping, and self-efficiency.

1. Introduction

Education has an important role in any nation and it is also a major investment in human capital development as well as plays a critical role in long-term productivity and growth at both micro and macro level (Kingdom et al, 2013). Moreover, education is the basic demand of society according to Mohanthy (2000), so a better education system will improve the social, scientific, and technological development in the country. And the country's production of human capital is belonging to the quality of education which is provided in the country (Zakira, 2021). Therefore, it is confirmed that there is an impact each other between education and other factors such as social, demands of human life, and country development. The changes in society also impact the demand for education training, programs as well as outcome standards.

The form and method of education training are important factors to evaluate outcome production. Due to technical problems and the quality of online training, it has not been appreciated and concerned by society before. On April 1, 2020, Vietnam announced the decision to do nationwide social distancing to prevent the spread of the Corona-19 virus. In which the pandemic brought many challenges to the education and training system in Vietnam (Nguyen, 2022). The solution for this situation is that e-learning was applied on a large scale in the country (Yahya et al., 2021). The schools in general, and the universities in particular tried to prepare the facilities for applying e-learning in the process of education training. E-learning impacts many sectors of education training including self-efficacy.

According to Bandura (1997), self-efficacy

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was the belief in their capabilities to organize and execute the required actions required to produce particular consequences. On the online platform, self-efficacy meets many difficulties so it is affected by some factors including testing online. Through the pandemic of Corona-19, testing online was a concern for universities. It was considered a situational solution in the context of society affected by the pandemic. The quality of the result in testing online should be discussed and appreciated more. However, we could not deny its value and usefulness in applying to tests online.

Testing has a crucial role in the evaluation of the quality and capacity of learners. Another way is testing effects on the rate of self-efficacy. According to Chapell et al (2005), anxiety in an exam was mentioned as a type of trait anxiety that is situational. The tension of testing was always the thing which students meet including anxiety in the process of training, especially testing is the anxiety situation students need to solve. Furthermore, decisions regarding online exams often made learners nervous (Joshi et al, 2020).

Although previous studies have shown a link between anxiety, coping strategies, and self-efficacy (Yan et al., 2021); (Arora et al., 2021); (Morales & Pérez-Mármol, 2019). However, these studies were conducted before the Covid-19 pandemic occurred or during the pandemic period, studies, when the pandemic was under control, have not been widely published. Infrastructure conditions of universities and learners' self-equipment of e-learning devices vary widely between these periods. Therefore, the above relationship may be different. In Vietnam, this is even more evident, before the pandemic happened, universities did not pay much attention to the e-learning system. When the pandemic broke out, universities began to spend large investments on online training (Van et al., 2021). Once the pandemic was under control, universities also put more emphasis on online training (Maheshwari, 2021). Therefore, this topic needs more research, especially in developing countries, where education is an essential foundation for economic and social development.

The goal of this study was to find out what effect online testing has had on self-efficacy in the e-learning context under the moderator role of coping. This meant the research will concentrate on evaluating the effect of testing online on self-efficacy

and the moderator role of coping for the relationship. In private universities in Vietnam, online anxiety had a positive effect on self-efficiency, coping had a positive effect on self-efficiency, and coping showed its positive role in boosting self-efficiency. Then, the research also proposed solutions to help educational stakeholders design strategies as well as plan in applying online testing.

2. Literature review

2.1. Coping theory

The coping theory holds that coping, also known as a psychological defense, refers to viewing people's functioning in terms of mental, and behavioral abnormalities. More recently, this theory has also been used to study beneficial coping strategies (Krohne, 2002).

Coping theory suggested that to deal with problems two strategies can be used. The first strategy is characteristic versus state-oriented, and the second is a micro-analytic versus macro-analytic approach. The first strategy is to identify individuals early with the resources and tendencies to deal with a particular person. Early identification of these people will help establish a successful response plan. The second strategy focuses on many specific coping strategies to develop a joint response plan. In theory, these two coping strategies are linked. The use of these strategies is primarily intended to minimize the probability of unforeseen occurrences of uncertain events (Krohne, 2002).

