

THE IMPACT OF TECHNOLOGY IN DIFFERENTIATED LEARNING

Rizki Kurniawati, Tanzil Huda

Universitas Muhammadiyah Jember

rizkikurniawati50@gmail.com, tanzilhuda@unmuhjember.ac.id

Abstract

As we know in this modern era, almost every person has a gadget in their hand to use on a daily basis. Without exception, students in school, especially those already in their high school level, have their own phone or gadgets to bring inside the class. In Indonesia, the use of gadgets also applies to education programs, but not all of the teachers maximise the utilisation of it to help students' diversity in the classroom. Therefore, this study aims to analyse the impact of technology in differentiated learning. This study uses semi-structured interviews to obtain data on students' opinion, teacher observation while teaching English using modern technology in class and also from reflection at the end of the lesson. The participants are senior high school students, mainly the tenth-grade students that have an experience in using modern technology. The result of the study revealed students appear more excited, enjoyed and motivated in their lesson and also have an encouragement to ask for more quizzes or games while the teacher uses technology as an instrument to fulfil the students' diverse needs. Furthermore, this impact showed us that as a teacher we need to consider students' diverse needs in learning and their preference to learn in class for the purpose to develop students' motivation in learning, in this case English learning class.

Keywords: *Technology, Differentiated Learning, Students' Perspectives*

Introduction

The development of technology in this modern era can be said to change a lot of aspects. Education is one of the many aspects influenced by modern technology. In Indonesia, especially in the colonial era, learning by reading a book is done only by elite individuals. Fifteen to twenty years ago, learning could be done by buying a book or reading in the library. Today, reading and buying a book, listening and watching a material given by a teacher or tutor can be achieved in one way by having a modern technology or gadget (Shefketi, 2019). Therefore, as a teacher we should enrich ourselves to learn more by using modern technology in teaching methods and models rather than using the usual way (Krishan, 2022).

The reason behind teachers' obligation to learn and to be proficient in using modern technology is because every student they will meet has a variety of needs (Al-shehri, 2020). It will be different for each person's characteristics, passion and knowledge. For the purpose of assisting the variety of needs, as an educator, teachers must be able to find a solution. If they fail to facilitate the students' needs then the outcome is students will be bored, unmotivated, and tedious while learning a lesson (Gustiani, 2020). After some inspection and observation, many teachers teach and accommodate each student with the same manner, materials and also lack in attending students' diversity needs (Joseph et al., 2013). The excuse for this phenomenon is the insufficient knowledge of the teacher in using various assessment by any means with or without skill to operate technology (Fawns, 2022). The other reason is the teachers do not conduct a diagnosis test before giving a material or lesson in order to know in depth about students' needs (Ghaicha, 2016).

Differentiated learning is the solution together with the operation of modern technology to assist teachers in shaping learning lessons more meaningfully. Differentiated learning focuses on giving teachers a way to create a variety of assessments in class aiding students' diversity in needs. According to an article (Taylor, 2017) to create a successful learning diversity, the teacher should bravely create and build an accommodation or platform for learners' diversity needs, background and knowledge. Therefore, in this article the impact of technology in differentiated learning needs to be analysed as a means to know how the students'

feelings and opinion after they experience learning with modern technology to help students' diversity and create a meaningful lesson. This is a significant area to analyse because nowadays especially senior high school students have their own gadget and skill to operate new technology fastly. Thus, if the educators teach the usual ways, then they create a monotonous classroom activity. Furthermore, the crucial involvement in this study is between the educational staff, school leaders, curriculum makers and teachers to consider the effect of technology in assessing students' diversity. In this research study, the following research question related to the impact of technology in differentiated learning are:

1. How are students' opinions on using modern technology in the classroom?
2. How does modern technology affect the students' motivation and learning satisfaction in the classroom?

