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The development of website games as learning media for 4th-grade elementary students

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ABSTRAK

Penelitian ini bertujuan untuk mengembangkan game website sebagai media pembelajaran untuk siswa kelas 4 sekolah dasar pada semester dua. Metode penelitian yang digunakan dalam penelitian ini adalah desain dan pengembangan (D&D) oleh Richey & Klein (2007) dengan model ADDIE (analisis, desain, pengembangan, implementasi, dan evaluasi). Terdapat beberapa instrumen penelitian yang digunakan dalam proses pengambilan data, yang berupa panduan wawancara terhadap guru bahasa Inggris, lembar observasi untuk proses pembelajaran di kelas, analisis dokumen dalam bentuk modul pembelajaran dan alur tujuan pembelajaran, lembar penilaian ahli untuk ahli pendidikan, dan lembar kuesioner pengguna untuk guru dan lima siswa sekolah dasar kelas 4. Hasil penelitian ini adalah prototype game website. Hasil dari analisis data menunjukkan bahwa prototype game website dikualifikasi sebagai media yang sangat valid. Oleh karena itu, game website ini layak untuk digunakan sebagai media pembelajaran untuk siswa kelas 4 sekolah dasar.

ABSTRACT

This study aims to develop a website game as learning media for 4th-grade elementary students in the second semester. The subjects of this study were 4th-grade elementary students and an English teacher. The research method used is design and development (D&D) by Richey & Klein (2007) using ADDIE (analysis, design, development, implementation, and evaluation) mode. Several research instruments were used in the data collection process, namely interview guides for English teachers, observation sheets to observe the learning process in the classroom, documents analysis in the form of teaching modules and objective learning flow, expert judgment sheet for the educational experts, user questionnaire sheet for the teacher and five 4th-grade elementary students. The outcome of this research is a website game prototype. The results of the data analysis show that the website game prototype was qualified as a very valid product. Therefore, this website game is feasible to use as a learning media for 4th-grade elementary students.

INTRODUCTION

The advancement of technology in the 21st century has encompassed various aspects of human existence, including the realm of education. The implementation of technology in learning has become a necessity for teachers in the 21st century (Gajjar, 2013). According to Gopo (2022), technology has emerged as a significant factor with the potential to exert a profound impact on the educational landscape. The observed phenomenon can be attributed to the integration of technology in the field of education, which has resulted in significant impacts. For instance, the utilization of technology has facilitated a faster and more efficient process of knowledge transfer. Additionally, it has led to increased student engagement, enhanced interactivity, and a greater sense of attraction towards the subject matter (Raja & Nagasubramani, 2018). Consequently, numerous educational institutions have initiated the provision of technological resources to their students. According to Jafarian et al. (2017), numerous educational institutions offer advanced technological resources, such as Chromebooks, gadgets, tablets, and laptops, to enhance the learning experience for both students and teachers. This phenomenon arises from the utilization of digital equipment, which enables teachers to enhance the accessibility and efficiency of learning activities (Jafarian et al., 2017).

In the context of English language acquisition in the 21st century, the integration of technology has become indispensable as a pedagogical tool (Ulfa et al., 2020). According to Aminullah et al. (2019), the integration of information and communication technology (ICT) in the field of education holds significant importance as it enhances the efficacy and efficiency of both teaching and learning processes. Yet, the integration of technology as an educational tool remains insufficient in the contemporary era. A significant number of educators predominantly rely on textbooks as instructional resources due to their inclination towards traditional teaching approaches. According to the research conducted by Sumardi et al. (2020), a majority of elementary school teachers, specifically 59.17%, employed traditional teaching approaches. The conventional approach to the learning process is often characterised by monotony and a lack of enjoyment, as it primarily revolves around teacher-centered instruction and relies solely on textbooks as the primary learning medium (Ulya et al., 2022). In the current century, numerous educators continue to employ traditional teaching methods when instructing English.

According to Zayyinah et al. (2022), it is imperative for learning to adopt a student-centered approach. According to the findings of Sumardi et al. (2020), a majority of elementary school teachers, specifically 59.17%, employed traditional teaching approaches. This is due to the fact that the competencies required by students in the 21st century extend beyond mere memorization, encompassing the capacity to effectively address a diverse range of real-world challenges. Furthermore, it has been observed that individuals belonging to the millennial generation exhibit a heightened ability to assimilate information at an accelerated pace when educational practitioners employ customized and inventive approaches in the development of learning materials. Hence, it is imperative to foster innovation in the development of English learning media that aligns with the demands of the 21st century, leveraging technological advancements. Consequently, games can be considered as a viable option for English teachers to utilize as instructional tools. The integration of games into the educational setting is commonly referred to as the gamification approach. The utilization of gamification as an instructional strategy involves the incorporation of game design elements to foster active engagement and facilitate direct interaction between students and the learning process. Combining a gamification approach to the learning process aids students in better understanding the course (Dewi & Listiowarni, 2019). According to Manzano-León et al. (2021), this educational approach facilitates the cultivation of diverse proficiencies among students, including curricular competence, cognitive competence, and social competence.

