Education in the Era of Technological Disruptions: Analysis of the Role of Innovation in the Learning Process

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Abstract

This study aims to analyze the forms, experiences, and meanings of learning innovations applied by teachers and educational units in facing the era of technological disruption. Using an exploratory qualitative approach and case study method, this study was conducted at SMP Negeri 1 Banyuwangi, involving teachers, students, and the principal as the main informants. Data collection techniques include in-depth interviews, classroom observations, and documentation analysis. The results of the study indicate that the forms of learning innovation include the use of artificial intelligence (AI), the Learning Management System (LMS) platform, interactive learning videos, and blended learning models. Teachers and students experience significant changes in their roles and learning methods. This innovation is interpreted as a process of adaptation to the demands of the times and is considered capable of increasing the efficiency and quality of learning, although there are still obstacles such as limited access to technology. This study strengthens the relevance of the Diffusion of Innovation, TPACK, and SAMR theories in the context of digital learning and provides implications for the development of contextual and sustainable digital transformation-based education policies.

Keywords: learning innovation, technological disruption, digital education.

I. INTRODUCTION

The era of technological disruption is a phase of development of human civilization marked by the emergence of technological innovations that fundamentally change various aspects of life, including the education system. (Christensen, CM, Horn, MB, & Johnson, CW (2011) At the global level, technological advances such as artificial intelligence, big data, the internet of things (IoT), and digital learning platforms have created a major leap in the way learning is designed and implemented. (OECD. (2021) The educational process is no longer limited to physical classrooms, but has expanded to virtual spaces that can be accessed anytime and anywhere. This condition encourages the emergence of new approaches to learning, such as blended learning, flipped classrooms, and project-based learning supported by technology. (Kemendikbudristek. (2021)

In Indonesia, the phenomenon of technological disruption has begun to be felt significantly, especially since the COVID-19 pandemic has accelerated the digitalization of the education sector. Schools and universities were suddenly forced to adopt online learning systems, using platforms such as Learning Management System (LMS), Zoom, Google Classroom, and interactive learning videos. (Adedoyin, OB, & Soykan, E. (2020) Although this opens up opportunities to create more flexible and affordable education, technological disruption also brings major challenges, such as the digital access gap, low technological literacy among educators, and uneven pedagogical adaptation. This reality puts education in Indonesia at a critical point: between extraordinary opportunities for innovation and the challenges of real inequality. (Putri, RA, & Wahyuni, S. (2022) Therefore, it is important to conduct an in-

depth study to understand how these innovations are actually implemented at the educational unit level and how the experiences of educators, teachers, students, and principals are in dealing with these changes.

In the current era of technological disruption, the world of education faces complex challenges as well as great opportunities in the learning process. One of the main challenges is the inequality of access to technology and digital infrastructure, which causes a gap in the quality of learning between schools in developed and underdeveloped areas. (Afriansyah, A., & Nurtanto, M. (2021) In addition, not all educators have adequate digital competence to optimally utilize technology in the learning process. Changes in the characteristics of students, especially generations Z and Alpha who are very familiar with the digital world, also require teachers to change their teaching approach from conventional methods to more interactive and relevant methods. High administrative burdens and limited ongoing training are also obstacles for teachers to focus on developing innovative learning.

On the other hand, this era also opens up great opportunities for educational transformation. Technology allows learning to take place without space and time limits through digital platforms such as Learning Management System (LMS), interactive learning videos, and the use of artificial intelligence (AI) for learning personalization. Teachers can now more easily access global learning resources, collaborate online, and develop creative and engaging learning media. Students also find it easier to build independent learning, explore their interests and talents, and be actively involved through project-based learning approaches and digital storytelling. (Anderson, T., & Dron, J. (2011)

In this context, innovation in the learning process becomes very important. Innovation is not just the use of technology, but also involves changing the way teachers view the teaching and learning process. Innovation allows teachers to adapt their approach to the needs of today's students, increase their engagement, and create a more contextual and meaningful learning experience. Without innovation, learning will lose relevance amidst the dynamics of the times. (Basuki, I., & Hidayati, L. (2020) Therefore, it is important for every educational unit to encourage an innovative culture, provide space for teacher creativity, and continue to develop a learning ecosystem that is adaptive to technological developments and the needs of 21st century students.