Literature Review and Previous Studies

Technology in Differentiated Learning

As we know, Technology become crucial in this modern era, because every action and activity in today's life can be related to the application of modern technology (Raja & Nagasubramani, 2018). This modern technology operation just needs one touch of finger, internet access and a gadget as a tool to speed up all of our deeds. Almost all of the individuals, whether young or old, hold one gadget such as a laptop/tablet, mobile phone or the simple one that can be used to browse or send a chat. This function of gadgets as an equipment to smooth the running of modern technology can be applied in the classroom learning activities. The purpose is to help teachers with students' variety of needs. Therefore, in the new curriculum in Indonesia called *Kurikulum Merdeka*, it focuses on students and their needs. The curricula encourage teachers to creatively create learning activities that are related to the students' needs suitable with technological development. Differentiated learning is a learning that can accommodate variations of needs and qualities of the learners in the scope of educational context (Sapan & Mede, 2022). This is related to the other study that confirms differentiated learning support in understanding learner self-confidence, motivation and satisfaction (Zhao & Liu, 2021). Another study also said that educators can use technology in differentiating the lesson for learners that need support and assistance (Mahoney & Hall, 2017).

There are several previous studies that related to the technology used in differentiated learning. First, this previous study conducted about the use of technology to differentiate and accommodate students with disabilities (Mahoney & Hall, 2017). The result showed the use of technology can accommodate the various different aspects in process, product and pace. The educators use a lot of applications for various content areas such as writing, reading and mathematical concepts. This study is in line with (Trust, 2018) an article that talks about the reason we need to use technology in education programs. The research finds that the potential of technology is to open up possibilities for every learner without exception.

This can also be said not only about the person or the people involved but also related to the situation such as the study about integrating technology in teaching and learning especially for the educators because of the lack of readiness while facing a pandemic era (Kusumaningrum et al., 2022). This result reveals the importance of awareness for the educator to always educate and improve yourselves in any situation to create a meaningful learning environment. In line with this study, other researchers found about the implementation of teaching English using differentiated instruction during the pandemic (Satyarini et al., 2022). This study finds the partial implementation of differentiated learning while the educator accommodates the diversity in content, process and product but not in students' readiness. According to the study (W. Zhang, 2022) about the role of technology and teacher professional development in EFL class, that teachers not only develop the new technology to use in students' learning needs, but also to increase teacher quality in conducting various activities in class.

There is also a finding related to the pandemic about educators that also can be a student in learning how to be a facilitator by using the technology to improve students' learning outcome (Damayanto et al., 2022). From these previous studies, it can be concluded that as educators, we will also get an impact, not only students, while using technology in differentiated learning. We can see the advantage of educational technology with the support from internet access, the hardware such as mobile phone or laptop, educator and learner, also the various kinds of technology can be used distantly or on the spot in educational programs (Stošić, 2015). In addition, these preparations are for the teachers and students mentally and physically using distance educational programs for an unforeseeable future if there will be similar cases like pandemic (McDiarmid, 2022).

Research Methodology

This research study was conducted in one of the senior high schools in East Java. The participants of the research consisted of the tenth-grade students who were learning English lessons, between 15-16 years old, who had their own gadget such as mobile phone or laptop. They were good at operating the gadget. This study uses semi-structured interviews to obtain data on students' opinion, teacher observation while teaching English using modern technology in class and also from reflection at the end of the lesson.

This research project is content analysis qualitative research about the impact of the technology in differentiated learning through the data or documentation of the artefact. Qualitative content analysis research not only extracting the meaning behind the words, picture or document but also to understand the social reality behind the situation or the content (Y. Zhang & Wildemuth, 2005). The data collection occurred in May to June 2023 during the English lesson in Jember, East Java. The semi-interview happens in answering online surveys about what kind of English lesson that the learner wants with the purpose to complete a diagnostic test before creating the learning lesson. The observation mainly focused on students' conditions and motivation in doing activities during the lesson by showing the picture of their activities. Lastly, the data collection proceeds from the students' reflection at the end of the lesson. The reflection asked about students' perspective of today's lesson, the benefit of the lesson and their feelings.

Findings and Discussion

In this part, the researcher will be presented the result of the data from the online survey semi-interview, the observation data from students' activities and condition while learning using technology, and the reflection answer about students' perspective, and feeling of the lesson.