Recent research showed that a positive coping strategy can help students deal with problems more effectively and help reduce stress (Pei Zhao et al., 2015). When the Covid 19 pandemic occurred in all countries, e-learning was considered one of the effective solutions to not disrupt learning. During this period, the research results of Yan et al. (2021) showed that negative coping strategies led to higher psychological stress and decreased academic performance. The same study claims that positive coping is beneficial for medical students when testing online (Pei Zhao et al., 2015). Research by Cofini et al. (2022) showed that e-learning satisfaction was positively and significantly associated with active coping.

2.3. Theories of self-efficacy

The theory assumes that an individual's sense of control will change their behavior (Conner & Norman, 2006). People will be determined to do a problem if they figure out how to solve it and try to do it. Determination, feeling, and thinking make a difference in self-efficacy Bandura (1977). Self-efficacy was weaker when they felt depressed, anxious, and helpless. Better social inclusion improves self-efficacy (Conner & Norman, 2006). Previous studies use this theory to explain behavior of leaners in education (Skaalvik, 2018); (Arora et al., 2021). This theory was used in research for many different areas such as the study of academic performance, mental and physical health, career choice, politics, and society. This is the fundamental basis of psychology, education, and health (Conner & Norman, 2006).

Cognitive Theory in e-learning argues that good competencies facilitate cognitive processes and performance in different learning environments (Bandura, 1977). Researchers recommend using images and sound to convey nonverbal and linguistic information to learners (Mayer & Moreno, 1996); (Chandler & Sweller, 1991); (Conner & Norman, 2006). Interaction in e-learning was very important, a highly interactive learning environment will promote the process of perceiving and absorbing new knowledge. Therefore, the cognitive aspect was extremely important in creating efficiency (Chandler & Sweller, 1991), this has also been demonstrated in the study of Kalyuga (2007). Cognitive in the exam will made a difference in effectiveness because then learners will be aware of difficulties and have appropriate coping strategies (Arora et al., 2021).

Self-efficacy theory was developed based on Cognitive Theory in the relationship between people, behavior, and environment. This theory assumes that these relationships are reciprocal. This interaction depends on the situation and may change over time (Shapiro, 2018). This theory had two main components: expectations of self-efficacy and expectations of results. The expectation of self-efficacy was the ability to complete a certain task. Result expectations represent what will happen if the task was done successfully (Bandura, 1977). When tasks are ordered by difficulty, performance expectations may be limited to simple, moderate, and difficult tasks. Expected results were also different.

Self-efficacy had been proven to be one of the important factors for good academic achievement

in the traditional form of learning. However, this result was not clear in the form of online learning (Jashapara & Tai, 2011). With support from the internet and other technologies, self-efficiency increases naturally. Some studies suggest that to increase the effectiveness of self-study, online courses need to be designed towards the experience, increasing the effectiveness of the software and the design of the support system. In addition, teaching activities need to be adjusted accordingly (Jashapara & Tai, 2011).

2.4. Anxiety

Online testing had advantages as well as disadvantages. Which, anxiety was one of the things we should notice when talking about the problem of testing in general, and online testing in detail. According to Freud (1936), anxiety was a common problem associated with certain neurological disorders. Moreover, that was also considered as the feelings of tension, fear, and apprehension (Simple et al., 2020). In general, the persons who prepare to take part in the exam always got nervous cause of their worries about the result, the knowledge they get in their minds for the test or the questions for the exam, and even their fortune. It is easy to sympathy that phenomenon. On the other hand, new behaviors can be generated from threats that lead to anxiety (Watson, 1920).

In this research, the anxiety of students could be found from two aspects. They are the anxiety from the online testing and other factors which affect the psychology of students. The following research will concentrate to illustrate to clarify what anxiety is and what affects its results.

