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# Digital Platform-Based Learning Innovation in Elementary Schools in the Industry 4.0 Era: Systematic Literature Review

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| **Abstract** | Information and communication technology advances have been utilized in many sectors of human life, including educational practices. This study aims to reveal the innovation practices of app-based digital application platforms. This research was conducted using a systematic literature review (SLR) approach. Data sources come from research journal articles and books by the theme of the discussion. The data analysis technique uses content analysis. The finding or result of this research is that learning can utilize digital platform features as part of learning innovation. Digital platforms that can be utilized are such as Microsoft Teams and Edmodo applications. Both applications have many services, such as video conferencing, presentations, assignments, and online assessments. The utilization of digital platforms in schools in the Industrial Age 4.0 aligns with the development and challenges of the rapidly changing times. Digital platforms are part of the innovations that can be used as alternative media and real solutions for technology-integrated learning. Learning with digital platform media can increase student participation and collaboration and provide new, in-depth learning experiences. |
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## 1. INTRODUCTION

The use of digital platforms in learning has become popular among educators due to the ease of access and flexibility they offer, such as during the COVID-19 pandemic, where online applications have been very helpful in facilitating learning. Educational digital platform-based learning innovation involves using technology to send, receive, and interact with learning content online (Decuypere et al., 2021). The application has features like webinars, video conferencing, and mobile applications. These digital platforms provide flexibility and convenience in accessing learning content, providing opportunities to learn from anywhere and anytime (Santiago et al., 2021).

Online learning can improve student learning outcomes and develop digital skills. Online learning can increase student engagement and reduce the accessibility gap between students from different backgrounds. However, some challenges must be overcome using learning innovations based on educational digital platforms, such as the decline in the intensity of interpersonal interactions among school members. In addition, there are differences between students who have technology accessibility and those who do not, which can lead to learning gaps (Jackman et al., 2021).

Evaluating the impact of adopting a digital platform in learning is essential to ensure students have an optimal learning experience. This can be done using digital platforms to measure student engagement, learning outcomes, and student satisfaction. There is also a need for more in-depth research on how digital platforms can be optimized to facilitate more personalized and targeted learning (Moldavan et al., 2022). In Indonesia's education context, learning innovations based on educational digital platforms also play an important role in ensuring equitable access and quality of education throughout Indonesia. Indonesia is a country with a large population spread across many regions. Using digital platforms in learning can help overcome the problems of accessibility and quality of education in remote and hard-to-reach areas (Williams et al., 2016).

Governments and educational institutions must continue to innovate and adopt digital technology in learning to improve the quality of education. Results related to learning innovation based on digital education platforms can be an important basis for educational institutions in determining policies regarding the effective and efficient utilization of digital technology in learning (Sayaf et al., 2022). Technology-based learning is expected to help create a more educated and competitive young generation in the digital era. Education is an important aspect of a country's development, and implementing technology-based learning has become a global trend. Digital education platforms have become an alternative solution to improve learning quality and provide equal learning opportunities for all students, regardless of distance and geographical location (Hassan et al., 2020). In Indonesia, an education digitalization program called Gerakan Nasional Literasi Digital (GNLD) was launched in 2019. GNLD aims to achieve national education goals, namely improving literacy and numeracy and developing student character (Kurnia, 2021).

The implementation of digital-based learning has utilized many convenient application services. This innovation has a positive impact on the implementation of teaching and learning activities in the classroom, such as improving student learning outcomes, making it easier for students to be more active in learning, and developing students' digital skills, which is one of the important competencies for today's generation (Al-Maroof et al., 2021). A teacher can organize learning with application tools to be used as adequate interactive media. Of course, the time required also becomes more proportional and efficient. Besides the benefits, digital apps for learning also have some risks that may occur and can be considered. The biggest risk is related to data leakage. Therefore, a team of experts is needed to oversee the digital learning process so that it can run well. Another risk is related to device access. Each student, of course, has different conditions. Some can access them by having adequate devices. Some cannot buy them. Internet access should also be a special concern to make the most of application services (Cho et al., 2021).

Several things must be considered in learning innovation based on digital education platforms.

Firstly, evaluating the application platforms used in educational organizations and assessing their effectiveness is necessary. Secondly, students' characteristics and learning needs should be considered when choosing the right digital platform. Third, security and privacy should be considered when choosing digital platforms and learning. The study of learning innovations based on digital education platforms can also help address issues of accessibility and quality of education in remote and hard-to-reach areas. The use of digital technology can provide a solution to overcome geographical constraints and provide equal learning opportunities for all students. In addition, this research can also help managers of educational institutions in Indonesia by developing more effective and efficient learning innovations. By using digital platforms for effective and efficient learning, students are expected to gain the knowledge and skills needed to compete in the current and future digital era (Sofi-Karim et al., 2023).

One of the key issues in digital platform-based learning is accessibility and equity in learning. While digital platforms can create more flexible distance learning opportunities, many students still do not have adequate access to devices and internet connectivity (Awaghade, 2022). This can deepen the education gap between students from different economic backgrounds. In addition, the aspect of social interaction and social skills development is also a concern. These interaction limitations can affect students' ability to communicate, cooperate, and develop social skills that are important in real life (Abu Zahra, 2020). Teaching quality is also a crucial issue. Implementing digital platform-based learning requires a different teaching approach from face-to-face learning. Not all teachers have sufficient technology skills to manage digital learning effectively. This can affect the overall effectiveness of teaching and learning (Arcos-Alonso & Arcos Alonso, 2021).

