

Challenges Faced by Students in Computer- and Paper-Based National Examinations: The Indonesian Context

Pegiiawan Basopi^{1*}, Roslina Abdul Aziz², Haiyudi³

¹*Institut Cinta Tanah Air, Jl. Petrus Kafiur, Brambaken, Samofa, Biak Numfor Regency, Papua 98111, Biak, Indonesia*

²*Academy of Language Studies, Universiti Teknologi MARA Cawangan Pahang, 26400 Bandar Tun Abdul Razak Jengka, Pahang, Malaysia*

³*Faculty of Teacher Training and Education, Universitas Muhammadiyah Bangka Belitung, Kec. Rangkui, Kota Pangkal Pinang, Kepulauan Bangka Belitung 33134, Indonesia*

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ABSTRACT

The national examination (NE) is an evaluation system that begins from junior high school to senior high school in Indonesia. The Indonesian government has implemented computer-based tests (CBT) and paper-based tests (PBT) for the NE since 2014. The aim of this study is to investigate the challenges students faced in these examinations. The study adopted a qualitative approach to data analysis, involving semi structured interviews. Six high school graduates were selected as participants. The findings reveal that CBT presents 3 major challenges, namely unfamiliarity with computer hardware, increased anxiety due to the visible countdown timer, and fear of technical problems that may disrupt the exam. PBT presented issues such as poor-quality test papers, difficulties in correctly blackening answer sheets for Optical Mark Recognition (OMR), and time management problems resulting in stress and hasty responses. The study concludes that both CBT and PBT formats pose challenges to students' optimal performance. These findings offer important insights for enhancing the design and delivery of national examinations in Indonesia, as elaborated further in the paper.

1. INTRODUCTION

Education serves as the foundation for nurturing a knowledgeable and capable generation, equipping individuals with the skills and information necessary to thrive in society. It is a lifelong process that begins in childhood and continues into adulthood, enabling individuals to develop their creativity, expand their knowledge, refine their character, and contribute responsibly to their communities (UNESCO, 2023). Central to the process of improving education is the role of assessments, which are critical tools for evaluating and enhancing the quality of learning within institutions. Assessments provide a means to measure educational outcomes and identify areas for improvement (Handoko et al., 2019).

In Indonesia, assessments have become a central focus in the government's efforts to improve education quality. Since the introduction of the National Examination (NE) in 2005, this standardised test has played a key role in tracking student achievement and shaping national education standards. Administered at both the junior and senior high school levels, the NE helps determine whether students are ready to graduate.

^{1*} Corresponding author. Pegiiawan Basopi. E-mail address: pegiiawanbasopi@gmail.com

Depending on the school's infrastructure and readiness, students take the NE either as a computer-based test (CBT) or a paper-based test (PBT) (Handoko et al., 2019).

In the modern era, technological advancements have significantly influenced various aspects of human life, including education. Indonesia has embraced these advancements by implementing the CBT alongside the traditional PBT for the NE. The first CBT was carried out in 2014 in several junior and senior high schools (Nurhikmah et al., 2021). According to Retnawati et al. (2017), the CBT is a selection of questions and presentations delivered via a computerized system, whereby students receive different versions of each test item. This method eliminates the need for traditional paper-based versions, as students answer directly using computers programmed to produce faster results. The CBT provides convenience for both students and teachers, as the results can be reviewed more quickly than with PBT (Retnawati et al., 2017). The shift also reflects a response to the growing importance of digital literacy and aims to foster competence in information and communication technology (ICT) among students and teachers (Soepriyanti et al., 2022).

CBT presents several advantages, including: (a) faster access to test results due to internet-based administration, as opposed to manual checking in PBT; (b) greater ease for students, who are no longer required to fill in personal data manually or worry about the neatness of their handwriting or pencil marks; and (c) reduced likelihood of cheating, as test questions are randomized for each participant (Berkhout et al., 2024). Furthermore, CBT supports the development of ICT skills among students. However, there are notable challenges in implementing CBT. These include the limited availability of computers in many schools, particularly in rural or remote areas, which restricts the widespread implementation of CBT (Biantoro & Arfianti, 2019). Inadequate internet infrastructure and unstable electricity supply further hinder the implementation of CBT, especially in areas where these resources are lacking or unreliable. As pointed out by Wardani (2021), these issues may lead to difficulties or even failure for students during the national exam.

The PBT, on the other hand, remains widely used due to its simplicity and accessibility. According to Nafiatin (2020), the PBT is a synchronous assessment using paper-based materials, whereby students answer questions simultaneously in the same location. This method allows students to annotate and bookmark questions for review, thus, offering a more flexible and familiar testing environment. PBT does not require internet access or digital devices, making it suitable for regions with limited technological infrastructure. However, there exist logistical drawbacks. As Nasir et al. (2023) highlighted, advantages of PBT include minimal technological requirements and flexible implementation times, but disadvantages include slow result processing, high printing costs, ease of cheating, and the risk of lost or damaged answer sheets. Sound effects or multimedia cannot be integrated into PBT, and image-based questions are often limited in quality due to black-and-white printing (Mirna Santi, 2018). Manual result checking also prolongs the evaluation process and results in reduced efficiency.