2.4.1. Online exam anxiety

Nowadays, the perspective of online exams is not new all over the world. People used the virtual platform for online learning, electronic assessment, learning, and examining (Karthika, 2019). Besides the benefits of the online exam as cost and time effectiveness, it also had the disadvantages like security, equality in testing, and requirement of instruments (Stowel, 2010). In recent years, online testing became more useful and popular, especially with the break of the Coronavirus pandemic according to Zagury-Orly (2020). This kind of testing could be seen as the best

solution for a situation in which everyone must stay at home or live in a rule distant society. In online testing, it was easy to confirm the normal anxiety of students for exams besides the special things that could create further anxiety for them. According to Guzbuz et al. (2021), they may have problems when focusing on the testing as the place they got the exam or communication on the exam is different from traditional testing such as the communication with supervisors. Furthermore, students felt isolated and it is easy to think that the testing process is out of the control of the school so they had the psychology of neglect. Sometimes, the anxiety also came from the characteristic of online testing. In general, when setting the questions for online testing, lecturers will give the open test. It means the questions will belong to the open question; students could use the materials they have. These will be more difficult than questions of a close exam.

2.4.2. The anxiety of support system

To organize the exam, many things are supported. Everything will play an important role in the process of testing, especially online testing. Therefore, these also made the anxiety for students in the exam. First of all, during the preparation process for online testing, students could meet problems with checking course materials/documents, the internet system, not concentrating on an exam, or insufficient information (Guzbuz et al., 2021). For the internet system, sometimes, it is difficult to ensure as students could not control it. Next is checking whether the technological tool used in the test will be good or not. Moreover, it is very important to use the software, and hardware fluently and control the society around them before testing. These create anxiety because students want everything must be good to ensure not any problems happen during the exam, besides they want to check those for more comfortable (Bozpolat et al., 2018). These do not accept the chance of happening the error of software/hardware while students could not control anytime it will occur during the exam. At that time, the support system of the school will advise them to fix the error, but it made more time and waste the time of testing. Sometimes, the support is not in time, so creates anxiety before the exam.

And last but not least is the lack of information about the test. As the online exam is following after the online course. So normally, the students are often ignoring some information in the process of training. Therefore, the result is that they do not have enough information for the test. So they worry about which question or chapter will be included in the exam (Guzbuz et al., 2021). In general, there is the state that both male and female students have high levels of testing anxiety which female ones having a higher level than male students (Isra et al., 2020).

2.4.3. Self-efficacy

Self–efficacy has defined as the belief in one's capabilities to set up and conduct the requisite actions which ask to produce particular results (Bandura, 1997). The more beliefs about self-efficacy the more level of motivation increases. It also confirms that there was a relationship between self-efficacy with performance. According to Bandura (1997), there were four sources of self-efficacy. They were mastery experiences which are the previous successful completion of a similar action; vicarious experiences give us the one's peer complete an activity successfully. Moreover, verbal persuasion and emotional state are the best ones. Verbal persuasion was the confirmation from the successful persons while the emotional state is the way that interprets and responds to feelings of tension. Roick and Rineisen (2017) found that self-efficacy positively affects students' exam anxiety levels and academic performance.

On the other hand, according to Francisco et al. (2019), general perceived self-efficacy was statistically involved in state and trait anxiety. So all the variance in self-efficacy, just 39% was predicted by a model including anxiety, problem-solving emotion expression, social withdrawal, and emotional identity. Besides, they also expressed that there is an association between three factors in which increased anxiety reduces self-efficacy. It means a higher level of anxiety would lower levels of self-efficacy.

2.4.4. Coping strategy

In terms of coping strategies, self-efficacy was determined to be influenced by problem-solving ability, emotional expression, and cognition (Francisco et al., 2019). Coping was defined as a process that describes how a person detects, appraises, deals with, and learns from stressful feelings (Simple

et al., 2020). As simply thinking, coping strategies were a collection of possible responses to tense positions. These illustrate that, when students got the anxiety or problem, how they could respond or react to the situation, is called coping strategies. Therefore, it is different for everyone. It is belonging to characteristics, the context of tension, environment, or the outside which impact to person who had their coping strategy. And differences in students' target orientations will create coping strategies according to Einar (2018).