A study with comparable objectives was undertaken by Choirun et al. (2021). The objective of this study is to develop an Android-based game platform for enhancing reading and writing skills in the English subject among senior high school students. The learning medium was specifically developed by the researchers to facilitate the learning process for students in the eleventh grade of senior high school. The research and development method employed by

researchers is derived from the adaptation of the ADDIE model. The learning material developed in this study is referred to as the Senior English Game (SEG). The SEG application is specifically created to enhance students' engagement in English language learning, with a particular focus on improving their reading and writing skills. Based on the results of the media testing, the researchers concluded that the utilization of Senior English Game (SEG) media is deemed appropriate for English language acquisition.

Another study conducted by Adnyani et al. (2020) also explored similar research topics using the design and development research method. The objective of this study is to create digital instructional materials utilizing PowToon, with the intention of enhancing the integration of information and communication technology (ICT) in educational settings for young students. The present study employed the ADDIE phase to develop digital teaching media. The development process relies on the utilization of questionnaires, interviews, and syllabus levels. Within each class, a range of four to six topics are meticulously crafted using the multimedia presentation software, Powtoon. The focus of this study is the utilization of Pawtoon-based video media as an instructional tool within elementary school classrooms.

Moreover, the presence of innovative and captivating educational games serves to enhance students' motivation to engage in English language learning within the classroom setting. In accordance with this perspective, the incorporation of a gamified approach within English language education has the potential to mitigate feelings of tedium and apathy. The observed phenomenon can be attributed to the implementation of gamification in educational settings, which has been found to enhance student motivation and concentration (Azar & Tan, 2020). Furthermore, the utilization of games as educational tools within gamification strategies has been shown to enhance students' academic performance in the classroom (Aljraiwi, 2019). Despite the numerous benefits of using games as learning media in the educational process, a significant number of schools have yet to adopt their implementation. Furthermore, the integration of games as educational tools within the instructional framework is a seldom observed phenomenon in the region of Bali, particularly in the Buleleng Regency. In a study conducted by Mahayanti et al. (2019), it was discovered that a significant proportion of students at a primary school in Buleleng, specifically 90%, possess electronic devices and actively engage in the utilization of these devices for the purpose of playing digital games.

However, similar to the aforementioned studies, a multitude of research endeavors have focused on the creation of educational resources through the utilization of technology. Many scholars engage in the development of game-based learning media that cater to students of different levels and cover a wide range of subjects in their academic pursuits. This study introduces various innovative aspects in comparison to past research endeavors. Specifically, the primary objective of this study is to create an internet game that serves as an educational tool. The website game has been specifically developed for pupils in the 2nd semester of 4th grade at the elementary school level. The game design has undergone modifications in accordance with the teaching module inside the Independent Curriculum. Similar to a prior investigation, the utilization of website games as educational tools for teaching English to 4th-grade students during the second semester at the elementary level was hardly observed. Hence, the primary objective of this project is to create a web-based educational game that serves as a learning tool for fourth-grade students throughout the second semester.

This phenomenon was also observed in an elementary school located in Buleleng Regency. Based on the findings of an initial interview, it was observed that the utilization of games as a medium for learning is not yet widely practised. In the interim, the educational institution provided its students with an ample supply of Chromebooks, which served as a valuable tool for their academic pursuits. In accordance with this, according to the findings of an initial observation conducted at one primary school in Bali, it was revealed that there is a deficiency in the utilization of technology as a learning medium. The teacher primarily relies on textbooks as the main instructional tool during English lessons.

Consequently, the researcher undertook a study involving design and development research, focusing on the aforementioned phenomenon. The objective of this design and development research is to create website games that can be utilised as educational tools. This

educational resource is suitable for utilisation by elementary school students, with a particular focus on fourth-grade students during the second semester. The development of games as a learning medium for 4th-grade students in the second semester, specifically tailored to the topic covered in the independent curriculum learning module, has not yet been achieved.

METHOD

Research Design

The study employed the Design and Development Method (D&D) to create website games as educational tools, utilising the ADDIE models (see Figure 1). Richey and Klein (2007) posit that Design and Development (D&D) is a methodological approach employed to systematically generate a product by means of design, development, and evaluation analysis.

Setting and Subject of the Research

The research participants consisted of five fourth-grade elementary students and an English teacher from a primary school in Bali. The object of investigation pertains to a website-based educational game that has been developed as a learning medium. This game has been designed in accordance with a teaching module utilised by an English teacher at one primary school in Bali. The student can access the product, which serves as the subject of investigation, via a hyperlink embedded in a website. This access can be achieved through various devices such as smartphones, Chromebooks, laptops, computers, tablets, or other similar electronic media.