In general, challenges persist in both testing methods. For CBT, consistent power supply and internet access are critical requirements, and the lack of stable internet connection in remote regions can severely hinder exam delivery and student performance. Technical disruptions during testing can lead to anxiety and incomplete responses. As for PBT, common problems include shortages of printed materials, which delay the exam process. Papadima-Sophocleous (2008) noted that missing question and answer sheets often require last-minute photocopying, consuming valuable test time and causing stress among students. Moreover, Piaw (2012) emphasised the possibility that lost answer sheets could also be detrimental, as this potentially requires re-examinations that disadvantage students who have already performed well.

Considering these challenges, the integration of CBT and PBT into Indonesia's education system must be carefully managed to ensure equal access and positive student experiences. These challenges highlight the need for continued efforts to improve the implementation of both CBT and PBT in Indonesia. In addressing these issues, it is essential to ensure equal access to high-quality education and to support students in achieving their academic potential.

Given the critical role of the NE in evaluating educational outcomes and its evolution from traditional paper-based methods to the integration of computer-based systems, it becomes essential to understand how

these assessment methods impact students. While the introduction of the CBT reflects Indonesia's efforts to modernise its education system, challenges such as technological limitations and resource disparities persist. Similarly, the traditional PBT, though more accessible in remote areas, faces its own set of logistical and technical issues. These challenges can significantly affect students' experiences and performance during the examination process.

To this end, this study aims to investigate the specific challenges students face when undertaking the NE through both CBT and PBT methods, hence guided by the following research objectives:

1. To determine the challenges faced by students in computer-based tests;
2. To determine the challenges faced by students in paper-based tests.

By exploring these difficulties, the research seeks to provide insights into how these challenges influence students' learning outcomes and to propose recommendations for improving the implementation of the national examination system.

2. LITERATURE REVIEW

According to Firdaos (2018), the national examination functions as a tool to measure the success of the educational process. This concept is widely implemented across many countries. National examinations are standardised assessments conducted at the national level, typically administered at key stages in a student's academic journey, such as the completion of primary or secondary education. These examinations aim to evaluate the knowledge, skills, and competencies students have acquired throughout their educational experience. The purposes of national examinations may include assessing student learning, ensuring accountability and quality assurance, evaluating and developing the curriculum, promoting equity and fairness, and enabling international benchmarking. In Indonesia, Handoko, Tolla, and Suprihati (2019) found that the adoption of computer-based testing (CBT) improved efficiency and reduced irregularities during exam implementation. Furthermore, Rasmuin (2020) emphasise that changes in examination policies, including the transition to the national assessment have influenced student motivation and the overall quality of education.

One of the main purposes of national examinations is to assess student learning. Popham (2006) explained that national examinations are used to measure students' acquired knowledge, skills, and understanding, which in turn helps gauge the effectiveness of the education system and determine whether students are meeting expected learning standards. Another objective is to assure accountability and ensure quality. Darling-Hammond (2004) noted that national examinations hold schools, teachers, and students accountable for performance by establishing benchmarks and quality standards, thereby fostering improvements in the education system. Furthermore, it helps in curriculum evaluation and development. Tyler (2013) emphasised that results from national assessments offer vital insights into how well the curriculum is functioning. Such data supports evidence-based decision-making among educators and policymakers to improve curriculum content and structure. In addition, standardised testing also promotes equity and fairness. Karakolidis et al. (2021) asserted that national examinations can help identify disparities in student outcomes among different demographic groups, enabling efforts to promote educational equity. Finally, it is crucial in international benchmarking. National examinations offer a reference point for comparing a country's educational performance with global standards. This allows for the identification of improvement areas and the adoption of best practices from international systems.

Building upon these perspectives, national examinations play a multifaceted role in shaping the educational landscape. These assessments are not only tools for measuring individual student performance and institutional effectiveness but also serve as essential instruments for broader educational policy and reform. Brookhart (2013) emphasised, the systematic collection and interpretation of assessment data enable stakeholders to make well-informed decisions to enhance educational outcomes. The alignment of national examinations with educational standards, as Tilaar (2006) pointed out, ensures consistency and quality across the national education system. Furthermore, Elvira et al. (2023) highlighted that national

examinations contribute to mapping educational quality across regions, offering crucial insights into regional disparities and guiding targeted interventions.

In essence, national examinations function beyond simple evaluation tools. They serve as strategic mechanisms for educational planning, policy-making, and continuous development at both local and national levels.

