Revolutionizing Primary Education Assessment: Opportunities and Challenges in Bandar Lampung's Technology-Driven Landscape

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ABSTRACT. This study aims to analyze the opportunities and challenges associated with implementing a technology and information-based educational assessment system in elementary schools in Bandar Lampung. The study recruited ten respondents who were IT staff members, teachers, and principals from upper-grade primary levels (grades IV, V, and VI). It used a qualitative descriptive research design. The research focused on identifying the opportunities and challenges related to IT-based assessment systems. Data collection methods included observations, interviews, and documentation, while data analysis was conducted using the Miles and Huberman model, encompassing data reduction, data display, and data verification. The findings reveal significant opportunities in adopting a technology-based assessment system, such as using Google Forms for flexible assessment scheduling and enhanced data analysis capabilities afforded to teachers through IT tools. However, notable challenges were also identified, including insufficient IT proficiency among teachers and staff, concerns over data privacy and protection, and inadequate internet connectivity within school premises, which hampers the effective use of IT-based applications. The study recommends that schools provide intensive training for teachers and staff to enhance their IT skills. The conclusion is that while technology-based assessment systems offer considerable advantages in facilitating teachers' tasks, the identified challenges must be addressed to optimize the benefits and overcome the obstacles encountered.

Keywords: *Education technology, elementary school, IT based assessment system*

INTRODUCTION

The importance of assessment in learning process activities needs serious attention, considering that assessment is an integral part of the learning process. Assessment is one of the activities carried out by teachers and students from a series of learning activities (Hanifah, 2019; Mujiburrahman et al., 2023). As learning managers, teachers must be able to prepare and carry out assessments using the correct procedures to achieve the set learning objectives. According to Ma'ruf et al. (2024), assessment is any form of information gathering by teachers, where teachers collect data about their students, analyze and synthesize it, interpret it, and use it in the classroom to make decisions. Learning outcome assessment tools can take advantage of currently developing technology where assessment of student learning outcomes will be faster using machines (computing), reach all routine work (automation), and communication can be done from anywhere and at any time (Abi Hamid, 2016; Rahmawati et al., 2022; Solihin, 2022). Information and communication technology development is increasingly rapid, and educational practitioners are

starting to direct assessments and move to computerized systems to improve the quality of education. For this reason, it is necessary to develop evaluation media using technology to support the process and assessment of student learning outcomes. So far, teachers have carried out assessments using conventional methods, namely paper-based tests (Imania & Bariah, 2019; Weni & Isnani, 2016)

According to Destiana et al. (2020), innovation is needed in assessing learning outcomes using IT-based evaluation or assessment tools as an application of IT in the field of education so that it can improve the quality of evaluating student learning outcomes in schools. Through the development of the learning outcomes test, the process of assessing student learning outcomes can be carried out without using paper (paperless) so that it can save costs on duplicating questions, is economical, practical, accessible, environmentally friendly, accurate, and efficient. Another problem teachers face is correcting student answers manually, which takes quite a long time, so the results of the student's assessment cannot be immediately known. Manual correction of student answers also has the potential for human error.

Therefore, tools are needed to correct student answers through computerization so that teachers do not need to correct student answers manually. The value of student learning outcomes can be known when students have finished working on all the questions on the learning outcomes assessment test. There is relevant research related to this article, namely, Rogers Pakpahan's research, which states that computer-based exams can be carried out in all regions or educational units if computer devices and the internet support them. So that the implementation of computer-based exams can run smoothly, educational units must prepare hardware, internet networks, and local computer networks (Pakpahan, 2016). Meanwhile, in research, Vertirico Thong said that digital-based education has many benefits and opportunities. Technology, communication, and information support can help build better education. Especially in the post-pandemic era, we need more innovation and increased digital literacy (Thong et al., 2023).

The uniqueness or difference from previous research lies in the assessment application and assessment system used based on the challenges faced in a particular area in the use of technology. Meanwhile, this research focuses on the opportunities and challenges of information and technology-based educational assessment systems, especially in primary education. Based on the problem topics above, the researcher aims to analyze the opportunities and challenges of a technology and information-based education assessment system for elementary schools in Bandar Lampung.