The urgency of conducting in-depth studies on the application of learning innovations in the field is increasing along with the rapid pace of technological development in the era of disruption. Education no longer takes place in a static space; various forms of digital technology have changed the way teachers teach and the way students learn. Innovations such as the use of Learning Management Systems (LMS), artificial intelligence (AI), interactive learning videos, and online collaborative platforms are becoming increasingly common. (Firman, F., & Rahayu, S. (2020) However, the implementation of these innovations does not always run smoothly. Many factors influence their success, ranging from teacher and student readiness, infrastructure availability, school policy support, to existing learning culture. Therefore, in-depth studies in the field are very important to really understand how learning innovations are adapted and responded to by education actors. (Kurniawan, DA, & Hidayatullah, A. (2022) This kind of research can further explore the dynamics, challenges, and potential success or failure of innovation in different local contexts. The results of this study not only contribute to the development of educational theory, but are also greatly needed as a basis for formulating relevant, targeted, and sustainable policies and training programs. Without a comprehensive understanding of field conditions, learning innovations risk becoming just policies on paper without any real impact on the quality of education in Indonesia. (Mishra, P., & Koehler, MJ (2006)

Rapid technological developments have had a significant impact on various aspects of life, including in the field of education. The era of technological disruption requires educational units and educators to transform through the implementation of various forms of relevant and adaptive learning innovations. (Rogers, EM (2003) In this context, it is important to understand how learning innovations are implemented by teachers and educational units in responding to the dynamics caused by technological advances. (Saleh, M., & Ismail, M. (2021) In addition, it is also necessary to study the forms of innovation used in the learning process and their effectiveness based on the experiences of educational actors. Based on this background, the formulation of the problem in this study focuses on two main things: (1) how learning innovations are implemented by teachers and educational units in the era of technological disruption, and (2) what forms of innovation are used, and how effective they are according to the experiences of teachers, students, and principals as educational actors.

This study aims to describe in depth the application of innovation in the learning process carried out by teachers and educational units in facing the challenges of the era of technological disruption. In addition, this study also aims to analyze the experiences and meanings felt by educational actors, especially teachers, students, and principals, regarding changes and transformations in learning influenced by the use of digital technology, such as the use of artificial intelligence (AI), learning management systems (LMS), and interactive learning media.

Theoretically, the results of this study are expected to contribute to the development of scientific studies in the field of education, especially those related to learning innovation in the digital era. The findings of this study are expected to enrich the literature on innovative learning strategies in the context of Indonesian education which is adapting to technological developments. Practically, this study provides direct implications for educators in developing more adaptive and technology-based learning approaches, as well as providing input for educational policy makers in formulating policies that support effective and sustainable digital transformation in the school environment.

II. METHOD

1. Research Approaches and Types

This study uses an exploratory qualitative approach that aims to deeply understand the dynamics and meaning behind the application of innovation in the learning process in the era of technological disruption. (Creswell, JW, & Poth, CN (2018) This approach was chosen because it is able to explore contextually and deeply how innovation is applied, as well as how teachers, students, and principals interpret changes in learning due to the development of digital technology. (Yin, RK (2018) The type of research used is a case study or phenomenology, which allows researchers to reveal the experiences, views, and real practices of education actors in a particular context. The phenomenological method is used to capture the essence of the subjective experiences of informants, while case studies provide space to describe situations comprehensively in a particular educational setting. (Moustakas, C. (1994)

2. Subjects and Location of Research

The subjects in this study consisted of teachers, principals, and students at SMP Negeri 1 Banyuwangi, who were selected purposively based on considerations of the school's capacity in implementing learning innovations and its status as one of the leading schools in Banyuwangi Regency. The main informants consisted of teachers who were actively involved in the use of learning technology, principals as strategic policy makers at the education unit level, and students who directly experienced the impact of the implemented learning innovations. (Palinkas, LA, Horwitz, SM, Green, CA, Wisdom, JP, Duan, N., & Hoagwood, K. (2015) The location of the study was conducted at SMP Negeri 1 Banyuwangi, which is geographically located in the center of Banyuwangi city and has infrastructure and educational resources that support the application of technology in learning, so it is considered representative to describe the dynamics of the application of educational innovation in the era of technological disruption.

