

SELF-ASSESSMENT TOOL FOR IMPROVING STUDENT'S SKILLS REGARDING THE EXAMS IN HIGHER EDUCATION

Shilan Ahmed Mohammed^{a*}, Nawzat Sadiq Ahmed^b^{a*} Information Technology Dept. Duhok Polytechnic University, Zakho, Kurdistan Region, Iraq - shilan.mohammed@dpu.edu.krd^b Information Technology management, Technical College of Administration, Duhok Polytechnic University - nawzat.ahmed@dpu.edu.krd

Received: 10 Apr., 2023/ Accepted: 17 June, 2023/ Published: 28 Sep., 2023

<https://doi.org/10.25271/sjuoz.2023.11.3.1150>**ABSTRACT:**

Preparing for exams in higher education can be challenging, and students often need help to assess their skills and competencies. This paper presents a self-assessment tool to improve students' exam preparation and performance. The study involved collecting data from students before and after using the tool, which asked questions related to exam preparation strategies such as understanding the exam format, imagining potential test questions, and following directions carefully. The results were compared to assess the tool's effectiveness in improving students' exam skills. The findings showed a significant improvement in the student's self-assessment and exam performance after using the tool. This paper provides an overview and comparison of existing e-learning management systems and self-assessment tools to highlight the unique features of the proposed tool. The self-assessment tool was designed and tested, with a pre-feedback and post-feedback evaluation of students' skills. Comparing pre and post results showed a statistically significant improvement in students' skills, leading to a notable shift in the percentage of responses. The "never" category experienced a considerable decrease of 27.91%, while the "always" category witnessed a substantial increase of 53.46%. These findings underscore the positive impact of the self-assessment tool on students' behaviors and attitudes toward exam preparation. Overall, this study showcases how self-assessment tools can effectively improve test readiness and outcomes in higher education.

KEYWORDS: self-assessment, exam preparation, higher education, e-learning management systems, student skills.**1. INTRODUCTION**

Effective assessment plays a vital role in learning, facilitating learners in identifying their strengths and weaknesses, monitoring their progress, and enhancing their performance (Wijaya, 2023). In recent years, technology in education has paved the way for innovative assessment methods that enhance the learning experience and make it more engaging and interactive. One such method is formative assessment, which focuses on providing timely feedback and support to learners to help them improve their performance. As a result, ICT-based tools like e-learning platforms, web-based games, and mobile-assisted learning have been integrated into the assessment process. In this context, it is important to explore the benefits and challenges of using these tools for formative assessment and understand how they can be effectively integrated into the learning process (Rahayu & Purnawarman, 2019) (Felszeghy et al., 2019).

Formative assessment is crucial in the continuous growth of students, as it aids in developing their competencies and skills (Joshi et al., 2020) (Šteh & Šarić, 2020). Self-assessment constitutes a critical component of professional learning, as it empowers students to assume responsibility for their learning and cultivate the necessary competencies for self-directed learning (Rahayu & Purnawarman, 2019) (Rustamova & Rashidova, 2022). Through self-assessment, students can identify their strengths and weaknesses, track their progress toward their goals, and learn from given formative feedback to improve their work (Awajan, 2023) (Olika, 2021).

However, the effectiveness of self-assessment could be improved by several obstacles. One of the obstacles is the workload of teachers, who may need help to provide timely feedback to students. Another obstacle is the need for self-assessment skills among students, which can be addressed by teaching them how

to review their work and identify areas for improvement (B et al., 2023).

This study aims to address these obstacles by developing and testing a self-assessment tool for improving students' skills regarding exams in higher education. The researcher will collect data through a pre-and post-feedback questionnaire to compare the tool's effectiveness in improving students' exam preparation skills.

The paper is structured as follows: Section 2 is about self-assessment in higher education, and Section 3 reviews the literature on e-learning Management Systems and self-assessment tools in higher education. Section 4 describes the methodology used to develop and evaluate the self-assessment tool, including data collection, tool design, and pre and post-feedback of students' skills. Section 5 compares pre and post-feedback results to evaluate the effectiveness of the self-assessment tool. Section 6 assesses the study and provides recommendations on using self-assessment tools to enhance student learning outcomes, and Section 7 concludes the study.

2. SELF-ASSESSMENT IN HIGHER EDUCATION

Individuals need to engage in self-assessment to facilitate self-regulated and continuous learning (Olika, 2021). Although self-assessment is often viewed as a skill or ability, it involves more than just assigning oneself a grade or rating. It is an important process that requires students to actively seek feedback from various sources, reflect on it, and evaluate their learning performance based on specific criteria. Empirical evidence supports a cyclical process model of self-assessment that involves determining assessment criteria, self-directed feedback seeking, and self-reflection. This article highlights the importance of feedback-seeking and generating internal feedback as essential elements of feedback literacy, as illustrated in Figure 1.

