Technology Readiness and Self Efficacy Impact to Technology Adoption for Student Assessment in Marine Vocational School

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Abstract—This study aims to address this research gap by investigating the relationship between technology readiness, self-efficacy, student competence, and technology adoption in the specific context of assessment. Assessment plays a crucial role in the management of marine vocational schools, encompassing the principles of planning, organizing, actuating, and controlling. The increasing importance of technology adoption in education necessitates a focus on technology readiness, as it plays a vital role in facilitating the adoption and utilization of educational technologies. However, previous research has not thoroughly examined the direct or indirect impact of technology readiness on technology adoption in the context of assessment. By focusing on marine vocational students, who often encounter various technological tools in their education, this study aims to shed light on the factors that influence their adoption of technology for learning evaluation purposes. The study involved 115 marine vocational students who utilized learning evaluation software as respondents. Through data analysis, the findings

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Keywords— technology readiness, self efficacy, student competence, technology adoption, student assessment.

1. Introduction

Education involves imparting knowledge to students through diverse methods, requiring effective management to enhance efficiency. It encompasses providing students with necessary materials to develop specific competencies and employing various methods to foster knowledge acquisition (Manuel, 2017). Education, guided by management principles, encompasses stages of planning, organizing, actuating, and controlling. The



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supervision process involves evaluating learning activities to assess potential and obstacles in knowledge comprehension. Evaluation can be conducted through conventional paper-based methods or modern computer-assisted techniques. The purpose of this evaluation is to gauge students' understanding levels during the learning process. In the current era, technology plays a crucial role in enhancing the efficiency of learning evaluations, benefiting students, teachers, school principals, and other stakeholders. Technologically supported evaluations provide transparency for students, aiding their understanding of knowledge progression. For teachers, technology-based learning evaluations streamline supervision and minimize cheating, ensuring efficient and effective assessment of students' comprehension. School principals, responsible for educational supervision, require technology-driven evaluations to facilitate monitoring of learning activities and students' knowledge progress.

Learning evaluation aims to assess students' understanding of the material and their ability to apply concepts into practical actions. In Indonesia, vocational education is offered across various fields, including maritime affairs. Technology-based learning evaluations are employed in the marine sector; however, the technology used is sourced from outside Indonesia and does not align with appropriate evaluation standards (Handayani & Shinta Dewi, 2019). Evaluations are meant to gauge students' abilities and skills based on their competencies. Unfortunately, the current technology used for learning evaluation does not adequately measure student competence, necessitating a shift towards alternative technologies (Alimen et al., 2019). This shift requires students to prepare for the operation of the new technology to facilitate the evaluation process. The software designed for testing purposes in the shipping sector aims to assess students' comprehension of the taught material.

Computer-Based Testing (CBT) refers to the use of technology, specifically computers, in administering tests and assessments to vocational students. CBT technology adoption in vocational education involves the integration of computer-based testing systems into the assessment practices of vocational schools. This technology assists students, teachers, and principals in fulfilling their respective responsibilities. However, previous studies have not extensively examined the

readiness to use new learning evaluation tools, emphasizing the need for research on technologydriven self-efficacy and readiness. While previous research has explored self-efficacy related to operating technology, there is a gap in understanding the readiness to operate learning evaluation tools among students. While the importance of technology in education has been analyzed in previous research, few studies have focused on integrating technology in learning evaluations. The relationship between technology adoption, technology readiness, and selfefficacy in the context of vocational education has been studied to some extent. However, there is a research gap that necessitates further investigation. Specifically, there is a need for more comprehensive studies that simultaneously examine the influence of technology readiness and self-efficacy on technology adoption in vocational schools. Existing research has largely focused on individual factors such as perceived usefulness, ease of use, and training opportunities, in relation to technology adoption. While these factors are important, they do not fully capture the complex interplay between technology readiness and self-efficacy in influencing the adoption of technology in vocational education settings. By exploring the combined effects of technology readiness and self-efficacy on technology adoption, researchers can gain a deeper understanding of the mechanisms that drive successful integration of technology in vocational schools.