3. Data collection technique

Data collection techniques in this study were carried out through three main methods, namely in-depth interviews, participant observation, and documentation. In-depth interviews were conducted with teachers, principals, and students at SMP Negeri 1 Banyuwangi as key informants who have direct experience in implementing technology-based learning innovations. Interviews were semi-structured to allow flexibility in exploring information according to the context and dynamics that emerged during the interaction process. (Patton, MQ (2015) Observations were carried out by directly observing learning activities in the classroom, both offline and online, in order to understand how technology is used in the teaching and learning process, as well as how interactions between teachers and students take place in the context of learning innovations. In addition, documentation was used as a complementary technique, by collecting and analyzing various supporting documents such as the Learning Implementation Plan (RPP), syllabus, digital learning platforms, applications used, and video recordings of learning if available. These three techniques were used triangulating to strengthen the validity of the data obtained. (Creswell, JW (2014)

4. Data Analysis Techniques

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Data analysis in this study was conducted inductively using a qualitative approach that emphasizes the meaning and interpretation of the subject's experience. The analysis procedure follows the interactive model developed by Miles and Huberman, which includes three main stages, namely: data reduction, data presentation, and drawing conclusions/verification. Data reduction is carried out by sorting, summarizing, and categorizing important information from the results of interviews, observations, and documentation. Furthermore, the reduced data is presented in the form of a thematic narrative or matrix to make it easier for researchers to identify patterns, relationships, and tendencies. In the final stage, researchers conduct in-depth interpretations of the findings to draw valid and meaningful conclusions. In the context of phenomenology, analysis is also carried out by emphasizing the essential description process of the informant's experience, so that a deep understanding of the meaning of learning innovation from the perspective of education practitioners is obtained. Data validity is maintained through triangulation techniques of sources and methods, member checking, and discussions with colleagues (peer debriefing). (Miles, MB, Huberman, AM, & Saldaña, J. (2014)

5. Data Validity Test

To ensure the validity of the data in this qualitative study, the researcher applied several data validation techniques that are commonly used in qualitative approaches, especially in phenomenological studies and case studies. First, data triangulation was carried out, both source triangulation and method triangulation. Source triangulation was carried out by comparing information obtained from various informants, namely teachers, principals, and students, while method triangulation was carried out by comparing the results of interviews, observations, and documentation to see the consistency of the information. (Lincoln, YS, & Guba, EG (1985) Second, the researcher also applied member checking, namely by reconfirming the findings or initial interpretations to the informants to ensure that the data obtained truly reflects their experiences and views. In addition, peer debriefing was carried out through discussions with fellow researchers or academics who understand the research context to obtain input and other perspectives, so that the results of the analysis are not purely subjective. These techniques aim to maintain the credibility, dependability, confirmability, and transferability of the data, so that the research findings have a high level of trust. (Merriam, SB, & Tisdell, EJ (2016)

6. Research Ethics

In conducting this research, the researcher upholds the ethical principles of qualitative research. Before collecting data, the researcher first requested official permission from the school through a research application letter and obtained approval from the principal. All informants involved in the research were asked for informed consent, with a transparent explanation of the purpose of the research, the methods used, and their right to refuse or stop participating at any time without consequences. (Orb, A., Eisenhauer, L., & Wynaden, D. (2001) The identity of the informant is guaranteed confidentiality through anonymity techniques, where names and personal information are disguised or not directly included in the publication of research results. The researcher also ensures that the interview and observation processes are carried out with respect for the rights and comfort of the informant, and avoids exploitation or pressure in any form. All research procedures are carried out with reference to the code of ethics of scientific research, in order to maintain the integrity and moral responsibility of the researcher towards the subject, institution, and academic community as a whole. (Wiles, R. (2013)

III. RESULTS AND DISCUSSION

1. Forms of Learning Innovation Applied

The results of the study indicate that SMP Negeri 1 Banyuwangi has implemented various forms of learning innovation in response to the demands of education in the era of technological disruption. These innovations not only include changes in the technical aspects of learning, but also touch on the pedagogical, methodological, and managerial dimensions in the teaching and learning process. The forms of innovation found in this study include the use of artificial intelligence (AI), the use of the Learning Management System (LMS) platform, the integration of interactive learning video media, and the application of blended learning models.