Online survey

This section only focused on the result of an online survey mainly focused on English lessons, there were 28 respondents that submitted their survey. This survey happened before the lesson or the technology implemented in class. There are 17 female students (60.7%) and 11 male students (39.3%). For the first question, the researcher asked about their average examination result. This question represented their readiness and also their capability before. Half of the respondents (14 students) answer that their results are good, capable level; 39.3% (11 students) of the respondents answer that their results are enough, passable level; and 10.7% (3 students) of the respondents answer that their results are low grade level. The second question is how your environment affects your motivation to learn something. The answers are 46.4% (13 students) are feel their surrounding is a good enough for them to learn a lesson; 39.3% feels their conditions good; 10.7% feels they had an excellent circumstance to learn and only 1 person that said he or she did not feel their conditions could motivated them to learn. Related to the third question, the fourth asked about whether the students obtained difficulty during the learning lesson in the class. 64.3% (18 students) answered they occasionally had some difficulty

while learning in class; 17.9% (5 students) answered they rarely had difficulty; 10.7% (3 students) frequently had difficulty while the teacher teaches the lesson and 7.1% (2 students) always had difficulty every time they were in class.

From the data above, the teacher asked more in-depth questions about why they have some difficulties while in class. After reviewing the whole answer there were some points, (1) the students got distracted by their surroundings, their friends and their own daydreaming; (2) The teacher method conducting the lesson is too difficult, boring, too fast and too long; (3) Uncomfortable conditions, such as hot weather or sleepy; and (4) Uninteresting material. Therefore, it can be concluded from the students' perspective data, the teacher needs to change the teaching method plan. The basic or standard method in teaching classroom using conventional approach for example, lecturing, memorising and teacher centre, unsuitable with the growth of student's needs (Sinha, 2022).

Students' observation data

This section concentrates on the students' activities and conditions while learning using modern technology in differentiated learning. There were some pictures as an artifact document during some activities.



Figure 1. The students listening to the recording using their gadget

Figure 1 shows the students' picture in using technology, mainly their own gadget in carrying out their listening task. In this picture, represent the new method by using their mobile phone in doing their task. The reason behind these changes is to reduce the teacher centre in lessons and increase the students' activity. Also, the students will not be distracted by opening another application on their phone such as an online game, but using their gadget for educational purposes. In this lesson, the students verbally told the teacher that this was their first time completing a listening task by hearing a recording or audio only. The students learn a new variety to find out their capability in the listening section. Thus, it can be said they experienced a new challenge. Furthermore, teachers also could not avoid the use of technology, because an educator must facilitate the students with the new technology for better teaching quality and creative learning media (Murati, 2017).



Figure 2. Students presenting their writing result using technology in gallery walked technic

The picture above, represents the students' creativity in writing and presenting their work to the other students from different groups. In this picture, technology improves the process of demonstration by aiding students to easily create fascinating media and boost their confidence but also suit their passion. Therefore, using technology, especially this picture accommodating students' learning needs, might encourage their self-assurance. It can be said technology teaches the educator to learn how to adapt the classroom activities in line with students' needs in purpose to improve the language learning process (Ahmadi, 2018).



Figure 3. Students excited using Kahoot as a post test



Figure 4. Students compete with each other trying to answer

From the two pictures portraying students using Kahoot as an interactive game in completing their post-test at the end of the activities, the students are enjoying their activities while using modern technology through the use of their own mobile phone. These pictures are also the result behind the diagnosis test about students' wants to have interesting and challenging activities to avoid boredom. They also show eagerness in doing the same activity in other themes or material. It can be said teaching using differentiated learning is more effective in improving students' cognitive skill rather than without it (Dalila et al., 2022).

Students' reflection

This last section concentrates on the students' reflection at the end of the lessons. It will be talking about students' perspective, and feelings of the lesson. The first question that is given in the reflection section is how do you feel after the English lesson.

"Feeling happy."

"Exciting, to present the group's creativity."

"Happy, because I can talk about my opinion for the presenter of the other group."

"Joyful, not only to evaluate the other group's presentation but also to talk to my friends and ask questions."

From the statements above, the researcher concludes that the students are excited and enjoy doing the lesson and the teacher is successful in conducting meaningful learning at the class using the activities suitable with the result of their learning needs. The students tell their

perspective of the learning method that it can greatly assist them in understanding the material while also asking questions to probe and stimulate the other students' knowledge.

Furthermore, to explore more knowledge of the students' learning needs, there is the second question in the reflective section. The second question is what is the interesting method that was used in the lesson.

