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EXPLORING THE POTENTIAL OF INTERACTIVE STORYTELLING IN E-LEARNING: ENHANCING STUDENT ENGAGEMENT AND LEARNING OUTCOMES

Abstrak

Artikel ini mengusulkan penggunaan interactive storytelling dalam e-learning melalui Learning Management System (LMS) untuk memberikan hasil pembelajaran yang lebih menarik dan efektif bagi siswa sebagai bentuk dampak dari transformasi digitalisasi. Interactive storytelling dapat menciptakan lingkungan belajar yang menyenangkan, interaktif, dan menarik secara visual, yang dapat membantu siswa tetap tertarik dan termotivasi selama proses pembelajaran. Selain itu, cerita interaktif dapat membantu mengembangkan kemampuan berpikir kritis dan pemecahan masalah, mempersonalisasi pengalaman belajar untuk setiap siswa, dan meningkatkan kualitas pendidikan secara keseluruhan. Untuk mencapai hal ini, kami menetapkan prinsip-prinsip desain instruksional untuk merancang dan mengembangkan program mendongeng interaktif yang efektif yang terstruktur dengan baik dan selaras dengan tujuan pembelajaran. Penggunaan cerita interaktif dalam penyampaian konten di E-learning sangat direkomendasikan dan dinilai lebih menarik dan menarik. Dengan memanfaatkan hal ini, para pendidik dapat menciptakan pengalaman belajar yang lebih menarik dan efektif bagi para siswa, yang mengarah pada peningkatan hasil belajar dan peningkatan keterlibatan siswa.

Kata Kunci: Transformasi Digital, Menggali Potensi, Penceritaan Interaktif, Sistem Manajemen Pembelajaran, Prinsip-Prinsip Desain Instruksional,

Abstrak

This article proposes using interactive storytelling in e-learning through the Learning Management System (LMS) to provide a more engaging and effective learning outcome for students as a form of impact from the digitalization transformation. Interactive storytelling can create a learning environment that is fun, interactive, and visually appealing, which can help to keep students interested and motivated throughout the learning process. Furthermore, interactive storytelling can help to develop critical thinking and problem-solving skills, personalize the learning experience for each student, and improve the overall quality of education. To achieve this, we established instructional design principles to design and develop effective interactive storytelling programs that are well-structured and aligned with the learning objectives. The use of interactive storytelling in the delivery of content in E-learning is highly recommended and valued as more appealing and engaging. By utilizing these, educators can create a more engaging and effective learning experience for students, leading to improved learning outcomes and increased student engagement

Keywords: Digital Transformation, Exploring Potentials, Interactive Storytelling, Learning Management System, Instructional Design Principles,

INTRODUCTION

Technological development has entered the digital era and society 5.0. Technology integration in digitalization has spread to all sectors and aspects of life, starting from the industrial sector, government, community services, health, and education. The Indonesian

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government welcomes the development of technology. This support is realized through the acceleration of digital transformation in all sectors. The education sector is one of the sectors the government targets in accelerating digital transformation. Digital transformation in the education sector is characterized by the application of blended learning models, namely the combination of conventional learning models with the use of E-Learning (online) (H. A. H. A & Bau, 2022).

Improving the quality of education is one of the problems experienced by developing countries including Indonesia (Suartama, 2010). Since the pandemic hit the world, it has also fundamentally changed the learning paradigm in Indonesia. The Indonesian government requires learning to be done remotely or online, this is contained in the circular letter of the Minister of Education and Culture No. 4 of 2020.(Very & Pasha, 2021). Through this pandami period, the government also launched the acceleration of digital transformation to support and implement technological developments that have entered the digital era. And the education sector is one that the government is trying to transform digitally quickly. One of the government programs is to change the learning model that no longer requires full face-to-face classes, but combines online and face-to-face learning models or better known as hybrid classes. (H. A & Bau, 2023).

