

Innovation in Education: Improving the Quality of Learning in The Digital Era

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Abstrak: Penelitian ini bertujuan untuk mengkaji bagaimana inovasi pendidikan di era digital dapat meningkatkan kualitas pembelajaran. Dengan menggunakan metode kualitatif deskriptif, penelitian ini mengeksplorasi implementasi berbagai inovasi berbasis digital, seperti model pembelajaran campuran, aplikasi interaktif (Google Classroom, Quizizz, Wordwall, Kahoot), dan platform nasional seperti SPADA Indonesia. Analisis berfokus pada bagaimana perangkat-perangkat ini memengaruhi keterlibatan siswa, motivasi belajar, dan aksesibilitas dalam pendidikan. Hasil penelitian menunjukkan bahwa integrasi teknologi digital meningkatkan fleksibilitas belajar, mendukung partisipasi interaktif, dan meningkatkan hasil belajar. Pembelajaran campuran menawarkan keunggulan pembelajaran tatap muka dan daring, sementara media berbasis video dan aplikasi pendidikan membantu siswa lebih memahami materi dan tetap termotivasi. Namun, tantangan seperti ketimpangan digital, infrastruktur yang tidak memadai, kurangnya pelatihan guru, dan resistensi terhadap perubahan masih ada. Penelitian ini juga menemukan bahwa tanpa literasi digital dan pendidikan karakter, penggunaan teknologi yang berlebihan dapat menyebabkan ketergantungan dan mengurangi interaksi sosial. Oleh karena itu, inovasi pendidikan yang berhasil harus dibarengi dengan upaya kolaboratif antara sekolah, keluarga, dan pemerintah. Strategi terstruktur yang melibatkan fasilitas, pendekatan, persuasi, dan dukungan kebijakan sangat penting untuk menghasilkan generasi yang kreatif, kritis, dan berdaya saing global di masa depan.

Kata kunci: Inovasi, Pendidikan, Teknologi Digital

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Abstract: This study aims to examine how educational innovation in the digital era can improve the quality of learning. Using a descriptive qualitative method, the research explores the implementation of various digital-based innovations, such as blended learning models, interactive applications (Google Classroom, Quizizz, Wordwall, Kahoot), and national platforms like SPADA Indonesia. The analysis focuses on how these tools influence student engagement, learning motivation, and accessibility in education. Results indicate that the integration of digital technology enhances learning flexibility, supports interactive participation, and improves learning outcomes. Blended learning offers the advantages of face-to-face and online instruction, while video-based media and educational applications help students better understand materials and remain motivated. However, challenges such as digital inequality, inadequate infrastructure, lack of teacher training, and resistance to change persist. The study also finds that without digital literacy and character education, excessive technology use may cause dependency and reduce social interaction. Therefore, successful educational innovation must be accompanied by collaborative efforts among schools, families, and the government. Structured strategies involving facilities, approaches, persuasion, and policy support are essential to produce a creative, critical, and globally competitive generation in the future.

Keywords: Innovation, Education, Digital Technology

Introduction

The rapid advancement of digital technology has significantly influenced the field of education, particularly in teaching methods, media, and learning systems (Effendi & Wahidy, 2019). Education, as the foundation of national progress, must continuously innovate to meet the demands of a dynamic era that requires flexibility, openness to information, and mastery of 21st-century skills (Firmansyah, 2019). Educational innovation is not limited to the integration of new technologies but also includes curriculum updates, pedagogical approaches, and the evolving role of teachers as learning facilitators (Hakim & Yulia, 2024).

However, previous studies indicate that the implementation of digital innovation in education still faces various challenges, such as the digital divide, limited infrastructure, inadequate teacher training, and resistance to change from both educators and learners (Zhao & Frank, 2003) (Fullan, 1991). Moreover, many schools and higher education institutions still rely on traditional teaching methods despite the availability of online learning platforms and digital tools. This reveals a significant research gap concerning the effective and inclusive implementation of digital educational strategies across diverse educational contexts.

Therefore, this study aims to:

1. Identify forms of digital innovation that have been implemented in education.
2. Analyze the positive impacts and challenges of educational innovation based on digital technology.
3. Provide strategic recommendations for fostering relevant and sustainable educational innovation in the digital era.

