Gamification as a Form of Innovation in Learning

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ABSTRACT
This study aims to examine the literature on gamification in concept and its application to learning in elementary school. This study uses a literature review method focusing on the concept of gamification to learning in elementary schools. The results show effective learning process that prioritizes the needs of students, whereas teacher as facilitator and catalyst must be able to create interesting learning media. Multimedia-based media is one of the media using technology that is able to provide a learning and playing climate through the concept of gamification which was developed based on edugames, which in turn provides a learning atmosphere, not only playing but there are meaningful learning outcomes after using the multimedia. This gamification in learning is very important to create learning motivation in students so that learning is more interesting and meaningful.

Keywords: *gamification, motivation, learning innovation*

1. INTRODUCTION

The rapid development of technology is currently providing a shift to the learning paradigm, especially how teachers learn for them as well as students; thus, the learning process becomes interesting and provides meaningful learning outcomes for students. The era of technology 4.0 requires teachers to move quickly in adjusting technological developments to be able to adapt to changes in educational paradigms, especially the ability of teachers to master the technology to implement it in the learning process with students. Teachers are required to learn for life (long life learning) in developing their potential capacity (Arafik et al., 2021). Teachers in the millennial are required to be more innovative in this current era of disruption so that they can synergize with technological advances in the field of education. Teachers are educators who are required to have pedagogic, professional, social, and personality competencies. The main tasks and functions of teachers following Permendikbud No. 15 of 2018 are to educate, teach, guide, direct, train, assess, and evaluate students. Along with the development of science and technology, teachers are required to carry out their duties adaptively, innovatively, creatively, and critically in the learning process (Darmawiguna et al., 2019).

Learning strategies in the past and present have shifted in the context of curriculum, strategies, or learning resources. In the past, the teacher was the only source of learning for students in learning; students were very dependent on the teacher, and the teacher became the center of learning (teacher-centered). The development of technology and educational paradigms has shifted, for now, the teacher acts as a facilitator and catalyst in learning, meaning, the teacher as a facilitator, namely the teacher as a teacher providing facilities for students both in providing learning media and a comfortable learning environment. The teacher as a catalyst means that the teacher can be a spark of enthusiasm and a good motivator for students so that they can increase interest in learning. Teachers as facilitators and catalysts need to be supported by how teachers prepare for learning, including using media in learning. The function of media in learning can make student interest on teaching and learning process (Hakam, 2020; Sunardiyah et al., 2022).

Learning media as a communication tool for teachers and students in the learning process must pay attention to the conditions or needs of students. The learning media used by the teacher must be responsive, meaning that it must be easily accepted by students to make it easier for students to learn and receive learning materials. Learning media must provide efficiency in learning so that learning is more meaningful (Rahmawati et al., 2022). The development of the learning media make student independent in learing (Kuswanto &

Radiansah, 2018). The relationship with current technological developments, the use of multimedia-based learning media is very appropriate to be applied because it provides convenience for teachers and provides learning motivation for students. Multimedia is a word to describe a new discourse about computer software, especially those related to information. Multimedia components can be characterized by the presence of text, images, sound, animation, and video, all controlled in several programs. The interactive component refers to the process of empowering the user to control the environment which is usually done through a computer. Interactive multimedia learning that uses information and communication technology or uses multimedia is called interactive multimedia-based learning media (Haryoko & Jaya, 2016).