Previous research primarily treated technology as a tool within the learning process, resulting in limited exploration of technology's potential in the realm of learning evaluation (Adinda & Mohib, 2020; Shaqour et al., 2021). This study aims to delve deeper into technology readiness and its influence on students' competence in operating software for learning evaluations. The readiness of students to use the software will have implications for the adoption of technology in evaluating learning at marine vocational schools in Indonesia. The primary objective of this study is to enhance students' technology readiness to effectively utilize learning evaluation tools. Furthermore, it examines the impact of technology readiness on the adoption of technology among marine vocational students. The research contributes to the existing body of knowledge by highlighting the significance of technology readiness and its influence on students' competence and the adoption of technology in learning evaluation. It offers practical implications for educators, policymakers, and stakeholders in promoting

effective technology integration in marine vocational schools.

2. Literature Review

Education, management, and technology are interconnected (Hatlevik, 2017), with education being a competency-focused process that imparts knowledge and skills to students. It incorporates management principles such as planning, organizing, implementing, and monitoring to guide organizational activities. The significance of learning evaluation lies in assessing students' skills in previously taught materials, enriching their insights and expertise (Lee et al., 2019). The measurement aims to analyze students' acquisition of taught material and serves as a reference in the learning process. Evaluations require technology for effective and efficient management, combining hardware, software, and educational theories to shape training and facilitate learning. Educational technology utilizes theoretical knowledge from various disciplines to conduct evaluations and enhance the learning process. This research focuses on evaluating students' knowledge acquisition during their education. Educational technology utilizes process equipment to support learning and achieve predefined goals, serving as a tool that facilitates knowledge transfer and the use of targeted learning media.

Technology adoption is of significant importance for students in today's digital age. Technology integration in education allows students to access a wealth of information and resources beyond conventional textbooks. Student can engage with interactive learning materials, multimedia content, and online simulations, which can enhance their understanding of complex concepts and make learning more engaging and enjoyable (Pavan Kumar, 2021). The internet provides students with access to an enormous amount of information, enabling them to explore various topics, conduct research, and gather data for their assignments and projects (Muktiarni et al., 2022). This availability of information broadens their knowledge base and encourages independent learning. Adaptive learning platforms can assess a student's strengths and weaknesses and provide targeted resources and activities to address their specific learning gaps. This personalized approach helps students learn at their own pace, promoting better understanding and retention of knowledge. When students perceive technology as useful and easy to use (technology adoption factors), they are more likely to develop higher levels of self-efficacy in using technology. Positive experiences with technology adoption can enhance students' confidence in their ability to engage with technology, leading to increased self-efficacy. A higher level of technology readiness, which includes having the necessary skills and resources, promotes technology adoption. When vocational schools provide adequate technology resources, training programs, and technical support, students and educators are more likely to adopt technology in their teaching and learning processes (Sumirat et al., 2022). Several studies have highlighted a positive relationship between technology adoption and self-efficacy in vocational education. When students perceive technology as beneficial and easy to use, their confidence in using technology for vocational tasks increases. Factors such as technical support, training programs, and positive technology experiences play a significant role in fostering students' self-efficacy in technology adoption. Studies have emphasized the importance of technology readiness in facilitating technology adoption in vocational schools. Schools that provide the necessary infrastructure, resources, and support systems are more likely to promote the integration of technology in teaching and learning practices (Kulkarni et al., 2018). Research has indicated that technology readiness factors, including access to technology resources, training opportunities, and organizational support, significantly influence the adoption of technology by both students and educators in vocational education settings.

3. Hypothesis Development

Based on the theories related to technology readiness, self-efficacy, student competence, and technology adoption in schools, several hypotheses can be formulated with supporting explanations. The following hypotheses can be proposed in this research:

A. The effect of technology readiness on competence and technology adoption

Technology readiness is a student-based factor influencing their proficiency in utilizing technology for learning evaluations. It encompasses the aptitude for using technology-based tools or media in the evaluation process. Technology readiness is influenced by multiple factors that enhance students' mastery, particularly among the younger generation, who are accustomed to incorporating technology into

