

Using Task-Technology Fit to Analyze the Adoption of Google Workspace for Education in Teaching and Learning Process

Christianus I Wayan Eka Budiarta, Sampoerna University, Indonesia
Anak Agung Ngurah Perwira Redi, Sampoerna University, Indonesia
Giovanni Richard Halim, Sampoerna University, Indonesia
Aulia Rachmah, Sampoerna University, Indonesia
Babtista Putri Grahani, Sampoerna University, Indonesia

The Asian Conference on Education & International Development 2024
Official Conference Proceedings

Abstract

In addition to the efficiency of teaching and learning activities, the important point of the development of technology in education is the aspect of collaborative work. Collaboration is crucial, encouraging teachers and students to integrate technology for a more meaningful teaching and learning experience. Google Workspace for Education (GWE) is designed to promote the digital transformation in education and highlights the collaborative functionality in its solution's features. The study aims to explore a comprehensive view of technology adoption and its usage by considering teachers' and students' beliefs, and their behavior towards the development of technology in education. Furthermore, the study aims to identify the factors influencing technology adoption and the effectiveness of its implementation in real-world contexts. The study was conducted by using a qualitative-method approach that involved teachers and students from a private school in West Java, Indonesia. The finding shows a mismatch between teachers' beliefs towards technology's role in education and their knowledge of Google Workspace. This finding is essential to design a method to train teachers and students on how to introduce GWE and familiarize them with working collaboratively to accomplish tasks more efficiently and effectively.

Keywords: Task-Technology Fit, Google Workspace for Education, Teaching Learning Performance

iafor

The International Academic Forum
www.iafor.org

Introduction

The use of technology in education has grown in recognition, with the goal of promoting collaborative learning as well as improving the effectiveness of teaching and learning activities (Mohammadi, 2018). Collaboration is essential to create an enjoyable educational environment and encourage students and teachers to go beyond monotonous activity (Shin, 2019). Due to this demand, Google Workspace for Education (GWE) provides a collection of resources intended to support digital transformation in classrooms. GWE has a strong focus on collaborative aspects within its features like online classrooms, real-time communication tools, and shared documents.

The implementation of technology in the classroom does not guarantee its efficient adoption and integration. Studies indicate that a more thorough understanding of technology adoption is required, taking into account not just the technology itself but also the attitudes and actions of educators and learners (Liu, S., Wang, F., & Chen, 2020). This entails discovering how they feel about the educational benefits of technology and how comfortable they are utilizing it for group projects.

Teaching and Learning in 21st Century

The 21st century, also known as the digitalization era, is an era where access to information and communication technologies fundamentally change everybody's lives. It influences how people live, work, and learn. Thus, it is necessary for the education system and sector to adapt to this transformation. Traditionally, the teacher-centered learning concept does not fully support the students with the skills that they need to thrive in this digital environment. On the other hand, the 21st century demands a skilled and adaptable next generation prepared to navigate a rapidly evolving technological landscape. Thus, the concept of "21st-century skills" has emerged, encompassing critical thinking, creativity, collaboration, communication, and computational thinking. As technology plays an increasingly important role in education, tools like Google Workspace for Education offer promising possibilities to foster these skills and create a more engaging and effective teaching and learning process.

Collaborative Work for Digital Transformation in Technology

Digital transformation in technology is revolutionizing the way people work and live their lives. It transforms the traditional and non-digital life system into a digitalized system. One of the cores of this transformation is collaborative work. With technology, people can work together easily and seamlessly. It also enhances the togetherness between one individual with another. Moreover, this transformation also indirectly transforms the teaching and learning process between teachers and students. Technology plays a vital role in facilitating collaborative work in the education environment. This collaboration empowers educators and students to achieve higher quality of work.