In another word, as Maya and her colleagues (2021), coping strategies include three factors. First of all, problem-focused coping was a coping strategy that concentrates on the problems encountered, planning steps to find out the solution, and making an impact to control the situation carefully. Next was emotion-focused coping which is a coping strategy that considers dealing with emotions arising as the problem. In this situation, sometimes, we must accept shortcomings, direct, etc… or even release emotions to develop ourselves, improve circumstances to deal with the problem in an emergency, and avoid the same position in the future. And the last one was seeking social support which is a form of coping strategy by looking for social support from persons around him, looking for information from his relatives, and asking for emotional support and ideas from them as well.

2.4.5. Anxiety, coping, and self-efficacy in online exams

Coping was an important factor in reducing stress, reducing negative outcomes, and increasing the effectiveness of online learning. Problem-focused coping responses could lessen the negative effects of stress, leading to more positive outcomes (Gustems-Carnicer et al., 2019). The anxiety related to exams was more obvious because learners were stressed and do not the content of the questions they will be asked, coping strategies in this case will help learners reduce stress, then the efficiency achieved will be improved (Vigneau et al., 2015).

Hypothesis 1. Coping has a positive effect on self-efficacy in online exam

To explore the relationship between anxiety, coping strategies, and the moderator role of self-efficacy, Morales & Pérez-Mármol (2019) conducted a study with a sample of university students in Spain. The results showed that overall self-perception performance was associated with anxiety. This could be explained because self-efficacy is closely tied to the way students feel, think, and act. High levels of anxiety could be a risk factor for perceived self-efficacy (Hendy et al., 2014). Self-efficacy was predicted by anxiety characteristics, problem-solving, and moderator relationships identified in the study by Morales & Pérez-Mármol (2019). The research on this relationship in online exams during the pandemic has found that an increase in anxiety leads to a decrease in self-efficacy (Rizun & Strzelecki, 2020); (Arora et al., 2021).

Hypothesis 2. Anxiety has a positive effect on self-efficacy in online exam

When learners worry about taking the exam online as this type of testing does not anticipate possible difficulties, they have coping strategies. Coping strategies helped improve this effectiveness (Arora et al., 2021). Learners' coping strategies had two tendencies including positive coping and negative coping (Krohne, 2002). When anxiety leads to stress, learners can choose negative coping strategies. There were cases where anxiety increases but learners have a strategy of not needing to cope (Skaalvik, 2018). However, the research of Cofini
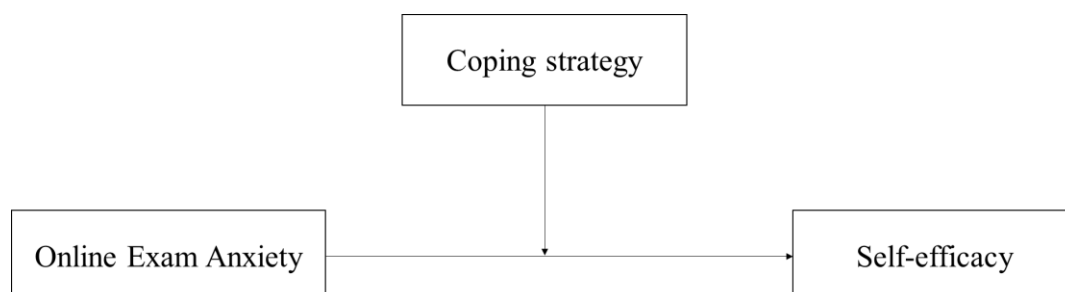

Figure 1. The research model

et al. (2022) showed this relationship when study 471 learners from Italian University a year after the COVID-19 pandemic began.

Hypothesis 3. coping moderates the effect of anxiety on self-efficacy

3. Research method

This research is aimed to investigate the effect of online exam anxiety on self–efficacy under the moderator role of coping. To achieve this goal, the study surveyed students studying at private universities.

3.1. Research setting

The research surveyed students studying at private universities in Ho Chi Minh City. These universities have a level of infrastructure investment that depends mainly on the policies of the investors. Survey samples were taken from universities including eleven private universities in Ho Chi Minh city. The research choose a group of private universities for two reasons: First, the majority of students in these schools have lower input quality than that of public universities; Second, private universities operate with the goal of training but also to make profits. The study wants to identify the effect of online exam anxiety on self-efficacy under the moderator role of coping, thereby recommending solutions for investors.