their lives. Given their familiarity, younger students in marine vocational schools adapt more swiftly to technology. Prior research has affirmed that readiness to employ technology impacts one's ability to effectively master and operate it (Chen et al., 2022). Readiness to use technology is linked to constant technology usage. Older generation utilizes technology less frequently. Research connects technology readiness with competence in operating learning evaluation tools. These tools are computerbased with software. Proficiency in technology facilitates mastery of evaluation methods. Student competence involves mastering technology. Factors encouraging technology readiness are crucial. External socialization factors enable experience and knowledge in technology-based software usage, enhancing technology competence (Mittelmeier et al., 2019). Technology is a crucial factor that facilitates students' learning evaluation compared to conventional paper-based methods. Students, being part of the younger generation, have a strong familiarity with technology. Technology serves as a tool for students to assess their learning process. The evaluation process requires the use of technology to measure the skills and abilities of students in a marine school, which is parallel to senior high school. Technology-based evaluation offers convenience and comfort in answering exam questions. Employing technology for testing enhances transparency and efficiency (Wijngaards-de Meij & Merx, 2018). The integration of technology in learning evaluation fosters students' perception that its use facilitates the evaluation process, thus promoting technology adoption. Previous research has established a correlation between technology readiness and student adoption in learning evaluation (Topal, 2016). The ease of using technology contributes to the numerous benefits it offers, consequently piquing students' interest in its adoption.

H1a: Technology readiness positively affects students' competence in utilizing software for evaluating learning at marine vocational schools.

H1b: Technology readiness marine vocational students significantly and positively influences technology adoption.

H1c: Technology readiness marine vocational students influence technology adoption through students' competence

B. The Effect of Self-Efficacy on Student Competence and Technology Adoption

Self-efficacy is the belief that action leads to success, fostering self-confidence and motivation. It plays a crucial role in encouraging specific actions with purpose. Students' self-efficacy forms when they believe in their ability to perform tasks, including mastering evolving technology. As technology rapidly advances, students who embrace its development believe it enhances their competence in evaluation. Self-efficacy encompasses beliefs and behaviors related to performance, reflecting confidence influenced by motivation and the social environment (Amora & Fearnley, 2020). Students' confidence in mastering technology affects their proficiency in using computers and evaluation software. The social environment impacts students' motivation and beliefs regarding computer and software usage for assessment. Students, being part of the younger generation, are familiar with computers and software, further reinforcing their belief in utilizing these tools for learning evaluation. Readiness for evaluation requires self-efficacy, as it boosts students' confidence and motivation in operating these tools. Student self-confidence drives the technology adoption process. When students feel capable of operating technology, they perceive it as a convenient medium. Students accept technology as a tool for measuring self-efficacy, including their skills and expertise in shipping (Estimo, 2020). The tools used to assess the learning process promote technology adoption, with technology being recognized as a capable tool for evaluating sailing education. The tool's effectiveness in evaluating learning relies on students' self-confidence, and when students can operate it easily, they tend to favor the device. Students face a dual challenge when encountering difficulties in using the equipment and evaluating learning materials. They must simultaneously learn to operate the technology-based equipment and evaluate the learning content. By easily operating technology-based tools for learning evaluation, students can focus primarily on assessing learning materials, which is the primary goal and indicator of learning success. The evaluation function demonstrates students' achievement of learning objectives.

H2a: Self-efficacy significantly and positively influences marine vocational students' ability to operate technology-based learning evaluation tools

H2b: Self-efficacy fosters confidence in operating technology, motivating marine vocational students to adopt technology for learning evaluation

H2c: Self-efficacy marine vocational students affect technology adoption through student competence

C. The effect of student competence on technology production

Competence in using technology facilitates learning evaluation, enhancing transparency, efficiency, and effectiveness in measuring learning success. Shipping Schools, as vocational institutions focusing on skill mastery, rely on regular learning evaluation to assess student abilities. Technologybased media are employed for evaluation, necessitating students to acquire technological proficiency before engaging in material assessment (Hsiao & Tang, 2014). External support, such as socialization on software usage, is crucial in enabling students to easily learn and operate the necessary technology, which supports learning evaluation. Userfriendly and easily accessible technology promotes its adoption for evaluation purposes (van Groen, 2020). Satisfied users are more likely to embrace technology for learning evaluation. Recognizing the importance of the learning evaluation process, socialization efforts are necessary to facilitate software learning and encourage technology adoption.

H3: Marine vocational students' competence in utilizing technology for learning evaluation significantly influences technology adoption.