Data Collection Method and Analysis

The data collection process employed by the researcher encompassed four distinct methodologies, namely interviews, observations, document analysis, and questionnaires. The data in this study was analysed using a combination of qualitative and quantitative methods by the researcher. The employed methodology involved the utilisation of this particular approach for the data analysis during the process of conducting interviews and observations. In accordance with this, the researcher also employed this methodology to comprehensively elucidate the processes involved in game development, encompassing the creation of a web-based game. This undertaking commenced with an analysis phase, followed by design, development, implementation, and evaluation stages. The researcher employed a quantitative methodology to analyse the data collected from questionnaires administered during the product validity tests. This data was derived from both the experts' judgement sheet during the development phase and the user questionnaire sheet during the implementation phase. The impact was analysed using Arifin's formula (2009) by the researcher in Formula 1 with P mean percentage, total maximal score = the number of questions x the highest score, with 1 being the lowest score and 5 being the highest score. In addition, Table 1 shows the validity level of the product, and Table 2 shows the quality level of the product.

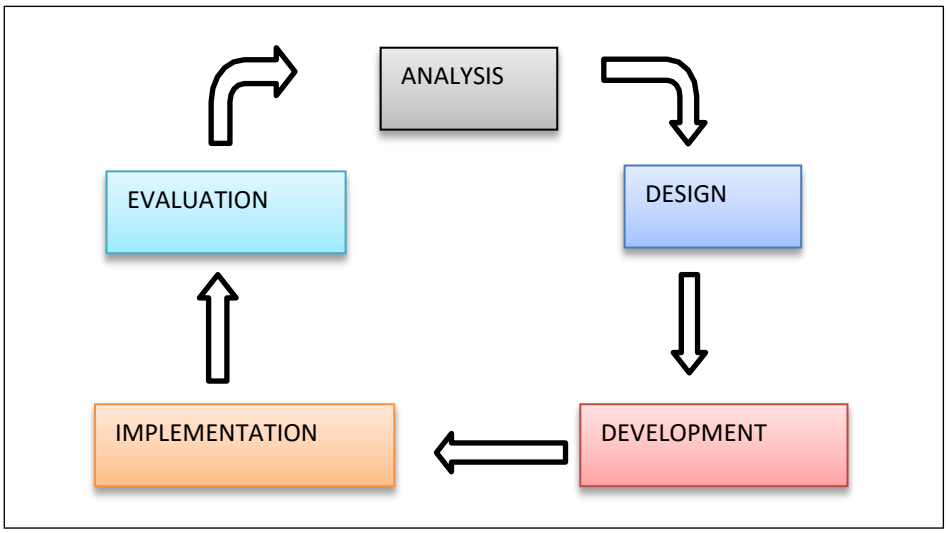

Figure 1. ADDIE Models

$$P = \frac{Total\ Score}{Total\ Maximum\ Score} x\ 100\% \quad (1)$$

Table 1. Validity level of the product

Percentage	Qualification
84 % - 100%	Very Valid
68% - 83%	Valid
52% - 67%	Sufficient
36% - 51%	Invalid
0% - 35%	Very invalid

Table 2. Quality level of the product

Percentage	Qualification
84 % - 100%	Excellent media
68% - 83%	Good media
52% - 67%	Average media
36% - 51%	Below average media
0% - 35%	Poor media

RESULT

The researcher presented a comprehensive overview of the data gathered throughout the various stages of analysis, design, development, implementation, and evaluation in this research study. The study utilises the design and development methodology (D&D) proposed by Richey and Klein (2007) and the ADDIE model introduced by Lee and Owens (2004) as the chosen research methods and procedures. The data collection instruments were implemented by the researcher to gather all the necessary data.

Analysis Stage

The researcher performed a series of preliminary activities, including conducting interviews, making observations, and analyzing documents, during the analysis phase prior to the development of the website game as an educational medium. At this stage, the researcher employed interview guidelines and observation sheets as tools for data collection. During the process of the interview, it was determined that the individual encountered certain obstacles while learning the English language. First, the use of technology remains infrequently applied solely to specific materials or subjects. In addition, the educational institution has already provided technological resources, including Chromebooks, laptops, and projectors. Second, the proficiency of students in English remains limited due to the prevailing perception among many students that English is a challenging and uninteresting discipline. Also, based on the observation, the instructor had not yet implemented instructional strategies aligned with 21st-century learning principles. The teacher exclusively relied on books as the primary source of information and educational materials. The document analysis phase also showed that the occurrence of learning loss persists due to the infrequent integration of technology-based methods by the teacher during the learning process.

Design Stage

During the Design Stage, the researcher formulated the blueprint and storyboard as a preliminary representation of the website game, which would subsequently be implemented by the programmer. The researcher developed a blueprint and storyboard by utilizing data obtained through observation, interviews, and analysis of teaching modules. Furthermore, the researcher decided to develop online gaming platforms. The learning media utilized in this study were derived from the findings of observations and interviews. The reason for this is that the teacher explained the potential benefits of equipping students with Chromebooks at the school. Consequently, the researcher developed web-based games compatible with various devices such as Chromebooks, laptops, smartphones, and other similar tools. In addition, the researcher utilized the teaching module provided by the teacher as outlined in the designated blueprint. The instructor incorporated the five topics outlined in the teaching module for the second semester into the designated blueprint. In addition, the researcher combined theories proposed

by experts in the field of website game development for educational purposes. One of the theories proposed in the field is the VISUALS principles framework by Nurseto (2011).