Google Workspace for Education

Google workspace for education is a set of productivity and collaboration tools to empower educators and students. It offers a variety of features, including Gmail and Chat for communication, Docs, Sheets, and Slides for collaborative document creation, Classroom for managing online courses, Meet for video conferencing, Forms for survey distribution, and Drive for document organizing. This set of tools is beneficial in fostering 21st-century skills

in the educational environment. Thus, to analyze the adoption of Google workspace for education, this paper utilizes task-technology fit framework. Using this framework, researchers may evaluate how well Google Workspace for Education fulfills demands and challenges of teaching in the 21st century, especially in target schools.

Studies elaborate how Google Workspace tools, such as Docs and Classroom, support group projects in the classroom. With these technologies, students can collaborate on documents, homework and projects, encouraging collaboration and communication. Many research works have investigated the application of GWE. According to one study, Google Classroom is a great tool for facilitating collaborative learning, especially in writing (Subandoro & Sulindra, 2019). In addition, case studies of Google Earth and Google Maps-based collaborative learning among Greek primary schools highlight the development of a real environment study (Tsoulis et al., 2013). Similarly, the use of Google Sites in undergraduate schools promotes collaborative learning and shows positive results in students (Roodt, 2017).

Technology offers possibilities for collaborative learning and developing 21st century skills, but successful integration depends on more than the functionality itself. This study takes an in-depth look at the fit between Google Workspace Education and the specific tasks and requirements of 21st century education through the perspective of the task-technology fit model. This study aims to more fully understand the potential of GWE to transform education in the digital age by examining its capabilities and the perceptions and comfort levels of teachers and students.

Literature Review

Task-Technology Fit

Grounded in the task-technology fit (TTF) theory proposed by Goodhue and Thompson (1995), this study investigates the interaction between task characteristics and technology characteristics. The theory suggests that a user's performance and acceptance of a technology depend upon the degree of alignment between the task requirements and the functionalities offered by the technology. The TTF model theorizes a central point: information technology adoption focuses on the alignment between its functionalities and user tasks. This alignment, often termed "fit," is achieved when the technology's features demonstrably facilitate the user's activities. Experienced users, acting logically, prioritize tools and methods that demonstrably enhance task completion speed and overall effectiveness. Therefore, software with functionalities that do not demonstrably align with user needs is less likely to see widespread adoption. (Larsen et al., 2009). Recent studies identified that the TTF model can effectively evaluate how well technology is adopted and integrated in educational settings. This demonstrates the model's usefulness in analyzing a wide range of educational technologies and platforms. Alyoussef's (2021) investigation into TTF within higher education e-learning systems highlighted that a strong fit between the system's features and user tasks leads to increased user satisfaction and a greater likelihood of continued engagement. Yaakop et al. (2020) investigated an integrated model that merges task-technology fit with the technology acceptance model. This approach successfully explains why students in Malaysian higher education maintain their usage of web-based educational tools. According to Yadegaridehkordi et al. (2016), a study investigating cloud-based collaborative learning technologies in educational settings found that a good fit between the learning tasks and the technology's functionalities (task-technology fit) encourages user adoption. Interestingly, the research also revealed that tasks requiring collaboration among

learners further strengthen this positive influence on task-technology fit. Lim and Lee (2021) argued that combining the TAM and TTF models offers a valuable framework for understanding technology acceptance in higher education, particularly regarding the development of 21st-century skills. This study extends this line of inquiry by employing the TTF framework to specifically examine the adoption of Google Workspace for Education, a collaborative suite designed to enhance educational activities.

Integration of Google Workspace for Education in Collaborative Learning

The integration of Google Workspace for Education into collaborative learning and technology in educational settings has been a subject of research across various academic disciplines (Gupta & Pathania, 2021). Oliynyk et. al. (2023) reports that Google Workspace for Education effectively fosters digital competence among teachers in postgraduate education, enhancing collaborative learning and enhancing learning outcomes. Previously, an observational study from Cahill (2014) reported that integrating Google Apps into university classrooms improves students' communication and collaboration skills, and enhances their understanding of technology use in the classroom. Furthermore, Siek & Wijaya (2022) find that adoption of Google Workspace for Education by university students is positively influenced by perceived usefulness, leading to improved learning performance. The study being reported, mostly aim on the subject of higher degree students. Meanwhile, studies that have been conducted in elementary and middle school are rare.