This research focuses on identifying the implementation of digital platform-based learning innovations in primary schools in the Industry 4.0 era and values its impact on learning. Research on learning innovations based on digital education platforms has been conducted previously. For example, Gillet's research on the "shape of the digital platform model for comprehensive education" (Gillet et al., 2022). In addition, there is also research from Yazici and Özerbas with the title "The Analysis of the Efficiency of Digital Education Platforms Based on Various Variables " (Yazici & Özerbas, 2022). Karaferye also researched learning innovation titled "Digital Teaching and Learning: Exploring Primary School Teachers' Approaches, Sources of Concern & Expectations" (Karaferye, 2022). However, these studies did not touch on learning innovation based on digital education platforms. Thus, this difference becomes a finding in this study that distinguishes it from previous studies.

## 2. METHOD

This type of library research uses a systematic literature review (SLR) with data collected from various existing scientific articles, books, journals, proceedings, and others. We can search for literature sources through e-journal and e-book service sites published in Franse and Taylor, springer, ERIC, DOAJ, and Google Scholar. Literature data collection begins with searching articles based on keywords through the official website page or portal. Furthermore, the researcher collects data from the article by the discussion matrix table compiled. Furthermore, the collected data will be sorted based on its relevance to the research theme and ends with data analysis using content analysis techniques related to the theme. This study's Data analysis techniques used descriptive and content analysis techniques (Kleinheksel et al., 2020). The data above can also be identified and filtered from the search results using PRISMA 2020 (Abelha et al., 2020).

## 3.   FINDINGS AND DISCUSSIONS

### *Digital Platform-Based Learning for Education in the Industry 4.0 Era*

Learning today can utilize various digital-based technologies, especially applications relevant to teaching and learning activities in schools. Various kinds of applications are available that can be applied to learning. The use of applications can be adjusted to the existing situation and conditions. Applications that are currently widely used to assist digital-based learning are Microsoft Teams and Edmodo. These two applications have several features that support the learning process. Digital application-based learning is intended to provide students with digital competencies and skills to face the industrial era 4.0.

### a.   Integrated Learning with Microsoft Teams

Microsoft Teams is a trending application platform for education. This application is equipped with supporting features that can be utilized, for example, video conferencing, presentations, and collaborative assignments, and can also be used for online assessment. The assessment feature of this application is that it can send assignments to students. Educators can create assignments in various forms, such as text, files, or interactive quizzes, and then send them to learners (Pal & Vanijja, 2020). These various features can be used to increase student independence and competence. Question types can also be set in various forms, such as multiple choice, short answer, or project assignments. In addition to assigning tasks, educators can set a deadline for submission to discipline children to have a sense of responsibility (Al Enezi et al., 2022).

The digital world has changed educational practices and made online applications the tool of choice for educational actors. In recent years, since the Covid-19 pandemic, learning applications have been trending among the public. The 21st century, characterized by technological advances and the rapid flow of information and communication, is also an important issue. Many learning applications have emerged that make it easier for students to understand the material studied. Microsoft Teams is one of the learning support applications that can be utilized. The reality of distance learning has changed many educational practices. The ease of operating Microsoft Teams is also a value in itself. Various learning materials can also utilize this popular software (Alabay, 2021).

The impact of learning integrated with Microsoft Teams can improve students' digital skills, student interaction, and student learning outcomes. Through this application, the teacher can also set the score of the questions that have been made, and the application system will work to correct student work, which will eventually be given in the form of real-time feedback. This instant feedback is also an added value for the teacher because it will help map the child's ability to understand the subject matter, as seen from the results of the assessment exams. With the direct feedback feature, students can also learn their learning results directly without waiting long. Students also know which points need to be corrected because each student who submits assignments or assessments will receive the data analysis of the assessment results (AlAdwani & AlFadley, 2022).

The features in Ms. Teams also allow educators to shape virtual classes according to real class situations. Educators can create special channels per class and per subject whose function is to facilitate the learning process. Additional applications can also be integrated with this application, such as the Forms or Quizizz applications, which are used to create interactive quizzes or apply survey methods. Through this application, it can also foster collaboration between students. The teacher can create a project together and divide students into several groups. The collaboration features in this application can be used by students to complete projects. Students can individually share their assignments and knowledge and solve problems together. Educators act as monitors and evaluate each student's process and contribution to the project assignments being carried out. Students have a positive attitude towards using Microsoft Teams as an e-learning and learning management system (LMS). All of the available features of the tool were found to be useful and easily adaptable, with online learning recording sessions

and online testing rated as the most interesting and different (Krsmanovic & Petrovic, 2021).

Microsoft Teams is rated an effective application in school learning practices. This shows that Microsoft Teams is an app platform that can be a top choice, as it has varied features, optimized accessibility, and functionality. It acts as a connecting media for teachers and students for interactive learning. These virtual learning platforms are evidence of a civilizational shift in education from traditional classrooms to distance learning or blended learning (Almodaires et al., 2021).

Microsoft Teams can increase group work, participation, and student collaboration. Students using this platform can share and collaborate, manage their groups or channels, and plan projects or assignments. All individual or group project work can be archived in one space that teachers can access, just like in the real world. These assessments have a level of authenticity that a traditional LMS lacks. Online assessment using Microsoft Teams can make assessment easier. Each student will receive the exam or assessment results. Educators can add written messages or comments, voice recordings, or even videos as feedback on student work. This feature will certainly give students an understanding of their strengths and weaknesses so they can be corrected directly. Another thing that must be considered when using this application is related to security and privacy. Assessment results must be secure, and teachers can store them in a separate database. This application can be used as a medium for technology-based authentic assessment and provide a different learning experience for their future success (Evans, 2022).

