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# E-Assessment of Case Method and Team-Based Project (TBP) in Education 5.0 to improve Students' Academic Writing in University

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## Abstract

Integrating an e-assessment model based on the Case Method and Team-Based Project (TBP) will enhance academic writing skills among university students in the Contextual Writing Language Skills (CWLS) course. This study addresses the challenges experienced by the students in organizing ideas, employing accurate grammar, and developing logical arguments in writing. Utilizing a Research and Development (R&D) method, the study involved a sample of 25 students who participated in e-assessments research. They provided their immediate feedback and personalized learning experiences. The findings indicated a significant improvement in students' writing abilities, with an increase of 27.4% in the students' average post-test scores. This suggests that digital e-assessment not only improved student performance but also aligned with the principles of Outcome-Based Education (OBE) to give significant outcomes in the learning process. The research concludes that adopting digital technology in pedagogical practices can significantly elevate students' academic skills, contributing to more effective teaching and learning environments in higher education.

**Keywords:** *E-assessment, Team-Based Project (TBP), Case Method, Contextual Written Language Skills (CWLS)*

## INTRODUCTION

The rapid advancement of digital technology has significantly transformed the educational landscape, particularly in higher education. The emergence of digital learning as a primary educational tool has reshaped how students engage with knowledge, moving beyond traditional classroom settings to a more versatile and technology-driven environment such as Artificial Intelligence (AI). Chat GPT, Jasper AI, and Bing AI (Wirasti et al., 2024). The COVID-19 pandemic, in particular, accelerated this shift, necessitating the adoption of self-directed learning (Tjahyanti et al.,2022). Such advancement in digital learning is aligned with the Education 5.0 era in which students are expected to enhance their cognition and academic performance through technology-enhanced learning. In Indonesia, this transformation is reflected in the Ministry of Education and Culture Regulation No. 3 of 2020, which mandates

Student-Centered Learning (SCL) and emphasizes an interactive, holistic, and collaborative learning process (Pratidhina, 2020). The decree, in Article 11, Clause 1, states that "the learning process in higher education should exhibit characteristics that are interactive, holistic, integrative, scientific, contextual, thematic, effective, collaborative, and student-centered". This educational standard is further regulated in another Ministerial Decree No. 3/M/2021 that establishes Key Performance Indicators (IKU) for State Universities, with IKU 7 highlighting case method and Team-Based Project (TBP) assignments as essential teaching methods in higher education (Wawan, et. al., 2022)

One of the primary challenges in higher education, particularly in English as a Foreign Language (EFL) learning, is the development of academic writing skills. Many students struggle with generating ideas, structuring arguments, and organizing coherent essays (Hutasuhut et al., 2023). Students enrolled in the Contextual Writing Language Skills (CWLS) course at the research site are required to analyze and compose case-based essays, a task that demands advanced cognitive skills. Conventional assessment methods, such as manually graded essays and paper-based evaluations, often fail to provide instant feedback and personalized learning support (Mutohari et al., 2021). Recently, teaching EFL has the purpose of preparing global citizens (Xu and Knijinik, 2024; Costea, 2024) based on global knowledge, collaboration, mutual support, shared values, and digital information (Suswati, 2022). E-assessment has emerged as an innovative solution, offering automated, immediate feedback tailored according to student's proficiency levels. Studies on e-assessment highlight its effectiveness in improving writing structure, grammatical accuracy, and critical thinking as some of the competencies that students should master to compete globally (World Economic Forum, 2016). Howe (2020), for instance, found that students appreciated the flexibility of online assessments, while lecturers reported a reduced grading workload. In the Indonesian context, Rosidah and Pramudia (2021) argued that students taught using TBP and Case Method scored higher (81.4) than those taught through direct instruction (73.9), indicating the effectiveness of these interactive learning strategies.