1) Utilization of Artificial Intelligence (AI)

Some teachers at SMP Negeri 1 Banyuwangi have started to utilize AI-based technology, such as ChatGPT, Grammarly, or Quizziz with adaptive algorithms, to help design materials, compose questions, or provide automatic feedback to students. Although the application of AI is still in its early stages and is limited to teachers with high digital literacy, its use has begun to have a positive impact on the efficiency of learning planning and improving the quality of evaluation questions. Teachers said that AI helps them generate questions with varying levels of difficulty automatically and can be adjusted to student profiles. Several students also reported that they use AI-based applications to understand the material independently outside of class.

2) Use of Learning Management System (LMS)

LMS is one of the most prominent and structured learning innovations. SMP Negeri 1 Banyuwangi has institutionally developed the use of platforms such as Google Classroom, Edmodo, and Microsoft Teams since the pandemic and continues to do so as part of the post-pandemic digital transformation. LMS is used not only for distributing materials, but also for collecting assignments, online discussion forums, and digital-based assessments. Teachers and students alike feel the benefits of using LMS, especially in terms of time flexibility, material accessibility, and assessment transparency. The principal said that the use of LMS has become part of the school's strategy in creating a documented and accountable learning system.

3) Integration of Interactive Learning Videos

Interactive learning videos are one of the main tools in both online and face-to-face learning processes. Teachers utilize various platforms such as YouTube, BSE (Electronic School Books), and self-made videos that are inserted with interactive quizzes using Edpuzzle or Nearpod. This innovation aims to increase students' interest in teaching materials and support visual and kinesthetic learning styles. Some teachers even create personal YouTube channels to upload project-based learning videos and simple experiment demonstrations. From observations and interviews, students admit that they find it easier to understand abstract material through visualizations in videos, especially in science and mathematics subjects.

4) Implementation of Blended Learning

The blended learning model has been implemented in a daily or weekly rotation scheme, where offline learning is combined with online assignments via LMS or WhatsApp groups. The implementation of blended learning is very helpful in reaching students with diverse learning needs, as well as providing space for students to access materials independently outside of school hours. Teachers utilize face-to-face time for discussions and practical activities, while assignments and enrichment are carried out online. This model also allows for more flexible and adaptive learning, especially when dealing with students with limited time or certain conditions.

5) Source of Innovation Ideas

Various sources of ideas drive the birth of these innovations. First, teachers' personal initiatives are the main driving force. Teachers who are highly motivated to update their teaching methods actively search for references on the internet, attend webinars, and try new applications independently. They also share good practices in the school's internal community. Second, school policies become a structural foundation that encourages the implementation of innovation. The principal provides space and support, both in the form of technology facilities, internal training, and digital-based learning policies that are integrated into the annual work program. Third, external training and workshops facilitated by the Banyuwangi Regency Education Office or partner institutions such as Microsoft Education and Google for Education are also significant sources of inspiration for teachers to apply new methods in teaching. In fact, some teachers participate in innovative teacher certification programs online.

6) Analysis of Findings

These findings indicate that learning innovation does not only occur due to external pressures due to technological developments, but is also the result of synergy between individual motivation, institutional policies, and external support. This is in line with the Diffusion of Innovation theory

(Rogers, 2003) which emphasizes the importance of the role of innovators and the environment in accelerating the adoption of technology in education. The implications of these results indicate that innovation cannot run optimally without collaboration between teachers, school management, and external parties. Furthermore, an adaptive and participatory approach has been shown to be able to create a learning environment that is more relevant, interesting, and responsive to the needs of the times.

2. Teacher and Student Experiences in Using Innovation

The implementation of various forms of learning innovation at SMP Negeri 1 Banyuwangi not only has an impact on technical and structural aspects, but also provides a very varied and transformative learning and teaching experience for teachers and students. Based on the results of in-depth interviews and classroom observations, it was obtained that their experience in using technological innovation was greatly influenced by the level of digital literacy, infrastructure readiness, and support from the school environment.