Microsoft Teams can be used as a tool of choice in learning innovation. Some tips should be considered in maximizing the use of Ms. Teams. Every teacher conducting an assessment should plan and prepare the tasks well. The tasks given should also be relevant to the material taught. Questions should be made with as many variants as possible, not just multiple choice. The goal is to train students' thinking power and improve students' overall understanding. Regarding feedback, teachers should be able to provide clear messages and explanations in the comments so that students can easily understand them. Special messages are given to encourage and motivate students to improve their competence. Continuous training and mentoring are needed to improve students' understanding and digital skills (Nurkusumaningrum et al., 2022).

Ms. Teams has a scheduling feature to conduct meetings. Teachers must communicate directly with students to avoid misperceptions. All students must be able to access the app on their own devices and have a stable internet connection to ensure a smooth learning process. In addition, children with special needs must also be considered so that they can participate in operating this application. This application can be used as one of the optional choices to implement digital learning. Ideally, all teachers should get special training before using this application to improve their skills. Every teacher must be adaptive to new technology to adapt to the rapidly changing digital technology era. This training aims to equip teachers to direct their students to operate this application properly and correctly per the provisions. This digital platform becomes a liaison and facilitates between teachers and students in addition to direct meetings in the classroom (Olugbade & Olurinola, 2021).

The features of Microsoft Teams should be optimized to improve students' learning output. This application platform should be evaluated regularly, especially its use as a virtual learning tool. All students are also given time to respond to the use of this application and whether it has met their expectations and needs. This is important for improvement and follow-up in improving app-based learning. App-based learning is also expected to increase student involvement and activeness in learning. Students have a new spirit because educators provide updates and innovations. Students' responses to using this application will improve their learning experience. The shortcomings and weaknesses are immediately addressed with the help of the application's real-time feedback feature. Students can interact with this device as a learning tool and motivate students to understand learning materials (Rojabi, 2020).

An application is made to adjust to the conditions and challenges of the times. Today's digital era

requires humans to be familiar with and skilled in operating digital products (Zain, 2021). Every student and teacher must master technology to facilitate their activities in the teaching and learning process. Digital applications can be an effective means to improve the quality of graduate output (Pal & Vanijja, 2020). The Microsoft Teams application has offered various features relevant to current learning. Student collaboration and participation can be increased, easy access to materials, and can be used as a tool for learning independence (Romadhona & Dwiningsih, 2021).

**b.  Integrated Learning with the Edmodo Application**

Edmodo is an online platform with various features supporting learning (Kaba, 2018). The learning that is carried out will make it more effective when collaborating with applications like Edmodo. The advantage is that students not only learn in class but students may access it at any time to improve their understanding and competence. Edmodo is suitable for solving learning problems and improving students' critical thinking skills (Rohyana, 2020).

Conventional face-to-face learning is limited because it can only be done at school. It's different if there is a link between students and teachers, which can be done through digital media; of course, this will be an added value for the continuity of learning. The use of application-based technology is a necessity in education today. Edmodo can be a choice for educational institutions, one of which is an innovative learning media (A. Susanti & Putri, 2022). The features in Edmodo include holding virtual classes and real classes for discussion media and the like. Assignment features can also be applied to develop student competence in understanding certain material, and teachers can set assignments to start and end. Sharing notes and material can also be done through this application. The assessment process can also use Edmodo. Teachers can provide assessments and feedback to students, which can be used as a learning evaluation tool. Using Edmodo can be said to be relatively easy. Of course, operating skills are also the main requirement for this convenience, and no less important is a smooth internet connection (Fitriasari, 2017).

Edmodo is a school-based network application. Edmodo can be used to assist teachers in forming online virtual classes that match real classes. Teachers can create discussion rooms and deliver additional material in this application. Teachers can also submit assignments through this application as well as conduct assessments. Every student can interact virtually and make this application a medium for discussion and space to convey their ideas, opinions, and thoughts (Aydin, 2021). Edmodo is an assistance application for carrying out learning, especially in terms of E-assessments, which makes tests more practical and effective and can increase student motivation in its application (Sabila et al., 2020).

The Edmodo application can utilize its various features (Sefriani et al., 2021). A teacher can give assignments in a variety of varied forms, such as in the form of text, multimedia, or interactive quizzes (Alqahtani, 2019). The types of questions in the test can also be adjusted to your liking, ranging from multiple choice forms, project or portfolio assignments, and short entries to essay questions (Siahaan, 2020). The task is given to test and measure the level of understanding and the depth of students' knowledge (Asfar & Asfar, 2021). Electronic assessment using Edmodo can increase children's motivation, is practical and easy to use, and reduces anxiety during exams (Ekmekçï, 2016). Also, through this online assessment, educators can provide direct feedback to each student who has submitted their assignments (Ndibalema, 2021). The teacher can provide comments and notes in detail. The hope is that students can discover their weaknesses and improve at future opportunities (Hamidi et al., 2020). Edmodo provides facilities for educators to administer computer-based tests (CBT), which can reduce student cheating in tests and make the resulting validity more accurate (Sumardi & Muamaroh, 2020).  Online virtual classes are also included in the Edmodo application, which can be used for online discussions between students and teachers (Sari et al., 2019). Teachers can also use this virtual space to deepen the material. Students also have the opportunity to express their ideas and discuss and collaborate with colleagues (Mrayed, 2020).