Multimedia-based learning media in learning, for now, is very diverse. Gamification is one example of the concept of multimedia-based learning media. Gamification-based interactive multimedia will contain an explanation of the material, games that can attract students' attention, and also practice questions. Through interactive multimedia, students will be guided by a computer to perform several activities, namely watching, reading, and playing. The material will be packaged in a communicative language so that this gamification-based interactive multimedia can make it easier for students to learn (Rokhayani et al., 2019). Gamification provides changes in learning patterns for students, with the concept of gamification learning media students will be more interested and motivated in learning because the material is packaged in the concept of learning and playing, this is following the characteristics of elementary school students, namely in the learning and playing stage (Nindyasari & Herawati, 2018). The application of gamification as a learning media for elementary school students does have a more interesting learning impact. Students will be more active because they are directly involved in the use of media. Students will be more creative and critical in thinking skills because the game in it will spur students to find out. Edugame as one of the gamification-based media is not only a media for playing, but in it there is a meaning in the learning process. Educational games (Edugagame) are digital games designed for educational enrichment to support teaching and learning, using interactive multimedia technology (Nugraheni, 2017). It can be concluded that an effective learning process and in accordance with the current era of technological development is a learning process that prioritizes the needs of students, where the teacher as a facilitator and catalyst must be able to create interesting learning media. Multimedia-based media is one of the media using technology that is able to provide a learning and playing climate through the concept of gamification which is developed based on edugames, which ultimately provides a learning atmosphere, not only playing but there are meaningful learning outcomes after using the multimedia.

Learning in elementary schools is by the application of edugame-based gamification, one of which is science learning in elementary schools. Science learning in elementary schools will be more interesting if one of them is presented with the concept of edugame-based gamification. Thus, students will not feel bored in learning even though they study a lot of learning materials. The application of the concept of edugame-based gamification in science learning in elementary schools will motivate students and build their curiosity. In the concept of edugame-based gamification, learning media is presented in the form of multimedia where the use of technology such as animation, motion pictures, and sound is improvised to produce interesting learning media. Edu-game is interactive learning multimedia that has three main elements as used by Rudy Bretz (2012). in classifying learning media. The three elements are visual, sound, and motion. In particular, Levie and Lentz (1982) mention four media in particular visual aspects – attention function, which is to attract and direct the attention of students to concentrate on the material; affective function, which can generate interest, emotions, and attitudes of students to pay attention to the material; cognitive function, which makes it easier to understand and remember messages or materials; and the compensatory function, which accommodates the weaknesses of students in receiving material verbally or has weaknesses in reading so that they can organize the information they can and can recall it (Nurrohman et al., 2021). This paper focuses on the relationship of media concepts based on multi-media, gamification, and edugame, the relationship between the concept of gamification and learning motivation, the use of the concept of gamification in science learning in elementary school.

2. METHODS

This study uses a literature review method or better known as a literature review on how to apply the concept of gamification in science learning in elementary schools. Sources of data are from various relevant

research journals. Technical analysis of data in this study by reviewing several research journals related to the application of the concept of gamification in science learning in elementary schools.

3. RESULT AND DISCUSSION

Enjoying playing is a characteristic of elementary school age students. Based on these characteristics, the learning process designed must adapt to the characteristics of the students being taught. That is, teachers need to design a learning process that is integrated with games. Some games that can be integrated with the learning process in elementary schools can be categorized into two, namely traditional games and modern games. Some traditional games that can be integrated with learning in elementary schools include *gobag sodor*. In the *Gobag Sodor* game, students are taught to work well with the team, hone their foresight and support the motoric aspects of children because they are required to move actively and nimbly.

Another traditional game that can be integrated in the learning process is *dakon*. In the *dakon* game, in addition to honing children's numeracy knowledge, the motor aspect is also honed because they have to move their fingers and hands carefully in grasping the seeds or stones used for the game.

In addition to traditional games, modern games can also be integrated in the learning process. this can be implemented by integrating learning materials with various applications used in learning such as the kahoot application. kahoot is an application that can be used for evaluation activities that are integrated with games by competing with other friends. Kahoot is also designed to be very attractive and makes children interested in working on problems. besides kahoot, there is also a gamification application that integrates animation, video, and learning materials so that learning becomes fun and not boring.