4. Research Methods

The study employs a quantitative approach, utilizing statistical methods to analyze data and draw conclusions. Data is obtained through a questionnaire instrument, utilizing a Likert scale to measure respondents' agreement. The research is conducted at a marine vocational school that utilizes software for learning evaluation. A total of 115 respondents' data is collected for tabulation and analysis, enabling interpretations to address the research problem and test the hypotheses. The study focuses on four variables: technology readiness, self-efficacy, student competence, and technology adoption. Technology readiness pertains to students' ability and knowledge in operating software for learning evaluation. Selfefficacy refers to students' beliefs in their capacity to operate technology for learning evaluation. Student competence represents the actual ability to utilize technology for learning evaluation. Technology adoption relates to students' acceptance and integration of technologies used in the learning evaluation process. The data is analyzed using SEM PLS in several stages: validity testing, reliability testing, Fit model testing, and hypothesis testing. Validity testing assesses the loading factor, with a criterion of >0.6. Reliability testing examines Cronbach's alpha and composite reliability, with a criterion of >0.7. Fit model analysis is conducted using chi-square and SRMR, with the SRMR criterion being <0.1. Hypothesis testing is performed to confirm the research hypotheses, examining t-test results (>1.96) and sig. (<0.05) at a 95% significance level (Savalei & Rosseel, 2022).

5. Results

This research presents descriptive data in the form of respondent data. In addition, the testing results are also presented, including validity testing, reliability testing, hypothesis testing, and model fit.

Table I : Descriptive Statistics

Description		N
Gender	Male	92
	Female	23
Age	<17	41
	17-20	56
	>20	18
Frequency assessment using an application	1	16
	2	18
	3	27
	>3	54

Based on Table I, mostly respondents are male due to data collection in a marine vocational school. The age range mostly falls between 17 and 20. Respondents are capable and fluent in using the application because its frequency is greater than 3.

A. Validity test

The validity test of the study was conducted to analyse the items that compose the variables. The

Table II : Validity Test Result

Variable Indicator	Self Efficacy	Student Competence	Technology Adoption	Technology Readiness
I am able to navigate and use technology tools and software proficiently.		0.707		
I can effectively evaluate my learning progress using technology-based methods.		0.821		
I am capable of adapting to new technological advancements and incorporating them into my learning process.		0.792		
I am confident in my ability to use technology for learning and evaluation purposes. I believe that I can effectively operate technology tools and software.	0.767			
I am confident in my problem-solving skills when faced with technological challenges.	0.790			
I regularly use technology tools and software for my learning and evaluation needs.			0.845	
I see the value in incorporating technology into my educational experience.			0.809	
I actively seek out new technologies that can enhance my learning outcomes.			0.701	
I feel comfortable using technology for educational purposes.				0.869
I have the necessary knowledge and skills to operate technology tools and software.				0.831
I enjoy exploring new technologies and learning how to use them effectively.				0.800

validity test was used to prove that the items could measure the variables. Table II represents the validity test.

The validity test results show that all items in the study have met the validity measurement. The results

Table III : Fornell-larcker And Ave Result

	Self Efficacy	Student Competence	Technology Adoption	Technology Readiness	Average Variance Extracted (AVE)
Self Efficacy	0.798				0.638
Student Competence	0.562	0.772			0.596
Technology Adoption	0.523	0.696	0.788		0.620
Technology Readiness	0.741	0.589	0.523	0.834	0.695

of the Fornell-Larcker strengthen validity testing and Average Variance Extracted (AVE) in Table III.

B. Reliability Test

Reliability testing is intended to analyse reliability and consistency. The results of the reliability test depicted in Table IV. The Cronbach's alpha and composite reliability values obtained in this study are in line with the rule of thumb, indicating good internal consistency and reliability of the measurement scales used in the research.

Table IV : Cronbach's Alpha and Composite Reliability Result

Cronbach 3711pha and Composite Renability Result					
	Cronbach's Alpha	Composite Reliability			
Self Efficacy	0.747	0.841			
Student Competence	0.716	0.815			
Technology Adoption	0.729	0.830			
Technology Readiness	0.782	0.872			

C. Test Model Fit

The test to analyse the Fit model is intended to determine the model's goodness in Table V.