Digital technology enables the implementation of distance learning (online learning). Students and teachers can interact through online learning platforms, conduct online lectures, and participate in virtual discussions. Digital transformation has significantly impacted the education sector, improving the learning experience for both students and teachers. Supporting this added that Virtual reality creates immersive learning experiences, allowing students to explore and interact with virtual environments. (Shenkoya & Kim, 2023) They added that digital transformation impacts the higher education sector, namely sustainable curriculum development, digitalization of higher education, increased innovation, and improved student performance.

Digital technology enables collaboration between students and educators around the world. Through joint projects, online discussions, and cultural exchanges, students can expand their understanding of the world and build relationships with fellow learners from different backgrounds. However, the application of digital technology in education, especially online learning, encounters various problems that cause the learning process to be ineffective. As revealed by Widodo and Nursaptini (2020) there is boredom and lack of focus felt by students, then learning media is also a factor (Widodo & Nursaptini, 2020). Another problem that arises is the lack of student participation caused by the absence of direct interaction between teachers and students, and the media used also does not attract students' attention. (Miftah, 2015). Fauzy and Nurfauziah (2021) stated that the limited interaction between teachers and students when learning online is a challenge because certain subjects require teacher attention and interaction to help students understand the teaching material. (Fauzy & Nurfauziah, 2021).

Educators recognize that interaction plays an essential role in successful online learning. Various studies have demonstrated its ability to increase student engagement and participation in the learning subject. Student engagement in learning using e-learning can be measured through motivation, collaboration, autonomy, participation, and resolution (Evendi, 2022). Interactive content can improve knowledge retention and develop students' decision-making skills. Students will feel more involved in their educational process, making it enjoyable and more efficient. Wiranto, (2022) revealed that learning in social science subjects using interactive learning content is fairly effective to use and implement continuously (Wiranto, 2022). This shows that interactive content is one of the factors that affect the effectiveness of the application of e-learning as a learning tool in terms of interactive content. Interactive content effectively engages students, both when they are learning online and in the classroom. It can potentially increase the effectiveness of e-learning and improve student retention rates. Interactive content can also be an effective tool for introducing microlearning, teaching smaller pieces of information in an accessible format easier for students to digest. This can be done by integrating interactive graphics and videos into lessons or providing links to relevant external websites/Learning Management Systems (LMS) for further study.

Presenting interactive content can be done in various ways, from templates to creating original videos and audio narratives. However, the material used must be practical and engaging for the viewer. Studies conducted by Fambudianto et al., (2022) show that uninteresting learning content is one obstacle that interferes with the learning process (Fambudianto et al., 2022). One of the best ways to increase interaction is to create animations. This will help your users understand your message better and can be done quickly and affordably. Animation and e-learning are brought together to form an ideal educational platform. This is because a single animated character can be linked to different types of information, such as images, audio narration, and videos, that help users to remember key ideas more easily. To make the content more effective, include questions that require a deeper understanding of the topic. These questions can be presented in various forms, such as fill-in-the-blanks, matching exercises, and word grouping.

The use of storytelling as a learning tool is one of the effective methods to build students' absorption even though they do not interact directly with the teacher. As has been done by Wakas et al (2020) applying digital storytelling in learning and the results show an increase in students' ability to understand and comprehend (Wakas et al., 2020). In line with Susanti (2023), developing storytelling-based interactive learning videos shows that the media is declared valid with a score of 0.910 and practical with a score of 91.67% (Susanti, 2023). Recent research conducted by Yansyah et al (2023) states that not only is storytelling able to improve student understanding and learning outcomes, it is also able to build language literacy for early childhood through the concept of big book storytelling (Yansyah et al., 2023). this shows that the use of the storytelling concept as a learning media can help the learning process of students.

This article will try to custom more engaging content by combining animation and various forms of questions into interactive audio-video content. The catch is that we will deliver the content in a storytelling package. Storytelling has become one of the most effective ways of delivering messages to audiences. From folklore to advertisements, the power of storytelling can motivate, inspire and even influence individual behavior. In today's digital age, e-learning has become one of the popular methods to learn anywhere and anytime. However, many students feel bored and unmotivated to learn online due to the lack of interaction and engaging experience. As a result, the learning outcome is not optimal. Therefore, integrating storytelling into e-learning design can increase students' interest and motivation. This paper will discuss utilizing established instructional design principles to design and develop a well-structured interactive storytelling program aligned with learning objectives.