“The teacher used a game.”

“The use of Kahoot.”

“The game is more interactive, and the teacher also can create role play.”

From the answer, students are satisfied with the different technology the teacher uses in the classroom. Thus, educational technology aids the educator in creating and innovating the media used in the learning process that can encourage the students to learn more (Sudarsana et al., 2019). They also bravely give their opinion for the next activities such as role play. It can be said that the students begin to voice their ideas.

Conclusion

Technology as it may be an equipment to implement differentiated learning in school. Students' diversity and problems that arise before, during and after the lesson can be solved by a variety of assessments. Teachers might need to conduct some tests such as diagnostic tests in the beginning to understand the students' learning needs and also organise a reflective section to deeply understand students. Reflective also can be guidance for teachers in creating new lesson plans according to students' learning needs after the lesson. This is all in line with the use of technology assisting teachers in differentiated learning. The impact can be seen in the finding and discussion point where the students experience an enjoyable and exciting situation while learning an English lesson. Also, students develop self-confidence in talking, praising, and giving an opinion to each other. The impact also affects the teacher, because with technology, it can save the earth by using paperless worksheets and creating an interactive and fascinating learning media. The media can be used again and edited to suit the students' learning needs. Theoretically, the result shows the impact of technology in differentiated learning for teachers and also students. Methodologically, this research endeavour is a wakeup call for all the educators to take advantage of the technological development in this modern era and to develop their own skill to compete with times. The educational staff duty as a facilitator for each educator and school to implement the impact or benefit from technology in this modern era. Furthermore, these finding results can be used for further study related to the use of technology in students' learning needs according to parental figures or the use of technology in students' diversity to increase the English skill.

References

- Ahmadi, M. R. (2018). The Use of Technology in English Language Learning: A Literature Review. *International Journal of Research in English Education*, 3(2), 115–125. <https://doi.org/10.29252/ijree.3.2.115>
- Al-shehri, M. S. (2020). Effect of Differentiated Instruction on the Achievement and Development of Critical Thinking Skills among Sixth-Grade Science Students. *International Journal of Learning, Teaching and Educational Research*, 19(10), 77–99. <https://doi.org/https://doi.org/10.26803/ijlter.19.10.5>
- Dalila, A. A., Rahmah, S., Liliawati, W., & Kaniawati, I. (2022). The Effect of Differentiated Learning in Problem Based Learning on Cognitive Learning Outcomes of High School Students. *Journal of Research in Science Education*, 8(4), 1820–1826. <https://doi.org/10.29303/jppipa.v8i4.1839>
- Damayanto, A., Ilmu, T., Balikpapan, E., Bina, U., Informatika, S., Pattimura, U., Jenderal, U., Yani, A., Pattiasina, P. J., & Trinova, Z. (2022). TRENDS IN TECHNOLOGICAL INNOVATION IN EDUCATION DURING A TIME OF PANDEMIC DISRUPTION :