Research Methods

Research Design

This study uses a mixed-methods approach to examine Google Workspace for Education (GWE) use in teaching and learning. Quantitative survey data is combined with qualitative focus group discussions (FGDs).

Participants

This study involved teachers and students from a private school located in West Java, Indonesia. Purposive sampling was employed to select participants who had prior exposure to GWE in their educational activities. The sample comprised 25 teachers and 65 students. Teacher selection focused on those who had participated in GWE-based courses, while students were drawn from various grade levels to ensure a diversity of experiences and perspectives.

Data Collection Methods

Quantitative Questionnaire

A comprehensive survey, utilizing both closed- and open-ended questions, was conducted among teachers and students. This investigation aimed to capture baseline data on their initial attitudes towards educational technology, their familiarity with GWE, and their perceptions of its utility and ease of use.

Focus Group Discussion

Following a preliminary survey, researchers conducted focus group discussions (FGDs) with educators to gain deeper understanding of their practical experiences using Google Workspace for Education (GWE). These discussions aimed to elicit rich insights concerning the challenges and opportunities associated with GWE, its suitability for achieving educational goals, and the perceived benefits and barriers to its successful integration.

Research Framework

By utilizing the Task-Technology Fit (TTF) framework, this study analyzes how well GWE's functionalities align with educational tasks. The analysis focuses on identifying GWE's strengths that benefit learning and any weaknesses that hinder its effective use in educational settings.

Qualitative data from FGDs and open-ended survey responses will be analyzed using thematic analysis. This analysis will identify recurring themes related to the adoption and use of GWE, the challenges encountered by teachers and students, and the strategies employed to overcome these challenges.

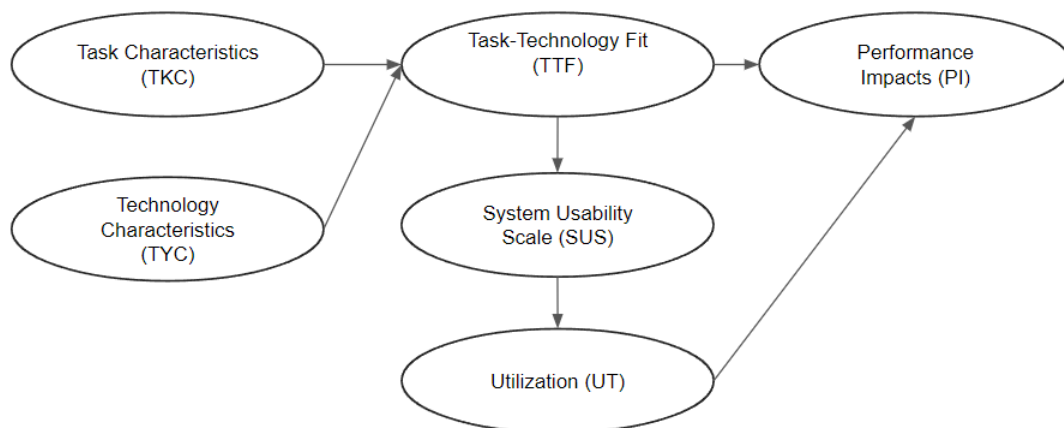


Figure 1: TTF Research Framework

Findings and Discussion

Initial Survey

The initial findings, based on the word cloud obtained from the teachers' lesson plan (Figure 2), reflect that the focus of the current teaching approach is still conventional. It can be seen from the prominence of some keywords such as "peserta" (students), "pembelajaran" (lesson), and "kegiatan" (activity). The "student" keyword indicates that the learning style is still passive, where students are more focused on receiving information and just being a participant and less active participation. Moreover, "lesson" keyword implies a teacher-centered learning style and presentation. However, "activity" mentioned in the word cloud reflects that the current teaching and learning process includes dynamic activities which provoke the emergence of critical thinking among the students.