2.1 Challenges faced by students in Computer-Based Test

According to Sulastris and Puspawati (2019), the use of computers presents various challenges in its implementation, stemming from both students and schools. The first challenge lies in students' familiarity with computers. Students who lack experience with computers often struggle with computer-based tests (CBT) (Jamiludin & Uke, 2017). Their unfamiliarity can significantly influence their performance during the test, particularly for those encountering the CBT format for the first time in the national examination.

The second challenge relates to the quality of school facilities. Sulastris and Puspawati (2019) emphasised that students attending high-quality schools with better funding and complete computer facilities are less likely to encounter difficulties compared to those from low-quality schools with limited resources. Schools with insufficient computer facilities often experience delays, forcing some students to take the test at alternative locations with better-equipped facilities. Such logistical issues can disrupt the testing process and negatively impact students' overall test experience.

One commonly adopted solution is for schools to divide the test into multiple sessions, typically two or three. Students are grouped accordingly, with the first group taking the exam in the morning, followed by subsequent groups later in the day. However, this approach has its drawbacks. According to Sulistiyono et al. (2018), students assigned to the later sessions often feel less motivated or satisfied than those in the earlier sessions. This discrepancy can affect their morale and potentially their test performance.

The third challenge involves technical issues related to servers and electricity. As noted by Jamiludin and Uke (2017), power outages and server malfunctions can significantly hinder the testing process. When electricity fails, computers shut down, and if servers are slow or unreliable, it disrupts the exam. Facing these issues during the test can cause panic among students, ruin their concentration, and ultimately affect their performance. Since electricity and server connectivity are critical components for conducting computer-based tests, any disruptions can render the test untakeable.

2.2 Challenges faced by students in Paper-Based Test

While paper-based tests have long been a traditional method of assessment, they present their own set of challenges for students, which can negatively affect the test-taking experience and potentially impact performance. One such challenge is the limited reviewability of answers. Sangmeister (2017) explained that in traditional paper-based tests, students are typically unable to review or change their answers once they move on to the next question. This lack of flexibility stands in contrast to computer-based tests, which often allow test-takers to navigate between questions, review their answers, and make changes before submitting the final exam. The inability to review or modify answers in paper-based tests can add additional pressure on students, as they must make decisions about each question without the benefit of being able to see the entire test at once. In contrast, computer-based tests provide a more dynamic and interactive experience, offering greater control over the testing process.

Another significant challenge is handwriting issues. Graham and Harris (2000) highlighted that illegible handwriting or slow writing speed can hinder students' ability to complete the test within the allotted time. Handwriting problems in paper tests can include difficulties in producing clear and readable writing, which may lead to misunderstandings or misinterpretations of the answers. Moreover, issues like inconsistent letter size, spacing, or slant can make the handwriting appear erratic and difficult to follow. Slow writing speed may also prevent students from answering all questions in time, and physical fatigue from prolonged writing can affect the quality of the handwriting as the exam progresses. These handwriting-related

challenges can significantly impact a student's ability to effectively communicate their responses and further adds to the stress of the test.

3. METHOD

3.1 Research Design

According to Creswell and Creswell (2017), qualitative research is a method of exploring and understanding individuals or groups who are associated with social or human problems. The research process typically involves emerging questions and procedures, with data often collected from participants within their natural setting. In addition, Sukmadinata (2016) explained that qualitative research involves describing and analysing phenomena, events, social activities, attitudes, beliefs, perceptions, and thoughts of individuals or groups. Various descriptions are used to uncover principles and explanations that lead to conclusions.

In this study, the researchers employed a descriptive qualitative method to analyse the challenges faced by students during the computer- and paper-based national examinations in Indonesia. The data are presented in the form of descriptions that summarise the findings from the students involved. The data were collected through direct interviews with the informants, providing first hand insights into the students' experiences and challenges.

3.2 Participants

Purposive sampling was employed in this study, with participant selection based on predetermined criteria relevant to the research objectives. The informants were 12th-grade students who were scheduled to complete their high school studies during the 2019/2020 academic year. Participants were drawn from three state schools in East Lombok: SMAN 1 Masbagik, SMAN 1 Terara, and SMAN 1 Selong. Two students were selected from each institution, resulting in a total of six participants.

The criteria for selecting the respondents included students who had experience with both PBT and CBT. This was crucial to ensure that the students could offer comparative insights and feedback regarding both testing methods. The participants were also chosen from three different state schools in East Lombok to capture a broader range of experiences and perspectives. This approach was intended to ensure the findings were not confined to the context of a single school, hence providing a more comprehensive understanding of the challenges faced by students in the national examination.

Prior to conducting the interviews, ethical procedures were followed. Permission was obtained from the respective schools, and approval was granted to conduct the interviews with students. The purpose of the study was explained to the participants, and their participation was voluntary. This ensured that the research process complied with ethical standards in educational research.