* Corresponding author

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When individuals engage in self-assessment, they establish the criteria for evaluating their performance. Next, they reflect on their performance and identify their strengths and weaknesses in those criteria. Based on this self-reflection, they judge their performance and continuously adjust it based on new assessment criteria, feedback, and self-reflection. Throughout this process, seeking feedback is crucial in supporting each step. For instance, individuals may request feedback to ensure their assessment criteria are appropriate and well understood. They may also seek feedback to enhance the direction and strategies of their self-reflection and improve the accuracy of their self-assessment judgment.

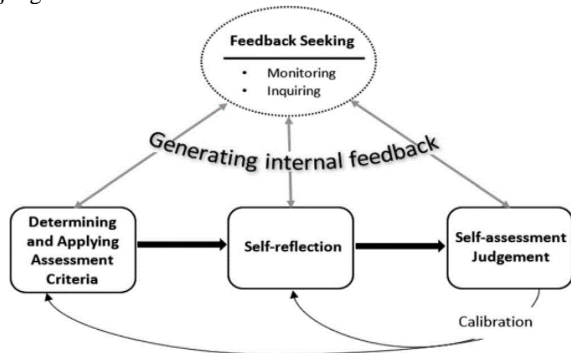


Figure1. The Self-assessment process with feedback literacy (Yan & Carless, 2022)

It should be acknowledged that students can conduct self-assessments independently without seeking external feedback, and they may stop self-assessing once they make their initial judgment. However, a self-assessment that relies solely on introspection or a self-assessment judgment without calibration is more susceptible to idiosyncratic biases and heuristics, such as overconfidence and placing too much emphasis on the effort put in rather than the quality of performance (B et al., 2023) This, in turn, reduces the effectiveness of self-assessment in improving performance and directing future learning. Internal feedback is critical to self-assessment because the main purpose is to generate feedback for oneself to enhance future learning. In self-assessment, different reference information can be used to generate internal feedback, such as assessment criteria, feedback from teachers/peers, or other comparators like exemplars or peers' work. The use of different reference information may lead to other internal feedback, which may, in turn, result in different self-assessment judgments (Yan & Carless, 2022).

3. RELATED WORKS

3.1 E-Learning Management Systems

Many researchers have studied e-learning and its importance, especially after the COVID-19 pandemic. Some of these studies include:

(Alhazzani, 2020) aimed to investigate how MOOCs (Massive Open Online Courses) affect higher education systems. The study focused on the context of the Kingdom of Saudi Arabia, aiming to investigate the potential benefits of utilizing open-source courses, particularly Massive Open Online Courses (MOOCs), in improving Saudi universities' instructional and learning methodologies. A descriptive and analytical research approach was employed to gather data, and a quantitative survey was administered to all professors at King Saud University (KSU). The study found that the higher education system in the Kingdom experienced a considerable and direct effect from the implementation of MOOCs, leading to a notable 65% enhancement in educational outcomes. Such findings provide evidence of the favourable impact that MOOCs have had on the higher education system of the Kingdom.

(Kumar et al., 2021) surveyed to investigate a range of tools, techniques, frameworks, and models that are advantageous for blended learning. The survey examined the experiences of students, teachers, and management in blended learning courses both before and during the COVID-19 pandemic. The study assessed the implementation and evaluation of blended learning at two universities in India: University of Petroleum and Energy Studies and the Jaypee Institute of Information Technology. The researchers analyzed the benefits and challenges of blended learning from the perspectives of both students and faculty, utilizing various online learning tools such as Blackboard, CodeTantra, and g suite. Additionally, the study compared the performance of students in traditional and blended learning courses to identify any concerns related to transitioning from face-to-face courses to a blended learning model during emergencies, such as the COVID-19 pandemic. The results indicated that blended learning is effective for educational institutions and professional training. Online tools helped the two universities carry out academic activities within schedule during the pandemic.

(Keržič et al., 2019) presented a study utilizing structural equation modelling to investigate the factors influencing students' perceptions of blended learning in higher education. The research focused on students' attitudes toward course topics and technology, learning preferences, and the role of teachers in course design and teaching management. The study found that e-teaching positively affected the perceived usefulness of an e-course. Students had positive views of various activities in an e-course, individual assistance, and teacher feedback. Students were more motivated to learn when the course material and activities were well-prepared and easy to use. Efficient interaction between students and teachers, particularly through quick feedback and frequent interaction in the e-course, resulted in a positive learning environment. Students expected timely feedback and had the option to contact teachers through messages or forums in an e-course. The study showed no significant differences when the model was tested on student subgroups sorted by gender, year of study, and weekly spare-time activities. (Mahfoodh & Alatawi, 2020) conducted a study that examined both the weaknesses and strengths of e-learning. The study suggests that if these weaknesses are addressed and resolved, while strengths are sustained through proper implementation, e-learning can become a more convenient and effective tool for the Higher Education sector. In other words, identifying and addressing the weaknesses of e-learning while maintaining its strengths can make it a valuable tool for Higher Education.