Figure 2: Word Cloud Analysis on Lecturer's Lesson Plan

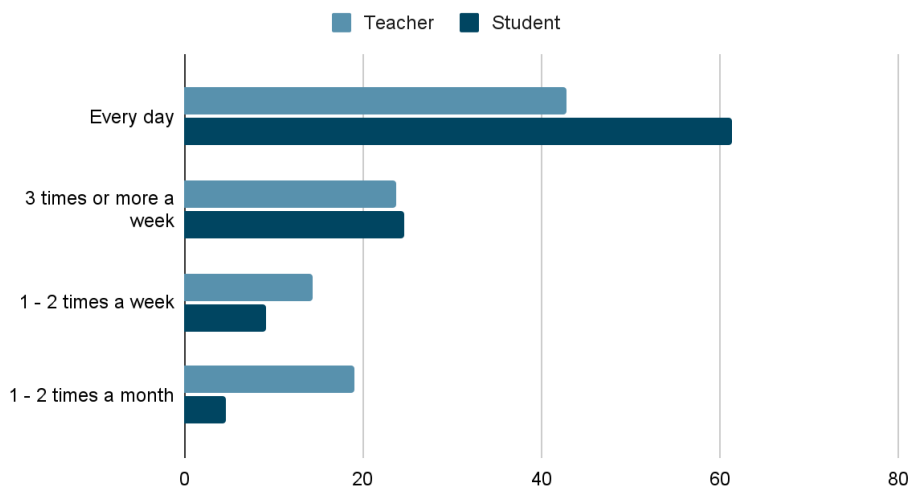


Figure 3: Comparison of the Frequency Using Technology Between Teacher and Student

Figure 3 shows the comparison of how frequent teachers and students are using technology for their operation daily. This figure emphasizes on the information that students are more frequent in using technology than teachers. However, it is not necessary to use educational technology for their learning experience (ex. for gaming and social media).

Through the survey, other findings indicate a positive use of technology adoption for both students and teachers. For instance, students' digital tool adoption has reached a staggering 98% in their day-to-day activities. Furthermore, when specified regarding the academic use of Google Solutions, 80% of the students reported daily usage of the technology. The teachers' survey yielded similar results, where 80% of them declared the adoption of digital tools for their daily teaching and learning process. Additionally, when specified regarding the

use of Google Solutions, 80% of the teachers answered that they have used those tools in the classroom. This indicates a positive use rate of digital devices overall.

However, the same cannot be said regarding the knowledge of Google Chromebooks. Although heralded as a tool for education, students and teachers do not have an awareness of its existence. Before the distribution of the devices, the percentage of students and teachers who knew of the Google Chromebook was 38% and 67%, respectively.

Focus Group Discussion (FGD) With Teachers (NVIVO)

Table 1 summarizes the Focus Group Discussion (FGD) results that describe the adoption and use of GWE based on the TTF framework. The most significant finding is the belief required in teachers when it comes to technology usage, where teachers realize the noticeable impact of technology's benefits after they apply the tools daily. Before any intensive training on Google Solutions was done, teachers were more focused on being the center of instruction and used more conventional teaching methods. On the other hand, students were more enthusiastic when it came to the use of technology. However, after the training, where teachers were given a chance to explicitly learn and explore the tools, they began to believe that there would be a benefit in using digital tools in the classroom. Therefore, upon the utilization of technology in the classroom, the teachers perceived that there was an increase in their performance impact. This particular research emphasizes the benefits teachers encounter when purposely using the tools and features that GWE provides for them. It proves that a mismatch exists in the teachers' belief in technology's role in education and their knowledge of GWE.