The survey subjects were asked questions related to three main contents. The first content was questions related to online exam anxiety. The second content was the questions related to coping strategies. The third content was questions related to self-efficacy.

3.2. Data collection and data analysis

The survey was translated from English to Vietnamese by the authors, in consultation with language experts to ensure that the meaning of the questions was not changed. Before surveying the target students, the researchers performed a pre-test with the number of 15 students from UEF and Hutech university. The purpose of piloting was to edit the survey so that the survey does not have problems such as unclear meaning, or other problems related to words, sentences, and ideas...

The survey was conducted in two forms. The first form was a survey via Google Forms. The second form was to distribute survey questionnaires at universities. Surveyed students were second-year students and above. The number of respondents from the Google Form survey obtained was 250. The number of survey questionnaires distributed at universities was 100, and the number of respondents was 94. Thus, the total number of responses from the survey was 344. The number of second-year students responding accounted for 30%, the number of third-year students responding accounted for 39%, and the number of final-year students responding accounted for 31%. Which, the number of male students accounted for 47%, and the number of female students accounted for 53%. The number of students is relatively equal at all levels (Table 1).

In the studies of Yan et al. (2021); Arora et al. (2021), the authors used "Partial Least Square – Structural Equation Modeling" (PLS-SEM) to process the data. This study has similarities with previous studies, so it will also use PLS-SEM for processing. This method is often used to study data with small sample sizes and is used for exploratory studies. According to Hair et al. (2012), the sample size should be at least 10 times the path. The sample size for this study was 344, which met the minimum requirement.

3.3. Measure of constructs

Table 1. Descriptive statistics

Characteristic	Value	Frequency	Ratio (%)
Gender	Male	162	47
	Female	182	53
Age	1st year	69	20
	2nd year	86	25
	3rd year	107	31
	4th year	82	24

Table 2. Questionnaire and their sources

Online Exam Anxiety (OEA): [Source: (Arora et al., 2021)	
OEA1	The unpredictable problems of the online test format worry me.
OEA2	The possibility of not being able to complete the test on time worries me.
OEA3	The possibility of not being able to access the exam worries me.
OEA4	I'm afraid I may not be able to submit my answers in time.
OEA5	I'm afraid of technical failures such as weak internet speed.
OEA6	I don't feel comfortable submitting the online exam.
OEA7	I am concerned about the fairness of the online testing format.
OEA8	I'm afraid I might not do well due to the stress of the online exam.
OEA9	I'm afraid of online supervision.
Coping strategy (COS) [Source:] (Friedel et al., 2007)	
COS1	I considered what was wrong with my approach.
COS3	I promise to try to do better in the future.
COS4	I think it was the lecturer's fault.
COS5	I thought that the lecturer did not teach the entire content of the exam.
COS6	I was angry with the lecturer.
COS7	I thought it wasn't a problem.
COS8	I thought it didn't matter.
COS9	I felt terrible about this.
Self-efficacy (SEF) : [Source: (Lewis, 1999)]	
SEF1	I will master online exam skills in the future.
SEF2	When I try, I do the hardest exercises.
SEF3	If I don't give up, I will do most of the online exams.
SEF4	I did all the online tests, even the hardest ones.
SEF5	I solved the hardest online exams.

Survey questions were designed based on previous research and adapted to private universities in Vietnam (Table 2). Online Exam Anxiety questions were based on the research of Arora et al. (2021). Coping strategy questions were based on the research of Friedel et al. (2007). Self-efficacy questions were based on research of the research of (Lewis, 1999).