The researcher incorporated the principles of VISUALS in the design of the website game. Firstly, they adjusted to enhance the visibility of the game's visuals. This was achieved by utilizing a diverse range of pictures and employing vibrant colors. The intention behind these modifications was to facilitate players' comprehension of the game's visuals, thereby enabling them to effectively engage with it as a medium for learning. Additionally, the researcher modified the principle of Interest by incorporating multiple game elements. This study incorporates theoretical frameworks proposed by Hunicke et al. (2004) and Firmansyah (2020) to analyze various components of the game. Furthermore, the researcher made a modification to a fundamental principle, namely the utilization of a game as an educational tool with a simplified design concept. The game was developed by the researcher, incorporating basic concepts such as materials and straightforward quizzes, in order to facilitate players' comprehension of the gameplay. In addition, the researcher modified a valuable principle by developing educational games as instructional tools that incorporate relevant content derived from the topics covered in the teaching module. In addition, the researcher implemented a precise methodology, incorporating relevant concepts from the teaching module, to develop educational materials and quizzes for instructional purposes.

In addition, the researcher modified a valid principle by developing educational games that possess a well-defined basis or framework, while also ensuring originality and avoiding plagiarism. Finally, the researcher made modifications to the structured principle to enhance the effectiveness of designing games as a medium for learning. The game was meticulously designed by the researcher to possess a well-structured framework, incorporating various menus such as the guidance menu, material menu, quiz menu, developer menu, and quit menu. Once the researcher completed the design of the storyboard and blueprint, the final versions of the storyboard and blueprint for the website game intended for 4th-grade students were prepared for development by the programmer. The ultimate storyboard comprised various visual elements derived from menus, including the introduction, main menu, guide, material, quiz, complete quiz views, grade quiz views, developer profile, and the game exit menu. In the final blueprint, there are five distinct topics, each of which is further divided into two levels.

Development Stage

The game's development into web-based learning media was continued by the researcher, with assistance from the programmer. The development of the website game commenced subsequent to the completion of the final storyboard and blueprint design. During this phase, the researcher has engaged in a series of revision processes with their supervisors to refine the development of learning media, resulting in a prototype that is now prepared for implementation. The final Blueprint was utilized by the researcher as a point of reference during the game development process. The ultimate design plan was employed to create the educational website game intended for fourth-grade students in primary schools, with a particular focus on its implementation during the latter half of the academic year. This website game can be accessed by a range of devices, including Chromebooks, smartphones, laptops, and other media devices. In addition, researchers received support from a programmer in the process of creating a website game. During the developmental procedure, the programmer's sole focus lay in the conversion of the researcher's design into functional prototype websites that are suitably equipped for utilization as educational tools. The game design was developed by the programmer through the utilization of the Articulate Storyline 3 Application. The inclusion of visual imagery serves as a valuable resource in the creation of educational content and interactive assessments within the context of this web-based gaming platform. The researcher employed the Freepik application to gather all the requisite images for this game (see Figure 2).