Table 1. Details of the Participants

Respondent	Age	Gender	School
1	19	Male	Senior High School No. 01 Masbagik-East Lombok
2	18	Female	Senior High School No. 01 Masbagik-East Lombok
3	19	Male	Senior High School No. 01 Terara-East Lombok
4	18	Female	Senior High School No. 01 Terara-East Lombok
5	19	Male	Senior High School No. 01 Selong-East Lombok
6	18	Female	Senior High School No. 01 Selong-East Lombok

3.3 Data Collection Method

This study employed a qualitative data collection method using semi-structured interviews to explore students' experiences and challenges with both CBT and PBT in the context of Indonesia's national examination. Semi-structured interviews were chosen because they offer a balance between consistency

and flexibility. This approach allowed participants the freedom to elaborate on their experiences and for the researcher to probe deeper based on the responses (Cohen et al., 2018).

Interviews were conducted in Bahasa Indonesia with six participants from three senior high schools in East Lombok. Each session was audio-recorded with the participants' consent and later transcribed for analysis. Each interview lasted between 25 to 35 minutes, depending on how much the participant elaborated on each question. The interviews were conducted over the course of two days, on January 12 and 13, 2019. They were conducted within the school grounds in a quiet and private setting to ensure participants' comfort and reduce distractions. The following questions were used as guidelines for the interview sessions:

1. Have you taken both Computer-Based Tests (CBT) and Paper-Based Tests (PBT) during your time in school?
2. Can you describe your experience with the CBT?
3. What specific challenges did you face when taking the CBT?
4. Can you describe your experience with the PBT?
5. What specific challenges did you encounter while taking the PBT?
6. How did these challenges affect your performance or concentration during the exam?

3.4 Data Analysis Procedure

In this study, thematic analysis was employed to analyse the interview data collected from the students (Braun & Clarke, 2006). Thematic analysis is a widely used method for identifying, analysing, and reporting themes within qualitative data. This approach provides a systematic framework for interpreting the data and is particularly effective for exploring the students' experiences with both PBT and CBT.

The thematic analysis began with data familiarisation, which involved transcribing the audio recordings of the interviews, reading through the transcripts multiple times, and making initial notes. This process helped in understanding the depth and breadth of the data collected.

The next step involved coding the data. An open coding system was adopted, where each transcript was systematically reviewed line by line to identify significant statements, phrases, or words that were relevant to the research questions. Codes were assigned to data segments that reflected the challenges faced by students in using both PBT and CBT. To enhance the credibility and consistency of the coding process, two independent coders were involved in the analysis. Both coders first conducted the initial coding separately and then met to compare and discuss their coding decisions. Any discrepancies were resolved through discussion until a consensus was reached. When disagreements persisted, the coders referred to the data and the research objectives to determine the most appropriate interpretation. This process ensured inter-coder reliability and strengthened the trustworthiness of the findings.

After generating the codes, the data was examined for recurring ideas that could be grouped into themes. These themes represented significant aspects of the data in relation to the research questions. The themes captured the core issue of the students' experiences and challenges with both the PBT and CBT. The themes identified were reviewed and refined to ensure they were coherent, distinctive, and comprehensive. This involved checking if the themes accurately represented the data and were relevant to the research questions. Some themes were merged, others were broken down into sub-themes, and some were discarded if they were not sufficiently supported by the data. Each theme was defined clearly, and sub-themes were created when necessary to better represent the students' experiences with both PBT and CBT.

The final step involved presenting the findings, with relevant responses from the students to illustrate the themes identified in the analysis.

To improve the reliability of the analysis, the interview transcripts were returned to the respondents for validation or member checking, ensuring their statements were accurately captured. In addition, the themes

generated from the analysis were reviewed and rated by an expert, who is a senior academician with over 20 years of teaching experience, to ensure the interpretations were credible and aligned with the data.

4. FINDINGS AND DISCUSSION

The researchers divided the results of this study into two categories: (a) challenges faced by students in computer-based tests, which included unfamiliarity with computers, time limitations, and technical problems related to devices; and (b) challenges faced by students in paper-based tests, which involved issues such as poor-quality test papers and difficulties with marking answer sheets. Table 2 below summarises the challenges faced by the students for both CPT and PBT.

Table 2. Summary of Challenges Faced by Students in Computer-Based and Paper-Based National Examinations