Data analysis

Data were processed using PLS-SEM software. The measurement model is evaluated by internal consistency reliability ratios (Cronbach's Alpha higher than 0.7; composite reliability factor higher than 0.5); evaluation of convergent validity (outer reliability higher than 0.7; AVE higher than 0.5); evaluation of discriminant (the Fornell - Larcker criterion and cross-loadings). Then, the structural model is evaluated by multicollinearity tests, and the path coefficients in the structural model and determination coefficients (R^2 values) are evaluated (Joseph F Hair et al., 2016)

4. Findings and discussion

4.1. Testing of validity of the measurement model

The outer loading value of all variables was greater than 0.7, so the variables were valid (Hair et al., 2016). All t-statistics of all variables were greater than 1.96, indicating that the variables were valid (Table 3).

Table 2 shows the results of convergent validity using AVE. All AVEs greater than 0.623 were considered acceptable, implying that the construct explained more than 62.3% of the variance in all items. Cronbach's Alpha was greater than 0.7, and the CR value was greater than 0.5, indicating that the scales had suitable internal reliability. Furthermore,

Table 3. Results of reliability and validity of constructs

Item	Outer loading	t-value	Cronbach's Alpha	CR	AVE	rho_A
COS1	0.935	89.840				
COS2	0.863	46.978				
COS3	0.766	27.417				
COS4	0.927	83.663				
COS5	0.913	58.898	0.950	0.958	0.717	0.954
COS6	0.729	21.382				
COS7	0.793	24.998				
COS8	0.773	20.556				
COS9	0.895	42.733				
OEA1	0.736	16.818				
OEA2	0.718	19.336				
OEA3	0.800	18.558				
OEA4	0.744	27.329				
OEA5	0.798	31.360	0.924	0.937	0.623	0.930
OEA6	0.848	41.216				
OEA7	0.813	30.953				
OEA8	0.814	30.677				
OEA9	0.821	40.520				
SEF1	0.785	26.727				
SEF2	0.884	56.091				
SEF3	0.864	37.231	0.901	0.926	0.716	0.906
SEF4	0.874	39.809				
SEF5	0.819	41.251				

Table 4. Results of Fornell – Larker criterion

	COS	OEA	SEF
COS	0.847		
OEA	0.888	0.789	
SEF	0.459	0.540	0.846

Table 5. HTML ratios of correlations

	COS	OEA
OEA	0.836	
SEF	0.470	0.565

the rho_A values were greater than 0.7, which aided in the consolidation of the scale to ensure convergent and reliable results.

Discriminant validity is deemed adequate when AVEs exceed their respective inter-construct correlations, as shown in Table 3. This demonstrates that the construct reliability and validity conditions of the measurement model are acceptable, and we proceed to evaluate the structural model (Table 4).

Table 4 shows that the Heterotrait - Monotrait (HTMT) ratios were less than 0.85, as suggested by Clark & Watson (1995). As a result, this confirmed that the model's scale ensured discriminant validity (Table 5).

Table 6. Results of structural modeling

Hypothesis		Standardized path-coefficients	p-value	Results
H1	COS -> SEF	0.111	0.004	Supported
H3	Moderating effect 1 -> SEF	0.051	0.005	Supported
H2	OEA -> SEF	0.101	0.000	Supported

4.2. Testing of the structural modeling

The results of structural modeling, the results of the research hypotheses, relationships between variables, path coefficients, and R-squared are presented in Table 5. When studying the impact of online anxiety on self-efficacy under the influence of coping strategies, the case of Vietnamese private schools shows that there is an interaction between these three factors. Which, online anxiety has a positive effect on self-efficiency. This result is compatible with the research results of Arora et al. (2021); Rizun & Strzelecki (2020). This means that anxiety motivates students in the way they think, act, and study to achieve self-efficiency. The result accepted hypothesis H1.

Coping has a positive effect on self-efficiency in private universities in Vietnam. The result accepted hypothesis H2 and is similar to the study of Gustems-Carnicer et al. (2019); Vigneau et al. (2015). Coping strategies help to increase self-efficiency. In this case, coping strategies are more positive than negative. The moderator role of coping helps to increase self-efficiency. Research results support the result of Arora et al. (2021); Cofini et al. (2022); Morales & Pérez-Mármol (2019). The result accepted hypothesis H3. This is because positive coping strategies help learners' concerns to be dealt with more effectively and properly.