Table V : Model Fit Result

Saturated Model	Estimated Model
0.09	0.090
0.627	0.627
0.255	0.255
168.694	168.694
0.701	0.701
	0.09 0.627 0.255 168.694

The model fit of the study in Table V is consistent with the rule of thumb, indicating a good fit between the proposed model and the observed data.

D. Hypothesis testing

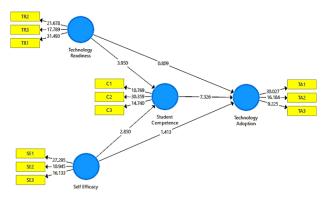


Fig. 1: Research Framework

Table VI : Direct Effect Result

Hypothesis	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
Self Efficacy → Student Competence	0.278	0.282	0.098	2.850	0.005
Self Efficacy → Technology Adoption	0.143	0.136	0.101	1.413	0.158
Student Competence → Technology Adoption	0.568	0.569	0.077	7.326	0.000
Technology Readiness → Student Competence	0.383	0.386	0.097	3.950	0.000
Technology Readiness → Technology Adoption	0.082	0.093	0.102	0.809	0.419

Table VII : Indirect Effect Result

Hypothesis	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
Technology Readiness → Technology Adoption	0.218	0.219	0.061	3.577	0.000
Self Efficacy→ Technology Adoption	0.158	0.16	0.06	2.624	0.009

The results of the hypothesis test indicate both a direct effect (Table VI) and an indirect effect (Table VII). The direct effect demonstrates that technology readiness and self-efficacy do not directly impact

technology adoption. However, their influence on technology adoption is mediated by student competence.

6. Discussion

Learning evaluation is a process aimed at measuring students' abilities and skills during their learning journey. Two aspects are crucial for effective participation in learning evaluation: readiness to operate the evaluation tool and readiness to engage in material assessment. Research primarily focuses on the evaluation tool aspect. When students are adept at using the tool, they encounter no obstacles during the learning evaluation process. Their sole focus lies in evaluating the material, specifically the questions provided by the teacher as the evaluator. The evaluation process necessitates preparedness, including self-efficacy, which enhances students' selfconfidence and motivation to proficiently operate the evaluation tool as a medium. Research concentrates on the evaluation tool aspect, where students face no hindrances while evaluating learning. Their primary focus remains on assessing the material, namely the questions posed by the teacher as the evaluator (Fleming et al., 2017).

Previous research has explored the relationship between self-efficacy, student competence, and technology adoption, specifically in the context of Computer-Based Training (CBT) or technologyassisted learning. Several studies have examined how self-efficacy influences students' competence in utilizing technology and their willingness to adopt it for learning purposes. For instance, a study Wang (Wang & Zhu, 2019) investigated the role of selfefficacy in technology adoption and competence among students. The findings revealed that higher self-efficacy beliefs were positively associated with students' competence in utilizing technology. Moreover, students with higher self-efficacy were more likely to adopt technology as a tool for learning. Previous study, examined the relationship between self-efficacy, competence, and technology adoption among college students using CBT. The results indicated that students with higher self-efficacy beliefs demonstrated greater competence in using CBT software and were more likely to adopt technology for their learning needs (Yamada et al., 2017). Students with higher self-efficacy beliefs exhibited higher levels of competence in utilizing CBT and were more inclined to adopt technology for learning purposes (Dubey & Sahu, 2022). Previous



research suggests that self-efficacy plays a significant role in predicting students' competence in utilizing technology, such as CBT, and their willingness to adopt it for learning (Nguyen et al., 2020). Students with higher self-efficacy tend to exhibit greater confidence, proficiency, and openness in using technology tools for learning activities. These findings highlight the importance of fostering self-efficacy beliefs among students to enhance their competence and promote technology adoption for effective learning experiences, including CBT.

The research findings demonstrate a significant impact of technology readiness on student competence. The study confirms that being prepared to operate technology directly influences students' actual ability to effectively utilize technology for learning evaluation. Learning evaluation plays a crucial role in applying appropriate management principles throughout the learning process. It falls under the category of control, ensuring that schools have appropriate criteria to develop students' expertise and knowledge in the shipping sector. Learning evaluation is essential in promoting effective learning strategies. When evaluation results are suboptimal, adjustments can be made during the learning process by employing ideal learning strategies and methods. The study's results provide evidence that readiness to use technology encourages students to incorporate it into their learning evaluation practices. This research emphasizes the significance of the technology readiness process as a crucial factor that enables students to focus on evaluating the learning material.