This study holds both theoretical and practical significance. Theoretically, it contributes to the growing body of literature on technology-based educational innovation. Practically, the findings may serve as a valuable reference for educators, policymakers, and educational institutions in developing innovative teaching strategies that are adaptive to contemporary challenges (Yang, 2024).

As emphasized by Regiani et al. (2023), video-based learning media significantly enhance students' motivation and learning outcomes, underscoring the importance of utilizing engaging and relevant technological tools in education. Thus, integrating digital technology must be balanced with digital literacy, character education, and strong collaboration among schools, families, and governments to ensure that educational innovation is implemented holistically and sustainably (Chehade, 2020) (Syafaruddin et al., 2012).

Methodology

One of the learning models that can be applied in development technology is blended learning. Basically, the Blended Learning model is a combination of superior learning that is done in a way face to face and virtually. Blended learning is a convenience combined learning various method delivery, teaching model, and style learning, introducing various choice of media dialogue between facilitator with the person who gets teaching. Blended

learning is also as A combination teaching face -to-face and online teaching but more than that as element from interaction social (Dai, 2024).

In the Blended Learning model there are: interaction in a way direct in the form of discussion direct in the learning process teaching (Z. Wang, 2024). There is a lecture program with Blended Learning then timetable studying will flexible so that student can balancing activity academic and non- academic. Blended Learning can also be done reduce cost education and improve results learning so that the learning process No only takes place in class , but also utilizes cyberspace (Effendi & Wahidy, 2019).

Result and Discussion

1. Innovation and Educational Transformation

a. Definition of Educational Strategy and Innovation

In an advanced and developing era rapid , technology has become tool help important in activity learning. Development knowledge knowledge has allow technology become efficient means in search and access various material learning with fast. Utilization digital technology in the learning process bring potential outside normal For speed up acquisition skills learn and improve participants 'life skills educate, while simplify task educator in compile material learning (Zabir, 2018). In the corner view scientific, to be imperative for participant educate For always follow development. Now this, digital technology becomes need urge in sector education, seen as an integral part of transformation adopted by the Ministry of Education and Culture in to design curriculum new and system learning online based. Various online application now this is very helpful student in the learning process, both For access material, following online classes, as well as train question (Lin, 2025).

b. Utilization Technology in the Learning Process

Applications such as Google Classroom, Ruangguru, Zenius, and Khan Academy provide flexible and interactive learning facilities, so that students can learn anytime and anywhere according to their needs. This effort aims to achieve Indonesia's vision as a creative country in 2045 (Abdullah, 2017). The development of technology has given rise to innovative and creative learning models in the learning process (Ji, 2024). The online learning system (SPADA) has helped lecturers in facing the challenges of technological developments. SPADA is an implementation of Distance Education in Higher Education that aims to improve equal access to quality learning. With an online learning system, SPADA Indonesia provides opportunities for students from a particular university to be able to take a certain quality course from another university and their learning outcomes can be recognized equally by the university where the student is registered. (Effendi & Wahidy, 2019) Technological developments allow lectures to be taken outside the classroom, not necessarily in the classroom, for example lectures can be accessed at home or anywhere as long as there is still an internet signal in the area (Effendi & Wahidy, 2019). Two-way communication in the SPADA lecture program between lecturers and students will be better because of the increasing number of communication media options available. Communication media that allows instructors or lecturers to give lectures directly via video conference or recordings. Then, in the next process, students can replay the video or recording repeatedly as learning material if there is material that is difficult for students to understand (Rathod, 2025). The learning substance delivered in online mode must be in

accordance with the substance of face-to-face learning which includes learning objectives, module content, suitability with the curriculum and syllabus and learning design. Therefore, it is necessary to develop a learning system that can accommodate online learning activities without reducing the substance of face-to-face learning (Cui, 2024). The material to be delivered in online mode must be in accordance with the material delivered in face-to-face mode. In addition, online learning media must also be able to facilitate students to actively build knowledge through discussion forums. And in the end, the evaluation of learning implementation can also be measured by assessments that are also available on the media (Radita, 2018) (Effendi & Wahidy, 2019).