Despite the numbers of research on digital learning (UNESCO, 2025; Thompson et al., 2025; Joosten et al., 2024; Haleem et Al., 2024; Davies et al., 2024) and writing skills (Taye et al., 2024; Hutasuhut et al., 2023), the studies integrating both Case Method and TBP in the Indonesian EFL context remain limited. Most existing studies focus on general digital learning applications but few explore how e-assessment can enhance students' writing skills, cognitive development, and analytical abilities through structured methodologies (Means et al., 2013) such as TBP and Case Method. Furthermore, this research focuses on Education 5.0 introduces more advanced technologies, such as AI-driven assessments, augmented reality (AR), and big data analytics (Ahmad et al., 2023). Based on the Google search and Scopus publication, the keyword of Education 5.0 only found nine searches. Meanwhile, the keywords of digital learning have existed for some time. The novelty of this study lies in its development of a digital e-assessment model specifically designed to support the Case Method and TBP in academic writing instruction, aligning with the Outcome-Based Education (OBE) curriculum. By addressing this gap, the research contributes to the advancement of digital literacy, particularly in higher education.

This study aims to investigate the effectiveness and efficiency of digital learning-based e-assessment in the Education 5.0 era. Specifically, it seeks to examine whether e-assessment enhances students' cognitive abilities in writing and how its implementation can better support idea generation in TBP and Case Method assignments. The research findings are expected to provide practical insights for



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educators and policymakers in designing technology-driven learning strategies that improve students' academic writing and their overall cognition in higher education.

In line with the technological advancements in Education 5.0, digital learning has become a primary component in education, especially in higher education institutions. Students are expected to undertake adaptive self-learning, project-based learning, and unrestricted access to learning resources. Based on constructivist learning theory, the role of digital learning has shifted from being an instructional tool to a learning facilitator, particularly in higher education (Widodo et al., 2024; Pratidhina, 2020; Ambo, 2020; Zhamanov et al., 2017; Ahmadi et al., 2017). In this way, technology no longer controls the learning process but rather facilitates it. The paradigm shift from Teacher-Centered Learning (TCL) to Student-Centered Learning (SCL). Therefore, the use of e-assessment has a significance role in improving students' writing competences.

One of the reason why the traditional assessment methods no longer be an option in teaching, it often fails to improve students' cognitive in providing immediate and personalized feedback, making it difficult for students to understand and correct their mistakes effectively (Mutohari et al., 2021; Wawan et al., 2022). To address this issue, e-assessment can be utilized in writing instruction. Some advantages of e-assessment include:(1) Automated feedback that analyzes grammar, structure, and text cohesion. (2) Instant assessment, allowing students to revise their writing immediately based on digital feedback. (3) Personalized learning, where the difficulty level adjusts according to students' abilities (Wirasti et al., 2022; Ambo, 2020; Zhamanov et al., 2017; B. Means et al., 2013)

The implementation of e-assessment based on the Case Method and TBP is expected to help students develop writing competencies more efficient and effectively. The e-assessment is designed and developed because of its novelty and the need for deeper exploration. Furthermore, digital-based learning plays a crucial role in the success of the OBE curriculum through case method and TBP assignments (UNIMED, 2024). Teaching materials developed through digital learning can be adapted according to the students' needs by providing writing ideas based on case studies. Therefore, through digital learning, lecturers and students can collaborate in implementing advanced technology to improve students' cognitive abilities.

Align with these gaps, this research addresses the following questions:

1. Is the development of digital learning-based e-assessment in the Education 5.0 era proven to be effective, efficient, and capable of enhancing students' cognition in writing?
2. How can the implementation and utilization of e-assessment meet students' needs in generating writing ideas through case method and TBP assignments in alignment with the OBE curriculum?

## LITERATURE REVIEW

### Outcome-Based Education (OBE)

Outcome-Based Education (OBE) is an educational approach focused on expected learning outcomes for students (UNIMED, 2024). OBE emphasizes the achievement of specific competencies that students must master upon completing a program. The primary goal of OBE is to ensure that education remains relevant to workforce and societal needs. The five main principles of OBE include (1) focus on learning outcomes, (2) backwards curriculum design, (3) structured suitability, (4) facilitating learning opportunities and (5) P-D-C-A systematic cycle (LSH-UGM, 2018). The OBE curriculum ensures that each learning process is designed to produce learning outcomes

in the form of material mastery as well as the application of knowledge and skills to real contexts. This is in line with Negara's research (2024) which shows that the assessment of the content, structure, and implementation of the OBE curriculum shows results that are very satisfying (average score of 4.42), proving its relevance to the world of work.