(Chang & Fang, 2020) conducted a study investigating the factors, issues, challenges, and difficulties affecting the efficacy of e-learning and online instruction. The research findings showed that some instructors lacked computer and internet-related skills and needed to be adequately prepared for online instruction. Some also preferred traditional methods of course instruction. These findings can be used to assess online learning levels and identify challenges instructors face during emergencies such as the COVID-19 outbreak. However, providing effective training to teachers in computer and internet-related skills can reduce challenges and improve the effectiveness of e-learning.

(Roman & Plopeanu, 2021) studied the factors influencing effective online learning during the COVID-19 pandemic. The research was carried out on 1415 students from five different faculties, and regression models were used to analyze the data. The results revealed that students who experienced psychological distress and increased concerns about COVID-19 had lower effectiveness in their online learning. Additionally, male students and students who faced challenges related to poor internet access, limited time due to domestic issues, and inadequate workspace at home were found to have lower effectiveness in online learning.

However, the study found that the university infrastructure for online activities positively impacted students' perception of online studies and increased the likelihood of effective online learning.

(Mishra et al., 2020) proposed a study investigating the key components for successful online teaching and learning during the COVID-19 pandemic in Mizoram University. The research utilized quantitative and qualitative methods to gather feedback from teachers and students regarding their experiences with online learning and the implementation process. The study aimed to provide a comprehensive understanding of the ongoing online teaching and learning activities during the lockdown period and establish a correlation between the change management process and the online learning process in the education system. The study's primary objective was to mitigate academic disruptions and ensure the continuity of educational activities.

Previous studies were conducted to gain a deeper understanding of the impact of online learning on both students and teachers. Results indicate that recommendations for remote learning require basic conditions such as internet access and suitable infrastructure. However, a major challenge for many teachers is adapting to remote learning technologies and changing their teaching methods. On the other hand, some studies show that the efficacy of online learning may be compromised by psychological factors and stressors associated with COVID-19. Finally, some researchers recommend training teachers in modern information and communication technology skills to improve the quality of remote learning.

3.2 Self-assessment tools

Self-assessment is a widely researched topic in e-learning, with several studies examining its impact on student learning outcomes. The findings indicate that self-assessment can enhance critical thinking skills and promote self-confidence among learners. Additionally, self-assessment is considered an effective tool for fostering student motivation and engagement in the learning process. The literature highlights several important studies contributing to comprehending self-assessment practices in e-learning. Further research in this area can provide valuable insights into the effectiveness of self-assessment practices in promoting student learning and achievement. Some of the most important studies in this field are:

(Sinta et al., 2019) presented a practical approach to self-assessment that utilized Quizizz features to enhance students' grasp of grammar. The self-assessment process involved a hierarchical sequence: receiving feedback, reviewing, replaying the quiz, and taking a new quiz. The researchers also investigated how self-assessment improved students' grammar skills. The study sample consisted of fourteen eleventh-grade students from a senior high school in Bandung. The research instruments included observation to monitor how students engaged in self-assessment with Quizizz, interviews to gain more in-depth insights into students' self-assessment practices, and tests to assess students' improvement in grammar. The findings revealed that students could engage in self-assessment by identifying their strengths and weaknesses, prompted by Quizizz. Nevertheless, it is worth noting that this study focused only on grammatical concepts and did not assess students' performance in other subjects.

(Huda & Siddiq, 2020) presented a qualitative study to investigate the impact of e-assessment on Bangladeshi university students, their readiness to adopt this method, and the associated benefits and challenges. The study randomly selected a small sample of surveyed students to obtain their perspectives on e-assessment. The survey results were then analyzed to gain insights into the students' perceptions of this method. While the study findings suggest that students generally hold a positive attitude towards e-assessment and are willing to adopt it, they

also expressed mixed views on the potential benefits and challenges associated with this approach. It is worth noting that this study was primarily theoretical and did not provide any practical program.

(Purba, 2020) utilized a quantitative involving experiment to evaluate the effectiveness of an interactive quiz in assessing online learning for the Physical Chemistry 1 course. The study used a test instrument comprising 10 multiple-choice questions, and an expert validator assessed validity. The non-parametric Wilcoxon Signed Rank Test was utilized for data analysis. The study's hypothesis testing revealed that using an interactive quiz as an e-assessment tool for Physical Chemistry 1 successfully improved student outcomes, with an average gain of 65%. These findings suggest that e-assessment can be a useful tool for evaluating student learning and performance in higher education, offering prompt feedback, reducing the cost of assessment, and enhancing the accuracy and reliability of assessment results.

(Schreurs et al., 2012) developed an eLearning self-assessment model (e-LSA) based on Total Quality Management (TQM) and the European Foundation for Quality Management (EFQM) excellence model to evaluate eLearning quality in organizations. The self-assessment model was divided into two parts. The first part focused on course content and the learning process, while the second part related to learning management and was used for management and staff self-assessment. The model was successfully implemented in a Belgian bank, and survey results revealed that the most significant improvement was required in the learning process and learning outcomes. The survey showed that 94.29% of learners responded, and 49% of those who requested improvement considered the issue very important. The results also indicated that the higher-value sub-criteria were Organization of Services, E-learning Activities, Learner Support, and Assessment Organization. However, it is worth noting that the e-LSA model needs to offer guidance on bridging the gap between the current and desired quality of the learning organization. Additionally, the model needs to enhance the quality of the learning content or learning process.

