INCORPORATING TECHNOLOGY IN TEACHING: AN ANALYSIS OF SENIOR HIGH SCHOOL ENGLISH TEACHERS' PROFICIENCY BASED ON BLOOM'S DIGITAL TAXONOMY FRAMEWORK

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ABSTRACT

This study explored the proficiency levels of Senior High School English teachers in integrating technology using the Bloom's Digital Taxonomy (BDT) framework. It also examined the factors that influence teachers' ability to effectively use technology in their teaching. An explanatory sequential research design was employed, beginning with the collection of quantitative data through questionnaires, followed by qualitative data gathered through classroom observations, interviews, and document analysis. This study involved five Senior High Schools located in the North Denpasar area, in total of 19 English teachers. The quantitative data were analyzed to determine index scores and average results, which were then further interpreted through qualitative findings. The analysis process included data condensation, display, and interpretation. Results showed that teachers generally demonstrated proficiency at the "Applying" level (C3) of BDT. Influencing factors included both external aspects, such as curriculum demands, workload, infrastructure, and digital training and internal ones, like motivation, teaching experience, and educational background. The findings also revealed that teachers most frequently applied the Technological Pedagogical Knowledge (TPK) aspect of the TPACK framework. In conclusion, this study offers several recommendations for future research: conducting similar studies in other regions of Bali with larger participant groups, exploring students' perspectives on technology integration, and investigating the effectiveness of digital training programs for teachers.

Keywords: Teachers' proficiency level; Bloom's Digital Taxonomy; TPACK

INTRODUCTION

The integration of technology into daily life is widely regarded as indispensable, particularly in the context of the digital era, where access to information is increasingly seamless. The rapid advancement of technological innovations has had a profound impact across various sectors, notably in the field of education.

Since the Covid-19 pandemic, the education sector switched up almost everything for learning process. Since technological tools are growing rapidly, educational process is suggested to use the digital tools for teaching process (Treve, 2021). There's no better, easier and cheaper than using several tools

such as Zoom, Google Classroom, Google Meet, and other communication devices for supporting the learning process (Ishak et al., 2022). Meaning that, teachers need to adapted the teaching method and strategies with suit this phenomenon.

However, challenges remain. Not all teachers have mastered technology in teaching. Teachers still stick to the conventional methods of teaching in the classroom, lack of supporting facilities and internet connection (Rosalina et al., 2020), less confidence (Ishak et al., 2022), and difficult to find the right method for applying technology (DeCoito & Estaiteyeh, 2022). As a result, teaching and learning can become more time-consuming. Despite these obstacles, the teaching process must continue. Teachers also need to focus on fostering students' development in knowledge, skills, and behavior.

A study from Ovcharuk et al. (2020) and Khan & Kuddus (2020) found that digital tools which used by teachers in teaching process are purposeful in conducting a digital environment, as well as students and teachers' digital competences, and also to gain a teaching and learning innovations in the classroom. This can improve and upgrade the interaction between students and teachers.

The usefulness of technology is still becoming the perfect match for our education. The Technological, Pedagogical, and Content Knowledge (TPACK), introduced as a framework for integrating technology in teaching by Koehler et al. (2013). TPACK provides the ways how teachers can understand technology and conduct it into teaching and learning process. Thus, TPACK has been developed strictly as a technological framework.

In parallel, Bloom's Digital Taxonomy (BDT) which was a revised version taxonomy by Anderson and Krathwohl (2001) provides a framework of the six hierarchy levels of cognitive knowledge. Furthermore, BDT has provided framework in order to assess teachers and students' ability and understanding in the application of technology. The six hierarchy levels of Bloom's Digital Taxonomy consist of Remembering, Understanding, Applying, Analyzing, Evaluating, and Creating. Therefore, BDT has become necessary in the education sector and it is flexible due to can be adapted in all subjects, learning styles, or students' levels. Nevertheless, BDT is considered to represent a new paradigm of the traditional learning and forced teachers and learners to fit this change. Teachers are found challenge in integrating BDT in the classroom when there's lack of teachers' proficiency and will cause teachers cannot imply the digital activities for the learning process effectively.