c. Blended Learning Method

One of the learning models that can be applied in development technology is blended learning. Basically, the Blended Learning model is a combination of superior learning that is done in a way face to face and virtually. Blended learning is a convenience combined learning various method delivery, teaching model, and style learning, introducing various choice of media dialogue between facilitator with the person who gets teaching. Blended learning is also as a combination of teaching face-to-face and online teaching but more than that as an element from social interaction (Q. Wang, 2025). In the Blended Learning model there are: interaction in a way direct in the form of discussion direct in the learning process teaching. There is a lecture program with Blended Learning then timetable studying will be flexible so that student can balance activity academic and non-academic. Blended Learning can also be done to reduce cost education and improve learning results so that the learning process not only takes place in class, but also utilizes cyberspace (Effendi & Wahidy, 2019).

Characteristics from Blended Learning, namely :

- a) Learning merge various ways delivery , educational model, style learning, as well as various media based diverse technologies.
- b) As a combination of education face to face, learning independent , and learning independent via online
- c) Learning supported by a combination effective from method delivery, method teaching and style learning, and Educators and parents participant educate own same role important, educator as facilitators, and parents as supporters (Effendi & Wahidy, 2019).

Although the Blended Learning model is very helpful in the learning process, right? means the model No There is its weaknesses.

Lack from the Blended Learning model, including: following.

- a) The media required are very diverse, so that difficult applied if facilities and infrastructure No support.
- b) Uneven distribution facilities owned students, such as computers and internet access. Even though in Blended Learning is required adequate internet access, if network not enough adequate will make it difficult participant in follow learning independently via online.
- c) Lack of knowledge public to use technology

d) Uneven distribution facilities owned students , such as computer and internet access So, this Blended Learning model can more maximum used with Supporter adequate internet network (Effendi & Wahidy, 2019).

Adaptation This implemented For ensure harmony draft learning with ability participant educate , at the same time increase qualifications and skills of educators and staff education . Education in the present era faced with challenges For always adapt with change era . Innovation that can done in learning as effort utilise technology is one of them is with using digital - based learning media (Dong, 2025).

d. Impact Positive from Development Technology in Field of education

As we know, that learning media own great influence on the process and results Study students. This is emphasized by Nurrita, that learning media can increase results Study student because of learning media create a learning process teach more interesting and more easy , so student can catch lesson with easy, efficient , and can Motivate student in Study because the media is interesting (Nurrita , 2018) (Regiani, 2023) From the description on obtained that the existence of learning media , can assist teachers in convey material learning as well as can make it easier student For understand and accept material. So, learning media become very important and not can separated in a learning process. According to Lautfer (1999) learning media is A tools used with objective For send a message to recipient, so that it can hone thoughts, feelings, attention, and interest participant educate in Study. (Regiani et al, 2023) Learning media that can applied as innovation education in the era of revolution 4.0 is one of them with learning media video based. Video based media in learning is a media that presents audio and visuals as well containing messages learning like theory, images, animations, concepts, procedures, applications For help understanding to a material learning (Riyana, 2007). Video media in learning use technology in the process. Learning media based on this video is one of the interesting media that can applied, good for unit elementary school/ Islamic elementary school, middle school, high school/vocational school, even college high. Video media is rated Enough attractive and capable increase motivation Study students. This is in line with opinion Basyaev et al, that this video media is a interesting innovation, because although simple use but capable give change Enough significant (Regiani et al, 2023). Technology will Keep going experience development from time to time based on needs life humans so that everything something can done with easy and fast. The existence of technology This give various influence to life global society (Utama, 2025).

Following This is development technology information from time to time:

- a) Computer start found With invention computer , human start feel influence significant especially in pattern think. Technology computer Keep going experience improvement from end World War II and around 1990 the internet started used by humans so that change direction technology. From here created Lots company big one that develops technology one of among them namely Microsoft and Apple.
- b) Digital communication begins found Development technology This Then start unite between technology computers and communications so that created technology very rapid information make exchange information from one country to another becomes

easy and fast. Exchange of information data This become No limited its reach, with means This so all activity can man do by online.