(Steer et al., 2016) proposed a study to assess students' learning outcomes in online assessments. The study highlighted the importance of well-planned online assessments due to concerns about their perceived cogency and trustworthiness. The paper outlined different methodologies and examined how online assessments are implemented in higher education. It also suggested different assessment practices that should be used for various types of learning. Additionally, the study presented the results of a survey conducted among 80 participants from Malta to understand their preferences for e-learning and suitable assessment methods. The survey employed a quantitative research methodology to collect data from the respondents. The survey results indicated that online assessments were preferred over traditional written examinations, and simulations, multiple-choice questions, and online assignments were identified as the most appropriate assessment methods for online courses.

(Appiah, 2018) conducted a scholarly study on e-assessment in higher education and highlighted some key concepts that are significant to e-assessment. The study concluded that e-assessment has the potential to enhance and improve student learning, provided that the assessment tasks are properly designed. E-assessment can evaluate higher-order assessment tasks, and students are more likely to participate if the results contribute towards their semester marks. The research demonstrated that e-assessment can improve student learning, engagement, and decision-making among administrators. Compared to traditional assessment, e-assessment can reduce student stress, improve decision-making among administrators, and save time and costs. As an innovation, e-assessment can potentially enhance teaching and learning at higher education

institutions. To ensure the credibility of e-assessment, educators should focus on creating authentic, consistent, transparent, and practical assessments. However, successful implementation of e-assessment requires addressing factors such as workload and test mode effects and providing opportunities for student reflections, formative e-assessment, and online professional development. Nonetheless, the study was theoretical and did not provide practical guidance.

(Thelen, 2021) conducted a pilot study to investigate the effectiveness of a nursing pharmacology synchronous online scrabbling active learning classroom design with simulated clinical immersion experiences in improving pharmacology self-efficacy and connecting theory to practice. The study utilized a qualitative descriptive design and collected data from accelerated nursing students using an online survey. The survey was administered before and after the simulated clinical immersions. The results showed that the students effectively perceived the simulated clinical immersions to promote authentic learning and confidence. However, the study's small sample size of 34 participants limits the generalizability of the findings, and the lack of a comparison group limits the ability to determine the effectiveness of the simulated clinical immersions compared to traditional methods.

Based on previous studies, educational tools are often created for specific purposes, such as grammar or medical studies. Such tools have limited usage and may not be accessible to students at all times or places. The proposed tool is unique in that it is accessible anytime and anywhere and allows for direct contact between students and their lecturers. This enables students to access the tool, receive immediate feedback on their progress, and improve their academic performance. The proposed tool facilitates collaboration between students and lecturers, as well as provides a variety of resources that can enhance the learning experience.

The proposed tool has been designed specifically for Duhok Polytechnic University, allowing lecturers to log in and create

questions for their students. Students can access the tool to view materials, respond to questions, and evaluate their performance to identify their strengths and weaknesses. This tool fosters transparency and communication between instructors and students, enabling them to share educational materials, questions, and answers and exchange knowledge and experiences.

Furthermore, this tool helps maintain the level of education and training at an excellent standard by updating educational materials and questions regularly. It can work as an integrated and effective educational tool for the university, enhancing the quality of education and students' academic performance. Ultimately, it can expand the circle of knowledge and skills.

Thus, this tool has the potential to be a valuable asset to the university, with the ability to enhance the quality of education and academic performance of students.

3.3 Experiments and Results

Self-assessment has long interested researchers and practitioners in education and training. Accurately evaluating one's performance is a critical component of effective learning and professional development. Self-assessment allows individuals to reflect on their knowledge, skills, and abilities and identify improvement areas. As such, it has become an important area of study, with many researchers examining the factors that influence self-assessment and its effectiveness in different contexts.

In order to contribute to the ongoing discourse on self-assessment, this discussion will focus on Table (1), which provides a comprehensive overview of previous studies on the topic. This Table summarizes each study's main findings, methodology, and limitations, offering valuable insights into the various approaches and techniques used to assess self-assessment, as well as their strengths and weaknesses. By examining this Table with the wider literature on self-assessment, we can better understand this important study area and explore its implications for education and training practice.