- EXAMINING. *Nazhruna: Jurnal Pendidikan Islam*, 5(1), 37–50.
<https://doi.org/https://doi.org/10.31538/nzh.v5i1.1867>
- Fawns, T. (2022). An Entangled Pedagogy : Looking Beyond the Pedagogy — Technology Dichotomy. *Postdigital Science and Education*, 4, 711–728.
<https://doi.org/10.1007/s42438-022-00302-7>
- Ghaicha, A. (2016). Theoretical Framework for Educational Assessment : A Synoptic Review. *Journal of Education and Practice*, 7(24), 212–231.
- Gustiani, S. (2020). STUDENTS ' MOTIVATION IN ONLINE LEARNING DURING COVID-19 PANDEMIC ERA : A CASE STUDY. *Holistic Journal*, 12(2), 23–40.
- Joseph, S., Thomas, M., Simonette, G., & Ramsook, L. (2013). The Impact of Differentiated Instruction in a Teacher Education Setting : Successes and Challenges. *International Journal of Higher Education*, 2(3), 28–40. <https://doi.org/10.5430/ijhe.v2n3p28>
- Krishan, I. Q. (2022). The Effect of Technology-Oriented Differentiated Instruction on Motivation to learn Science. *International Journal of Instruction*, 16(1), 961–982.
<https://doi.org/https://doi.org/10.29333/iji.2023.16153a>
- Kusumaningrum, S. R., Widiati, U., Anwar, K., & Farisia, H. (2022). Integrating The Technology in Teaching and Learning Process Through Digital Media Creation as A Way to Improve Indonesian EYL Teachers ' Competence. *Jurnal Pendidikan: Teori, Penelitian, Dan Pengembangan*, 7(5), 197–204.
- Mahoney, J., & Hall, C. (2017). Using technology to differentiate and accommodate students with disabilities. *E-Learning and Digital Media*, 14(5), 291–303.
<https://doi.org/10.1177/2042753017751517>
- Mediarmid, G. W. (2022). Time to Rethink : Educating for a Technology-Transformed World. *ECNU Review of Education*, 6(2), 189–214. <https://doi.org/10.1177/20965311221076493>
- Murati, R. (2017). The Use of Technology in Educational Teaching. *Journal of Education and Practice*, 8(6), 197–199.
- Raja, R., & Nagasubramani, P. C. (2018). Impact of modern technology in education. *Journal of Applied and Advanced Research*, 3(1), 33–35.
<https://doi.org/https://dx.doi.org/10.21839/jaar.2018.v3S1.165>
- Sapan, M., & Mede, E. (2022). The Effects of Differentiated Instruction (DI) on Achievement , Motivation , and Autonomy among English Learners. *Iranian Journal of Language Teaching Research*, 10(1), 127–144. <https://doi.org/10.30466/ijltr.2022.121125>
- Satyarini, P. N., Padmadewi, N. N., & Santosa, M. H. (2022). The Implementation of Teaching English Using Differentiated Instruction in Senior High School during Covid-19 Pandemic. *Jurnal Pendidikan Bahasa Inggris Undiksha*, 10(1), 46–52.
<https://doi.org/https://doi.org/10.23887/jpbi.v10i1.49840>
- Shefketi, B. (2019). KNOWLEDGE – International Journal Vol.35.2 THE IMPACT OF TECHNOLOGY IN EDUCATION. *International Journal*, 35(2), 625–629.
- Sinha, K. K. (2022). Role of Modern Technology in Teaching and Learning the English Language in Indian Educational Institutions. *Indonesian Journal of English Language Studies (IJELS)*, 8(2), 71–82. <https://doi.org/https://doi.org/10.24071/ijels.v8i2.4713>
- Stošić, L. (2015). THE IMPORTANCE OF EDUCATIONAL TECHNOLOGY IN TEACHING. (*IJCRSEE*) *International Journal of Cognitive Research in Science, Engineering and Education*, 3(1), 111–114.
- Sudarsana, I. K., Nakayanti, A. R., & Sapta, A. (2019). Technology Application In Education And Learning Process. *Journal of Physics: Conference Series*, 1316, 1–6.
<https://doi.org/10.1088/1742-6596/1363/1/012061>
- Taylor, S. (2017). Contested Knowledge : A Critical Review of the Concept of Differentiation in Teaching and Learning. *Warwick Journal of Education*, 1, 55–68.
<https://journals.warwick.ac.uk/index.php/wjett/article/view/44>
- Trust, T. (2018). Why Do We Need Technology in Education? *Journal of Digital Learning in*

- Teacher Education*, 34(2), 54–55. <https://doi.org/10.1080/21532974.2018.1442073>
- Zhang, W. (2022). The Role of Technology-Based Education and Teacher Professional Development in English as a Foreign Language Classes. *Frontier in Psychology*, 13, 1–7. <https://doi.org/10.3389/fpsyg.2022.910315>
- Zhang, Y., & Wildemuth, B. M. (2005). Qualitative Analysis of Content by. *Human Brain Mapping*, 30(7), 2197–2206. <https://doi.org/10.1002/hbm.20661>
- Zhao, L., & Liu, X. (2021). The Differentiate Effect of Self-Efficacy , Motivation , and Satisfaction on Pre-Service Teacher Students ' Learning Achievement in a Flipped Classroom : A Case of a Modern Educational Technology Course. *Sustainability*, 13(2888), 1–15. <https://doi.org/https://doi.org/10.3390/su13052888>