Interesting and interactive learning media will of course have a positive impact on the psychological learning of students, including being able to build students' learning motivation. By presenting interesting learning media, it will build enthusiasm for learning and motivation of students. Sanjaya (2010) said that the motivational learning process is one of the most important dynamic aspects. It often happens that students who lack achievement are not caused by their lack of ability, but because there is no motivation to learn so that they do not try to direct all their abilities. In the traditional learning process that uses an expository approach, the teacher sometimes forgets the element of motivation. The teacher seems to force the students to accept the material that is conveyed. This situation is not profitable because students cannot learn optimally which of course the achievement of learning outcomes is also not optimal. The modern view of the learning process places motivation as one of the important aspects in generating student learning motivation.

Learning motivation is a condition that exists in an individual where there is an urge to do something to achieve a goal (Nurmawati et al., 2022). Woodwort in Sanjaya (2010) declare that a motive is a set that can make individuals perform certain activities to achieve goals. Thus, motivation is an impulse that can lead to certain behaviors that are directed to the achievement of a certain goal. The behavior or actions shown by a person to achieve certain goals is very dependent on the motive he has. As stated by Arden (1957) in Sanjaya (2010) that the strength or weakness of the efforts made by a person to achieve goals will be determined by the strength of the motives of that person.

Motivation is a series of efforts to provide certain conditions so that someone wants and wants to do something and if they don't like it, they will try to negate or avoid the feeling of dislike. So motivation can be stimulated by external factors, but motivation grows within a person. The environment is one of the external factors that can foster motivation in a person to learn.

The success of the teaching and learning process is influenced by students' learning motivation. Teachers as educators need to encourage students to learn in achieving goals. Two functions of motivation in the learning process proposed by Sanjaya (2010), namely: (1) Encouraging students to be active Everyone's behavior is caused by an impulse that comes from within which is called motivation. (2) As a behavioral director, each individual is directed to meet their needs or to achieve predetermined goals. (3) Encouraging humans to act, so as a mover or motor that releases energy. Motivation in this case is the driving force of every activity carried out. (4) Determine the direction of action in the direction to be achieved. (5) Selecting actions, namely determining what actions must be done to achieve the goal.

So the motivation will provide encouragement, direction, and actions to be taken to achieve the goals that have been formulated previously. The function of motivation as a driver of effort in achieving achievement,

because someone doing business must encourage his desires, and determine the direction of his actions towards the goals to be achieved. Thus students can select actions to determine what must be done that is beneficial to the goals to be achieved. Motivation to learn can raise because of intrinsic factors, in the form of desire and desire to succeed and encouragement of learning needs, hopes for ideals. While the extrinsic factors are awards, a conducive learning environment, and interesting learning activities (Uno, 2016).

The concept of gamification is very appropriate for learning at the elementary level because considering the age of the elementary level is a stage of learning and playing so it requires learning media as communication in the delivery of material somewhat more easily accepted by students. In the learning process, teaching media is a place and channel for messages from the source of the message, in this case, the teacher, to the recipient of the message, in this case, the student. In a broader sense, the definition of teaching media is everything that can be used to stimulate students' thoughts, feelings, attention, and willingness to encourage the learning process in students (Nasrah & Muafiah, 2020).

In this era of globalization and information, the use of Information Technology (IT)-based learning media has become a necessity and a demand, but its implementation is not an easy thing. In using the media, it is necessary to pay attention to several techniques so that the media used can be utilized optimally and does not deviate from the purpose of the media (Muhson, 2010). Technology-based learning media that are often used include Adobe Flash, Construct, Android, PowerPoint, and so on, which is commonly used is PowerPoint. One of the learning media using PowerPoint which is installed with Ispring Suite 8 add-ins has not been widely developed. Ispring is a tool that can convert presentation files that are compatible with PowerPoint to be in the flash form (Himmah & Martini, 2017). According to Hermawati (2010), Ispring is a tool that converts presentation files into flash form, can easily be integrated into Microsoft Powerpoint so that its use does not require complicated skills. The use of this application can create various forms of quizzes, including audio, video, or YouTube.