**IKU 7**

In the context of education, IKU 7 refers to an indicator that measures learning outcomes and graduate quality. It serves as an evaluation tool to assess the effectiveness of educational programs in achieving their intended goals. The indicator of IKU 7 uses learning methods like case solving or group projects as part of the assessment. In a class, the learning method must use one or a combination of case solving problems or group projects. (Yani, et.al., 2022)

**Case Method**

The Case Method is a teaching technique that uses real-life case studies to encourage students to think critically and apply theoretical concepts to practical situations. This method is highly effective in higher education, particularly in business and law, as it enables students to analyze and discuss complex problems. Widiastuti (2022, in Lismalinda, 2017) said that case-based learning provides opportunities for students to develop their potential to innovate by giving possible solutions to problems that have been analyzed. This is supported by Bungatang, et al., (2024) who examined the effect of the case method on BSI Class 2021 students in class A as an experimental class and class B as a control class in child language acquisition material in psycholinguistics courses. The final results show that class A has a higher final grade. Not only that, class A also tends to show more active participation in the class in the form of solving the problems given, which is in contrast to class B that does not show the same level of participation as that of class A.

**Team-Based Project**

Team Based Project is a teaching approach that focuses on problem-solving. In TBP, students face real-world problems that they must solve, and this encourages them to think creatively and critically. This approach aligns with OBE, as both emphasize competency development and practical skills. Research conducted by Cholifah and Pana Pramulia (2021) which shows that the application of Team-Based Project (TBP) can improve students' learning development skills, with a higher average score compared to direct and individual learning methods. It can be said that the application of learning methods such as Team Based Project (TBP) really affects learning styles, cognitive development, and the development of innovative and creative thoughts in students.

**E-Assessment**

E-assessment is an assessment processes that uses information technology to support the creation, delivery, and evaluation of assessment activities in a learning environment. Advantages of e-assessment include immediate feedback, flexible access, cost and time savings, automated and reliable scoring, inclusivity for students with disabilities, promotion of deep learning, reduced administrative load for lecturers, and enhanced security with proper measures (Appiah & Tonder, 2018).

The challenges of e-assessment include security concerns such as hacking and impersonation, high implementation costs for infrastructure and technology, technical



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issues like equipment failure, limited access for some students due to different operating systems or timing, and the considerable effort required to develop high-quality assessment tasks. Additionally, design challenges such as clarity of instructions and question phrasing, as well as potential biases favoring higher-performing students, further complicate e-assessment implementation (Appiah & Tonder, 2018).

In the context of higher education, e-assessment has the potential to improve the effectiveness of assessment by providing rapid and personalized feedback to students. Jt can help overcome challenges in traditional assessment, especially in the rapidly growing era of online learning, where the number of students and diversity of teaching methods are increasing. By utilizing e-assessment systems, educators can provide a variety of assessment design options, such as online examinations, portfolios, and surveys, which can be designed to meet students' specific needs (Isaias et al., 2023).

This research focuses on the use of big data's list on various educational cases, various educational games such as Kartini's Day Challenge, educational and attractive learning videos.

## METHODOLOGY

### Research Procedure

This research used a Research and Development (R&D) design to develop and evaluate an e-assessment system integrated with the Case Method and Team-Based Project (TBP) for enhancing students' cognitive skills in the Contextual Writing Language Skills (CWLS) course. The research follows the 4 D model (**Define, Design, Develop, and Disseminate**), which is widely used in instructional design and was originally introduced by Thiagarajan et al (1974). The ADDIE model ensures systematic product development and evaluation, improving learning effectiveness and efficiency. The stages of this research method consist of 1) analysis; identifying the learning challenges faced by students in CWLS, particularly in academic writing, and assessing the need for an e-assessment system. 2) design; designing e-assessment framework incorporating the Case Method and TBP. 3) development; develop e-assessment in digital system and designing interactive features for automated feedback, assessment tracking, and personalized learning experiences. 4) implementation; implement the results of e-assessment to student and also lecturer. 5) evaluate; after implementing, the product would be evaluated or assessed the effectiveness through student performance analysis and feedback collection.