Table 1: Related Work Discussion

Research	Objective	Methodology	Findings	Limitations
(Alhazza ni, 2020)	To investigate how MOOCs affect higher education systems, particularly in the context of the Kingdom of Saudi Arabia	Descriptive and analytical research approach, with a quantitative survey administered to all professors at King Saud University (KSU)	Implementation of MOOCs had a considerable and direct effect on the higher education system in the Kingdom of Saudi Arabia, leading to a notable 65% enhancement in educational outcomes. Such findings provide evidence of the favorable impact that MOOCs have had on the higher education system of the Kingdom.	The study sample is on all professors at KSU -low student participation in online forums. - the study was conducted before the COVID-19 pandemic, which may have affected the results
(Kumar et al., 2021)	To investigate the benefits and challenges of blended learning from the perspectives of students and faculty and assess its effectiveness	Surveyed experiences of students, teachers, and management in blended learning courses at the University of Petroleum and Energy Studies and the Jaypee Institute of Information Technology, comparing performance of students in traditional and blended learning courses to identify any concerns during the COVID-19 pandemic.	Blended learning is an effective approach for educational institutions and professional training, and online tools helped the two universities carry out academic activities within schedule during the pandemic.	-This study just focused on two Indian universities -The study did not extensively address the issue of data security and privacy in blended learning.

<p>(Keržič et al., 2019)</p>	<p>To investigate the factors influencing students' perceptions of blended learning in higher education utilizing structural equation modeling</p>	<p>Structural equation modeling was used to examine students' attitudes toward course topics and technology, learning preferences, and the role of teachers in course design and teaching management</p>	<p>E-teaching positively affected the perceived usefulness of an e-course. Students had positive views of various types of activities in an e-course, individual assistance, and teacher feedback. Students were more motivated to learn when the course material and activities were well-prepared and easy to use. Efficient interaction between students and teachers, particularly through quick feedback and frequent interaction in the e-course, resulted in a positive learning environment. Students expected timely feedback and had the option to contact teachers through messages or forums in an e-course. The study showed no significant differences when the model was tested on student subgroups sorted by gender, year of study, and weekly spare-time activities.</p>	<p>-the e-course were only measured with a questionnaire. -The study was conducted within a specific higher education setting and utilizes a specific learning management system</p>
<p>(Mahfoo dh & Alatawi, 2020)</p>	<p>To examine the weaknesses and strengths of e-learning and suggest ways to address them for more effective implementation in Higher Education</p>	<p>Qualitative research methodology, involving interviews with Higher Education sector experts and reviewing related literature.</p>	<p>E-learning has both strengths and weaknesses in the Higher Education sector. Weaknesses identified include technical issues, isolation, lack of student-teacher interaction, and limited opportunities for practical work. However, if these weaknesses are addressed and resolved while sustaining the strengths, e-learning can become a more convenient and effective tool for the Higher Education sector.</p>	<p>The study's findings are based on a limited sample of Higher Education sector experts and related literature. The findings may not be generalizable to other contexts or populations.</p>
<p>(Chang & Fang, 2020)</p>	<p>To investigate the factors, issues, challenges, and difficulties affecting the efficacy of e-learning and online instruction.</p>	<p>Survey research design, involving the use of an online questionnaire. Data were collected from 150 instructors from one university in Taiwan.</p>	<p>Some instructors lacked the necessary computer and internet-related skills and were not adequately prepared for online instruction. Some also preferred traditional methods of course instruction. Providing effective training to teachers in computer and internet-related skills can reduce challenges and improve the effectiveness of e-learning.</p>	<p>The study was conducted in one university in Taiwan and may not be generalizable to other contexts. The sample size was small, which may limit the generalizability of the findings.</p>
<p>(Roman & Plopeanu , 2021)</p>	<p>To identify the factors influencing effective online learning during the COVID-19 pandemic.</p>	<p>Quantitative research design. A questionnaire was administered to 1415 students from five different faculties. Regression models were used to analyze the data.</p>	<p>Students who encountered psychological distress and heightened COVID-19 concerns struggled to perform effectively in online learning. Moreover, male students and those grappling with challenges such as limited internet access, familial responsibilities, and inadequate home workspace exhibited lower effectiveness in their online studies. Conversely, a supportive university infrastructure for online activities positively influenced students' perception of online learning and enhanced their likelihood of achieving successful outcomes.</p>	<p>The study was conducted during the COVID-19 pandemic, which may limit the generalizability of the findings to non-emergency situations. The study was conducted in one university in Romania, which may limit the generalizability of the findings to other contexts.</p>
<p>(Mishra et al., 2020)</p>	<p>Investigate key components for successful online teaching and learning during COVID-19</p>	<p>Quantitative and qualitative approaches to collect feedback from educators and students.</p>	<ul style="list-style-type: none"> - Comprehensive understanding of online teaching and learning activities during lockdown - Correlation between change management process and online learning process - Identification of key components for successful online education 	<ul style="list-style-type: none"> -The study only includes data and analysis from Mizoram University. -The research is solely centred