5. Conclusion

As the learner's anxiety increases, the effectiveness of the results achieved under the influence of coping strategies is increased. This means that when learners are worried, they look for strategies to deal with and handle these problems. However, it is essential to implement solutions to help learners' coping strategies achieve higher results, from the perspective of education institutions. From the research results, the authors propose solutions for universities that can help learners as follows:

Reduce test taker anxiety

One effective solution involves implementing comprehensive stress management programs within educational institutions. These programs can include workshops and seminars that teach students practical techniques for managing stress, such as mindfulness meditation, time management strategies, and relaxation exercises. Additionally, providing students with resources for effective study habits, goal-setting, and maintaining a healthy work-life balance can contribute to a more positive academic experience. Furthermore, creating a supportive and open environment where students feel comfortable seeking assistance from teachers, counselors, or peers can help alleviate anxiety by fostering a sense of community and shared responsibility. Emphasizing the importance of holistic education, which considers not only academic performance but also mental and emotional well-being, can lead to more resilient and confident students during the challenging period of final exams.

Quality online exam

Almost websites currently only allow multiple-choice exams, while some subjects need to be assessed by the essay or a combination of essay and multiple choice. Therefore, it is necessary to select a system that meets these requirements. With the multiple-choice test, the system can swap questions at the same level, the answer options will also be swapped to generate as many different codes as possible, avoiding the case where learners pass answers to each other during the assignment. Moreover, it will be better if we can design the test by filling out blanks, especially for listening sections of foreign language majors.

The multiple-choice test will be automatically marked by the computer, and the score will be known immediately, but the correct answer will only be disclosed after the test time. For the essay

exam, learners can do the test by typing directly on the computer, or can also present it on paper and then take a photo and send it to the system. If the essay is related to drawings and formulas, learners are still used to presenting on paper, as drawing pictures and typing formulas on computers will take a lot of time. For the grading of the essay, firstly the test papers of students will be encrypted, then the school management assigns a grading lecturer, the system will randomly assign the papers to the lecturer, and when marking, the lecturer does not see the candidate's information to ensure objectivity.

For lecturers, to be proactive in the process of making exam questions, lecturers can create a set of questions with multiple-choice questions and essays through e-learning software to design the test. Besides, lecturers can organize online exams in the form of questions and answers. With this form, teachers can use the video conference feature and connect directly with learners to check.

Test content

For multiple-choice questions, the content of the exam must be broad, covering the entire program. The test must ensure the matrix, specification, and combination of multiple-choice questions and essay questions at the levels of awareness, comprehension, application, and high application. However, because the characteristics of the online exam will create higher pressure than the face-to-face exam, the matrix should focus mainly on questions at the level of awareness and comprehension. The time for taking the test should be carefully calculated so that learners do not have enough time to discuss. With essay questions, the questions must be new, not taken from available sources such as textbooks, and workbooks... because the solutions to these questions are available online, learners can use a different device to look them up. Furthermore, the exam should be open as it is difficult to control the seriousness during the exam. The content of questions should relate to personal thinking to avoid copying.

On the other hand, the mixed test should be divided into two sessions, the multiple-choice session should be taken in a separate time frame because when the two parts are combined, the total time of the two sessions is very large, and learners have enough time to discuss. During the multiple-

choice test, the university should use software that can recognize and record behaviors related to dishonesty, such as in the course of the test. During the test, learners can open a different tab or another application to look up the answers. With the essay session, the university can properly assign lecturers to supervise an online exam, both to support learners in technical terms and to supervise the process of doing the test through the classroom system.

Online exam technique

When the examiner only controls candidates through remote computers, webcams, and mics of students, it is not possible to monitor them in the live exam room. In this way, we need to trust the honesty of the learners. Technical measures to detect fraud are also available, but not exhaustive. To provide technical support, universities should organize an online mock exam first so that learners and teachers can get used to this test method so that when the real test comes, it won't be surprising.

Finally, when learning online, the lecturers speak continuously for a long period, which can distract learners. Therefore, storing lectures is an important way to help teachers and learners create high efficiency in teaching and learning. Recorded lectures can be saved so that learners can review them when needed. In particular, the school should increase the transmission line or bandwidth of the internet to ensure a smooth connection to the server when many students log in to the testing system at the same time.