ASPECT	COMPUTER-BASED TEST (CBT)	PAPER-BASED TEST (PBT)
Technical Issues	Students experienced anxiety about potential computer malfunction, unstable electricity, or server disruptions during the examination.	Students faced poor-quality test papers, blurred images, and unclear text that hindered focus and readability.
Student Familiarity	Many students were unfamiliar with computer hardware and keyboard functions, which slowed down performance and increased stress.	Students were more comfortable with the traditional format.
Anxiety and Stress	The visible countdown timer increased nervousness, leading to rushed responses and loss of focus. Fear of technical problems also caused sleeplessness and psychological tension.	Anxiety arose from the possibility that Optical Mark Recognition (OMR) sheets would not be properly read due to imperfect shading.
Time Management	The countdown timer caused students to feel pressured to finish quickly, resulting in incomplete answers and reduced accuracy.	Students often struggled to allocate time efficiently, feeling as if they were “racing against the clock.”
Infrastructure and Resources	Implementation required stable electricity, sufficient computer facilities, and reliable internet, which were often unavailable in rural schools.	The system required adequate printed materials and stationery, with potential risks of paper shortages or damage.
Assessment Accuracy	System errors or sudden power failures risked loss of responses and interrupted testing.	OMR scanning errors could occur when students failed to fill in answer bubbles perfectly.
Overall Impact on Performance	Technical anxiety, lack of digital literacy, and distractions from the interface reduced test performance.	Stress from manual marking and paper quality issues decreased accuracy and overall student confidence.

4.1 Challenges Faced by Students in Computer-Based Tests

4.1.1 Unfamiliarity with the Computer Hardware

The researchers found that one of the primary challenges students faced when using the CBT during the national examination was a lack of familiarity with computers. Many students struggled with basic functions of the keyboard, such as using CAPS LOCK or SHIFT + letters to type uppercase letters when entering their usernames. This issue is reflected in the following response:

“Iya, saya sempat gelisah waktu awal masuk ke sistem. Soalnya di menu login harus ngetik nama dan password dengan huruf besar di awal, jadi harus pencet tombol CAPS LOCK atau SHIFT.”

(Yes, I was a bit anxious when first logging into the system. Because in the login menu, you have to type your name and password with capital letters at the beginning, so you have to press the CAPS LOCK or SHIFT key.) – Respondent 1

This suggests that students, like Respondent 1, feel anxious during the CBT, primarily due to unfamiliarity with the keyboard functions. Similarly, Respondent 2 expressed similar difficulties when using the CBT:

“Iya, agak gelisah karena belum terlalu paham tombol-tombol di keyboard kayak CAPSLOCK dan SHIFT buat huruf besar.”

(Yes, I was somewhat anxious because I don't really understand the keys on the keyboard like CAPSLOCK and SHIFT for capital letters.) – Respondent 2

Respondent 3 also shared a similar challenge during the CBT, especially as it was his/her first experience with this testing method:

“Kurang menikmati karena masih bingung dengan fungsi simbol-simbol di keyboard.”

(Did not really enjoy it because I'm still confused about the functions of the symbols on the keyboard) – Respondent 3

Based on these responses, the students were unfamiliar with the functions of a computer keyboard, which might affect their ability to effectively complete the CBT. This issue suggests that some students lack updated technological knowledge and may have never received adequate instruction on how to use computers in their schools. As noted by Fatimah and Santiana (2017), technology plays a crucial role in modern education by enhancing both teaching and learning. It creates authentic, engaging, and meaningful learning experiences, fosters a dynamic and collaborative environment, and provides easy access to information that supports student achievement.

In the context of language learning, Kranthi (2017) emphasised that technology can further enrich the process by motivating students, offering authentic materials, and facilitating global classroom connections. Importantly, both researchers highlight the need for students to be introduced to technology early and meaningfully. This is particularly critical in assessment contexts such as CBT, where unfamiliarity with digital tools can cause confusion or anxiety. Therefore, it is essential for schools to ensure students are well-prepared to engage with technology, so they are not overwhelmed when faced with computer-based assessments or other tech-integrated academic tasks (Fatimah & Santiana, 2017; Kranthi, 2017).

4.1.2 Anxiety Due to Countdown Timer

The countdown timer feature on the CBT screen emerged as another challenge for students during the national examination process. Time display can offer benefits, such as helping students estimate how much time they should allocate to each question. However, many students found it to be a source of anxiety. Instead of aiding their time management, the visible countdown intensified their stress and affected their focus. This is reflected in the following response:

“Gugup karena ada tampilan waktu di layar yang bikin tambah tegang.”

(Nervous because there was a time display on the screen that made it even more tense.) – Respondent 4

From this extract, it is evident that Respondent 4 experienced heightened anxiety due to the visible time on the screen. This anxiety led the student to rush through the questions, which in turn affected his/her concentration. Respondent 5 shared a similar experience, as shown in the following statement:

“Saya merasa tegang karena tampilan waktu di layar bikin saya jadi terburu-buru ngerjain soal, akhirnya malah susah fokus dan jadi panik sendiri.”

(I felt tense because the time display on the screen made me rush in answering questions, and in the end, it was hard to focus, and I panicked by myself) – Respondent 5

Both Respondent 4 and Respondent 5 expressed that the time display on the screen made them feel nervous, resulting in rushed answers and a loss of focus. Although the time display is intended to help students manage their time by indicating how much time remains, it can have the opposite effect on those who find it distracting. This was confirmed by Olipas and Luciano (2020) who observed that a visible countdown during exams can distract students and cause them to lose focus. While the intention is to support time management, for some students, the ticking clock increases anxiety and the pressure to perform quickly.