In fact, there are still limited studies who had investigated about teachers' proficiencies in the application of BDT and TPACK. In this case, BDT can be one of the references for teachers when they want to applied the aspects of TPACK. Both BDT and TPACK have the same consideration which can help teachers in integrate technology effectively in teaching and learning process. Nonetheless, it is important to examine how far teachers' show their proficiency in integrating technology in line with BDT. Furthermore, the challenges of teachers' in applying technology in the classroom become the main issue in this study.

The preliminary study has been conducted and resulted that teacher involved the integration of technology in the teaching and learning process. However, senior high school English teachers only used it in one main activity in the classroom. In other words, teacher did not show a variation of technological tools for the lesson, which may affect in teacher's proficiency about how far teacher can use technology in teaching.

The relation between technology and knowledge that is in line with BDT has been examined by several studies. A study from Amin & Mirza (2020) found that students and teachers in online learning environments used digital tools effectively, with students outperforming teachers in higher-order thinking skills. They recommended further research into the factors affecting teachers' digital proficiency as an issue central to this study. Abalkheel (2021) also highlighted the need to improve teachers' technology integration skills,

noting its impact on students' learning outcomes. BDT was shown to support the development of students' higher-order thinking. Meanwhile, a study from Matore (2021) is related to the present study with the exploration to all the Bloom's Digital Taxonomy levels. Finally, the study from Nava et al. (2022) suggested to future researches may consider the similar research focus with the qualitative design. The cognitive domain of BDT may be included in further researches.

In conclusion, the past literatures above showed the relevance of the present study about BDT in technology integration. Teachers' proficiency, in addition, also become essential for the education in order to give a systematic learning activity to the students. Besides, the factors influencing teachers in integrating technology also need to be focused. The predictions can lead into better preparations and problem's solving to in case the negative factors influence.

Based on the previously given explanation, the research problem of this research can be provided as follows: 1) What is the proficiency level of Senior High School English teachers in integrating technology into instructions based on Bloom's Digital Taxonomy? 2) What are the factors influencing Senior High School English Teachers proficiency in integrating technology into instructions based on Bloom's Digital Taxonomy?

METHOD

This study employed an explanatory sequential research design. According to Creswell & Clark (2018), explanatory sequential design is one of the mixed method paradigms where the main data were gathered and analyzed by the quantitative method instrument as the first phase namely questionnaire. Furthermore, building from the quantitative data result, the researcher conducted the development of the second phase by gathering the qualitative data from interview, observation and document analysis to provide further insight to the main quantitative data. Finally, the researcher began the third phase by interpreting how the qualitative data results have given the clear explanation and understanding of the quantitative data results.

A multi-stage random sampling was utilized by combining stratified sampling and cluster random sampling. In stratified sampling, choosing Denpasar city, specifically the North of Denpasar. This was due to the researcher has access to the North Denpasar than other regions. Therefore, the cluster random sampling, according to Gay & Diehl (1992), the sample is selected from the 10% minimum of the total population, which resulted five from nine Senior High Schools in north Denpasar from lottery and was resulted SMAN 8 Denpasar, SMAN 7 Denpasar, SMA Saraswati 1 Denpasar, SMA Dwijendra Denpasar and SMA Harapan Nusantara. These schools represented the study results.

The quantitative data were gathered using a closed-ended questionnaire. The closed-ended questionnaire items are convenient to collect and can be analyzed by using the statistical procedure (Griffee, 2012). The questionnaire was based on the construct theory of BDT by Churches (2007), consists of remembering, understanding, applying, analysing, evaluating, and creating. The questionnaire measured teachers' proficiency level in integrating technology and in which level of BDT they are mastering. Content validity ratio followed the Lawshe's theory was established due to the odd number of Likert-scale of the questionnaire. All the English teachers filled in the questionnaire in google form to see the teachers' proficiency in integrating technology based on BDT aspects. Responses showed the highest and lowest level of proficiency and further analyzed by employing Likert-scale analysis that had five-point scale, namely never, rare, moderate, often, and always. This concept will be used for yielding index number of the formula as below.

$$\text{Index} = \left(\frac{\text{Current Value}}{\text{Base Value}}\right) \times 100$$

Therefore, the data will be analyzed with average of descriptive statistical analysis that showed each of BDT aspect of teacher in integrating technology and finally compared to see the lowest and highest BDT level of the teachers to answer the first research question.