A teacher can discover students' obstacles and problems through this virtual classroom and

provide guidance and direction according to student needs. The assignment feature is also an interesting part of this application (Kaba, 2018). Online assignments are certainly intended as a measuring tool to see student progress periodically. The time limit can also be set by the teacher when giving assignments. Answers sent by students can be corrected by the application system and given a review or feedback (Loo & Dass, 2021). This assignment feature can also be a tool for educators to identify each learner's progress level, and the results are used for intervention and follow-up purposes if needed. All of these demonstrate the role of Edmodo, especially in terms of time effectiveness when conducting assessments (R. D. Susanti & Effendi, 2020).

Teachers, as teachers and educators, can also use this application to share additional learning materials according to the themes being studied. Various files in text, videos, and website links can be shared regularly as learning materials for students. Of course, this kind of practice can be used to train students' independence in learning and support increasing learning activities and competence. The application of Edmodo certainly provides a different experience for children. Skills in utilizing application features will also strengthen, along with active use of applications in learning (Nurbani & Permana, 2020).

Optimizing the use of Edmodo for learning can follow several steps. The process of learning innovation carried out through applications must still involve students actively. That is, it is ensured that all students can access the application properly and have the skills to support it. There should be no misunderstanding between the teacher's intentions and what students do. Active involvement of students can also be in the form of open dialogue to add insight and improve their skills as the main provision for facing life in the 21st century (Wulan et al., 2019). Teachers can monitor student progress patterns regularly through this application. Edmodo's analytical features allow teachers to find out in-depth about trends in student learning outcomes, and this data can be used to design remedial programs and more effective learning strategies and be used as a basis for student tutoring. Edmodo can also be integrated with other methods in teaching and learning activities. For example, adopting other applications in learning (Ekayati, 2018).

Data security must also be considered when implementing Edmodo in learning. Educators must master the application's various features to guarantee data security. The Edmodo application can generally be used in various learning processes. The features available in it can be used for more constructive educational purposes. Various existing services have proven to be able to make a major contribution to the world of education in particular. Educational institutions and teachers can use Edmodo for virtual discussions, making assignments, conducting online assessments, providing feedback, and analyzing data from the results. Using Edmodo from a student's perspective can reduce anxiety, and they prefer application media to traditional paper-based tests (Etfita, 2019).

### Values of Implementing Digital Platform-Based Learning in Elementary Schools in the Industrial Age 4.0

Digital platform products in the form of web and applications can potentially support successful learning to be more effective (Rahman et al., 2022). Era 4.0 and post-truth have brought many changes in the world of education. Educational actors (educators and learners) must be skilled in operating various applications and web products in the current digital era. Existing applications and websites also mark a new era in terms of libraries, from conventional to open resources. Of course, this is an adequate alternative for developing student education solutions. Learning styles have also transitioned from traditional reading texts in conventional books to articles on websites, applications, and other digital products connected to the internet (Rusydiyah, 2019).

A teacher's digital competence and skills are the key to success in app-based digital learning. Qualified educators will certainly have a good effect on learning output. A teacher must have competence in designing learning, managing the learning class, and conducting learning evaluation and feedback. The effectiveness of the learning process influences learning output. One of the skills that

educators must possess in the 21st century is the skill and proficiency in operating digital products in the form of applications, websites, and others (Mudlofir, 2021). The main competencies of educators in the industrial era 4.0 must be proficient and skilled in digital matters. Digital literacy is also a necessity that a teacher must master as part of successful learning. Teachers must adapt to information technology products related to information skills and media awareness (Rusydiyah et al., 2020).

Optimizing learning innovations based on digital educational platforms is also necessary to prepare adequate infrastructure and human resources. Technological infrastructure, such as a reliable internet network and adequate computers or gadgets, must be available and affordable. In addition, teachers and lecturers must be provided with adequate training and support to integrate digital platforms in learning into existing curricula and teaching methods. In addition, it is important to pay attention to security and privacy when using digital platforms for learning (Abdou et al., 2021). Since using digital platforms involves the transfer of data, sensitive information of students and teachers must be properly protected from digital security threats. Therefore, governments and educational institutions must adopt policies and practices that ensure the privacy and security of student and teacher data (Nurbekova et al., 2020).

Learning innovations based on digital educational platforms can provide valuable insights for educational institutions in optimizing the use of digital technology in learning. By understanding the benefits and challenges of using digital platforms in learning, educational institutions can plan appropriate strategies and tactics to improve the quality of learning and ensure equitable accessibility for all students (Sarker et al., 2019). In Indonesia's education context, research on learning innovations based on digital educational platforms can also help address issues of accessibility and quality of education in remote and hard-to-reach areas. Using digital technology, educational institutions can provide equal learning opportunities for all students without being limited by distance and geographical location (Ferri et al., 2020).

Learning by using applications can be an alternative to form a student's learning environment. Teaching with the help of online media is an extension of conventional learning that is traditional. Learning through application media can certainly increase student involvement effectively. Students can form small groups through groups or channels used as intensive collaboration media (Baker & Spencely, 2023). The application platform applied in learning can increase collaboration, student participation, and effective and efficient assessment. As a result, the application platform has become the tool of choice for educational institutions and an additional force for improving learning outcomes. However, not all institutions can adopt this application in learning because several factors do not support it. Guidance and the role of the teacher play an important role in application-based learning to provide a holistic learning experience for students (Callaghan, 2021).