- c) Development of Smart Application Computer Hardware present followed with tools device software in it there is Lots ability in help and facilitate various activity human, application the help in various ways field like entertainment, offices and others. Development application this is very helpful various work man become more fast and effective.
- d) Development Smartphone Spread increasing internet access and connection wide result in existence developments in technology telephone so that all activity man can set up via Smartphone. Communication man more made easy with the presence of smartphones through social media Where man Can each other connected without limits of space and time. Then the transaction as well as business can also be done with easy through e-commerce.
- e) Development device intelligent With existence development This make company can more increase efficiency and effectiveness the business he manages. Example from existence development tool intelligent This namely the auto teller machine, where tool This Can make it easier for customers in transaction banking without need go to the bank. After That appear invention new in the form of internet banking where application the make Customer can do transaction from home. Followed with emergence sms banking and banking applications on smartphones.
- f) E-Money Electronic money or digital money is one of the development technology that changes transaction models human . Human can save money inside A application Then do transaction with easy and fast. With the existence of e- money man No need bring cash again Enough do scan QR code if want to do payment goods (Danum, 2019) (Hakim & Yulia, 2024)

2. The Role of Teachers and Families in the Digital Era

The role of the teacher as facilitator main in the learning process covers various aspects, starting from ensure presence students , convey material learning, motivating, guiding , to evaluate results learning (Stenhouse, 2004) (Ahmadi, 2013). As a educator, skills in operate digital technology and creating relevant learning media with demands students in the 21st century era become very important thing. Digital media has become choice favorite for generation moment This Because serve feature interesting , like fusion images, videos and audio visuals, which are significant increase understanding student to material lessons. Development (Arikarani & Amirudin, 2021). With existence digital technology that has develop rapid so teacher can develop learning become more innovative through utilization various device technology. In addition Study Can utilise various digital applications that can support and facilitate the activity process learning. There are various application interactive that teachers can use For increase interactive learning with students. For example is application wordwall, mentimeter, kahoot, quizizz and so on. With various features available teachers can utilise application the in accordance needs (Hakim & Yulia, 2024). The method e- learning where learning This recommend means technology For made into as tool or media for support the learning process (Sánchez-Gómez, 2024). In its implementation, teachers need device

Volume 3 Number 1 (2024) 150 computers or tool other electronics for look for knowledge knowledge through available resources. Implementation e-learning methods in this digital world wanted For Can to plant various mark especially mark morals and ethics. Because If student No equipped with mark morals and ethics then can easy influenced by influence negative from the internet (Hasriadi, 2022). For example moment This Lots utterance hatred carried out by people through social media (Romero-Rodríguez, 2024), then distribution hoax news so public easy believe with news that is not credible. Teachers or parents must also to educate his son in filtering what children watch on the internet. Without strict supervision so child can easy affected by various content that is of a nature not enough Good (Goosen, 2024).

Development technology this also has an effect to activity learning, including that is:

- a. Learning inside class become Can implemented Where only and when Just From use paper become all online.
- b. Change from service physique to service network Work .
- c. Communication media like computers , internet, and so on utilized For activity Study so that with so learning No only Can done offline but also can done online or learning distance far (Ilham, 2022).

Challenge Implementation Educational Innovation

In development technology that continues increasing, digital skills and critical thinking are highly prioritized and must be owned by each educators. There are several things to do educator use in activity learning namely the Internet of Things, AR, and AI (Baharizqi et al, 2023). The third matter the relevant with condition moment this is all digital. Teachers in the digital era face different challenges from the previous era Although innovation in learning own Lots benefits, there are a number of challenges that must be faced in its implementation. One of challenge the biggest is resistance to change. As stated by Fullan (1991), resistance to change is one of the obstacle main in implementation innovation education. Teachers, students, and parents often feel comfortable with method traditional and reluctant For try approach new. In addition, the lack of support infrastructure and resources power also becomes constraint in adopt innovation technology. According to Zhao and Frank (2003), the implementation technology in learning need strong support from aspect infrastructure, teacher training, and access to device adequate technology (Wu, 2024). Face challenge learning in the digital era requires comprehensive solutions, such as improvement access technology, digital literacy, teacher training, and support for student in arrange time and keep mental health. With cooperation all parties, digital learning can become more effective, inclusive and supportive development student in a way comprehensive.