Edu game is a reflection of learning in the 21st century that integrates learning in the classroom using ICT. The learning process of edugames is suitable for use in learning today, namely in the 21st century. Learning in the 21st century leads students to be able to innovate using technology and be able to work together. Technology has a reciprocal relationship with learning, with the emergence of new technology should be able to encourage education to understand and utilize technology in classroom learning and be able to implement it in the learning process (Oktarina & Nisa, 2021). Therefore, there is a need for learning innovations that are by the demands of today's technology. In edugames learning, it is necessary to set up computer devices in the classroom and have an internet connection so that students can interact with fellow students, teachers, and the environment related to the learning process (Girsang et al., 2020). Multimedia learning in the form of games is useful in supporting teaching and learning activities, but not many games have been made for learning functions in schools (Rahmawati et al., 2022). Finally, games began to be used as a medium of learning in the hope that students would become more interested and spend more time learning. The phenomenon that occurs is that children often forget to learn because the time that should be for learning is spent playing games. It would be nice if games made and played by children are games that are used in the world of education to support teaching and learning activities and attract students' learning motivation (Aini et al., 2019).

Games fulfill both of these requirements for an effective learning environment: they are active experiences and can provide intrinsic motivation. Meanwhile, Griffiths in Kuswantoro, (2018) mentioned several benefits of educational games, namely (1) games can provide an element of interactivity that can stimulate learning. (2) Games allow participants to get new things, increase curiosity, and challenge in learning. (3) Games can equip children with knowledge about technology. (4) Games can help to develop skills in the IT field. (5) Game can be used as a simulation. (6) Games can provide entertainment (Nurrohman et al., 2021). Based on the description of these characters Learning becomes more fun Encourage students to complete their learning activities Helps students focus more and understand the material being studied Provide opportunities for students to compete, explore and excel in the classroom (Nisa et al., 2020).

4. CONCLUSION

Based on the explanation above, it can be concluded that the learning process carried out in elementary schools needs to be integrated with the game method so that children are happy in participating in the learning

process and this will have an impact on motivation and learning outcomes. Some of the games that are integrated can be in the form of traditional games such as *Gobag Sodor* and *Dakon*, as well as modern games that are integrated with technology such as the use of the Kahoot application, gamification applications that integrate animation, video and materials, as well as other educational technologies.

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REFERENCES

Aini, B. O., Ayu, K. C., & Siswati. (2019). Pengembangan Game Puzzle sebagai Edugame Berbasis Android untuk Meningkatkan Kemampuan Berpikir Matematika Siswa SD. *JTAM | Jurnal Teori Dan Aplikasi Matematika*, *3*(1), 74. https://doi.org/10.31764/jtam.v3i1.768.

Arafik, M., Putra, P. A., Putro, A. A. Y., Nisa, A. F., & Wiarsih, N. (2021). Development of Digital Comic Technology Applications Design to Increase Children's Literature Reading Interest in Elementary School. *International Conference on Education and Technology (ICET)*. https://doi.org/10.1109/ICET53279.2021.9575105

Baber, H. (2020). *Determinants of Students ' Perceived Learning Outcome and Satisfaction in Online Learning during the Pandemic of COVID19*. *7*(3), 285–292. https://doi.org/10.20448/journal.509.2020.73.285.292

Chan, D. K. C., Zhang, L., Lee, A. S. Y., & Hagger, M. S. (2020). Reciprocal Relations Between Autonomous Motivation from Self-determination Theory and Social Cognition Constructs from The Theory of Planned behavior: A cross-lagged Panel Design in Sport Injury prevention. *Psychology of Sport and Exercise*, *48*. https://doi.org/https://doi.org/10.1016/j.psychsport.2020.101660

Darmawiguna, I. G. M., Santyadiputra, G. S., Pradnyana, G. A., & Pradnyana, M. A. (2019). Pelatihan Implementasi Gamifikasi dalam Pembelajaran dengan Platform Kahoot bagi Guru di SMK Negeri 1 Nusa Penida. *Prosiding SENADIMAS Ke-4*, 967–972.