Several other applications can also be used as media to connect directly or collaborate with Microsoft Teams. The Tasks by Planner application can be an option. Assignments can be distributed to all students, and due dates can be set. The Task by Planner app is very helpful in tracking long-term project progress. Another application is YouTube. Teachers can upload videos or links for students to access. Through this application, students can see interesting content related to their study material. YouTube has millions of videos that students can use to strengthen their understanding. Another favorite application is the Google form, which can be used as a medium for students to do assignments and submit reviews or opinions. Task by Planner, YouTube, and Google Form are some of the applications that can be an option of choice, but many applications are still available to be integrated to suit the needs and conditions at school (Ruenz, 2021).

Applying digital platform-based learning innovations to elementary schools in the industrial era 4.0 had a significant impact. The following are some of the possible impacts:

a. Learning with digital platform integration allows easier and equitable access to learning materials. This innovation allows students in remote areas or those with physical limitations to access

learning resources more easily. It can also help reduce the education gap between urban and rural areas (Zhu & Liu, 2020).

b.  In the industrial era 4.0, digital skills are very important. Using digital platforms in learning can improve students' skills in operating digital products from an early age. They can learn about using software, basic programming, and other skills relevant to technological developments (Goh & Sigala, 2020).

c.  Digital platforms can provide more interactive and interesting learning experiences through multimedia, simulations, and educational games. Students can have more fun and be more involved in the learning process. In addition, digital platforms also allow personal adjustments and feedback, enabling each student to learn according to their own pace and learning style (Videnovik et al., 2020).

d.  Digital platforms facilitate collaboration and communication between students, teachers, and parents. Students can collaborate on joint projects, share thoughts, and provide feedback to their classmates. Additionally, teachers can provide tutoring online, provide immediate feedback, and manage classes more efficiently. Parents can also be actively involved in their child's learning by accessing digital platforms and following their child's learning progress (Chen & Rivera-Vernazza, 2022).

e.  teachers can monitor student learning progress through digital platforms. They can track students' progress, identify difficulties encountered, and provide appropriate interventions. This platform also allows for more measurable and objective evaluations, thereby enabling continuous improvement in the learning process (Gross & Opalka, 2020).

It is important to remember that implementing digital platform-based learning innovations has challenges. Some challenges that may arise are limited internet access in certain areas, limited infrastructure, and the tendency to reduce direct social interaction. Educational institutions, teachers, and students must be prepared with everything that supports the success of digital platform-based learning in schools. Digital platform-based learning using supporting applications is one of the options that can be done to solve the current learning problems, especially related to children's digital competence and skills. Digital skills have not been fully owned optimally by students. In contrast, in the industrial era of 4.0, characterized by the acceleration of information, digital skills are needed to support student learning success. Students can practice independence, find and process new information, and hone critical thinking through these digital skills.

## 4.  CONCLUSION

Digital platform-based learning can be done in the context of innovation to create a learning atmosphere responsive to technology. The digital platforms in question are Microsoft Teams and Edmodo applications. Both applications have various features to facilitate school teaching and learning activities, such as sharing materials, virtual classes, assignments, and online assessments. Integrated learning with apps aims to develop children's digital skills and improve students' competence, participation, and collaboration. The positive contribution of using technology in learning must be optimized to equip students to become skilled human beings and ready to face challenges in today's digital era.

## REFERENCES

Abelha, M., Fernandes, S., Mesquita, D., Seabra, F., & Ferreira-Oliveira, A. T. (2020). Graduate Employability and Competence Development in Higher Education—A Systematic Literature

Review Using PRISMA. *Sustainability*, *12*(15), Article 15. https://doi.org/10.3390/su12155900

Abu Zahra, H. (2020). *The Management of Digital Technology Towards Equipping Students with 21st Century Skills: Its Implementation in Lower Primary Pedagogy*. https://bspace.buid.ac.ae/handle/1234/1700

Al Enezi, D. F., Al Fadley, A. A., & Al Enezi, E. G. (2022). Exploring the Attitudes of Instructors toward Microsoft Teams Using the Technology Acceptance Model. *International Education Studies*, *15*(1), 123–135. https://eric.ed.gov/?id=EJ1331301

Alabay, S. (2021). Students' Views on Learning French Online with Microsoft Teams® during the COVID-19 Pandemic. *African Educational Research Journal*, *9*(2), 333–338. https://eric.ed.gov/?id=EJ1297118

AlAdwani, A., & AlFadley, A. (2022). Online Learning via Microsoft TEAMS during the COVID-19 Pandemic as Perceived by Kuwaiti EFL Learners. *Journal of Education and Learning*, *11*(1), 132–146. https://eric.ed.gov/?id=EJ1330208

Al-Maroof, R. S., Alnazzawi, N., Akour, I. A., Ayoubi, K., Alhumaid, K., AlAhbabi, N. M., Alnnaimi, M., Thabit, S., Alfaisal, R., Aburayya, A., & Salloum, S. (2021). The Effectiveness of Online Platforms after the Pandemic: Will Face-to-Face Classes Affect Students' Perception of Their Behavioural Intention (BIU) to Use Online Platforms? *Informatics*, *8*(4), Article 4. https://doi.org/10.3390/informatics8040083

Almodaires, A. A., Almutairi, F. M., & Almsaud, T. E. A. (2021). Pre-Service Teachers' Perceptions of the Effectiveness of Microsoft Teams for Remote Learning. *International Education Studies*, *14*(9), 108–121. https://eric.ed.gov/?id=EJ1311376

Alqahtani, A. S. (2019). The use of Edmodo: Its impact on learning and students' attitudes toward it. *Journal of Information Technology Education. Research*, *18*, 319.