				around the COVID-19 pandemic and its impact on online teaching and learning.
(Sinta et al., 2019)	To present a practical approach to self-assessment utilizing Quizizz features and investigate the extent to which self-assessment improved students' grammar skills.	- Observation to monitor how students engaged in self-assessment with Quizizz. - Interviews to gain more in-depth insights into students' self-assessment practices. - Tests to assess students' improvement in grammar.	Students engaged in self-assessment by identifying their strengths and weaknesses, prompted by Quizizz. Self-assessment can enhance critical thinking skills, promote self-confidence, and foster student motivation and engagement in the learning process.	The study focused only on grammatical concepts and did not assess students' performance in other subjects.
(Huda & Siddiq, 2020)	To investigate the impact of e-assessment on Bangladeshi university students, their readiness to adopt this method, and the associated benefits and challenges.	Qualitative study involving a survey to obtain students' perspectives on e-assessment.	Students generally hold a positive attitude towards e-assessment and are willing to adopt it. However, they also expressed mixed views on the potential benefits and challenges associated with this approach.	The study was primarily theoretical in nature and did not provide any practical program.
(Purba, 2020)	To evaluate the effectiveness of an interactive quiz in assessing online learning for the Physical Chemistry 1 course.	Experiment utilizing a test instrument comprising 10 multiple-choice questions, and validity was assessed by an expert validator. The non-parametric Wilcoxon Signed Rank Test was utilized for data analysis.	The use of an interactive quiz as an e-assessment tool for Physical Chemistry 1 was successful in improving student outcomes, with an average gain value of 65%. E-assessment can serve as a useful tool for evaluating student learning and performance in higher education, offering prompt feedback to students, reducing the cost of assessment, and enhancing the accuracy and reliability of assessment results.	
(Schreurs et al., 2012)	To develop an eLearning self-assessment model (e-LSA) based on Total Quality Management (TQM) and the European Foundation for Quality Management (EFQM) excellence model.	The study involved implementing an e-LSA model in a Belgian bank and conducting a survey to understand the areas where improvement was required.	The e-LSA model was successfully implemented in a Belgian bank, and survey results revealed that the most significant improvement was required in the learning process and learning outcomes. The sub-criteria with higher value were Organization of Services, E-learning Activities, Learner Support, and Assessment Organization.	The e-LSA model does not offer any guidance on how to bridge the gap between the current and desired quality of the learning organization. Additionally, the model does not provide any guidance on how to enhance the quality of the learning content or learning process.
(Steer et al., 2016)	Assessing students' learning outcomes in online assessments, highlighting the importance of well-planned online assessments, and suggesting assessment practices	Examined different methodologies and presented survey results	Online assessments were preferred over traditional written examinations, and simulations, multiple-choice questions, and online assignments were identified as the most appropriate assessment methods for online courses	Limited sample size of 80 participants from Malta

(Appiah, 2018)	Examining key concepts significant to e-assessment in higher education and investigating its potential to enhance and improve student learning	Theoretical study	E-assessment can enhance student learning and engagement, reduce stress, save time and costs, and improve decision-making among administrators. However, successful implementation requires addressing workload, test mode effects, and providing opportunities for reflection and professional development	Did not provide practical guidance
(Thelen, 2021)	Investigating the effectiveness of a nursing pharmacology synchronous online scrabbling active learning classroom design with simulated clinical immersion experiences	Qualitative descriptive design	The simulated clinical immersions were effective in promoting authentic learning and confidence in nursing students	quation modeling was used to examine students' attitudes toward course topics and technology, learning preferences, and the role of teachers in course design and teaching management

3.4 Data collection

The study employed a mixed-method approach encompassing quantitative and qualitative data collection techniques. The research objective was to gather additional evidence regarding the problem and proposed solution. Accordingly, pre and post-questionnaires, as well as interviews, were utilized to gather data. The study focused on measuring the effectiveness of a self-assessment tool in improving students' skills regarding exams. The pre and post-questionnaire instrument was adapted from the University of Houston (<http://www.uhcl.edu/counselingservices>) and administered to 130 undergraduate students in the Technical College of Administration – Duhok, Duhok Polytechnic University. Quantitative data on the students' skills before and after utilizing the self-assessment tool was collected via a questionnaire.

In addition to the questionnaire, the study also conducted interviews with 15 lecturers to gain more in-depth knowledge about the requirements needed for the estimated tool. The qualitative interview instrument allowed the researchers to gather detailed insights from the lecturers regarding the tool's effectiveness and how it could be improved.

Overall, this mixed-method approach allowed the researchers to gather quantitative and qualitative data, providing a more comprehensive understanding of the studied problem and solution. Pre and post questionnaires and interviews ensured that the data collected was reliable and valid. It allowed the researchers to draw more meaningful conclusions from the study (RAHMAN, 2023)(Mukumbang, 2023).

3.5 Self-assessment tool design and test

The management system for the self-assessment website was designed using an agile system development methodology. This approach allowed for iterative and incremental development, enabling the system to evolve based on feedback and changing requirements. Agile development also facilitated collaboration between the developer and stakeholders, ensuring that the system met the needs and expectations of all parties involved. The agile development cycle can be seen in Figure 2.