Deterding, S., & Dixon, D. (2011). From Game Design Elements to Gamefulness : Defining "Gamification." *Conference Paper · September 2011*, *September*. https://doi.org/10.1145/2181037.2181040

Girsang, M. L., Silalahi, M., Nainggolan, M. F., & Wahyuni, N. S. (2020). Kendala Guru dan Siswa dalam Menerapkan Sistem Belajar Online pada Masa Covid-19 di SDN 101747 Klumpang Kebun Kecamatan Hamparan Perak Kabupaten Deli Serdang. *Jurnal Mutiara Pendidikan*, *5*(2), 17–23. http://e-journal.sari-mutiara.ac.id/index.php/JMT%0AKENDALA

Hakam, I. (2020). *Motivasi Belajar Mahasiswa dalam Penyelesaian Studi di Ma'had Al-Khansa Universitas Muhammadiyah Pontianak* [Universitas Muhammadiyah Pontianak]. http://repository.unmuhpnk.ac.id/1203/3/BAB I %26 V.pdf

Haryoko, S., & Jaya, H. (2016). Multimedia Animasi Berbasis Android "MABA" untuk Mata Pelajaran Produktif di SMK. *Jurnal Penelitian Pendidikan*, *19*(2), 102–118. https://doi.org/https://doi.org/10.20961/paedagogia.v19i2.36079

Haryoko, S., Jaya, H., & Ahmar, A. S. (2017). *Inovasi Pembelajaran dengan Pendekatan Lingkungan Virtual*. Fakultas MIPA Universitas Negeri Makassar.

Hermawati. (2010). *Perilaku Siswa dalam Pembelajaran Matematika di Pondok Pesantren*. Universitas Muhammadiyah Yogyakarta.

Himmah, F., & Martini. (2017). Pengembangan Multimedia Interaktif Menggunakan Ispring Suite 8 Pada Sub Materi Zat Aditif untuk Meningkatkan Hasil Belajar Siswa Smp Kelas VIII. *Pensa: Jurnal Pendidikan Sains*, *05*(02), 73–82. https://ejournal.unesa.ac.id/index.php/pensa/article/view/18834

Jusuf, H. (2016). *Penggunaan Gamifikasi dalam Proses Pembelajaran*. *5*(1), 1–6. https://media.neliti.com/media/publications/92772-ID-penggunaan-gamifikasi-dalam-proses-pembe.pdf

Kompri. (2016). *Motivasi Pembelajaran Perspektif Guru dan Siswa*. PT Remaja Rosdakarya Offset.

Kuswanto, J., & Radiansah, F. (2018). Media Pembelajaran Berbasis Android Pada Mata Pelajaran Sistem Operasi Jaringan Kelas XI. *Jurnal Media Infotama*, *14*(1). https://doi.org/10.37676/jmi.v14i1.467

Marisa, F., Akhriza, T. M., Maukar, A. L., Wardhani, A. R., Iriananda, S. W., & Andarwati, M. (2020). Gamifikasi (Gamification) Konsep dan Penerapan. *JOINTECS (Journal of Information Technology and Computer Science)*, *5*(3), 219–228. https://doi.org/10.31328/jointecs.v5i3.1490

Muhson, A. (2010). Pengembangan Media Pembelajaran Berbasis Teknologi Informasi. *Jurnal Pendidikan Akuntansi Indonesia*, *VIII*(2), 1–10. https://doi.org/https://doi.org/10.21831/jpai.v8i2.949