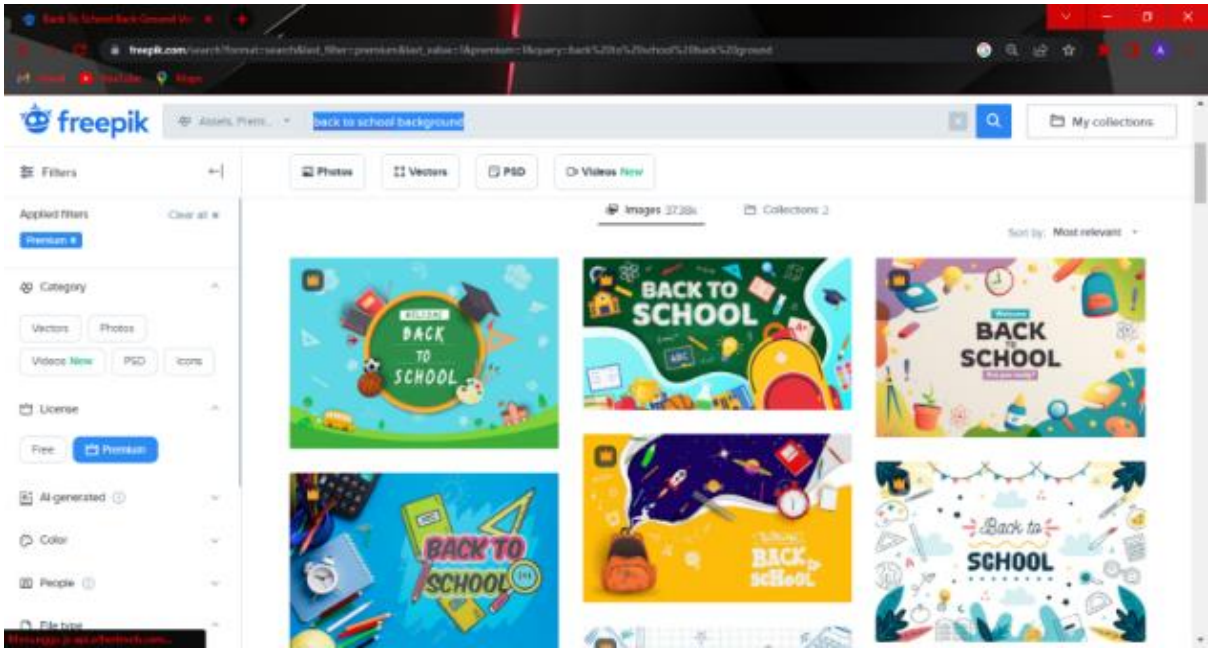

Figure 2. Searching specific pictures in Freepik with the keyword

The researcher employs the use of PowerPoint to visually present the concept of material and game aesthetics in a manner that facilitates comprehension for the programmer (see Figure 3). The researcher creates five distinct PowerPoint presentations that encompass various materials tailored to specific learning topics. In addition to employing visual elements such as pictures for the background and animations, researchers also incorporate auditory components in the development of this website game (see Figure 4). Sound is a crucial element that contributes to enhancing the user's engagement during gameplay. The researcher employs auditory stimuli as a background accompaniment for instructional materials and assessments. Furthermore, the researcher incorporates auditory stimuli in the form of sound effects that are triggered upon players' failure or successful completion of quiz questions.

Upon locating the relevant images, including the background and animation, and creating a PowerPoint presentation, the researcher proceeds to identify an appropriate audio component. Subsequently, the researcher delegates the task of transforming these assets into a website game to a programmer. The revision process encompasses various modifications, such as enhancing grammar, incorporating animation and background elements, introducing additional instructions, altering the game model, and ensuring consistency in fonts and colors.

Figure 3. Powerpoint for material

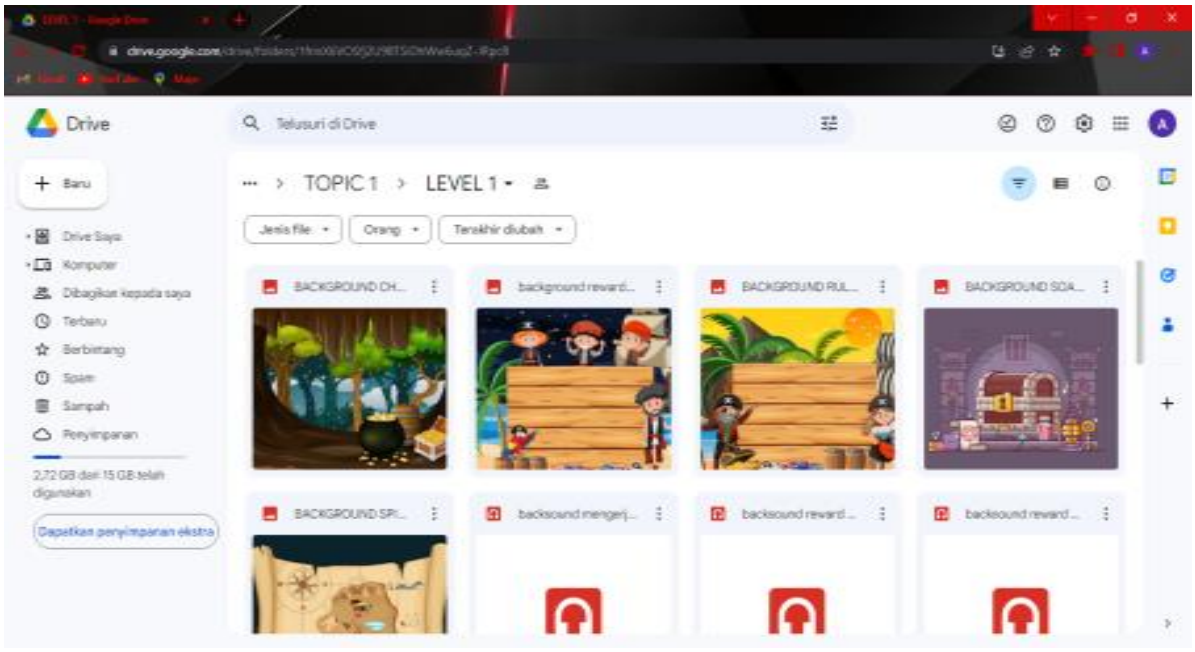

Figure 4. Picture, PowerPoint, and sound for the programmer

For the expert judgement, the validity level of the website game was assessed by the researcher following revisions made in response to suggestions and feedback provided by the supervisor. The validity testing process was conducted by experts using an instrument. This instrument comprises two indicators, namely the media design and content aspects. The entire instrument contains a total of 28 statements, which are divided into 19 statements pertaining to media design aspects and nine statements about content aspects. These statements were assessed using the five Likert Scale and assigned using a rubric score for expert Judgment (Arifin, 2009), as can be seen in Table 3. The assessment process was conducted offline. The researcher scheduled a meeting with an expert to assess the credibility of the website game as shown in Table 4. Upon acquiring the cumulative data score and the cumulative high score from all experts, the researcher proceeded to assess the validity of the game website utilizing the formula proposed by Arifin (2009). This procedure was conducted to ascertain the percentage and level of validity of the website game (see Table 5).