Recent studies suggest that the presence of a time display during examination can be both beneficial and challenging, depending on a student's time management skills. On the one hand, a visible time display can increase awareness by helping students monitor the remaining time, aiding in pacing and ensuring they allocate time appropriately across questions (Baker et al., 2020). On the other hand, for some students, constantly seeing the countdown increases test anxiety and serves as a distraction, which can negatively impact focus and performance. The visibility of time pressure in such cases may increase cognitive load and elevate stress levels (Olipas & Luciano, 2020).

If students are unable to focus while answering questions in the national examination, their results may suffer due to increased nervousness, anxiety, and stress. Symptoms such as confusion, tension, and difficulty concentrating are common indicators of psychological distress and are often linked to exam-related anxiety. According to past studies, this form of anxiety that is referred to as situational or test anxiety stems from the fear of evaluations. It frequently leads to psychological disturbances, fatigue, and physical symptoms such as headaches and abdominal pain (Zeidner, 1998; Putwain, 2008; Rana & Mahmood, 2010).

This type of anxiety can significantly impair student performance. When anxious, individuals often feel overwhelmed, find it difficult to concentrate, and may experience racing thoughts or physical symptoms such as sweating or an increased heart rate. These issues interfere with their ability to study effectively and recall information during exams. Specifically, anxiety can impair concentration, making it difficult to focus on exam questions and leading to missed details or problems with information processing (Bieling et al., 1998). It can also hinder memory retrieval, making it harder for students to recall what they have learned and increasing the likelihood of forgetting critical information (Sandi, 2013). Lastly, the anxiety can also cause time management problems, with students feeling rushed or overwhelmed, spending too much time on difficult questions, and potentially running out of time before completing the exam (Putwain, 2009).

4.1.3 Anxiety Stemmed from Fear of Technical Problems

Technical problems emerged as another challenge faced by students during the computer-based national examination. Many students expressed concerns about the potential for technical issues to disrupt their exam experience, which affected their sleep and overall mental well-being. The fear that the computer could malfunction at any moment caused anxiety and restlessness. Respondent 5, for instance, shared that:

"Susah tidur juga sih, soalnya mikirin kalau nanti tiba-tiba komputernya eror."

(I also had trouble sleeping because I kept thinking that the computer might suddenly have an error) – Respondent 5

This statement highlights the emotional toll that these technical worries took on the students. Similarly, Respondent 6, conveyed a similar sense of unease:

"Susah tidur karena malamnya mikirin kemungkinan masalah teknis kayak listrik padam atau komputer nge-hang."

(I was worried about technical failures such as outages or frozen screens) – Respondent 6.

The extracts above highlight the significant anxiety caused by the potential for technical issues, and how such concerns contributed to students' stress levels during the examination.

Technical issues can create serious obstacles for students during examinations. While technology offers numerous advantages, it also introduces the risk of technical difficulties, which can significantly impact students' performance. Common technical problems include internet connectivity issues, such as slow or unstable connections, which can disrupt students' access to online exams or hinder their ability to submit answers. This can result in lost time and incomplete submissions. In addition, computer hardware or software malfunctions, including system crashes or freezing, can interrupt the exam-taking process, leading to data loss. In extreme cases, students may not be able to resume their exams and may have to start over or receive incomplete results. Compatibility issues can also arise, where certain online exam platforms may

not function properly on specific operating systems or devices, causing students to encounter errors or difficulties in completing the exam.

When students feel anxious about the possibility of technical problems, it can demotivate them and detract from their focus during the national examination. Technical issues, if they occur, also take away valuable time that could otherwise be spent answering questions. Slimi (2020) highlighted some of the most common frustrations associated with online examinations, such as poor internet connections, a lack of collaboration among learners, and cultural restrictions. Moreover, the institution's IT infrastructure, the readiness of instructors, and the preparedness of students to transition to online exams all play a crucial role in ensuring the quality of the examination process. Mohammed et al. (2020) further highlighted the challenges faced by students in rural areas, where internet connectivity issues were compounded by the need to travel to areas with more reliable service to attend online examinations.

4.2 The Challenges Faced by Students in Paper-Based Tests

4.2.1 Poor Quality Test Papers

When students sit for PBT, they often find the experience uncomfortable due to poor quality of the test papers like unclear images or text on the examination paper. This issue is a significant factor that detracts from the students' ability to focus on the test, as they may waste time reporting unclear images or text to the invigilators. As Respondent 1, noted:

"Kurang menikmati karena gambar soal kadang gak jelas."

(I did not really enjoy it because the images in the questions were sometimes unclear) — Respondent 1

This extract highlights how unclear images can disrupt the exam experience, as students like Respondent 1 are forced to spend valuable time addressing issues instead of focusing on answering questions. Similarly, Respondent 2 shared a similar experience.

"Soalnya gambarnya gak jelas."