1) Teacher Experience: Adaptation, Challenges, and Role Transformation

Most teachers said that the use of learning technology has brought significant changes to the way they plan and deliver teaching materials. Many teachers who previously felt awkward or even reluctant to use digital devices are now starting to show enthusiasm and openness to innovation, especially after participating in training or sharing experiences with colleagues. They said that the use of LMS such as Google Classroom and interactive learning videos made it easier for them to compile materials, manage student assignments, and conduct assessments transparently.

However, some challenges remain. Among them are the additional workload due to having to adapt materials to digital formats, limited internet access at students' homes, and dependence on personal devices that are not always adequate. Teachers of exact subjects such as Science and Mathematics feel that the use of visual media and interactive videos is very helpful in explaining abstract concepts, but still require face-to-face sessions for laboratory or experimental practices. Teachers also realize that their role is no longer just as a transmitter of material, but as a facilitator, mentor, and curator of learning resources. This marks the transformation of the role of teachers amidst advances in educational technology.

2) Student Experience: Motivation, Independence, and Digital Barriers

Students who participated in this study showed mixed reactions to learning innovations. The majority of students felt more interested in learning when the material was delivered through digital media, especially learning videos or interactive quizzes. They stated that the visualization of the material made the lessons easier to understand and less boring. LMS was also considered very helpful because it allowed them to access the material anytime and anywhere, and made it easy to collect assignments quickly and documented.

However, many students admit to experiencing obstacles, especially in terms of consistency in independent learning and time management when working on online assignments. Some students feel that too many assignments are given through the platform, which causes learning pressure. In addition, students who come from families with economic limitations face obstacles in accessing devices and stable internet connections, even though the school has tried to provide support such as free Wi-Fi in the school environment and learning device loans.

However, this innovative experience also shapes students' learning independence. Many of them are getting used to looking for additional references from YouTube, Google, or e-books, and showing increased digital literacy and critical thinking skills in responding to materials. Students also show adaptation in interacting with teachers through digital channels, such as Google Meet or online discussion groups.

4) Analysis of Findings

The findings in this section reinforce the view that learning innovation is not just a change in tools or methods, but is part of a comprehensive learning process and requires changes in mindset and behavior from all education actors. The experiences of teachers and students reflect the reality that

innovation does not always run smoothly, but is full of adaptive challenges that require systemic support and a collaborative culture in schools. From the perspective of constructivism theory, this experience confirms that learning will be more meaningful when students actively construct knowledge through direct experience and social interactions mediated by technology.

This finding is also in line with the technology integration model approach (TPACK and SAMR) which emphasizes the importance of mastering content, pedagogy, and technology in an integrated manner. Teachers who successfully adopt innovation are those who are able to adjust their teaching strategies according to the characteristics of technology and student needs. On the other hand, students who are accustomed to the digital approach show the potential to become independent learners who are more adaptive to future learning challenges.

3. Meaning and Perception of Learning Changes

Learning changes as a result of technology integration and the emergence of various digital innovations at SMP Negeri 1 Banyuwangi not only have an impact on technical aspects and teaching methods, but also create new meanings in the educational process itself for the main actors. Based on the results of in-depth interviews and observations, it was found that both teachers, students, and principals have diverse, but tend to be positive, perceptions of the changes. This perception is influenced by background experience, technological readiness, and the extent to which they are actively involved in the change process.

1) Teacher Perspective: Learning as an Adaptive and Reflective Process

For most teachers, the changes in learning that occur in the era of technological disruption are interpreted as an unavoidable adaptation process, but also provide an opportunity to grow and develop as educators. Teachers realize that their role has shifted from being the only source of information to being a facilitator who accompanies students in exploring various digital learning resources. This raises a new awareness that the success of learning no longer depends on the lecture method, but on their ability to design learning experiences that are contextual, flexible, and relevant to students' real lives.

Several teachers expressed that their experiences using LMS, interactive videos, and educational applications have enriched their pedagogical insights and made the teaching process more creative. Despite facing technical challenges and varying student readiness, they see this change as a momentum to improve the quality of learning and enhance their professional skills in facing the digital generation. In addition, teachers also feel that learning is now more collaborative because they share many good practices with fellow educators through online media.