METHOD

This research uses a qualitative descriptive design to describe and analyze the phenomenon of implementing an IT-based assessment system in elementary schools. This design was chosen to understand in depth the experiences, opportunities, and challenges teachers and staff face in implementing technology. The research object is the opportunities and challenges of IT assessment systems, the implementation of IT-based assessment systems, and the development of assessment instruments and IT-based assessment systems.

The research location is at 3 Way Laga Elementary School in Bandar Lampung from January to March 2024. Determining the research location was carried out through several stages and considerations, namely (1) identification of research objectives: this school has started or is planning to implement an IT-based assessment system, (2)) city selection: SD N 3 Way Laga has relatively good technological infrastructure compared to schools in other areas, the Bandar Lampung city government has carried out technology-based education development, including programs that support school digitalization, (3) school selection: conducting an initial survey to identify schools that have been in the process of adopting an IT-based assessment system, selecting public schools in city centers with different levels of technology adoption, (4) purposive sampling: schools were

selected because they were able to provide insight into the opportunities and challenges of implementing an IT-based assessment system. The research subjects were principals, teachers, and IT staff of upper elementary schools (IV, V, and VI), totaling ten respondents.

The number of respondents in the study was determined because, with a smaller number of respondents, researchers can conduct more in-depth interviews and obtain detailed data, ten respondents can provide relevant and in-depth information about the topic under study, ten carefully selected respondents are sufficient to ensure the validity and reliability of the data through triangulation, ten respondents selected purposively could cover sufficient variation in terms of relevant characteristics such as teaching experience and level of technological understanding. The research instruments used were (1) observation to record the activities and process of implementing an IT-based assessment system in the classroom, (2) a list of interview questions, including open questions to explore the experiences and views of teachers, principals, and IT staff, (3) documentation: to collect and record documents related to the assessment system such as assessment reports, report cards, and policy documents.

Data was collected by (1) observation: directly observing the process of implementing an IT-based assessment system in the classroom and school environment, and (2) in-depth interviews: conducting semi-structured interviews with teachers, principals, and IT staff. This interview aims to gain an in-depth understanding of experiences and perceptions of IT-based assessment systems. (3) Documentation: Collect related documents such as student assessment reports, school policies regarding assessment, and technical notes on the IT system used. Data validity is measured by observation, increasing persistence, and triangulation of sources and techniques. Data analysis uses the Miles and Huberman model, which includes (1) data reduction, the process of selecting, focusing, simplifying, abstracting, and transforming rough data that emerges from field notes, interviews, and documents; (2) data display: arranging the reduced data in form a matrix, graph, table, or diagram to facilitate understanding and interpretation. Presentation of data helps in seeing patterns, themes, or relationships that emerge from the data; (3) verification and concluding: concluding and verifying data through triangulation, namely comparing and confirming data from various sources.

The research procedures carried out were (1) preparation stage: identifying SDN 3 Way Laga, which would be the research location; compiling research instruments including observations, list of interview questions, and documentation format; and instrument testing to ensure the validity of the data. (2) Data collection stage: conducting direct observations at SDN 3 Way Laga to see the implementation of the IT-based assessment system; conducting in-depth interviews with teachers, principals, and IT staff; collecting documents related to assessment reports, student report cards, and documentation of the IT system used. (3) Data analysis stage: organizing and reducing the data that has been collected; presenting data in a form that can be analyzed; verifying and triangulating data for the validity of findings. (4) Reporting stage: compiling a report on research results and submitting recommendations based on research findings. The following are the steps in Miles and Huberman's data analysis:
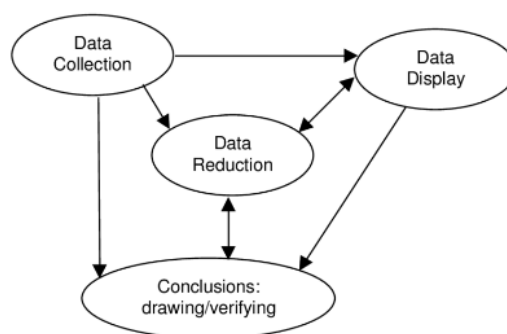

Figure 1. Miles and Huberman Analysis Steps (Sam & Qohar, 2016)

RESULT AND DISCUSSION

Result

The world of education is one of the sectors that has benefited most from advances in information technology. The positive impact obtained by the world of education includes the ease of exploring various learning resources in the form of quality learning materials such as literature, journals, and books from experts worldwide. Educators and students can obtain or access these things easily, quickly, and cheaply. The extraordinary impact has provided a new atmosphere in the education system, especially in Indonesia. Various things related to the world of education can utilize information technology. It is appropriate to use information technology assessment in learning, which involves assessing learning outcomes. What is meant by information technology assessment is assessment activities that utilize, involve, or use information technology. Information technology assessment is no longer carried out manually. It is in line with the conditions students' face, namely the millennial generation, so educators are required not to be technologically illiterate. Therefore, educators must build creativity to innovate in assessing learning outcomes.