(The images on the questions were unclear.) — Respondent 2

From these responses, both students were unable to have a positive experience on the national examination due to the presence of unclear pictures in the PBT. Manurung (2018) also observed that students did not appreciate the PBT format due to factors such as poor-quality photocopies, small font size, and unclear images. These factors contributed to a less-than-ideal testing experience for students.

The PBT model has several distinct characteristics when compared to the CBT model. According to Suhardi (2017), one major difference is the number of items included in the examination. The PBT typically includes many questions, often resulting in a smaller font size that can make it difficult for students to read. This is because it is important to ensure that questions are not cut off or split across pages, especially when images or graphs are involved. This can create challenges for students trying to complete the test efficiently (Suhardi, 2017).

Another significant difference is the format of the questions. PBT examinations consist mainly of text and image-based questions, whereas CBT examinations can display multimedia content, such as text, images, sound, and video. Moreover, the quality of the images and text on a PBT examination depends heavily on the printing process, including the quality of the paper, ink, and printing equipment (Suhardi, 2017). Poor quality materials can lead to blurry or difficult-to-read questions, as noted by Respondents 1 and 2. While it is possible to print PBT examinations in colour, doing so on a large scale is expensive, and the examination papers are often printed in black and white. This can further reduce the clarity of images and text.

4.2.2 The problem in Blacking OMR Sheets

The next challenge identified in the PBT is related to blackening the answers on the answer sheet. Some students expressed uncertainty about their answers due to imperfections in the way they fill in each answer bubble. If students do not blacken the circles perfectly, the Optical Mark Recognition (OMR) software may fail to read their responses correctly. Respondent 3 highlighted this concern:

"Kurang yakin karena takut bulatannya kurang tebal atau keluar garis."

(I am not very confident because I am afraid the bubbles might not be dark enough or go outside the lines (referring to OMR)) — Respondent 3

This extract reveals that Respondent 3 felt uneasy about taking the PBT due to the possibility of imperfectly darkened answer circles, leading to concerns about the machine not being able to read the responses. Similarly, Respondent 4 expressed a similar anxiety:

"Saya merasa takut saat menghitamkan bulatan jawaban karena jika tidak rapi atau terlalu tipis, ada kemungkinan jawaban tersebut tidak terbaca oleh mesin pemindai."

(I feel scared when shading the answer bubbles because if it is not neat or too light, there is a possibility the answer will not be read by the scanner.) - Respondent 4

"Tidak selalu yakin karena kadang saya ragu apakah bulatan yang saya buat sudah sesuai dengan ketentuan. Saya takut jika ada kesalahan kecil seperti terlalu tipis, tidak penuh, atau keluar garis bisa membuat jawaban tidak terbaca oleh mesin pemindai."

(I often doubted whether my responses were properly shaded according to the instructions) - Respondent 4

The responses clearly reveal that the students' anxiety stemmed from the fear that their answer sheets might not be properly read by the OMR system due to imperfections in how they blackened their answers. This concern highlights the importance of ensuring that students are properly trained on how to mark their answers so that the OMR system can accurately read and process their responses. Akbar et al. (2019) highlighted that innovations such as the use of Computer Answer Sheets (CAS) have the potential to improve the grading process by making it more efficient and compatible with OMR technology. These CAS formats are widely used in multiple-choice examinations and help expedite data processing. However, Akbar et al. (2019) also noted that OMR systems come with their own set of challenges. Mainly it causes the anxiety students experience when they fear their answers may not be correctly recognized, particularly if their blackening is imperfect. This fear of mis-grading can lead to considerable stress and frustration.

The technical issues within OMR systems can also impose a significant psychological burden on students. When answer sheets are unreadable by the system, students may experience anxiety due to uncertainty about their exam results. Even when they believe they have answered correctly, the system's failure to process their responses may lead to self-doubt about their performance. Furthermore, students may worry about academic consequences such as unfair grades or reduced future opportunities. Time pressure exacerbates the situation, especially if technical errors are discovered only after the examination has ended. The feeling that their efforts are not acknowledged due to a system error can also create a sense of injustice that heightens their anxiety. These findings align with a study by Elshazly et al. (2023), which demonstrated that technical obstacles in electronic examinations directly contribute to increased test anxiety and academic stress.

In general, concerns about whether their answers are correctly recorded by automated assessment systems are widespread among students. These issues not only contribute to examination-related anxiety but also risk negatively affecting the overall test experience (Elshazly et al., 2023; Deng & Liu, 2025).

4.2.3 Time Management Difficulties

The students interviewed also faced challenges in managing their time during the high-pressure environment of the national examination. The limited time allotted for each subject often forces students to

rush through reading, understanding, and answering questions. This can result in incomplete attempts, errors due to lack of careful review, or skipped questions. Moreover, students unfamiliar with strategic time allocation may spend excessive time on difficult questions, leaving insufficient time for easier ones, which could negatively impact their overall performance. This can be seen in the extract below:

“Tegang pas lihat soal susah dan waktu udah hampir habis. Rasanya kayak balapan sama jam.”