Arcos-Alonso, A., & Arcos Alonso, A. (2021). Problem-Based Learning and Other Active Methodologies as Support for Distance Teaching during the COVID-19 Pandemic. *Cypriot Journal of Educational Sciences*, *16*(1), 277–287. https://eric.ed.gov/?id=EJ1288554

Asfar, A. M. I. T., & Asfar, A. M. I. A. (2021). The effectiveness of distance learning through Edmodo and Video Conferencing Jitsi Meet. *Journal of Physics: Conference Series*, *1760*(1), 012040. https://doi.org/10.1088/1742-6596/1760/1/012040

Awaghade, A. B. (2022). Online education—Issues and challenges in digital equality matters. *International Journal of Human Rights and Constitutional Studies*, *9*(4), 369–380. https://doi.org/10.1504/IJHRCS.2022.126183

Aydin, S. (2021). Using Edmodo in Language Learning: A Review of Research. In *Online Submission*. https://eric.ed.gov/?id=ED618638

Baker, L. A., & Spencely, C. (2023). Is hybrid teaching delivering equivalent learning for students in higher education? *Journal of Further and Higher Education*, *0*(0), 1–13. https://doi.org/10.1080/0309877X.2023.2183357

Callaghan, N. (2021). Understanding the role of technological platforms in schools. *Educational Media International*, *58*(4), 355–373. https://doi.org/10.1080/09523987.2021.1992864

Chen, J. J., & Rivera-Vernazza, D. E. (2022). Communicating Digitally: Building Preschool Teacher-Parent Partnerships Via Digital Technologies During COVID-19. *Early Childhood Education Journal*. https://doi.org/10.1007/s10643-022-01366-7

Cho, W., Fan, M., Yoo, B., & Zhang, H. (2021). Special issue on digital transformation: Challenges and opportunities. *Information Systems and E-Business Management*, *19*(2), 387–388.

Decuypere, M., Grimaldi, E., & Landri, P. (2021). Introduction: Critical studies of digital education platforms. *Critical Studies in Education*, *62*(1), 1–16. https://doi.org/10.1080/17508487.2020.1866050

Ekayati, R. (2018). Implementasi Metode Blended Learning Berbasis Aplikasi Edmodo. *EduTech: Jurnal Ilmu Pendidikan Dan Ilmu Sosial*, *4*(2), Article 2. https://doi.org/10.30596/edutech.v4i2.2277

Ekmekçï, E. (2016). Integrating Edmodo into Foreign Language Classes as an Assessment Tool. *Participatory Educational Research*, *3*(4), Article 4. https://doi.org/10.17275/per.16.spi.1.1

Etfita, F. (2019). Students' Perspective on the Use of Edmodo as an Assessment Tool. *J-SHMIC : Journal of English for Academic*, *6*(1), Article 1. https://doi.org/10.25299/jshmic.2019.vol6(1).2516

Evans, N. (2022). Microsoft Teams Supports Authentic Assessment of Learning. *Journal of Teaching and Learning with Technology*, *11*, 37–50. https://eric.ed.gov/?id=EJ1363908

Ferri, F., Grifoni, P., & Guzzo, T. (2020). Online learning and emergency remote teaching: Opportunities and challenges in emergency situations. *Societies*, *10*(4), 86.

Fitriasari, P. (2017). APLIKASI EDMODO SEBAGAI MEDIA PEMBELAJARAN E-LEARNING. *Jurnal Dosen Universitas PGRI Palembang*. https://jurnal.univpgri-palembang.ac.id/index.php/prosiding/article/view/877

Gillet, D., Vonèche-Cardia, I., Farah, J. C., Hoang, K. L. P., & Rodríguez-Triana, M. J. (2022). *Integrated Model for Comprehensive Digital Education Platforms*. 1587–1593.

Goh, E., & Sigala, M. (2020). Integrating Information & Communication Technologies (ICT) into classroom instruction: Teaching tips for hospitality educators from a diffusion of innovation approach. *Journal of Teaching in Travel & Tourism*, *20*(2), 156–165. https://doi.org/10.1080/15313220.2020.1740636

Gross, B., & Opalka, A. (2020). Too Many Schools Leave Learning to Chance during the Pandemic. In *Center on Reinventing Public Education*. Center on Reinventing Public Education. https://eric.ed.gov/?id=ED605576

Hamidi, S. R., Salleh, K., Shuhidan, S. M., & Lokman, A. M. (2020). The Adoption of Learning Management System: A Case Study of Schoology and Edmodo. In H. Shoji, S. Koyama, T. Kato, K. Muramatsu, T. Yamanaka, P. Lévy, K. Chen, & A. M. Lokman (Eds.), *Proceedings of the 8th International Conference on Kansei Engineering and Emotion Research* (pp. 105–114). Springer. https://doi.org/10.1007/978-981-15-7801-4_11

Hassan, M. M., Mirza, T., & Hussain, M. W. (2020). A critical review by teachers on the online teaching-learning during the COVID-19. *International Journal of Education and Management Engineering*, *10*(8), 17–27.