Nasrah, & Muafiah, A. (2020). Analisis Motivasi Belajar dan Hasil Belajar Daring Mahasiswa Pada Masa Pandemik Covid-19. *Jurnal Riset Pendidikan Dasar*, *03*(2), 207–213. https://doi.org/https://doi.org/10.26618/jrpd.v3i2.4219

Nindyasari, Y., & Herawati, T. (2018). *The Relation of Emotional Maturity , Family Interaction and Marital Satisfaction of Early Age Married Couples*. *03*(02), 16–29. https://doi.org/https://doi.org/10.29244/jfs.3.2.16-29

Nisa, A. F., Prasetyo, Z. K., & Istiningsih. (2020). The Teachings of Ki Hadjar Dewantara in Improving the Character of Elementary School Students in the Revolution of Industry 4.0 Era*. *International Conference on Educational Research and Innovation (ICERI 2019) The*, *401*(Iceri 2019), 49–56. https://doi.org/10.2991/assehr.k.200204.010

Nugraheni, N. (2017). *Implementasi Permainan pada Pembelajaran Matematika di Sekolah Dasar*. *1*(2), 142–149. https://e-journal.ivet.ac.id/index.php/matematika/article/view/490

Nurmawati, A. D., Nisa, A. F., Rosianawati, A., Artopo, B., Erva, R. A. L., & Nizhomi, B. (2022). Implementasi Ajaran Tamansiswa "Tri Nga" Melalui Model Pembelajaran Discovery Learning Dalam Pembelajaran IPA Kelas IV Sekolah Dasar. *TRIHAYU: Jurnal Pendidikan Ke-SD-An*, *8*(2), 1366–1372. https://doi.org/10.30738/trihayu.v8i2.11832

Nurrohman, A., Dahlan, U. A., & Artikel, I. (2021). Analisis Edugame Berbasis Android Sebagai Media Pembelajaran Di Sekolah Dasar. *Prosiding Seminar Nasional Sains*, *2*(1). http://proceeding.unindra.ac.id/index.php/sinasis/article/view/5349/1148

Oktarina, E., & Nisa, A. F. (2021). Development of Environmental Care-Based Curriculum in Improving Character Education in Elementary Schools. *JHSS (Journal of Humanities and Social Studies)*, *05*(02), 126–130. https://doi.org/10.33751/jhss.v5i2.3713

Rahmawati, D. N., Nisa, A. F., Astuti, D., Fajariyani, & Suliyanti. (2022). Pemanfaatan Aplikasi Quizizz sebagai Media Penilaian Pembelajaran Ilmu Pengetahuan Alam. *Dawuh Guru: Jurnal Pendidikan MI/SD*, *2*(1), 55–66. https://doi.org/10.35878/guru.v2i1.335

Ratminto, & Winarsih, A. (2009). *Manajemen Pelayanan*. Pustaka Pelajar.

Rokhayani, D., Kuswandi, D., & Abidin, Z. (2019). Multimedia Interatif Melalui Gamifikasi. *Jurnal Kajian Teknologi Pendidikan*, *2*(2), 102–108. http://journal2.um.ac.id/index.php/jktp/index

Sanjaya, W. (2010). *Strategi Pembelajaran Berorientasi Standar Proses Pendidikan*. Prenada Media Group.

Sardiman, A. (2018). *Interaksi dan Motivasi Belajar Mengajar* (p. 246). Raja Grafindo Persada.

Sunardiyah, M. A., Wibawa, S., & Nisa, A. F. (2022). pemanfaatan instagram, media pembelajaran IPA, abad 21. *Prosiding Seminar Nasional Pendidikan Guru Sekolah Dasar 2022*, 159–164. https://jurnal.ustjogja.ac.id/index.php/sn-pgsd/article/view/12365

Suyanto, M. (2005). *Multimedia: Alat untuk Meningkatkan Keunggulan Bersaing*. Andi & STIMIK Akakom.

Uno, H. B. (2016). *Teori Motivasi dan Pengukurannya*. PT Bumi Aksara.