As for the qualitative data, it was gathered through semi-structured interview, participant-observation and document analysis of teacher's teaching module. These were focusing on the specific data of technology integrations into teachers' classroom teaching. The interview guideline was adapted from Schmidt et al. (2009) and Tseng (2016). The observation was conducted to examine if teachers really implemented BDT activities into their teaching. Finally, the document analysis was employed to give systematic and focus with the description of the explanation of the research (Altheide, 2000). Furthermore, the document analysis was also conducted to examine how teachers integrated technology into their teaching modules. Therefore, the qualitative data was conducted to the English teachers who receive the highest and lowest score of BDT level.

The qualitative data further analyzed through in-depth analysis according to Miles et al. (2014) with data condensation, where all the data was simplified by using the content analysis techniques to get the better understanding of the meaning. Data display where the result of the data was displayed through narrative, quote, or the descriptive table to illustrate the findings. Finally, drawing conclusion to give in depth understanding for the readers, the conclusion will be drawn through document analysis.

Furthermore, secondary assessment analysis is used corroboration technique where the result of the research from the interview and observation submitted to the expert to be assessed. The experts will see the consistency of the result until the saturation point. The result of the qualitative data analysis of interview will give the information about the factors influencing English teachers' proficiency in integrating technology into instructions based on BDT. Meanwhile, the observation and document analysis will give specific information and confirm the questionnaire result of teachers' proficiency level in integrating technology into instructions based on BDT.

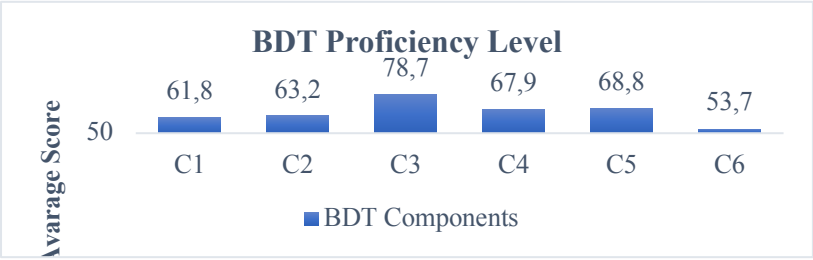
RESULT AND DISCUSSION

As previously mentioned in this study, teachers' proficiency in integrating technology plays an important role in order to build a successful fun and enjoyable learning environment in the classroom. The integration of technology is found to be effective in increasing both students and teachers' activity in the classroom. This study aims to investigate the proficiency level or Senior High School English teachers in integrating technology, as well the factors influence teachers' proficiency based on Bloom's Digital Taxonomy (BDT) framework.

Teachers' Proficiency Level

The first research question investigated in this study was teachers' proficiency level in integrating technology into instructions based on BDT Framework. The questionnaire was distributed to all English teachers in five Senior High Schools of North Denpasar area, and were resulted 19 teachers who had filled up the questionnaires. The participants were answered the questionnaire of their proficiency in integrating technology based on BDT Framework. The calculation of questionnaires was conducted through the result of the total score and the index score of the teachers. The index scores are the criteria of the highest and lowest score of teachers becoming.

Chart **Error! No text of specified style in document.**.1 Questionnaire Results of Teachers' Proficiency Level on BDT



The questionnaire results revealed that Senior High School English teachers scored highest at the C3 level of Bloom's Digital Taxonomy (Applying) with a mean score of 78.8, indicating their ability to incorporate digital tools into teaching. In contrast, the lowest score was at the C6 level (Creating) with 53.7, reflecting limited capacity to produce original digital content. This finding was supported by interview data, where teachers most frequently cited Applying as their predominant practice. Data from questionnaires, observations, interviews, and document analysis collectively highlighted the pressing need for effective technology integration in classroom instruction.