Previous research has examined the relationship between technology readiness and student competence, as well as technology adoption, specifically among vocational students. Several studies have shed light on the impact of technology readiness on students' competence in utilizing technology and their willingness to adopt it for learning purposes. Previous research, (Berenyi et al., 2021) investigated the relationship between technology readiness and student competence in using technology for vocational education. The findings revealed that higher levels of technology readiness among vocational students were positively associated with their competence in operating technology tools and effectively applying them in vocational learning contexts. Similarly, (Alghamdi et al., 2022) explored the relationship between technology readiness and technology adoption among vocational students. The results indicated that students with higher levels of technology readiness were more likely to adopt and integrate technology into their learning processes, demonstrating a greater willingness to utilize technology tools for vocational education. Furthermore, technology readiness significantly predicted both student competence in utilizing technology and their propensity to adopt technology for vocational learning (Tang et al., 2021). Higher levels of technology readiness contribute to students' proficiency in operating technology tools and their openness to integrating technology into their vocational learning experiences. These findings highlight the importance of fostering technology readiness among vocational students to enhance their competence and promote technology adoption for effective vocational education.

Previous research has examined the relationship between student competence and technology adoption, focusing on how students' competence in utilizing technology influences their willingness to adopt and integrate it into their learning experiences. (Senaratne & Samarasinghe, 2019) investigated the factors influencing the adoption of technology, including individual characteristics such as competence. The findings indicated that students' perceived competence in using technology positively influenced their intention to adopt and use it for learning purposes. The researchers examined the relationship between user competence and technology adoption. The results showed that students' competence in using technology significantly influenced their intention to adopt and use it for various tasks, including learning activities (Damerji & Salimi, 2021). Students' competence in utilizing technology significantly influenced their willingness to adopt and integrate it into their vocational learning experiences (Antee, 2021). Student competence in using technology plays a crucial role in their willingness to adopt and integrate it into their learning processes. Students who perceive themselves as competent in utilizing technology are more likely to embrace and incorporate it into their educational activities. These findings highlight the importance of developing students' competence in technology use to enhance technology adoption and promote effective learning experiences.

Technology should be utilized as a user-friendly tool for efficient evaluation, allowing students to focus on the evaluation process without being burdened by the complexities of operating the tools (Long & Van Hanh, 2020). Students' readiness, specifically through self-efficacy, plays a crucial role in conducting technology-based evaluation. When students perceive that computer tools and software can be easily operated, it enhances their willingness to adopt technology. The convenience offered by software and computer operation expands the range of available technology options. Proficiency in computer operation is a technical skill that students must acquire to effectively evaluate learning (Suartama et al., 2019). Implementing technologybased evaluation successfully facilitates a more accurate measurement of learning objectives. Technology tools such as educational apps, multimedia presentations, and collaborative platforms encourage active engagement and participation among students. It enables them to interact with content, collaborate with peers, and develop critical thinking and problem-solving skills. Technology enables personalized learning experiences tailored to individual student needs and learning styles. Adaptive learning platforms, intelligent tutoring systems, and educational software can assess students' strengths and weaknesses, providing targeted instruction and feedback for better learning outcomes.

Conclusion

The findings of this study reveal an important relationship between technology readiness, selfefficacy, student competence, and technology adoption. It was observed that technology readiness and self-efficacy alone do not directly impact technology adoption. However, student competence in operating technology for learning evaluation acts as a mediating factor. In other words, students' ability to effectively use technology in the evaluation process plays a crucial role in encouraging technology adoption. The study highlights the significance of student competence in determining technology adoption. Without the necessary skills and proficiency to operate technology, technology readiness and selfefficacy alone may not influence the adoption of technology. Therefore, it becomes crucial to focus on enhancing student competence through developing both their readiness to operate technology and their confidence in evaluating learning. In conclusion, this study underscores the importance of student competence as a key determinant of technology adoption. By equipping students with the necessary skills and confidence to utilize technology for learning evaluation, educational institutions can foster a culture of technology adoption that positively impacts students' learning experiences and outcomes.

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