Lesson design

When learners are confident with their knowledge of the subject, the strategy to cope with the exam will also be more positive (Gustems-Carnicer et al., 2019). Therefore, teachers need to design effective lessons. With any form of teaching and learning, the conciseness and science of the method of content presentation are important factors.

Characterized by the indirect communication between the teacher and the learner, these factors become more essential in online learning. Lesson slides, visually designed, and attractively decorated will help students focus on the lesson better. If teachers cannot design quickly and beautifully, they can use PowerPoint files available on websites

such as Slidego or Canva. These websites have a wide variety of PowerPoint themes for different fields. The text content put on the slide needs to be short. Besides using slides, teachers should also use drawing boards to be able to write lectures on the screen. The electronic drawing board is a device that supports writing on a piece of software. Naturally, learners will focus on lessons with words written by the teacher rather than standard computer fonts.

Teaching methods

One of the differences between online learning is the lack of face-to-face interaction between learners and between learners and teachers, leading to different learning and exam effectiveness (Maheshwari, 2021). Lack of sense of behavior, and facial and body movements lead to communication, information testing, and group activities that can be more difficult than in a traditional classroom. Online learning can also be detrimental for some subjects that require hands-on instructors and specialized software or equipment to conduct. To overcome these problems, instructors should prepare lectures that have all three elements of "online presence", including:

- Teacher presence involves making an impression on learners by sharing information about personality or personal interests before the first lesson as well as a teaching style that reflects one's personality. Teachers must play a constructive role and connect learners through complementary activities, asking group questions, and providing feedback both online and after the classroom. Learners will also be more likely to connect and enjoy the lecture if they understand and accept the personality and expressions of the online teacher.

- Social presence helps online learners connect and empathize with the whole group, creating a presence similar to real life by interacting, discussing via chat, and direct messaging on the teaching platform, or even creating an online discussion group right in the middle of a lecture.

- Cognitive presence is connecting online lectures with learners' existing knowledge, helping learners to create new information and knowledge through the forms of quizzes, knowledge testing right in the lecture, answering questions, etc. Answer questions through pictures, sounds, or messages.

Exploiting learners' needs

Educational administrators also need to understand the needs of learners because if the needs of learners are met, their anxiety will be reduced, thereby promoting self-efficiency. Online learning gives students plenty of time to study on their own at home. Therefore, the need in each lesson students will be to acquire the amount of knowledge as the foundation found in textbooks, workbooks, and an extended part of the content contained in the exam questions.

The indirect interaction between teachers and students through smart devices will limit the lecturer's analysis and expansion of the problem. Sometimes, having students in the class will not keep up with certain content. Therefore, lecturers should also spend more time surveying the lesson content, supplementing basic knowledge if students do not understand to improve the quality of online teaching.

Software and support system

According to the self-efficacy theory, to increase the effectiveness of the exam (Shapiro, 2018), it is necessary to increase the effectiveness of the software and the design of the support system. Universities can develop grading systems and generate online reports to store information about students' academic progress, helping to assess the effectiveness and quality of teaching. Besides, they could set up flexible regulations to match online studying. Use the online system to inform students about test plans, assessments, upcoming big assignments, etc.

Ministry of Technology should upgrade the national transmission and bandwidth system, ensuring the stability of the internet network. Besides, universities need to strengthen facilities to meet the requirements of online exams in terms of hardware equipment and software systems, such as Terminals of units, Centers data, LAN/WAN connection systems and high-speed internet, online classrooms/exam guides, website systems, forums, and specialized management software,... Facilities Services for the online exam organization must be eligible for continuous, smooth, safe operation and ensure the convenience for management and information provision of management departments, and the teaching process.

Limitations

The research had not yet been conducted comparing the impact before, during, and after the pandemic to see the impact of the level of investment in the online teaching system of schools. Furthermore, the study did not compare the level of impact with public universities, where the financial resources for education are financed by the State.

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