In response to the research questions, the questionnaire results indicated that teachers demonstrated the highest proficiency at the C3 level (Applying) of Bloom's Digital Taxonomy. This aligns with Amin & Mirza (2020) who found that teachers tend to focus on lower-order thinking skills in their instruction. Conversely, the lowest score was observed at the C6 level (Creating), the highest-order thinking skill in BDT. This supports Matore (2021) found that Creating is the most challenging level for teachers to implement. Observation and interview data further confirmed that C3-Applying was the most frequently practiced level, while C6-Creating was the least utilized in classroom activities.

Furthermore, technology integration within classrooms is always being commanded to the teachers. BDT can be implemented by conducting active learning practises, as well as teacher involvement in teaching process. The research from Nava et al. (2022), stated that teachers agreed about how beneficial BDT in education. They also stated that the utilization of Bloom's Digital Taxonomy provided a good impact on students' learning performances. Students' creativity, curiosity, and critical thinking are increasing significantly found in that study.

The findings highlight the need for increased support and training to enhance teachers' ability to integrate technology into teaching. Such training can foster more creative and innovative practices, while also improving teachers' confidence in addressing challenges that may arise during technology integration. Ultimately, ongoing professional development contributes to creating a more relevant and engaging learning environment for students.

In this study, two English teachers from SMA Saraswati 1 Denpasar (Teacher 13) and another from SMA Negeri 8 Denpasar (Teacher 3), were observed and interviewed. Qualitative data from observations, interviews, and document analysis revealed that C3-Applying was the most frequently demonstrated level of Bloom's Digital Taxonomy, occurring 14 times across both teachers. In contrast, C6-Creating appeared only once. A noticeable gap was also observed in the types and frequency of digital tool usage between the two teachers.

Teachers' Proficiency Level Factors

The second research question investigated was the factor influencing teachers' proficiency level in integrating technology into instructions based on BDT Framework. The proficiency level of English teachers in Applying (C3) was confirmed by the teachers that teachers were applied the technology into

the teaching.

From the interview and document analysis, the researcher found several factors influencing teachers' proficiency level in integrating technology in the classroom. The factors are divided into external and internal factors. First, external factors are consisted of curriculum demand, teachers' workload, school infrastructure, and digital training. On the other hand, internal factors are consisted of self-motivation and self-learning, years of teaching experience, and educational background of the teachers.

First, curriculum demand becomes one of the external factors. According to the teachers' teaching modules, the researcher found that there were requirements and expectations of the curriculum within the technology integration. The new curriculum mandates the use of digital tools where teachers need to adjust their teaching process with the technology. Moreover, since Covid-19 pandemic, teachers were adapted the technology-based teaching where everything was commanded by online learning Ishak et al. (2022); Charlotte et al. (2021). Technology also found useful, as well as more effective and efficient for the learning process. Teacher 3 also mentioned how she applied the digital tools into the teaching process.

> *"I often edit the questions that I made in quizzes and google form which she has found from internet. I also edit some videos which I got from YouTube for the teaching media". (Teacher 3, May 7th, 2024).*

From the statement above, this new curriculum only allows teachers to adapt the C3-Applying level. This approach indicates a focus on the application of pre-existing knowledge rather than fostering higher-order thinking skills, for example, analyzing, evaluating, or creating new knowledge, which are represented by the higher level of BDT.

Another factor found was teachers' workload. Teacher 13 stated that the difference of new curriculum influenced the total of teaching hours teachers need to take. Many classes that are needed to be taught make teacher may not have enough time and energy to integrate technology.