Several things about information technology that can be used as part of an information technology assessment include, first, assessment software. Educators can develop assessment models from manual assessment models to digital assessment models. Educators create an assessment model using information technology and assessment software in this case. Google Forms is the IT assessment tool teachers at SDN 3 Way Laga utilize to gauge the learning outcomes of their students. It is in line with interviews with class IV teachers Mrs. S and Mrs. P, who said that: *"SDN 3 Way Laga has used information technology to assess learning outcomes, considering that during the COVID-19 pandemic, teachers are inevitably required to carry out online learning and assessments. Until now, the assessment method for assessing learning outcomes has changed from manual, paper-based, and stationery-based to digital. Information technology assessment with the help of software helps speed up student assessment, and the results or scores obtained by students when doing the exercises come out immediately."*

Regularly grading, reviewing, and evaluating assignments can make a teacher's workday intolerable. Teachers can evaluate student work more swiftly, and now that technology and current internet tools have advanced, freeing up more time for genuine instruction. Students can check their uploaded assignments before sending them using software like Google Forms. In addition, this eliminates the need for students to carry all their work home and eliminates paper mounds on tables and misplaced exam papers. With technology, students can get answers to their questions without bothering each other. Technology allows for a more efficient and accurate assessment process, where human errors in adding or recording can be minimized. It is beneficial for teachers who can allocate time and energy to other activities, such as lesson planning and student coaching, and for students who receive feedback more quickly and accurately.

Second, flexibility in assessing student learning outcomes. Flexibility in assessing student learning outcomes refers to using various evaluation methods and approaches that can be adapted to students' diverse needs, abilities, and learning styles. It is important because every student has a different way of learning, so varied assessments can provide a fairer opportunity to demonstrate their understanding and abilities. By offering various forms of assessment, such as written tests, projects, portfolios, and presentations, as well as technology-based assessments, such as online quizzes and educational games, you can increase student involvement and motivation in the learning process. Flexible assessments also help reduce the stress and anxiety often associated with traditional exams. Technology, such as Google Forms, can provide multiple assessment forms and reduce the administrative burden. That way, teachers can assess students' work anytime and anywhere. It was also expressed by the sixth-grade teachers, Mrs. MM and Mrs. P, who: *"With technology, teachers' work in assessing becomes more effective. They are not tied to time when they finish teaching. They have to assess students' work, which can be taken home and corrected by the teacher during breaks or outside*

of study hours. For assessment, there is also no need to bother carrying textbooks or writing books, which are a burden on the teacher to bring to the teacher's room when assessing."

Teachers can easily access the assessment results via the online platform. In manual assessment, the teacher assesses by writing in a grade book at the end of teaching or during learning. In contrast, digital assessment uses information technology; during learning or at the end of learning, the teacher can assess and provide feedback in the form of comments or suggestions so that students can improve their work that has been done on the Google application form. Teachers can also assess student learning outcomes via gadgets, laptops, or computers. With flexibility in assessing, teachers can also identify students who work quickly and late. That way, there is no excuse for students who are late in submitting school work because the Google Form application already states the deadline for completing assignments.

Third, the ability to analyze data more deeply. Assessment with this information technology system can process big data to provide detailed insight into students individually and in groups. With the help of information technology, it is possible to see or analyze student grades on a large scale. You can display learning results from data analysis in Word, Excel, or graphic form. It is used for teachers to see the success of students' learning after receiving lessons. Previously, teachers assessed manually, which required several times to know which students had lower grades. However, with information technology, it only takes one or two times. It was also expressed by the class V teacher, Mrs. N, who said that: *"Information technology is beneficial in storing and analyzing student assessment data; it is not flammable, is not destroyed if exposed to water, and can even be stored in files to copy data on a computer or laptop. With the help of information technology, students can also quickly see learning results. From the Google form, student grade data can be converted into Excel to make it easier for teachers to analyze the grades for each lesson."*