Table 3. Rubric Score for Expert Judgment by Arifin (2009)

SCORE				
5	**4**	**3**	**2**	**1**
Very valid	Valid	Sufficient	Invalid	Very invalid

Table 4. Expert judgment validation result

Expert	Total score	Total highestscore
Expert 1	(5 x 13) + (4 x15) = 125	(5 x 28) = 140
Expert 2	(5 x 14) + (4 x 14) = 126	(5 x 28) = 140
Expert 3	(5 x 15) + (4 x 13) = 127	(5 x 28) = 140

Table 5. The result of percentage and qualification of validity level from all experts.

Expert	Percentage	Qualification of validity level
Expert 1	125× 100% = 89.28% 140	Very Valid
Expert 2	127× 100% = 90.00% 140	Very Valid
Expert 3	128× 100% = = 90,71% 140	Very Valid

Based on the data presented in Table 5, the initial expert's assessment yielded a percentage result of 89.28%. This indicates a high level of validity for utilizing website games as a medium for learning. Consistent with this viewpoint, the second expert's assessment reached a percentage of 90%, indicating a high level of validity for website games as a medium for learning. The final percentage provided by the third expert was 90.71%, indicating a high level of validity for website games as a medium for learning. Hence, drawing upon the collective expertise of all scholars, it can be inferred that website games possess a high level of validity as learning media. Here is the link to the media: https://gamificationbykristinkarina.on.drv.tw/GAME%20KRISTIN%20KARINA/Gamification%20For%204th-Grade%20Students%20In%20The%20Second%20Semester/story.html (online website) and https://drive.google.com/drive/folders/1cbG1Lyg6ZWkmTBMMiSzTLWcxdJrzbsEH?usp=drive_link (offline website, RAR file and need to be extracted first).

Implementation Stage

The implementation process was conducted directly at one primary school in Bali for several hours. The implementation was undertaken subsequent to the completion of the game development process and was deemed valid by experts. The validation process relies on the outcomes of the expert judgment sheet conducted during the preceding procedure. The researcher's primary focus was on a sample of five fourth-grade elementary students who were using the website Game. The English teacher at the elementary school employed a random selection process to choose these students. The researcher facilitated the provision of website links, which were subsequently accessed by students who engaged in interactive activities. The game was performed by students individually using a laptop or Chromebook, with direct supervision from the researcher. Furthermore, apart from a number of students, a solitary English instructor also executed this experimental procedure.

The researcher transmitted RAR files to facilitate the teacher's access to additional information pertaining to the game website in question. In this experimental procedure, educators employed portable computing devices known as laptops. The objective of the implementation phase, specifically the trial, was to assess the efficacy of the game website developed by the researcher through the participation of a group of students and a single teacher. The researcher distributed questionnaires to students and teachers who have participated in game trials as users. The present questionnaire comprises an assessment of the game website's efficacy as an educational tool, which has been previously employed. Upon the completion of the questionnaire, the researcher proceeded to retrieve the questionnaire and delivered the relevant documentation about the implementation process of the game to both the students and the teacher.

Evaluation Stage

The evaluation process represents the final stage in this study. A formative evaluation was employed by the researcher to ascertain the outcomes of the questionnaire during the implementation phase. The objective of this evaluation is to obtain precise and reliable data about the quality of the product that has been developed by the researcher. Hence, the evaluation of the efficacy of utilizing website games as an educational tool for teaching English can be assessed by analyzing the data obtained from the user questionnaire. The instructor received a questionnaire sheet from the users, which comprised a total of nineteen statements. All of the aforementioned statements pertain to the media component of the website game. The assessment process was conducted in an offline manner. The researcher scheduled a meeting with the teacher to assess the efficacy of the website game at one primary school in Bali. The result can be seen in Table 6.

Table 6. Teacher evaluation result

User	Total score	Total highest score	Percentage
English teacher	(5 x 12) + (4 x 7) = 88	5 x 19 = 95	88× 100% = 92, 63% 95

Table 7. Students' evaluation result

User	Totalscore	Total highest Score	Percentage
Student 1	(5 x 11) + (4x 6) + (3 x 2) = 85	5 x 19 = 95	85× 100% = 89, 47% 95
Student 2	(5 x 8) + (4 x8) + (3 x 3) = 81	5 x 19 = 95	81× 100% = 85, 26% 95
Student 3	(5 x 10) + (4 x 9) = 86	5 x 19 = 95	86× 100% = 90, 52% 95
Student 4	(5 x 9) + (4 x8) + (3 x 2) = 83	5 x 19 = 95	83× 100% = 87, 36% 95
Student 5	(5 x 12) + (4x 6) + (3 x 1) = 87	5 x 19 = 95	87 × 100% = 91, 57% 95