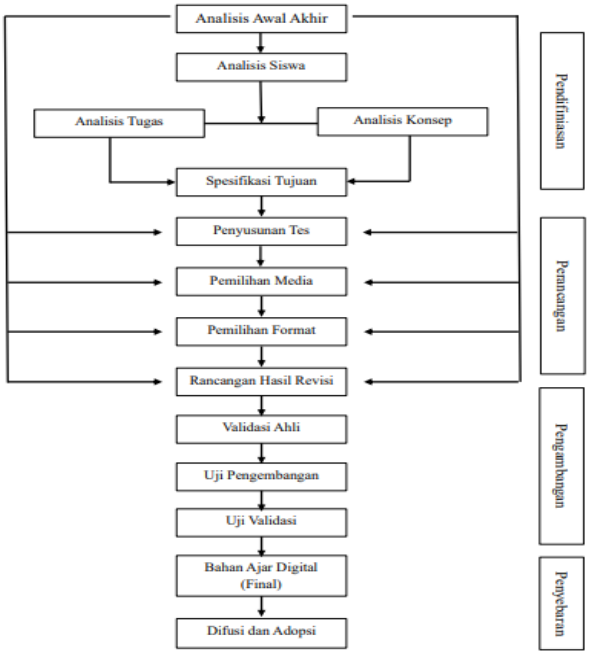


**Figure 1. Research Flowchart adopted from Thiagarajan (1974: 6-9)**

## Participants

This study involved a total of twenty-five undergraduate students who were enrolled in the Contextual Writing Language Skills (CWLS) course at the State University of Medan. Among the participants, five were male and twenty were female, reflecting the gender distribution within the class. These students were selected through purposive sampling based on their active enrollment in the CWLS course during the semester in which the study was conducted. All participants were fully informed about the nature of the study and gave their consent to participate. As part of the research procedure, each student was required to complete a pre-test and a post-test designed to measure their writing competence before and after the implementation of the e-assessment system. In addition, they were asked to complete a need analysis questionnaire to provide insights into their learning preferences, experiences, and expectations related to writing instruction and the digital assessment platform used in the course.

## Instruments

The primary research instrument used in this study was a structured need analysis questionnaire. This questionnaire was carefully developed and validated by experts in language assessment and educational technology to ensure its reliability and content validity. The questionnaire was designed to gather detailed information about the students' perceptions, learning needs, and feedback regarding the use of an e-assessment system in the CWLS course. The responses collected from the questionnaire were analyzed using descriptive statistical methods to identify trends and summarize the students' overall perceptions. These findings provided essential input for evaluating the role of e-assessment in enhancing the teaching and learning of writing in higher education settings.



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## RESULTS AND DISCUSSION

### 1.Is the development of digital learning-based e-assessment in the Education 5.0 era proven to be effective, efficient, and capable of enhancing students' cognition in writing?

This research aims to contribute to the ongoing development of digital learning tools in Education 5.0, offering insights into the integration of technology-enhanced assessment methods within higher education. The findings will provide valuable input for future improvements in e-assessment design, ensuring alignment with Outcome-Based Education (OBE) standards and student-centered learning principles.