Table 1: Summary of findings related to the proposed TTF framework based on FGD results.

Variable	Excerpt
Task Characteristics (TKC)	<p><i>Sistem penilaian, supervisi pekerjaan siswa dan mengecek progress dari siswa, Pencatatan aktivitas harian anak-anak dalam ibadah, seperti shalat.</i></p> <p>(Evaluation system, work supervision of students, and checking student progress. Recording daily activities of children, for example prayers.)</p>
Technology Characteristics (TYC)	<p><i>Kelebihan Chromebook adalah kemudahan dalam berbagi dan akses berbasis online, menghilangkan kebutuhan untuk menggunakan perangkat tambahan seperti flashdisk. Kekurangan Chromebook adalah ketidakfamiliaran pengguna dengan platformnya, yang membutuhkan aktivitas untuk mencoba dan mengembangkan diri.</i></p> <p>(The advantage of Chromebook is the ease of sharing and online-based access, eliminating the need for additional devices like flash drives. The drawback of Chromebook is the users' unfamiliarity with its platform, which requires activities to try and develop oneself.)</p>

Task Technology Fit (TTF)	<p><i>Memudahkan guru dalam administrasi tugas siswa. Memudahkan dalam memberi feedback kepada student.</i></p> <p>(Facilitates teachers in student task administration. Facilitates providing feedback to students.)</p>
System Usability Scale (SUS)	<p><i>Beberapa merasa nyaman dengan Google Chrome karena lebih simpel, dan meningkatkan kolaborasi namun masih belum terbiasa dengan beberapa fitur.</i></p> <p>(Some feel comfortable with Google Chrome because it is simpler and enhances collaboration but are still not familiar with some features.)</p>
Utilization (UT)	<p><i>Sudah diintegrasikan ke semua aspek, dari buku digital, penyampaian materi, pengumpulan tugas, dan asesmen. Setiap pagi, wali kelas dapat menggunakan Google Chromebook untuk mengaji Al-Quran. Ayat-ayatnya juga dapat ditampilkan di depan.</i></p> <p>(It has been integrated into all aspects, from digital books, lesson delivery, task submission, to assessment. Every morning, homeroom teachers can use Google Chromebook to recite the Quran. The verses can also be displayed in front.)</p>
Performance Impacts (PI)	<p><i>Komentar langsung pada tugas-tugas siswa melalui Google Chromebook membuat mereka lebih rajin dan cepat mengevaluasi pekerjaan mereka. Melalui kolaborasi belajar dengan teknologi Google, perubahan positif dalam karakter siswa menjadi lebih terlihat, terutama dalam motivasi dan kualitas pekerjaan mereka.</i></p> <p>(Direct feedback on student assignments through Google Chromebooks makes them more diligent and quicker to evaluate their work. Through collaborative learning with Google technology, positive changes in students' characters become more noticeable, especially in motivation and the quality of their work.)</p>

Conclusion

Although there are benefits of Google Workspace for Education (GWE) to teaching and learning, to make the suite impactful, the teachers must have the intention of using it first. Further studies may show the impact that GWE has on the teachers and students as they continue learning the features and functionality that the suite has. Overall, the benefits of Google Workspace for Education are apparent, and the teachers find its applications beneficial to their performance. The finding shows a mismatch between teachers' beliefs towards technology's role in education and their knowledge of Google Workspace. This finding is essential to design a method to train teachers and students on how to introduce GWE and familiarize them with working collaboratively to accomplish tasks more efficiently and effectively.