Jackman, J. A., Gentile, D. A., Cho, N.-J., & Park, Y. (2021). Addressing the digital skills gap for future education. *Nature Human Behaviour*, *5*(5), Article 5. https://doi.org/10.1038/s41562-021-01074-z

Kaba, F. (2018). Edmodo as an Assessment Tool in the Foreign Language Learning Process. *European Journal of Social Science Education and Research*, *5*(3), 210–215. https://revistia.com/index.php/ejser/article/view/6691

Karaferye, F. (2022). Digital Teaching and Learning: Exploring Primary School Teachers' Approaches, Sources of Concern & Expectations. *Journal of Educational Technology and Online Learning*, *5*(4), 808–824. https://eric.ed.gov/?id=EJ1378873

Kleinheksel, A. J., Rockich-Winston, N., Tawfik, H., & Wyatt, T. R. (2020). Demystifying Content Analysis. *American Journal of Pharmaceutical Education*, *84*(1). https://doi.org/10.5688/ajpe7113

Krsmanovic, I. M., & Petrovic, V. M. (2021). The Use of MS Teams in ESP Instruction during the COVID-

19 Pandemic: Students' Attitudes towards the E-Learning Environment. In *Research-publishing.net*. Research-publishing. https://eric.ed.gov/?id=ED617988

Kurnia, D. (2021). Analisis kritis terhadap Gerakan Nasional Literasi Digital dalam perspektif good governance. *Academia Praja: Jurnal Ilmu Politik, Pemerintahan, Dan Administrasi Publik*, *4*(1), 107–133.

Loo, Q. O. K., & Dass, K. (2021). Edmodo in an Institute of Teacher Education: A Platform for Blended Learning. In *Research Anthology on Developing Effective Online Learning Courses* (pp. 807–827). IGI Global. https://doi.org/10.4018/978-1-7998-8047-9.ch039

Moldavan, A. M., Edwards-Leis, C., & Murray, J. (2022). Design and pedagogical implications of a digital learning platform to promote well-being in teacher education. *Teaching and Teacher Education*, *115*, 103732. https://doi.org/10.1016/j.tate.2022.103732

Mrayed, S. M. (2020). Using Edmodo online application as a supplement to enhance student level of performance and critical thinking in the learning process of Thermodynamic course. *2020 Sixth International Conference on E-Learning (Econf)*, 390–394. https://doi.org/10.1109/econf51404.2020.9385460

Mudlofir, H. A. (2021). *Desain Pembelajaran Inovatif: Dari Teori ke Praktik-Rajawali Pers*. PT. RajaGrafindo Persada.

Ndibalema, P. (2021). Online Assessment in the Era of Digital Natives in Higher Education Institutions. *International Journal of Technology in Education*, *4*(3), 443–463. https://eric.ed.gov/?id=EJ1310978

Nurbani, N., & Permana, R. (2020). Efektivitas E-Portofolio Berbantuan Edmodo Terhadap Keaktifan Belajar dan Kreativitas Mahasiswa Pada Matakuliah Desain Grafis. *Edumatic: Jurnal Pendidikan Informatika*, *4*(2), Article 2. https://doi.org/10.29408/edumatic.v4i2.2658

Nurbekova, Z., Grinshkun, V., Aimicheva, G., Nurbekov, B., & Tuenbaeva, K. (2020). Project-based learning approach for teaching mobile application development using visualization technology. *International Journal of Emerging Technologies in Learning (IJET)*, *15*(8), 130–143.

Nurkusumaningrum, F., Utomo, S., & Nuraeningsih, N. (2022). STUDENTS' PERCEPTIONS ON LEARNING ENGLISH THROUGH MICROSOFT TEAMS. *JALL (Journal of Applied Linguistics and Literacy)*, *6*(2), 126–134. https://doi.org/10.25157/jall.v6i2.8514

Olugbade, D., & Olurinola, O. (2021). Teachers' Perception of the Use of Microsoft Teams for Remote Learning in Southwestern Nigerian Schools. *African Journal of Teacher Education*, *10*(1), 265–281. https://doi.org/10.21083/ajote.v10i1.6645

Pal, D., & Vanijja, V. (2020). Perceived usability evaluation of Microsoft Teams as an online learning platform during COVID-19 using system usability scale and technology acceptance model in India. *Children and Youth Services Review*, *119*, 105535. https://doi.org/10.1016/j.childyouth.2020.105535

Rahman, M. R., Panggayuh, B. P., & Rusydiyah, E. F. (2022). Utilization of Web-Facilitated Learning to Improve Teacher Skills in Identifying Basic Competencies. *Journal of Innovation in Educational and Cultural Research*, *3*(2), Article 2. https://doi.org/10.46843/jiecr.v3i2.87

Rohyana, H. (2020). ANALISIS PROSES BERPIKIR KRITIS SISWA MELALUI PROBLEM BASED LEARNING BERBANTUAN EDMODO. *JISPE Journal of Islamic Primary Education*, *1*(1), Article 1. https://doi.org/10.51875/jispe.v1i1.13

Rojabi, A. R. (2020). Exploring EFL Students' Perception of Online Learning via Microsoft Teams: University Level in Indonesia. *English Language Teaching Educational Journal*, *3*(2), 163–173. https://eric.ed.gov/?id=EJ1268365

Romadhona, G. P., & Dwiningsih, K. (2021). Learning The Periodic System Elements With Microsoft Teams To Improve Learning Independence. *Qalamuna*, *13*(2). https://doi.org/10.37680/qalamuna.v13i2.1157

Ruenz, M. M. (2021). Using Microsoft Teams to keep the E-resources department organized during a pandemic and beyond By Megan M. Ruenz, Wheaton College (IL). *Journal of Electronic Resources Librarianship*, *33*(3), 230–233. https://doi.org/10.1080/1941126X.2021.1949166

Rusydiyah, E. F. (2019). *Teknologi Pembelajaran: Implementasi pembelajaran era 4.0*. UIN Sunan Ampel Press Surabaya.