> *"The changes from 3 to 2 hours-time teaching for one week of English subject makes me to take more classes than before. This will be so time consuming if the technology does not address well in the classroom. It wastes time when students do not understand how to use the applications meanwhile me, as a teacher, have prepared everything" (Teacher 13, April 23rd, 2024).*

This statement indicates that the shift from the previous curriculum to the new one impacts the teachers' teaching workload. Teacher will be in hurry in teaching and resulting in the ineffective outcomes of the teaching lesson. Teachers' workload, according Mercader & Gairín (2020), became one of obstacles in straightening teachers' personal development. This workload includes not just the time spent teaching, but also the additional responsibilities, namely planning the lessons, grading students' assignments, or attending meetings. Moreover, Afutor (2020) stated that overwhelmed teaching time affected teachers' ability in integrating technology. This problem may result teachers' lower level of technology integration in the classroom. Teachers will rely on traditional teaching methods rather than incorporating innovative technology to enhance students' learning and do not have much time to learn and implement the higher-order thinking skills into the classroom practices.

Moreover, the researcher also found that both schools were less supported by technological tools and facilities where make teachers will be distracted in teaching process.

> *"Sometimes, schools Wi-Fi is not always good to use. Then, I will switch the lesson into conventional method or even use my own Hotspot tethering" (Teacher 13, April 23rd, 2024).*

"When I want to conduct listening activity, for example, the school does not have proper facilities namely headphone, for each of the students so

there will be no disturbance for students" (Teacher 3, May 7th, 2024).

It indicates that school facilities have a strong influence with teachers' proficiency in integrating technology. This is in line with the study from Rosalina et al. (2020) and Vatanartiran & Karadeniz (2020), which mentioned lack of internet connection is become a serious thing in the learning process, especially related with technology. Furthermore, Fidelis & Oduor Onyango (2021) also found that poorly maintained and outdated facilities address to the disruptions and distractions. Teachers will be more challenging to integrate technology into the productive teaching and learning environment. Moreover, proper facilities will significantly increase teachers' teaching ability as well as students' outcomes.

Besides, the support from digital training can also help teachers in integrating technology. Teacher 13 did not mention any digital training that she attended, but teacher 3 stated that there were two trainings that she had participated.

> *"I had participated two digital trainings about technology integration. One of them is how to edit video learning. I learn how to edit the video and put several questions in several parts of the video. I have once applied it into the classroom and students were enjoyed it. It also increased students critical thinking to watch video and directly give them exercise" (Teacher 3, May 7th, 2024).*

As stated in Abalkheel (2022) and Syafryadin et al. (2020), teachers with professionalism will be not limited by time or place to dispense their knowledge in English. Moreover, Nugroho & Mutiaraningrum (2020) mentioned that when teachers provided with supporting knowledge and ability, teachers' will be more confident in performing the technology-based teaching in the classroom. This statement is in line with why digital training is need by teachers and can influence teachers' proficiency in integrating technology.

The digital training leads into the first internal factor, self-motivation and self-learning of teachers. From the interview, researcher found that teacher 3 stated that she was motivated by her lecturers where she knew a lot of digital tools for teaching. Furthermore, she will try to learn it by herself.

> *"I know several digital tools from my lecturers and from the training program that I participated. Then, I try to implement all of the digital tools I got by myself" (Teacher 3, May 7th, 2024).*

It reflects teacher's initiative to incorporating technology in teaching. However, the digital training program still did not find training for the higher-order thinking skills of BDT. As stated in Sharma & Srivastava (2020), the motivation level of teachers established their ability in adopt technology. This statement indicates that teachers with more self-motivated are likely to be more successful in integrating technology into their teaching method. High level of self-motivation leads into better and effective technologies utilizations in educational settings.

The motivation may be also considered due to the years of teaching experience of both teachers. Teacher 3 who has five years of teaching experience, was found integrating more digital tools compared to teacher 13 who has 19 years of teaching experience. Harisman et al. (2019) and Nugroho et al. (2023) stated that teaching experiences indeed influence teachers' performances in teaching. Therefore, study from Dele-Ajayi et al. (2021) stated that teachers with more years of teaching experience were less concerned about the exploration of the technology into the teaching compared to those with less experience. However, the difference years of teaching experience do not affect both teachers in demonstrating effective technology integration, especially in C3-Applying into their teaching practices.