The change from Education 4.0 to Education 5.0 has significantly transformed higher education by prioritizing digital learning and interactive teaching strategies like the Case Method and Team-Based Projects. This study discusses how integrating e-assessment with these methods enhances students' writing abilities in the CWLS course at University. The results of this research support previous studies to reveal that digital assessment tools benefit higher education. E-assessment provides real-time feedback, personalized learning, and adaptable difficulty levels, which are essential for improving students' writing skills (Jones & Smith, 2023). Using the Case Method and TBP also aligns with the Outcome-Based Education (OBE) system, which emphasizes competency-based learning and student-focused teaching (Wang et al., 2023). The findings suggest that digital assessment enhances students' ability to analyze, organize, and develop ideas in academic writing.

CWLS is one of the course that focus on the students' competency in writing an essay. However, the students experienced some difficulties in finding the right topic for the case method and TBP. These difficulties occurred mostly due to unclear instruction, the lack of examples and references of educational cases to be solved. While the Case Method is used to evaluate and formulate academic arguments based on particular topic, TBP promotes teamwork when completing writing assignments. It serves as the foundation for the electronic assessment that was put into place. Further, case method and TBP aim to develop collaborative and problem-solving skills (Rosidah and Pramulia, 2023). Their study highlights that collaborative learning environments improve both cognitive and social skills. These methods stimulate students to solve complex, unstructured problems, promoting creative and flexible thinking. The study also shows that Case method and TBP enhance engagement by encouraging active participation and deep reflection. Structured teamwork in TBP helps students develop higher-order thinking skills, such as analysis and evaluation. CWLS course is crucial for developing students' cognitive and research skills, especially in higher education, where scholarly publication is highly valued. Du Plooy et al. (2024) explain that writing involves continuity learning, critical thinking, and identity development. Their research underlines the need for structured writing environments that promote deep analysis and reflection. E-assessment in writing courses provides structured feedback, helping students improve their skills step by step and prepare for academic publishing. Here is the feedback from students' analysis questionnaire.

Based on the students' need analysis, it is found that there is an improvement in student's cognitive in doing the case method and TBP. Students easily get new ideas by using e-assessment. It provides various topics to be chosen and discussed. Giving more alternatives for students to think of a gap that they found in e-assessment. There are some interactive displays in the e-assessment. One of the topic is writing a descriptive essay. E-assessment used to describe a person such as a national hero R. A Kartini that has been presented in an attractive way through a game.