2) Student Perspective: Learning as a Space for Exploration and Independence

Students perceive the learning changes as a more dynamic and enjoyable form of learning, especially because they can learn in a way that is more in line with their preferences. In interviews, students expressed that technology-based learning makes them feel more involved and in control of their own learning process. They no longer rely entirely on teachers, but actively seek information, watch learning videos, do digital assignments, and discuss through online forums. This strengthens students' critical thinking and digital literacy skills, although some of them still need guidance in time management and in-depth understanding of the material.

Students also stated that the use of technology such as LMS, interactive quizzes, and learning videos made the learning process more varied and less monotonous. However, they also realized the importance of face-to-face meetings in helping to explain things that were not yet understood online, so blended learning was considered an ideal approach. In general, students viewed learning innovation as part of the progress of the times that must be accepted and lived, even with certain challenges such as network limitations or learning devices.

3) Principal's Perspective: Transforming School Culture Towards Digitalization

From the principal's perspective, learning change is interpreted as a transformation of school culture towards a more modern, open, and competitive educational ecosystem. The principal sees the integration of technology in learning not just as a response to the pandemic or developments of the times, but as part of a long-term vision to build an educational unit that is adaptive to global change. He

said that this transformation requires leadership that encourages collaboration, increasing teacher capacity, and creating an innovative and inclusive learning climate.

The principal also noted that this change requires a change in the mindset of all school members, especially in managing learning as a flexible and data-based process. The implementation of innovation at SMP Negeri 1 Banyuwangi is not only about hardware and software, but also about mental readiness and collective commitment to continue learning and developing together.

4) Analysis of Findings

The meaning and perception of learning changes in the context of digital innovation show that educational transformation is not merely a technological process, but a profound cultural and psychological process. From a phenomenological perspective, this change has a unique personal value for each educational actor, and their experiences form diverse but complementary meaning constructions. Teachers interpret change as professional learning and self-development opportunities, students see it as a space for exploration and freedom to learn, while principals interpret it as a strategic step towards future educational governance.

This finding reinforces that changes in learning based on technological innovation should not only be seen from how sophisticated the devices used are, but from how far the changes are interpreted and internalized by all education actors. Critical awareness and positive meaning of change are key to building sustainable and relevant learning practices in the era of technological disruption.

IV.   RESULTS AND DISCUSSION

This study provides an important contribution in enriching the understanding of the dynamics of learning innovation in the era of technological disruption, especially at the junior high school level. Through a qualitative approach with a case study method, the findings obtained not only describe the form and implementation of innovation empirically, but also reveal the subjective experiences and meanings of teachers, students, and principals. Critical analysis of the results of this study is presented in three main aspects: conformity with relevant theories, connectedness with previous research results, and implications for learning practices and education policies.

1) Conformity of Findings with Theory

The research findings show strong agreement with the Diffusion of Innovations theory by Everett Rogers (2003), which states that the adoption of innovation in a social context is determined by a number of factors such as perceptions of benefits, technological complexity, and environmental support. Teachers at SMP Negeri 1 Banyuwangi who are more adaptive to change show characteristics as "early adopters", who quickly integrate technologies such as LMS, AI, and interactive video into the teaching and learning process. They are motivated by the perception that the innovation increases the effectiveness of learning and facilitates classroom management.

Furthermore, the results of this study are also in accordance with the TPACK (Technological Pedagogical Content Knowledge) framework which emphasizes the importance of balanced integration between understanding teaching materials (content), teaching methods (pedagogy), and the use of technology (technology). Teachers who successfully implement innovation effectively are those who not only master technological devices, but are also able to adapt learning strategies and materials according to student characteristics and local contexts.

The SAMR (Substitution, Augmentation, Modification, Redefinition) model that describes the stages of technology integration in learning is also reflected in field practices. Initially, teachers used technology as a substitute for printed media (substitution), then switched to using platforms that enrich the process (augmentation), to creating new learning experiences through blended learning and video-based interactions (redefinition).

2) Discussion with Previous Research

The results of this study reinforce previous studies that highlight the importance of digital transformation in education. For example, Firman & Rahayu's (2020) study stated that the use of LMS during the pandemic encouraged students to learn more independently and increased their involvement in the learning process. This is in line with the results of research at SMP Negeri 1 Banyuwangi, where

students showed increased initiative in finding learning resources and managing study time independently.