Educators must be able to study technology so they understand it and how to use it well and wisely so they can use it correctly. If you can utilize technology correctly, you can easily carry out various activities related to learning, assessment, and so on. Access to various things through information technology must have a positive effect and help achieve a better future. Apart from opportunities that teachers and schools can utilize to make their work easier when assessing learning outcomes, there are various challenges in implementing an IT-based educational assessment system, namely (a) the lack of attitudes of teachers and staff towards the use of IT in the assessment process due to excessive use of English as well as is one of the obstacles in information technology resources. Teachers still have a lot to learn in applying and implementing an assessment system using Google Forms because the language in the application is foreign, so older teachers have to take training or ask younger teachers to teach them the assessment procedures. It was also expressed by one of the class V teachers, Mrs. N, who said that: *"Assistance is needed to use online assessments, and before practising them, teachers are given training on how to operate them so they know how to use them. Moreover, this application uses English, so it is confusing for teachers to have to ask or translate into Google Translate every time they want to use the application."*

Online assessment in education presents several challenges that need to be overcome. One of them is the need for more technical skills among teachers. Before implementing online assessments, adequate training is needed so teachers can understand how to operate the application. Especially when the application is in English, it can confuse teachers who must be fluent. They may need to use translation via Google Translate every time they operate the application, which can slow down the process and cause confusion. Therefore, it is essential to provide practical training and pay attention to accessibility and language when developing online assessment applications so that all teachers can use the platform effectively without unnecessary obstacles.

Apart from that, the challenges in assessment systems using information technology are (b) privacy and protection of assessment file data. Privacy and data protection in the context of online assessments is a crucial aspect that must be taken seriously. When collecting and storing student

information digitally, it is necessary to ensure that the data is stored safely and can only be accessed by authorized parties such as school IT staff. Security measures such as data encryption and appropriate access settings must be implemented to protect the confidentiality of student information. In addition, it is also essential to comply with applicable privacy regulations and provide transparency to users about how their data will be used.

Data collected in online assessments may also not be used for any other purpose without the user's express permission. With the proper steps in securing applications and servers, as well as proper education to users, we can ensure that the use of online assessments not only provides educational benefits but also maintains the privacy and security of student data properly. It is because exceptional IT staff must be trained in schools, and according to their knowledge, only schools with exceptional facilities and infrastructure have adequate school IT teams. 3 Way Laga State Elementary School needs an exceptional IT team or very sophisticated and proficient IT staff because employing specialized IT experts at the school is costly. It was confirmed by the principal of SDN 3 Way Laga, namely Mr. S, who said that: *"At this school, technology staff, especially those in IT, are not specifically hired for IT majors because by hiring experts, the school has to pay very expensively. Indeed, the advantage is that student data and school data are safer and cannot be accessed by just anyone, especially those related to student learning outcomes."*

While hiring IT experts with the appropriate educational background can improve the security of student data, it also has the potential to result in high costs for schools. Therefore, schools may choose to refrain from taking on exceptional staff who have an educational background in the IT field. However, this decision may present risks as staff not explicitly trained in information technology management may need to provide optimal protection of student data. The advantage of using trained IT staff is that student and school data can be more secure, with more controlled access and fewer opportunities for unauthorized parties. It also increases parents' and students' confidence in the security of their data. While the costs associated with hiring IT experts may be high, the long-term value of data security and enhanced trust may be worth the investment. Therefore, it is necessary to carefully assess the school's needs and financial capabilities to decide whether investing in trained IT staff is the right step in managing the school's information technology effectively.