METHOD

In this study, we use Design Thinking to incorporate instructional design principles to design and develop interactive storytelling content in E-Learning. Design thinking is a methodology used to address complex problems and ensure users are involved in the entire design and product development process. This methodology involves four main stages: understand, observe, interpret, and experiment. In the context of e-learning product design and development using interactive storytelling, design thinking can be used to assess the conditions and needs of users in learning and develop a design that suits these needs.

In the first stage, we must understand the learning objectives, the student's characteristics, and the relevant learning context. In the second stage, observe students to understand the needs and challenges faced in learning. In the third stage, analyze and interpret the data obtained from the previous stage to identify problems and opportunities that can be solved by designing and developing interactive e-learning products. In the last stage, develop a prototype of the proposed product based on data analysis and interpretation results in the previous stage, then conduct testing and evaluation to ensure that the design meets user needs and can provide an effective learning experience.

3.1 Instructional design principles approach

According to Vick Oletu (Oletu, 2019), there are five essential instructional design principles for e-learning courses. Making a conscious effort to ensure the reception is necessary to capture attention. For instance, getting someone's attention piques their interest and creates expectations

in their minds. A challenge, sharing rich insights, posing a problem to be solved, or delivering a tale that connects with the students are all practical approaches. It would be easier for the students to focus their learning efforts and arrange their ideas if you let them know what they can do after participating. Students can better determine whether they are learning something successfully if they understand what you expect them to learn. This teaching approach creates room for original thought. By the learning objectives and desired outcome, you can use storytelling, branching scenarios, role-plays, gamification, and interactive films. Be aware that the focus of feedback regarding the correct or incorrect answer should be on enhancing learning. Use word puzzles, drag-and-drop activities, scenario activities, learning games, or drag-and-drop interactions to make your evaluations interactive and interesting. You might give your students a second chance to take the test depending on the learning objectives. Lastly, providing detailed and insightful comments on a student's performance is essential.

Literature Study

The 21st century has brought many innovations in education. Especially in the learning process, storytelling is one way to amplify or awaken students' voices in the classroom (Chafsoh, 2020). The latest technology in learning that adopts storytelling is digital storytelling. Storytelling is a storytelling pattern seasoned with improvisation. In contrast, digital storytelling is a storytelling pattern through digital media by taking elements from various data packaged as interesting as possible and then delivered online (Evendi, 2022). Digital storytelling combines various multimedia features such as graphics, text, recordings, sounds, songs, music, and videos with the art of storytelling to present material or specific points within a certain duration of time and packaged in an attractive digital format (Gordon, 2011). Storytelling is an interactive art that uses words and actions to reveal a story (Martarini et al., 2020).

In order to weave stories together with the author's narrative voice, digital storytelling combines the age-old craft of storytelling with a variety of modern resources, such as digital images, graphics, music, and sound. Innovative applications of digital storytelling as a teaching method and learning resource have been implemented across all educational levels. Teachers can use digital storytelling to implement creative and enhanced teaching strategies while also enhancing student learning. Digital storytelling is a relatively new and infrequent use in early childhood education settings, whereas storytelling is a tried-and-true pedagogy (Rahiem, 2021).

The application of storytelling in learning has been carried out by several researchers, such as by Moradi (2019) found that the application of digital storytelling in education provides many benefits, such as experiential learning, providing real-life situations and more active student engagement. (Moradi & Chen, 2019). Digital storytelling has affected information gathering skills, problem solving and attitudes towards collaboration of teachers and students. Educators also use digital storytelling as a motivational tool to attract attention and guide their students (Çetin, 2021). The genuine and significant learning experiences that Digital Storytelling provides to help students become proficient English speakers and innovative thinkers. It is therefore advised that educators develop transdisciplinary Storytelling projects in the future (Yang et al., 2022). No less interesting is the concept of storytelling being able to build soft skills in students, this was revealed by Haca (2021) that the use of digital storytelling as a learning media provides a significant increase in the level of self-confidence of students (Hava, 2021).