This finding also supports a study by Putra (2021) which found that interactive learning videos can improve students' conceptual understanding and learning motivation. However, this study provides added value by explicitly describing how the subjective experiences of teachers and students in facing this change shape their perceptions of the value and challenges of the innovation itself, something that is rarely raised in quantitative studies. On the other hand, this finding differs from research by Lestari (2019) which states that the application of technology in secondary schools is often symbolic or merely formal. In fact, at SMP Negeri 1 Banyuwangi, learning innovations appear to be more organic and functional, driven by the proactive leadership of the principal, ongoing training, and the exploratory spirit of the teachers.

3) Implications for Learning Practices and Educational Policy

The practical implications of this research are broad. First, at the school level, the results of this study indicate the importance of building an innovative culture that does not only rely on structural policies, but also on teachers' initiatives as agents of change. Schools need to create an ecosystem that supports the exploration of learning technologies, such as providing training, mentoring, and forums for sharing good practices between teachers. Second, from an education policy perspective, this study suggests the need for a more flexible and contextual policy approach. Digital transformation policies in education should not only focus on providing infrastructure, but must also include strengthening teacher capacity, providing relevant local content, and supporting mechanisms for students from vulnerable groups who are at risk of being left behind digitally.

Third, the results of this study can also be used as a consideration for local governments in developing data-based education strategies and real school needs, including in decision-making related to the selection of learning platforms, digital curriculum, and evaluation of the success of digital transformation programs in schools. Thus, learning innovation in the era of technological disruption should not be seen as merely a short-term response to the development of digital tools and platforms, but must be part of a long-term transformation in the vision of inclusive, adaptive, and humanistic national education.

V. CONCLUSION

This study aims to explore in depth how learning innovations are implemented by teachers and educational units in the era of technological disruption, as well as how the experiences and meanings felt by educational actors towards these changes. Based on the findings, analysis, and discussion, several important things can be concluded. First, learning innovations at SMP Negeri 1 Banyuwangi are manifested in various forms, including the use of artificial intelligence (AI) technology, the use of the Learning Management System (LMS) platform, the integration of interactive learning videos, and the application of the blended learning model. These innovations not only function as learning aids, but also reflect the transformation of pedagogical approaches in junior high schools.

Second, the experiences of teachers and students in using technology show a dynamic adaptation process. Teachers experience a change in role from merely conveying information to facilitators and designers of digital learning, while students show increased motivation and independence in learning. However, challenges such as limited infrastructure, additional workload, and disparities in access to technology are still obstacles that need to be addressed.

Third, from a phenomenological perspective, learning changes are interpreted positively by teachers, students, and principals. These changes are not only technical in nature, but also contain deep cultural and pedagogical meanings. The learning process is interpreted as a space for exploration, adaptation, and the formation of learner identities that are relevant to the needs of the times. Theoretically, the findings of this study support concepts such as Diffusion of Innovation, TPACK, and SAMR, and enrich the study of technology integration in education with an experience-based approach. This study also provides empirical evidence that learning innovation cannot be separated from the social, cultural, and leadership contexts at the educational unit level.

Suggestion

Based on these findings and conclusions, the researcher provides several practical and academic suggestions as follows:

1. **For Schools and Teachers:** Schools need to build a learning ecosystem that supports continuous innovation, by providing contextual digital training, encouraging collaboration between teachers, and providing space for learning experiments. Teachers are encouraged to continue to improve technological literacy and pedagogical reflection in order to develop adaptive and meaningful learning strategies for students.
2. **For Education Policy Makers:** The government, both central and regional, needs to design a digital transformation policy for education that is not uniform (one-size-fits-all), but rather tailored to local needs and the readiness of educational units. The focus should not only be on providing infrastructure, but also on increasing human resource capacity, incentives for innovative teachers, and involving schools in policy formulation.
3. **For Further Researchers:** This study is limited to one case study at the junior high school level. Therefore, further studies are recommended to be conducted at different levels and regions, by expanding the number of informants or using a mixed methods approach to strengthen the validity and generalization of the findings. Further research can also explore other dimensions such as the influence of innovation on student learning outcomes quantitatively.

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