Another challenge is (c) the availability of the Internet in the assessment process, which has a significant influence on uploading student assignments and downloading and analyzing student learning outcome data. To run Google Forms, you must use a stable internet. The learning assessment process and outcomes will run optimally with the Internet. The availability of the Internet plays a vital role in the use of Google in the assessment process. With stable internet access, students and teachers can easily access assessment forms from anywhere at school and home. It allows students to fill out forms online via their devices and submit answers directly to Google Forms without hassle. The availability of the Internet also allows for real-time data updates, allowing teachers to see student responses immediately after delivery. In addition, teachers can easily manage student assessment forms online, creating, editing, and organizing forms conveniently through the teacher's Google account. Although Google Forms offers significant advantages in the assessment process, internet availability remains critical in ensuring this tool's smooth and efficient use. Therefore, ensuring stable and reliable internet access is essential in supporting using Google Forms in the assessment process

Discussion

The development of information and communication technology, which is increasingly soaring as it is today, is being used by several education activists to direct exams or tests from traditional systems to move to computerized systems to improve the quality of education. Therefore, technological media needs to be used as a support in the process of assessing student learning outcomes because so far, teachers have carried out assessments of students using

conventional methods, namely paper-based tests (Masluhah & Afifah, 2022; Rosnaeni, 2021; Susiyanto, 2021). The weakness of paper-based assessment is that it requires prohibitive costs because you have to create questions, and the results of the questions that have been photocopied could be better. Sometimes, questions about the writing need to be more transparent and precise, and the quality of the photocopies could be better. It will undoubtedly make it difficult for students to answer questions.

In contrast to technology-based assessments, the questions are conducted via computer, and students have to answer them. They can be assessed immediately, so they are more practical, economical and efficient and do not require photocopying costs. In using learning outcomes assessment instruments through information technology, various essential aspects can be considered, including those based on practical, economic value and ease of implementation in schools (Inayati & Mulyadi, 2023). These values are adhered to to make the learning atmosphere more conducive, effective and productive. In principle, practical value can provide convenience in every process using information technology.

Meanwhile, in this case, the economic value is that information technology in implementing education makes it cheaper and more efficient (Mayasari et al., 2021; Syamsuar & Reflianto, 2019). In this way, the assessment of learning outcomes, which has tended to use paper in the implementation process, can be reduced to reduce the costs of purchasing paper and other materials (Agisna et al., 2023). In assessing learning outcomes, schools need innovation by assessing student learning outcomes using technology as a form of application that utilizes the sophistication of information and communication technology to improve the quality of evaluating student learning outcomes in the school. Fitriani (2021) lists a few advantages of using information technology: a) computers can complete tasks quickly; b) can perform repetitive tasks consistently; c) can complete tasks accurately and reduce human error; d) can complete tasks quickly, consistently, and accurately; e) it can be assumed that the decisions made can be trusted to yield the same results repeatedly; and e) can increase productivity and creativity.

Assessment of learning outcomes by utilizing technology can provide various conveniences. An application that can be used to create questions online is Google Forms. This application can be directly connected to an online learning application that can be accessed for free. It is free to use, so adjust it to create online exam questions. This application can create multiple-choice questions and long or short essays. Apart from being used to create questions, this application can also create surveys and questionnaires to determine how effective the material presented is (Wafara, 2023). Google Forms offers excellent opportunities as an effective and efficient assessment software. With features such as form customization, a variety of question types, and the ability to store and analyze data, the platform can help teachers better create, manage, and analyze assessments. Teachers can use Google Forms to create assessments tailored to their needs, from simple tests to more complex questionnaires. Features such as branch logic also allow for more adaptive assessment of student ability levels. It is also said by Astini (2020) that in online learning, one of the applications used is Google Forms; by using the Google Forms application, the distance learning process can be controlled and run. Similar to research by Haryani et al. (2023), technology can make learning activities easier and be a solution for the world of education.

The use of Google Forms provides excellent flexibility in assessing student learning outcomes. Teachers can create different types of assignments, such as written tests, practical projects, or reflection questionnaires, which can capture different aspects of student understanding. Using Google Forms, teachers can provide students with opportunities to demonstrate their understanding in various ways, increasing student motivation and engagement in learning. It allows for a more holistic assessment, covering creativity and problem-solving aspects. Google Forms provides the ability to analyze data in greater depth. With built-in features like Google Sheets, teachers can easily track and analyze assessment results to gain more detailed insights into student performance and teaching effectiveness. Through deeper data analysis, teachers can identify

student performance patterns, evaluate teaching methods' effectiveness, and make evidence-based decisions to improve learning outcomes. It allows for a more adaptive and responsive assessment approach to student needs.

One of the challenges faced in using information technology or digital assessment systems is the attitude of teachers and staff towards using IT in the assessment process. The excessive use of English in Google Forms can be a barrier, especially for those needing proficiency. Teachers and staff must be comprehensively trained and supported to meet this challenge. Training tailored to their skill level and needs and providing appropriate technical support can help overcome any fear or discomfort in using information technology. It is similar to research by Astini (2019), which stated that a teacher in this era must be technologically literate to remember.