Figure2.agile development cycle (Lalband & Kavitha, 2019)

The proposed system's architecture comprises two key elements: the website and the database, which need to be accessible from any internet-connected client workstation. The system incorporates a login mechanism to ensure robust authentication and security. The web server application facilitates communication with the browser, while most of the system's processing occurs on the server side through web applications. The required data is stored in a relational database server, and PHP is employed to manage database requests initiated from the web server.

In order to validate the system, we conducted functional and non-functional testing. Functional testing was conducted to verify the system's features were operating as intended. That included assessing the performance of the login system, adding topics relevant to the courses, incorporating midterm or final exams, and verifying students' ability to access course lectures, respond to questions posted by the instructor, identify their academic proficiency, and rectify any mistakes. We also tested the communication features of the system, including sending lectures, messages, assignments, and announcements non-functional testing involved testing the system's performance, reliability, and security. We tested the system's performance by simulating heavy user traffic and monitoring the system's response time. We also tested the system's reliability by ensuring it was always available and operational. Security testing involves testing the system's ability to prevent unauthorized access and protect user data.

Overall, the agile development methodology(Lalband & Kavitha, 2019) used in designing and testing the self-assessment tool allowed for a more efficient and effective process, ensuring that

the system met the needs of both professors and students. The functional and non-functional testing methods helped ensure the system was reliable, secure and met the necessary performance requirements (RAHMAN, 2023)(Mukumbang, 2023). The system is shown in Figure 3 and Figure 4.

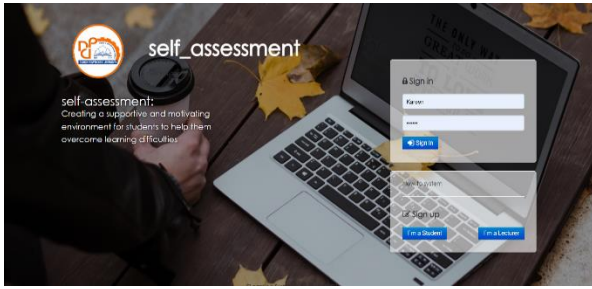


Figure3: Self-assessment tool

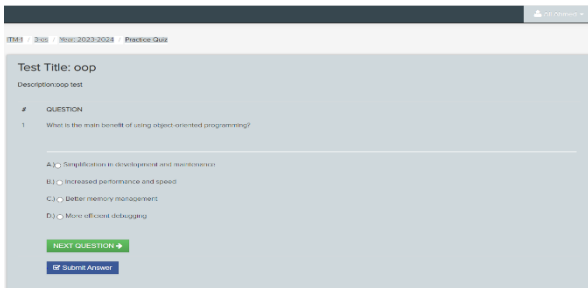


Figure 4. Students using the self-assessment tool

3.6 Pre-feedback of Students’ Skills

In the pre-feedback phase of the study, the self-assessment tool was administered to a sample of 130 students enrolled in the Information Technology College at Polytechnic University Duhok to gather information about their exam-taking skills and strategies. The tool was a questionnaire measuring students' confidence, preparation, and exam-taking strategies. The questionnaire was designed to be simple and easy to understand. The responses were measured on a four-point scale ranging from 1 to 4, where 1 represents "never", 2 represents "sometimes," 3 represents "usually," and 4 represents "always.", and it was administered online. The pre-feedback data provided a baseline for students' exam-taking skills and allowed for comparison with post-feedback data to assess the impact of the self-assessment tool on students' skills. The pre Test Strategies and Test Anxiety results are stated as shown in Table 2.

3.7 Post-feedback Students’ Skills

After the students had completed the self-assessment tool, a post-feedback questionnaire was administered to measure any changes in their exam-taking skills. The post-feedback questionnaire consisted of the same questions as the pre-feedback questionnaire, and The students were requested to provide their level of concurrence with each statement on a scale ranging from 1 to 4. The responses obtained from the pre-and post-feedback questionnaires were then compared to determine whether there were any significant changes in the students' exam-taking skills after using the self-assessment tool. Results are stated as shown in Table 3.

Table 2: Questions and their answers formulated in the pre-questionnaires.