3. Challenges faced by teachers in Teaching in the Digital Age

The Gap between teachers and students Many teachers still apply method impressive learning ancient , whereas participant educate Already more proceed in digital things. As a result , there is mismatch with style teaching teachers to students in this era. The teacher arrives Now Still Lots use 80s products, while his student Already use product contemporary (Latif , 2020). As a result, the students are different in a way radical with the

teachers, because Lots happen disconnection here and there. Gaps between teachers and students in the digital era is one of the challenges faced by teachers in teaching (Rahmatiah & Asiyah, 2019).

Following is a number of factors that cause gap the :

- a. Limitations ability technology. Many teachers are still gaptak (stuttering) technology) so that his credibility in front of his students decreased and students tend to belittle the teacher.
- b. Change fast in technologist . Technology Keep going develop with fast, so teachers have to Keep going renew knowledge and skills them to stay relevant in teach.
- c. Disturbance technology. Although technology can help the learning process, disturbances technology like bad internet connection or damage device hard can disrupt the learning process.
- d. Need For teach the participants multicultural education. In the digital era, teachers must teach the participants students who come from from various background behind different cultures and languages. Therefore that, the teacher must control Language English as a media tool communication in learning.
- e. Meaningful learning. Meaningful learning is very important in the digital era, where participants educate can with easy access information from various source . Teachers must can give meaningful and relevant learning with need participant educate . As for (Hakim & Yulia, 2024). According to Rahman Taraju et al, (2022), which is challenges faced by teachers in the digital era, including Moral Crisis.

Consequence the influence of science and technology and globalization has happen shift existing values in life society. Values traditional which highly respects tall morality now Already shift along with influence science and technology and globalization. Among teenager so felt influence science and technology and globalization (Duane, 2025).

Important Implications

This article demonstrates that digital-based educational innovation is a key element in improving the quality of learning in the modern era. The use of technologies such as Google Classroom, Quizizz, SPADA, and video media has been proven to increase student participation, motivation to learn, and expand access to quality education. This confirms that technology integration is no longer an option but a strategic necessity to produce a 21st-century generation that is critical, collaborative, and globally competitive. The blended learning model, which combines the advantages of face-to-face and online learning, is a relevant, flexible solution, especially post-pandemic. However, the implementation of this model also reveals a significant digital divide, particularly related to limited infrastructure, devices, and uneven internet access. Furthermore, the roles of teachers and families are becoming increasingly complex. Teachers are not only required to master content but also to act as facilitators of technology-based learning. Meanwhile, parents play a crucial role in guiding their children and filtering the digital content they consume.

Along with the benefits of digital innovation, significant challenges also arise, including resistance to change, a lack of teacher training in digital literacy, and limited resources and infrastructure.

Conclusion

Innovation education is element important in face challenges and needs of the world of education that continue to developing. Utilization digital technology has become an integral part of the modern learning process, not only make it easier access information but also improve skills life participant educate. Transformation system education carried out by the government, including development curriculum digital based, reflecting effort For print creative and adaptive generation facing the global era. In terms of This, the teacher holds role central as facilitator in demand own ability operate technology as well as create interesting and relevant learning media with characteristics participant educate 21st century. Therefore that, integration technology in education No just choice, but rather need strategic For realize system more education effective , innovative and competitive.

Recommendations

Suggestions for further research include the need for longitudinal studies to assess the effectiveness of digital media and platform use on long-term student learning outcomes. Research should also focus on mapping the digital divide, which encompasses geographic, economic, and social factors. Furthermore, it is crucial to develop effective training models for teachers to master technopedagogy and digital literacy skills. The study of the influence of digital media on the formation of students' character, moral values, and ethics is also a relevant topic for further exploration.

As a recommendation, the government and educational institutions need to increase the availability of digital infrastructure equitably, especially in remote areas. Continuous training for teachers on the use of media and technology-based learning strategies needs to be prioritized. Collaboration between schools, families, and the government is crucial to creating a supportive, safe, and meaningful learning environment. Finally, the integration of character values into digital learning content must be strengthened so that technological innovation not only increases access and efficiency but also shapes students with noble and responsible character.

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