References

- Alyoussef, I. Y. (2021). E-Learning Acceptance: The Role of Task–Technology Fit as Sustainability in Higher Education. *Sustainability*, 13(11). <https://doi.org/10.3390/su13116450>
- Cahill, J. L. (2014). University Professors' Perceptions About the Impact of Integrating Google Applications on Students' Communication and Collaboration Skills. *Journal of Research Initiatives*, 1(2), 7. <http://digitalcommons.uncfsu.edu/cgi/viewcontent.cgi?article=1019&context=jri>
- Goodhue, D. L., & Thompson, R. L. (1995). Task-Technology Fit and Individual Performance. *MIS Quarterly*, 19(2), 213–236. <https://doi.org/10.2307/249689>
- Gupta, A., & Pathania, P. (2021). To study the impact of Google Classroom as a platform of learning and collaboration at the teacher education level. *Education and Information Technologies*, 26(1), 843–857. <https://doi.org/10.1007/s10639-020-10294-1>
- Larsen, T. J., Sørebo, A. M., & Sørebo, Ø. (2009). The role of task-technology fit as users' motivation to continue information system use. *Computers in Human Behavior*, 25(3), 778–784. <https://doi.org/https://doi.org/10.1016/j.chb.2009.02.006>
- Lim, T. L., & Lee, A. S. H. (2021). Extended TAM and TTF Model: A Framework for the 21st Century Teaching and Learning. *2021 International Conference on Computer & Information Sciences (ICCOINS)*, 334–339. <https://doi.org/10.1109/ICCOINS49721.2021.9497216>
- Liu, S., Wang, F., & Chen, L. (2020). Examining teachers' adoption of mobile learning technologies: A task-technology fit perspective. *Computers & Education*, 144, 103708.
- Mohammadi, H. (2018). The necessity of collaborative learning in educational technology. *International Journal of Emerging Technologies in Learning (IJETL)*, 13(1), 1–8.
- Oliynyk, V., Gushchyna, N., Kondratova, L., & Kasian, S. (2023). Developing digital competence of teachers in postgraduate education using Google Workspace for Education. *CTE Workshop Proceedings*, 11. <https://doi.org/10.55056/cte.662>
- Roodt, S. (2017). *European Conference on Information Systems (ECIS) 5-12-2012 USING GOOGLE SITES AS AN INNOVATIVE LEARNING TOOL AT UNDERGRADUATE LEVEL IN HIGHER EDUCATION*. <https://api.semanticscholar.org/CorpusID:798359>
- Shin, N. (2019). Collaborative learning with technology: Benefits and challenges. *International Journal of Instruction*, 12(3), 221–236.
- Siek, M., & Wijaya, I. (2022). Investigating Cloud-Based Educational Technology Adoption in Advancing Learning Performance. *2022 4th International Conference on Cybernetics and Intelligent System (ICORIS)*, 1–8. <https://doi.org/10.1109/ICORIS56080.2022.10031577>

Subandoro, P. S., & Sulindra, E. (2019). *OPTIMIZING COLLABORATIVE LEARNING: USING GOOGLE CLASSROOM IN BUSINESS ENGLISH CORRESPONDENCE CLASS*. <https://api.semanticscholar.org/CorpusID:86389225>

Tsoulis, M., Costas, T., & Mitkas, K. (2013). Collaborative learning using google facilities. *2013 International Conference on Interactive Collaborative Learning, ICL 2013*, 577–582. <https://doi.org/10.1109/ICL.2013.6644658>

Yaakop, A. Y., Mahadi, N., Ariffin, Z. Z., Hasan, Z. R. A., & Harun, M. (2020). Examining students' continuance usage intention for web-based educational tools: A developed integrated structural model approach. *Asian Academy of Management Journal*, 25(1), 25–41. <https://doi.org/10.21315/AAMJ2020.25.1.2>

Yadegaridehkordi, E., Iahad, N. A., & Ahmad, N. (2016). Task-Technology Fit Assessment of Cloud-Based Collaborative Learning Technologies. *International Journal of Information Systems in the Service Sector (IJISSS)*, 8(3), 58–73. <http://doi.org/10.4018/IJISSS.2016070104>

Contact email: eka.budiartha@sampoernauniversity.ac.id