About the learning process, using storytelling as learning content in e-learning is a breakthrough and the latest innovation. Because one of the factors of the effectiveness of using e-learning in learning is the interactive content in the e-learning. Sukirman (2016) revealed that applying AR technology to storytelling activities could add interactivity to learning (Sukirman, 2016). The same thing was also revealed by (Martarini et al., 2020) that the use of digital storytelling as a learning media in e-learning could help improve Higher Order Thinking Skills (HOTS) in teachers and students (Martarini et al., 2020). So that indirectly the use of storytelling as learning content has provided teachers with opportunities to continue improving digital skills to keep up with the demands of the digital era today. Another advantage of using storytelling is that it can improve learners' digital literacy (Nuroh et al., 2022).

Using e-learning as a learning tool is one of the realizations in accelerating digital transformation in the education sector. In accordance with President Joko Widodo's direction in the 2021-204 Digital Indonesia roadmap, the education sector is one of the targets for accelerating digital transformation in Indonesia. So, academic practitioners are expected to support the government in the process. One way that educators can do this is by utilizing and optimizing the use of e-learning in the learning process. Using e-learning as a learning tool has given a new perspective on learning, where learning classes no longer require face-to-face learning classes. Nevertheless, it is more flexible and no longer limited by time and space. Following the needs of the digital education era, e-learning now has a significant position in the learning process. E-learning is essential in the era of education 4.0 not only as a system but also as a multifunctions container and learning media. Learning by utilizing e-learning as a supporting tool can run optimally (H. A. H. A & Bau, 2022).

RESUL AND DISCUSSION

This initial condition analysis was conducted on first-semester information systems study program students. The scope of the research was only carried out on the Pengantar Teknologi dan Sistem Informasi course. The first question asked was, "Do you have any experience studying studies related to Information Systems?" 83% answered "Yes."
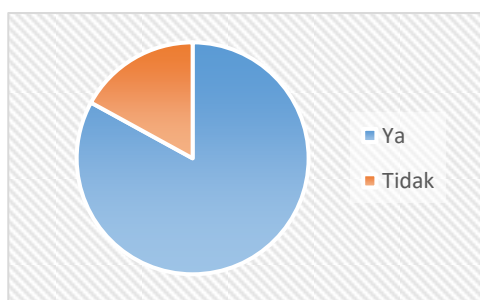

Figure 1. Data used to understand student's characteristic

Based on this question, it can be concluded that most students already have experience in everything related to technology, such as using Microsoft Word to programming. This question is asked to understand students' level of knowledge in using a technology product. Thus, the educator can adjust how advanced the content will be. Subsequent questions were asked to determine which learning style could entice them to engage in the learning process.
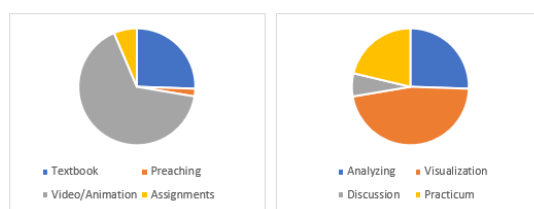

Figure 2. Data used to observe student's needs

Thirty-one students prefer video/animation as how to learn a new subject, and 22 students choose visualization as how they like to process complex information. Culture Shock is a condition in which someone has extreme fear and worry in a new environment (Chafsoh, 2020) (Chafsoh, 2020). This also applies to students who have just entered the college environment and do not know what to expect and how to deal with almost everything. These questions will help educators at least know what they need when they are exposed to both scenarios. Thus, it can be assumed that visualization methods will help students learn new things and process complex information. This aligns with what Andina (2019) revealed: elevating a story by visualizing can make it easier for someone to remember ideas and concepts than the numbers listed in the data (Andina, 2019).