Different educational backgrounds influence teaching styles. Teacher 3, with a background in education, adapted more easily to teaching than Teacher 13, who studied linguistics. Educational graduates tend to align better with industry needs. Oraison et al. (2019) have investigated matching

educational background with job competencies enhances professional performance. While both teachers showed strength in applying C3-level tasks, they still need to improve in integrating higher-order thinking skills in BDT.

To this end, teachers mainly applied technology in C3-Applying and rarely in C6-Creating. Furthermore, the researcher also found that teachers were integrated technology related to Technological, Pedagogical, Content Knowledge (TPACK) aspects. From the results of 14 occurrences in C3-Applying, there were 10 occurrences of the total teachers applied Technological Pedagogical Knowledge (TPK), 4 occurrences for TPACK, and 2 occurrences for Technological Content Knowledge (TCK).

Based on interviews, teachers applied TPK to enhance the teaching and learning process and create engaging strategies. Digital tools used included Quizzes, Google Forms, Padlet, Wordwall, and Microsoft Office. In terms of TPACK, teachers integrated technology with specific topics and adapted methods to suit students' needs, using digital tools to improve both their teaching and students' understanding. TCK involved teachers using technology to support their own learning, develop materials and media, and prepare teaching modules.

From all the results above, it can be seen that teachers are integrating technology effectively in the classroom. Teachers also stated that technology is really helpful and make students more interactive. Besides, technology also creates fun and enjoyable learning situations. To summarize, the integration of technology in teaching, especially teaching English plays an important role. Therefore, this study found that teachers are successfully implemented the role of TPACK into the teaching process. By effectively integrating technology into the teaching process, teachers have enhanced the teaching quality and learning experience of both teachers and students.

Based on the discussion above, this study directs into the new ways of combination between BDT and TPACK framework. This combination provides the unique and systematic approach to enhance both teachers' proficiency in integrating technology and students' learning experience. Furthermore, this study also enriches the literature in technology-based education context.

CONCLUSION

To conclude, this study' findings revealed that most of Senior High School English teachers in North Denpasar have strong proficiency in C3 (Applying) level of the Bloom's Digital Taxonomy (BDT) Framework. It is indicating that teachers can incorporate digital tools and digital activities into the teaching and learning process effectively.

Furthermore, there are several factors found influencing the proficiency level of teachers in implementing technology into teaching. The factors can be categorized to two parts, namely internal factors and external factors. External factors are consisted of curriculum demand, teachers' workload, school infrastructure, and digital training. Moreover, internal factors are consisted of self-motivation and self-learning, years of teaching experience and educational background. However, despite the frequent use of technology, there was an acknowledgement of the necessity to combine it with conventional methods to ensure comprehensive understanding and effective learning, particularly for complex topics.

Finally, this study also investigated the role of Technological, Pedagogical, Content Knowledge (TPACK) of teachers, where it was related to the teaching process and technology integration based on BDT Framework. Teachers are frequently applied Technological Pedagogical Knowledge (TPK) aspect into the classroom, where it was focusing on the intersection of technology and pedagogy to enhance teaching and meet students' educational needs. In summary, while teachers in North Denpasar have made strides in integrating technology into their teaching process, especially at the C3 (Applying) level, further support in terms of infrastructures, training, and

balancing traditional methods with digital tools is necessary to enhance their proficiency and effectiveness.

Furthermore, this study suggests to further researches that technology integration in the classroom settings need to be increase. Present study' findings are based on small sample size of 19 English teachers of Senior High School in North Denpasar. This is limiting the generalizability of the results. Future researchers are suggested to conduct this study with a larger and more diverse teachers from various schools and regions to enhance the robustness of the findings. Furthermore, this study is limited to the Senior High School English teachers in North Denpasar only, where future research should investigate in further area of Bali which will leads into larger sample size.

Moreover, future researchers can explore the students' perspectives of the technology integration, includes their experiences, hopes, and challenges in technology-based learning. In addition, future researchers can also further investigate the adequate training that can be attended by teachers about teaching with technologies.

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