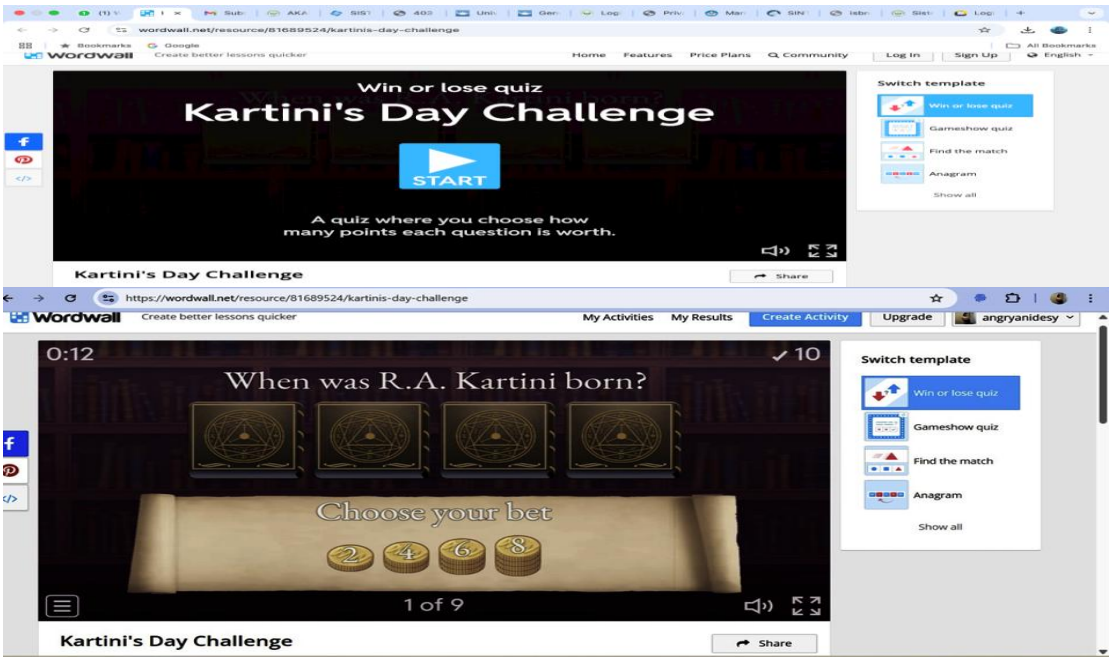


**Figure 2.** Adaptation of The Wordwall E-game by Desy (2024)

**2. How can the implementation and utilization of e-assessment meet students' needs in generating writing ideas through case method and TBP assignments in alignment with the OBE curriculum?**

With the development of interactive platforms such as *Wordwall*, the use of e-games for education has grown significantly in recent years. According to Khusna and Septikasari (2024), *Wordwall* can be used to make learning interesting and fun, thus increasing student motivation and understanding, such as the test of Kartini Day.

In the context of this research, the Kartini's Day Challenge game is an interactive test designed to measure students' understanding of the historical context and values of R.A. Kartini's struggle, which is used to implement the *Wordwall* adaptation. Apart from increasing students' interest, the use of e-games like this also provides immediate feedback which is very important in the learning process. Moreover, the idea of Education 5.0 which emphasizes the use of technology to provide a more customized and adaptive learning experience, is in line with the integration of technology in the classroom. As a result, the use of *Wordwall* e-games in the classroom not only increases student interest and understanding, but also helps move education into the digital age.

Additionaly, by using the e-assessment, students can decide a particular project based on the available topics, links to access the journal, and educational games. Further, they can modify any games to be an interactive project. Therefore, it helps them practice in writing an essay for the case method and TBP.



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The cognitive development of pupils in academic writing was assessed using the findings of the pre-test and post-test. Students' scores before and after completing the e-assessment are contrasted in the following:

**Table 1.** Student E-Assessment Scoring Table

| Student Initials | Pre-Test | Post-Test | Percentage of Improvement (%) |
|---|---|---|---|
| 1. DST | 60 | 78 | 30% |
| 2. ABH | 62 | 80 | 29.% |
| 3. TS | 65 | 82 | 26.2% |
| 4. Z | 63 | 79 | 25.4% |
| 5. NS | 66 | 85 | 28.8% |
| 6. RH | 64 | 81 | 26.6% |
| 7. ANT | 61 | 77 | 26.2% |
| 8- SG | 67 | 84 | 25.4% |
| 9. GMT | 68 | 86 | 26.5% |
| 10. A | 70 | 88 | 25.7% |
| 11. NAR | 59 | 76 | 28.8% |
| 12. KL | 62 | 79 | 27.4% |
| 13. A | 65 | 83 | 27.7% |
| 14. NS | 64 | 82 | 28.1% |
| 15. DLG | 60 | 78 | 30% |
| 16. AN | 69 | 87 | 26.1% |
| 17. AT | 71 | 89 | 25.4% |
| 18. KT | 58 | 75 | 29.3% |
| 19. MN | 66 | 84 | 27.3% |
| 20.NFP | 63 | 81 | 28.6% |
| 21. OLS | 60 | 77 | 28.3% |
| 22. RD | 68 | 85 | 25% |
| 23. SM | 67 | 84 | 25.4% |
| 24. TN | 65 | 83 | 27.7% |
| 25. YS | 70 | 88 | 25.7% |
| Average | 64.2 | 81.6 | 27.4% |

These findings indicate that after implementing the Case Method and TBP-based e-assessment, students' academic writing abilities increased by an average of 27.4%. This indicates that students' ability to analyze texts, write coherently, and organize their arguments have improved. The e-assessment has effectively implemented.