According to Arifin's formula (2009), the percentage outcome can be categorized as excellent media, as it falls within the range of 84% to 100%, with a specific value of 92.63%. Hence, drawing from the aforementioned data, one can infer that the quality of the product was exceptionally high. For the students' questionnaire result, the selection of students who transitioned into users was conducted through a random process facilitated by the teacher. The instructor distributed a user questionnaire consisting of nineteen statements to the students. All of the aforementioned statements pertain to the media component of the website game. The experiment was carried out in an offline setting at a primary school in Bali. The test was conducted by the researcher subsequent to the completion of the user questionnaire by the teacher. Based on the findings of the user's questionnaire as shown in Table 7, it can be inferred that the quality of the product can be categorized as exceptional.

DISCUSSION

In accordance with the findings of the observation conducted at a primary school in Bali, similar issues were identified as those previously discussed. These include: 1) The utilisation of textbooks as the primary source of information and instructional materials by the teachers, employing a conventional teaching approach; and 2) The infrequent incorporation of technology to enhance the learning process, which is essential in the context of the 21st-century education system. The students' level of enthusiasm, interest, and participation during the learning process remained insufficient, thereby impacting their comprehension. However, the findings from the interview with the English teacher revealed a significant challenge encountered during the process of learning English, namely the limited integration of technology, which was only observed in specific materials or topics. The instructor exclusively utilised technological tools such as a speaker, projector, or laptop, as well as occasional online quizzes and exercises, which remain infrequently employed. In the interim, the educational institution has already provided technological resources, such as Chromebooks. The proficiency of students in English remains limited as a significant number perceive English to be a challenging and uninteresting academic discipline. In addition, the researcher performed a thorough examination of the curriculum employed for fourth-grade students in elementary education.

The study revealed that students in the fourth grade at one primary school in Bali had successfully implemented an Independent Curriculum. The instructor has ceased utilising syllabi and lesson plans as benchmarks or instructional aids, as they have instead adopted a teaching module and ATP (learning objective flow) as the new standards or guiding principles for learning. According to the instructional module, the educator delivered instruction on five subject areas to fourth-grade students during the latter half of the academic year at one primary school in Bali. Consequently, employing a combination of observational techniques, interviews, and document analysis, the researcher devised educational online games as a means of instruction for fourth-grade students in elementary school. Games have emerged as a viable alternative to traditional forms of media-supported learning in the 21st century due to their capacity to serve as technology-based educational tools. Aljraiwi (2019) posits that the

utilisation of games as educational tools within gamification approaches has the potential to enhance students' academic performance.

According to Azar and Tan (2020) and Nehring et al. (2018), the implementation of gamification in educational settings has been found to elicit increased motivation and concentration among students, resulting in improved academic performance and heightened levels of enjoyment. According to Zayyinah et al. (2022), it is imperative for learning to adopt a student-centred approach. This is due to the fact that the competencies required by students in the 21st century extend beyond mere memorization, encompassing the capacity to effectively address diverse real-world challenges. In addition, the researcher generated a storyboard and blueprint subsequent to engaging in observation, conducting interviews, and analysing relevant documents during the design phase. Before instructing English to young learners, it is imperative to consider the principle of incorporating games into language acquisition (Ratminingsih et al., 2020; Scott & Yterbreg, 2000). This implies that children possess an inherent inclination towards engaging in recreational activities. Consequently, the incorporation of gamification into the educational process can enhance the young learner's comprehension of the subject matter.

Furthermore, according to Jafarian and Shoari (2017), students experience a sense of happiness and freedom from concerns and stress while engaging in digital games. This phenomenon can be attributed to the student's exclusive concentration on gameplay, with the sole objective of achieving the target or completing the game. Students often encounter difficulties when engaging in game activities. The researcher incorporated the VISUALS (Visible, Interesting, Simple, Useful, Accurate, Legitimate, and Structured) principles proposed by Nurseto (2011) when developing a website game. In accordance with this, the researcher made modifications to the game elements utilising the theoretical frameworks proposed by Firmansyah (2020 and Hunicke et al. (2004). The researcher incorporated various elements such as points, levels, challenges, badges, gifts, rewards, competition, and goals into the game design. In addition, the researcher proceeded to formulate the ultimate blueprint and storyboard with the aim of transforming it into a prototype for a website-based game.