Rusydiyah, E. F., Purwati, E., & Prabowo, A. (2020). HOW TO USE DIGITAL LITERACY AS A LEARNING RESOURCE FOR TEACHER CANDIDATES IN INDONESIA. *Jurnal Cakrawala Pendidikan*, *39*(2), 305–318. https://doi.org/10.21831/cp.v39i2.30551

Sabila, N. F., Pahlevi, M. R., & Miftakh, F. (2020). INCORPORATING EDMODO AS LEARNING MANAGEMENT SYSTEM OF SUMMATIVE ASSESSMENT IN EFL CLASSROOMS. *Eltin Journal : Journal of English Language Teaching in Indonesia*, *8*(2), Article 2. https://doi.org/10.22460/eltin.v8i2.p%p

Santiago, C. J., Ulanday, M. L., Centeno, Z. J., Bayla, M. C., & Callanta, J. (2021). Flexible Learning Adaptabilities in the New Normal: E-Learning Resources, Digital Meeting Platforms, Online Learning Systems and Learning Engagement. *Asian Journal of Distance Education*, *16*(2), Article 2. http://asianjde.com/ojs/index.php/AsianJDE/article/view/580

Sari, D. P., Wulan, A. R., & Solihat, R. (2019). Developing 21st century student research skills through assessment matrix and edmodo in biology project. *Journal of Physics: Conference Series*, *1157*(2), 022093. https://doi.org/10.1088/1742-6596/1157/2/022093

Sarker, M. F. H., Mahmud, R. A., Islam, M. S., & Islam, M. K. (2019). Use of e-learning at higher educational institutions in Bangladesh: Opportunities and challenges. *Journal of Applied Research in Higher Education*, *11*(2), 210–223. https://doi.org/10.1108/JARHE-06-2018-0099

Sayaf, A. M., Alamri, M. M., Alqahtani, M. A., & Alrahmi, W. M. (2022). Factors Influencing University Students' Adoption of Digital Learning Technology in Teaching and Learning. *Sustainability*, *14*(1), Article 1. https://doi.org/10.3390/su14010493

Sefriani, R., Sepriana, R., Wijaya, I., Radyuli, P., & Menrisal. (2021). Blended Learning with Edmodo: The Effectiveness of Statistical Learning during the COVID-19 Pandemic. *International Journal of Evaluation and Research in Education*, *10*(1), 293–299. https://eric.ed.gov/?id=EJ1285675

Siahaan, E. B. (2020). Students' Perception of Edmodo Use as a Learning Tool. *Journal of English Teaching*, *6*(1), 12–23. https://eric.ed.gov/?id=EJ1266038

Sofi-Karim, M., Bali, A. O., & Rached, K. (2023). Online education via media platforms and applications as an innovative teaching method. *Education and Information Technologies*, *28*(1), 507–523.

Sumardi, S., & Muamaroh, M. (2020). EDMODO IMPACTS: MEDIATING DIGITAL CLASS AND ASSESSMENT IN ENGLISH LANGUAGE TEACHING. *Jurnal Cakrawala Pendidikan*, *39*(2), Article 2. https://doi.org/10.21831/cp.v39i2.30065

Susanti, A., & Putri, D. N. (2022). EDMODO AS ONLINE ASSESSMENT TOOL: TO IMPROVE EFL STUDENTS' READING COMPREHENSION. *Satya Widya*, *38*(1), Article 1. https://doi.org/10.24246/j.sw.2022.v38.i1.p12-24

Susanti, R. D., & Effendi, M. M. (2020). EFEKTIVITAS PENGGUNAAN EDMODO DALAM PELAKSANAAN ULANGAN HARIAN MATEMATIKA. *FIBONACCI: Jurnal Pendidikan Matematika Dan Matematika*, *6*(1), Article 1.

https://jurnal.umj.ac.id/index.php/fbc/article/view/4756

Videnovik, M., Trajkovik, V., Kiønig, L. V., & Vold, T. (2020). Increasing quality of learning experience using augmented reality educational games. *Multimedia Tools and Applications*, *79*(33), 23861–23885. https://doi.org/10.1007/s11042-020-09046-7

Williams, F., Philip, L., Farrington, J., & Fairhurst, G. (2016). 'Digital by Default' and the 'hard to reach': Exploring solutions to digital exclusion in remote rural areas. *Local Economy*, *31*(7), 757–777.

Wulan, A., Isnaeni, A., & Solihat, R. (2019). Penggunaan Asesmen Elektronik Berbasis Edmodo Sebagai Assessment for Learning Keterampilan Abad 21. *Indonesian Journal of Educational Assesment*, *1*, 1. https://doi.org/10.26499/ijea.v1i2.7

Yazici, E. B., & Özerbas, M. A. (2022). The Analysis of the Efficiency of Digital Education Platforms Based on Various Variables. *Participatory Educational Research*, *9*(3), 383–402. https://eric.ed.gov/?id=EJ1324994

Zain, S. (2021). 13c—Digital transformation trends in education. In D. Baker & L. Ellis (Eds.), *Future Directions in Digital Information* (pp. 223–234). Chandos Publishing. https://doi.org/10.1016/B978-0-12-822144-0.00036-7

Zhu, X., & Liu, J. (2020). Education in and After Covid-19: Immediate Responses and Long-Term Visions. *Postdigital Science and Education*, *2*(3), 695–699. https://doi.org/10.1007/s42438-020-00126-3