Quality teachers without technology will not be able to instil "critical power" in students to become revolutionary humans. So, they need to work on exploring their potential. Professional teachers, including teachers in elementary schools, are the spearhead of implementing learning in the classroom, and they are now required to use and utilize developments in information and communication technology to support the learning process. Similar to research by Abidah et al. (2022), teachers must have competence and skills in utilizing facilities and infrastructure. Elementary school teachers can develop and improve the quality of learning to welcome the era of society 5.0. Learning in the era of Society 5.0 prioritizes human resources (teachers and students) as the centre of innovation in learning. Competent elementary school teachers will produce diligent and enthusiastic students about learning. It will enable students to improve their learning outcomes or increase their learning scores by continuing to innovate.

Another challenge in using information technology systems is the privacy and protection of assessment file data. When using Google Forms, it is essential to ensure that student data is stored securely and can only be accessed by school officials such as teachers and staff. Security measures such as data encryption, proper access settings, and regular system security monitoring must be implemented to protect student data from unauthorized access or leaks (Yusuf & Sodik, 2023). In research, Ziyad and Widodo (2024) for Carrying out data security from cyber attacks can be handled with cyber security, which can handle data leaks for any reason. However, it would be better if the programmer who creates digital mechanisms involving the implementation of the Out-of-School medium is also someone who can anticipate the coding process. Human resources are minimal, and awareness of the public's information security level still needs to improve, so training and empowerment in the technology field are needed.

In addition, internet availability is a critical factor in using Google Forms in the assessment process. A stable and reliable internet connection can hinder student and teacher access to assessment forms (Lembong et al., 2023; Nuriyah & Hikmah, 2023; Ulpah et al., 2024). It is important to ensure stable and reliable internet availability for all students and teachers involved in the assessment process. It can be done through investing in the school's internet infrastructure or providing alternatives for offline access when required. The research by Wulandari and Murdiono (2022) suggests that being constrained by the availability of internet quota is the same as being constrained by an unstable internet network. The availability of this internet quota means that the questions that have been worked on and the answers that have been chosen will be lost, or students will not be able to take the assessment according to the predetermined schedule. Students must repeat the questions from the initial number to work on them.

Another thing that may need to be prepared or checked before the assessment is the availability of adequate internet quota. If this is neglected, it may disrupt the assessment process. Similar to research by Syahrijar et al. (2023), adequate digital infrastructure can support learning activities. One of the most important components in implementing digital-based learning is the availability of an internet network via WiFi. The number of access points dispersed throughout each school area and the consistency of the signal quality can be used to gauge how good the WiFi

is in an educational institution. The quality of the internet network via WiFi still often needs improvement. It is known that the signal transmission power in schools is only partially distributed throughout and only at specific points. At the same time, in classroom areas, the internet network conditions are often problematic, and the signal cannot even be reached. By understanding the opportunities and challenges associated with using information technology systems in assessment, educators can take appropriate steps to optimize their benefits and overcome barriers that may arise. This includes providing appropriate training for teachers and staff, implementing strict privacy policies, and ensuring reliable internet infrastructure. Thus, using Google Forms in assessment can be an effective tool for improving teaching and learning, as long as it is done carefully and thoughtfully.

CONCLUSION

Utilizing information technology in assessments, such as through Google Forms, offers significant advantages. It reduces teachers' workload by providing the flexibility to evaluate student learning outcomes anytime and anywhere without needing physical textbooks. Additionally, IT enables teachers to perform more comprehensive data analyses, as files stored in applications like Google Forms are protected from risks like natural disasters, data loss, or fire. Despite these opportunities, challenges persist, such as inadequate IT skills among teachers and staff, privacy concerns over the security of assessment data, and limited internet access in school areas, which impede the effective use of technology-based assessment tools. In order to solve these problems, it is advised that educational institutions give teachers and staff extensive training on how to use IT efficiently, with a particular emphasis on Google Forms for the production of assessments, data analysis, and data security. Future research should explore the impact of IT tools, like Google Forms, on the assessment process in elementary schools, particularly their effects on student learning outcomes, motivation, and engagement.

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