Exploring technological options in Interactive Storytelling Design

Pamfilie et al., (2012) Suggest E-learning as an alternative to students which leans more toward visualization (Pamfilie et al., 2012). In this article, we will explore options to cooperate instructional design principles in Interactive Storytelling to create more engaging content in E-Learning. Of 47 students, even though the term E-Learning is already familiar to them, five have not had the chance to use it. This will consider how e-learning can be used for those not experienced using e-learning or other technology products. We made a mindmap as the third phase in design thinking, interpreting the obtained data to identify opportunities that can be solved through the design.
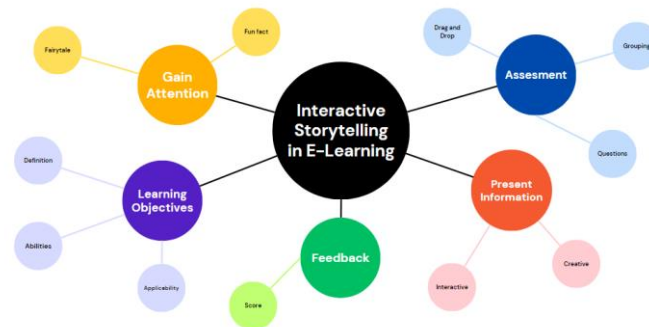

Figure 3. Solving problems with five instructional design principle approaches

Steps in designing Interactive storytelling on E-learning by noticing the five instructional design principles is to select relevant and important materials to be learned. The materials are then designed using interactive storytelling, which means the material is presented as a story with interesting characters and visuals. This is expected to make students more interested and easily understand the material. Structuring e-learning also needs to be considered by creating creatively arranged and interactive content. One of the best ways to increase interaction is by creating assessments. The questions can be presented in various forms, such as fill-in-the-blanks, matching exercises through drag and drop, and word grouping—finally, the feedback feature reviews the answers and scores. By applying these five instructional design principles, interactive storytelling e-learning will help students understand the material and build their skills simultaneously

Designed Interactive Storytelling in E-Learning

Figure 4. Steps in prototyping interactive storytelling on e-learning

Above is the plot we developed to design interactive storytelling on E-Learning. Below is how we implement the plot into a prototype of Interactive Storytelling on Pengantar Teknologi dan Sistem Informasi E-Learning.
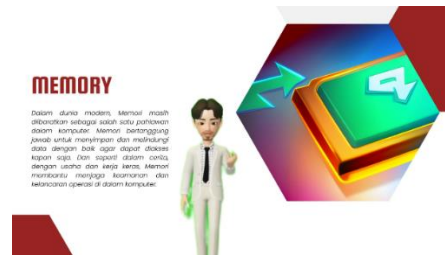
Figure 5. Created video animation

After gathering information and developing storytelling, we create a video animation. In that video, we explain, for example, the definition of memory, what memory is for, and how applicable memory is as a component of a computer. All of these are packed with Interactive Storytelling.

"Memori adalah seorang penyimpan yang rajin dan pandai mengingat segala sesuatu. Dia memiliki kemampuan untuk menyimpan data dengan rapi dan cepat, dan memungkinkan komputer untuk mengakses data tersebut kapan saja. Suatu hari, kerajaan tersebut diserang oleh serangan virus yang mengerikan. Virus tersebut mampu menghapus data dari komputer dengan mudah, membuat seluruh penduduk kerajaan panik.

Memori merasa sangat terancam oleh serangan tersebut, karena jika data hilang, maka akan sulit untuk dikembalikan. Namun, Memori tidak menyerah dan berusaha mencari cara untuk melindungi data di kerajaan tersebut. Setelah berpikir dan mencari tahu, Memori pun menemukan solusi yang tepat. Dia mengatur ulang cara penyimpanan data sehingga data dapat disimpan dengan lebih aman. Dia juga membuat salinan data yang penting dan menyimpannya di tempat yang aman.

Akhirnya, berkat usaha Memori, kerajaan Komputeer terhindar dari serangan virus tersebut. Semua data tetap aman dan seluruh penduduk kerajaan pun merasa lega."