(Tensed when I saw difficult questions and time was almost up. It felt like racing against the clock.) — Respondent 6

This response illustrates how difficulties in pacing and prioritising questions under examination conditions can heighten stress and hinder optimal performance. While Respondent 6 did not specifically mention anxiety related to the PBT in this extract, it is worth noting that other responses from the same student indicated physical symptoms of anxiety, such as sweaty palms, which in turn affected their ability to handle the test paper comfortably.

A recent study conducted at the University of Galați in Romania corroborates this finding, revealing that 66% of students reported experiencing stress due to time management challenges, particularly during examination periods. Students struggled to organise their time between classes, projects, and personal responsibilities, which led to confusion, decreased cognitive performance, and exhaustion during examination (Lovin & Bernardeau-Moreau, 2022).

CONCLUSION

Several key conclusions can be drawn based on the findings obtained from investigating the challenges faced by students during computer-based and paper-based national examinations. First, the primary issues with computer-based national examinations stem from technical challenges, including network and equipment-related problems that students are often unfamiliar with. Similarly, paper-based national examinations present their own challenges. Issues such as poor paper quality and substandard materials hinder students' ability to effectively answer questions. Instead of focusing on solving examination problems, students often spend time addressing external issues, such as cleaning smudged paper or dealing with pencils that are either too light or excessively dark. These distractions lead to difficulties in managing time effectively during the examination. Moreover, many students become anxious, fearing that their answers may not be properly read due to dirty paper or inconsistent pencil markings.

The findings of this study have important implications for schools and teachers involved in administering national examinations in Indonesia. The results suggest that both computer-based tests and paper-based tests present unique challenges that can hinder students' optimal performance. To address these challenges, schools should focus on strengthening their internal preparation and support systems to ensure smoother and fairer examination experiences for students. For CBT, schools need to ensure that their computer laboratories are equipped with functioning hardware and stable internet connections. Routine technical checks should be administered before the examination period to prevent possible disruptions. Teachers can also play a crucial role by familiarising students with the digital testing environment through regular practice sessions or mock tests. As for PBT, schools should conduct basic quality checks on test materials before distribution to ensure legibility and usability. Teachers can also help students develop strategies for managing their time effectively and completing answer sheets correctly, particularly when using Optical Mark Recognition forms. These activities not only improve students' technical readiness but also reduce test-related anxiety caused by unfamiliar interfaces or time pressures.

Collaboration between teachers and school administrators is essential to create a supportive testing environment. This includes providing clear pre-exam briefings, offering reassurance to anxious students, and setting up quick response procedures for unexpected issues, whether technical or logistical. By focusing on these practical improvements, schools and teachers can play a key role in promoting a fairer, more efficient, and more supportive examination system.

Although this study involved a small number of participants, and the findings may not represent all student experiences across Indonesia, they offer useful insights into practical steps that schools and teachers can take to enhance the examination process. Future research could include a larger and more diverse sample to better understand how school-level factors such as resource availability, digital literacy, and classroom preparation influence examination readiness.

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CONFLICT OF INTEREST STATEMENT

The authors agree that this research was conducted in the absence of any self-benefits, commercial or financial conflicts and declare the absence of conflicting interests with the funders.

AUTHORS' CONTRIBUTION

The authors confirmed that there is no conflict of interest in this article. Pegiawan Basopi and Roslina Abdul Aziz conceptualised the study, designed the methodology and supervised the research process. Haiyudi conducted the data collection, performed the formal analysis and contributed to the manuscript writing. All authors read and approved the final manuscript.

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About the Authors

Pegiawan Basopi is a lecturer in English Education at the *Institut Cinta Tanah Air*, located in Biak, Papua, Indonesia. He holds a Master of Education (M.Ed.) from Ahmad Dahlan University, Yogyakarta. In 2019, he participated in a thesis program jointly organised by Ahmad Dahlan University and Universiti Teknologi MARA (UiTM) Cawangan Pahang, Malaysia. His main research interests include teaching English as a second language and linguistics. He can be reached at pegiawanbasopi@gmail.com.

Roslina Abdul Aziz, PhD is a senior lecturer at the Akademi Pengajian Bahasa, Universiti Teknologi MARA Cawangan Pahang. She holds a PhD in Corpus Linguistics from University Malaya. Her research interests include Corpus Linguistics, and teaching English as a second language. She can be contacted via email at leenaziz@uitm.edu.my.

Haiyudi is an Assistant Professor in curriculum and instruction at the Faculty of Teacher Training and Education, Universitas Muhammadiyah Bangka Belitung. He holds an M.Ed. in curriculum and instruction from Khon Kaen University, Thailand. His research interests include curriculum development, teaching evaluation and English language teaching. He can be reached at haiyudi@unmuhbabel.ac.id