A study by Isaias et al. (2023) highlights the key features of effective e-assessment systems, such as a variety of assessment methods, scalability, security, accessibility, ease of use, feedback options, personalization, and integration with other platforms. These features make assessments more flexible, secure, and student-centered. Additionally, e-assessment assists self-directed learning by allowing students to track their progress and adjust their study strategies. Using the Case Method and TBP in higher education helps in developing critical thinking, teamwork, and problem-solving skills to support Student-Centered Learning (SCL) (Pratidhina, 2020). The Case Method engages students with authentic problems, encouraging them to consider different perspectives and create structured solutions. TBP focuses on project-based learning, where students work together to solve complex problems, simulating real

workplace situations. This approach not only improves academic skills but also prepares students for professional needs (Wawan et al., 2022).

Student perceptions of e-assessment have been implemented positively. As highlighted by Howe (2020), students appreciate its instant feedback, flexibility, and accessibility. The ability to complete assessments online and receive immediate results helps them identify and correct mistakes in real-time. E-assessment also diminish teachers' grading workload, allowing them to focus more on personalized academic support. However, challenges such as technical issues, internet reliability, and academic integrity concerns still exist. Therefore, improving technological infrastructure and assessment security is necessary to make e-assessment more effective (Howe, 2020). Traditional writing assessments often fail to provide immediate feedback, making it difficult for students to improve their work efficiently. E-assessment solves this problem by offering instant feedback on grammar, structure, and coherence, encouraging independent learning and self-improvement (Almeida & Costa, 2023). Moreover, Seidel and Godfrey (2023) found that problem-based learning approaches like TBP and the Case Method promote collaboration and real-world applications, helping students obtain a broader academic and professional perspective. Integrating digital tools into assessments aligns with the OBE framework, developing students' digital literacy, critical thinking, and problem-solving skills (González et al., 2023).

## CONCLUSION

The Education 5.0 framework's integration of e-assessment with the Case Method and Team-Based Projects has been shown to be a successful strategy for enhancing students' cognitive skills, particularly in academic writing. This study emphasizes how e-assessment improve competency-based education, offers personalized learning, and offers instant feedback. In keeping with the goals of Outcomes-Based Education (OBE), the Case Method and TBP foster students' critical thinking, collaboration, and problem-solving abilities.

Despite the positive findings, this study has limitation that should be noted. The research was conducted in a single institution with a limited number of participants, which may restrict the generalizability of the results to other contexts or educational settings.

Additionally, for other researchers, it is suggested to study further the e-assessment technologies to improve student engagement and self-directed learning. Even though there are still obstacles to overcome, like technical problems and academic integrity, e-assessment will become more successful in facing the digital world. In the end, using digital learning-based assessment has greatly helped the students to self-prepare in the workplace.

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**Appendix 1** Questionnaires of Students' Need Analysis of E-Assessment

**Name :**
**Class :**
**Gender :**
**Course :**

| No | Questions | Strongly Disagree | Disagree | Agree | Strongly Agree |
|---|---|---|---|---|---|
| 1 | Do you find the e-assessment more challenging than the conventional one? | 0 | 0 | 5 | 20 |
| 2 | Do you think the various online assessment will improve your writing skills? | 0 | 0 | 15 | 10 |
| 3 | Do you get more idea by using various International articles in your case method? | 0 | 0 | 23 | 2 |
| 4 | Do you agree that the using of online games effective in improving students' cognitive? | 1 | 4 | 20 | 0 |
| 5 | Do you prefer e-assessments that are integrated with your regular course materials? | 0 | 0 | 5 | 20 |

| | | | | | |
|---|---|---|---|---|---|
| 6 | Do you prefer e-assessments that are directly related to real-world scenarios or applications? | 0 | 0 | 15 | 10 |
| 7 | Do you find it was helpful in deciding your case using e-assessment? | 0 | 0 | 0 | 25 |
| 8 | Do you prefer to work individually or collaboratively on e-assessment tasks | 0 | 0 | 0 | 25 |
| 9 | Do you think e-assessment assist to develop your writing skills? | 2 | 3 | 10 | 10 |
| 10 | Do you think any English courses should use e-assessment to have more challenging tests in the future? | 0 | 0 | 0 | 25 |



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