We put some activity in the video using HTML5 Package when all materials were ready and dubbed. This step is required to enhance students' engagement.
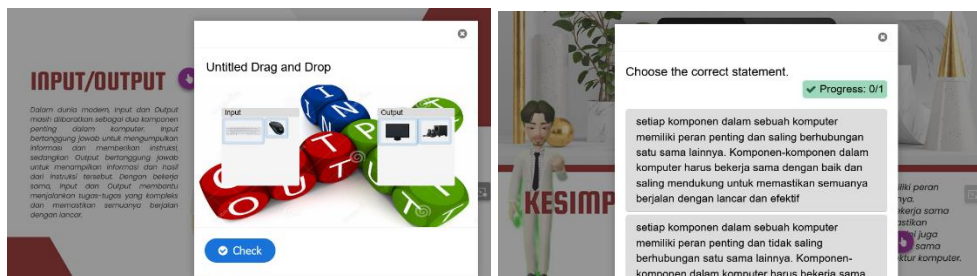

Figure 6. Interaction added to the video

Various forms of questions are created to make the video interactive. We also add feedback to review answers and scores.'
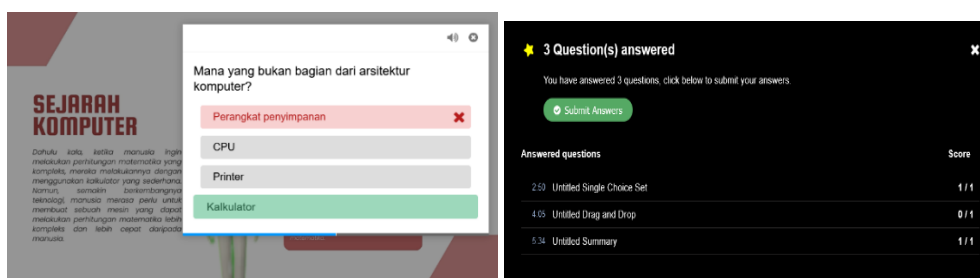

Figure 7. Feedback on answers and score

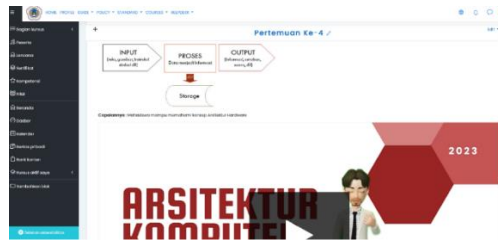Next, as e-learning, we embed the video into Learning Management System (LMS).

Figure 8. Video embed on SPADA

Acceptance testing

Figure 9. Student's opinions on the delivery of the materials

95% of students agree that the materials delivered in the video are clear. The other 5% did not agree due to the lack of experience using e-learning. Students also mentioned that the video was engaging, understandable, and interactive when asked how the material was presented.

Figure 10. Students recommended interactive storytelling

Students approved that the use of interactive storytelling in e-learning is recommended. By doing so, engagement in learning will be enhanced because most students mentioned that their favorite part was answering the popped-up questions. In line with what was expressed by Eroglu (2021) that students really enjoy the learning process using storytelling, students like the concept of stories set to music because they are considered entertainment (Eroglu & Okur, 2021).

Although according to the students' opinion storytelling is good to use in learning. In fact, there are still obstacles for teachers/lecturers in implementing the interactive storytelling model. Namely in the manufacturing process where the concept of interactive storytelling that is created must be in accordance with the character of the students, because not all students are able to learn to use storytelling (Yigit, 2020). However, this is a challenge that must be answered by teachers/lecturers to further develop their competence in creating learning media based on interactive storytelling (Kim et al., 2021).

CONCLUSION

The use of interactive storytelling in the delivery of content in E-learning is highly recommended to be applied. Educators can understand students' learning challenges and concerns using the instructional design principles approach. This helps teachers understand the level of student receptiveness to new learning methods. Interactive storytelling in e-learning is

valued as more appealing and engaging due to the various forms of questions in the middle of video playback. Interactive storytelling can also improve student learning outcomes due to the feedback feature.

In fact, the concept of interactive storytelling can be one of the learning media. However, as technology develops, new learning media emerge one by one, so the concept of storytelling is rarely used in the current era. Even though the combination of the concept of storytelling with interactivity is in fact able to support learning and become the latest innovation in facilitating online and offline learning. So the author recommends trying to apply the concept of interactive storytelling learning media more.

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