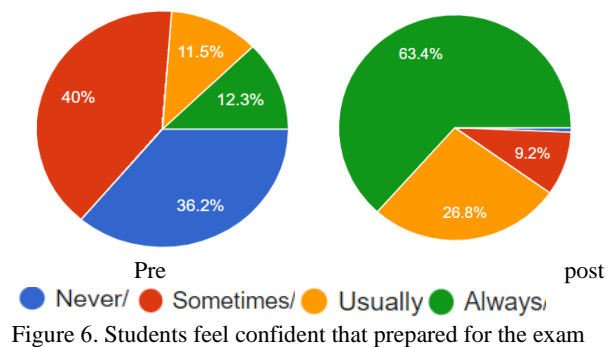
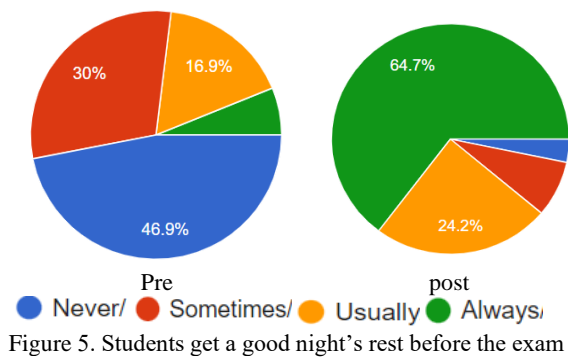
Index	Questions	Never	Sometimes	Usually	Always
1	I try to find out what the exam will cover and how the exam is to be graded	30.8	37.7	23.8	7.7
2	I feel confident that I am prepared for the exam	36.2	40	11.5	12.3
3	I try to imagine possible test questions during my preparation for an exam	25.4	50	12.3	12.3
4	I am calmly able to recall what I know during an exam.	36.2	37.7	20	6.1
5	I take time to understand the exam questions before starting to answer	14.6	39.2	28.5	17.7
6	I follow directions carefully when taking an exam	14.6	33.1	30	22.3
7	I usually get a good night’s rest before a scheduled exam	46.9	30	16.9	6.2
8	I understand the structure of different types of tests, and can prepare for each type	34.9	43.4	13.2	8.50
R a t i o	overall	29.95	38.88 75	19.52 5	11.63 75

.Table 3: Questions and their answers formulated in the post-questionnaires.

Index	Questions	Never	Sometimes	Usually	Always
1	I try to find out what the exam will cover and how the exam is to be graded	2.6	10.5	28.1	58.8
2	I feel confident that I am prepared for the exam	0.6	9.2	26.8	63.4
3	I try to imagine possible test questions during my preparation for an exam	2	8.5	30	59.5
4	I am calmly able to recall what I know during an exam.	2	5.9	17.6	74.5
5	I take time to understand the exam questions before starting to answer	2.6	7.2	31.4	58.8
6	I follow directions carefully when taking an exam	0.6	7.2	20.3	71.9
7	I usually get a good night's rest before a scheduled exam	3.3	7.8	24.2	64.7
8	I understand the structure of different types of tests, and can prepare for each type	2.6	11.1	17	69.3
R a t i o	overall	2.03 75	8.42 5	24.42 5	65.1 125

4. COMPARISON OF PRE AND POST RESULTS

The pre-and post-feedback questionnaire results significantly improved students' exam-taking skills after using the self-assessment tool. Before using the tool, students reported lower levels of confidence, less effective exam preparation, and a weaker understanding of exam structures. However, after using the tool, students reported increased confidence, better preparation, and improved strategies for approaching different types of exams. Specifically, students were more likely to seek out information about the exam, imagine potential test questions, take time to understand exam questions and follow directions carefully. The findings suggest that utilizing the self-assessment tool can serve as a viable approach for improving students' exam-taking skills and preparing them for success in higher education. The difference in the proportions of answers before and after using the tool about students' answers with "never" and "always" indicates a significant improvement in students' skills in applying for tests, as the percentages of responses changed significantly before and after using the tool, as there was a difference of 27.91 % answered with "never", and 53.46% with "always". Figure 5 and Figure 6 show the differences in answers between pre and post of using the tool.



5. ASSESSMENT AND RECOMMENDATIONS

Upon analyzing the data collected, it is evident that the self-assessment tool we developed has had a constructive influence on students' examination skills within the context of higher education. Pre-feedback assessment results showed a significant gap in students' self-perceived and actual exam skills. However, post-feedback results demonstrated a substantial improvement in students' exam skills across all skill areas assessed. Educators and instructors recommend incorporating self-assessment tools like the proposed tool in their teaching practice to improve student's exam performance and foster self-awareness of their strengths and weaknesses. Furthermore, future research can focus on improving the design of self-assessment tools and examining their effectiveness in various educational curricula and settings. It can also analyze the impact of self-assessment tools on students' performance, such as increasing self-confidence, class participation, and academic achievement overall. In general, self-assessment tools are an effective means of improving students' exam skills in higher education, and instructors can provide the necessary support to use these tools effectively and correctly to enhance their performance and promote their success in higher education.

6. CONCLUSION

In conclusion, this study provides valuable insights into developing and evaluating a self-assessment tool designed to improve students' exam-taking skills in higher education. The findings indicate that the tool positively impacts students' confidence, preparation, and exam-taking strategies. The study highlights the importance of self-assessment tools in helping students develop effective learning strategies and prepare for exams.

The implications of the findings for higher education institutions include the need to incorporate self-assessment tools into their teaching and learning strategies to help students develop the necessary skills for successful exam-taking. Furthermore, this study highlights the importance of providing students with the necessary support and resources to enhance their learning experiences.

The study's limitations comprise a limited sample size and a single institution's setting. In order to improve the generalizability of the study, it is recommended that future research expand the scope of the study by increasing the sample size and conducting it in multiple institutions. Additionally, future research could examine the long-term effects of using self-assessment tools on students' academic performance and learning outcomes.

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