Before implementing this digital educational game in a classroom environment, careful consideration of several elements is important to ensure its optimal functionality (Dewi & Agung, 2021; Mulyati & Evendi, 2020). The incorporation of media in the educational context necessitates the consideration of various factors, including the establishment of clear learning objectives, the assessment of student characteristics, and the evaluation of the specific conditions and learning environment. The utilization of educational games facilitates comprehension of the instructional content and cultivates students' enthusiasm for the learning process (Perdana et al., 2020). Educational games have the capacity to facilitate students' comprehension of learning concepts, enhance their motivation, foster curiosity, and establish a conducive learning environment. The utilization of game-based learning has been found to enhance student engagement and promote academic achievement. By including games in the learning process, students are provided with an opportunity to acquire valuable learning experiences that enable them to overcome hurdles and strive for success (Rahayu & Fujiati, 2018; Vinika et al., 2019). According to Perdana et al. (2020), the utilization of game-based learning enhances the appeal of educational material or technology by promoting active engagement among users. This approach therefore leads to heightened levels of audience participation, motivation, and academic accomplishment. Furthermore, the utilization of game-based learning offers a more comprehensive platform for the creation of process knowledge. It fosters the development of an understanding and recognition of other viewpoints, incorporates practical and contextually relevant learning, and stimulates self-awareness regarding the process of knowledge construction (Perdana et al., 2020).

The development process encompasses multiple sequential stages, including the identification of suitable visual content, the creation of a PowerPoint presentation, the acquisition of appropriate audio elements, the transformation of the website game into a prototype, the iterative refinement of the game prototype, and the evaluation of the website game's validity through expert judgement. The researcher employed the Freepik application to

gather all the requisite images for this game. In accordance with this, the researcher employs the use of PowerPoint as a means to visually present the concept of material and game aesthetics, thereby facilitating comprehension for the programmer. Furthermore, the researchers employed the Mixit Application to retrieve background sound and sound effects for the purpose of enhancing the materials and quizzes. The teacher collaborated with a programmer to transform a design website game into a functional prototype suitable for educational purposes. The programmer is committed to transforming the researcher's design into functional prototype websites. The game design is developed by the programmer through the utilisation of The Articulate Storyline 3 Application.

However, subsequent to the completion of the game's development by the programmer, multiple revisions were undertaken with the aim of enhancing the overall quality of the product. The researcher was guided by the supervisor in the course of this process. In addition to this, the researcher employed expert judgement as a means of assessing the validity of the website game. This process was conducted by three experts in the field of education. The expert assessment determined the validity of utilising the website game as a medium for learning. Additionally, following the classification of the website game as a legitimate product, the researcher proceeded to carry out an implementation process in order to assess the product's quality. The participants in this study consisted of an English teacher and five fourth-grade students from one primary school in Bali. The trial was conducted by the teacher and the students at one primary school in Bali using a laptop. Upon completion of the trial, participants were provided with a user questionnaire sheet that pertained to the design aspect of the website game. In accordance with this, the educator implemented an assessment procedure to categorise the quality of the product. Formative evaluation was employed by the researcher in order to ascertain the outcomes of the questionnaire. The results of the user questionnaire indicated that the media received high ratings from all participants. Hence, it can be inferred that the website game exhibited effectiveness and possessed commendable quality as an educational medium. The utilisation of website media can be employed by educators to facilitate the instruction of English language skills to elementary students in the fourth grade.

Consequently, employing a combination of observational techniques, interviews, and document analysis, the researcher devised website games as an educational tool for fourth-grade elementary students. Games have emerged as a viable alternative for facilitating learning in the 21st century due to their capacity to serve as technology-based educational tools. Aljraiwi (2019) posits that the utilization of games as educational tools within gamification approaches has the potential to enhance students' academic performance in the classroom. The implementation of gamification in educational settings has been found to elicit increased motivation and concentration among students, resulting in improved academic performance and heightened enjoyment (Azar & Tan, 2020; Nehring et al., 2018). Furthermore, with regards to attitudes and academic performance in the classroom, it was observed that the class in which gamification strategies were employed exhibited a significantly higher level of engagement and participation. Throughout the duration of the activities, there was a lack of discernible disparity between students who excelled in English and those who struggled in the subject. The participants in the study actively participated in the designated activities, and there was a lack of apprehension among the students regarding their involvement in the classroom setting (Alfulaih, 2018; Mufidah, 2019; Tan et al., 2018). The frequency of English usage increased significantly subsequent to the implementation of gamification (Flores et al., 2015; Mufidah, 2019).

The findings of this study align with prior research, which has demonstrated that the utilization of educational games can effectively engage students in learning by incorporating captivating audio and visual elements (Pardede, 2020; Rahayu & Fujiati, 2018). According to Dewi & Listiowarni (2019), previous research findings indicate that educational games have the potential to engage students and enhance their proficiency in many language skills, including listening, speaking, reading, and writing, particularly in the context of language lessons such as English. Subsequent investigations have demonstrated that the utilization of this educational game has the potential to enhance student motivation in developing technological proficiency

and utilizing the internet for constructive purposes, thereby fostering students' familiarity with technology in the context of learning to the findings of several studies, educational games have been shown to have a beneficial impact on student learning outcomes and enthusiasm (Abidin et al., 2021; Vinika et al., 2019). Therefore, it can be concluded that these games are viable for long-term utilization.

CONCLUSION

This study endeavors to create a website game as an educational tool for 4th-grade students during the second semester, in response to the numerous challenges encountered in the learning process. This website game is accessible to elementary students across all grade levels. The student has various means of accessing the website, including but not limited to devices such as computers, laptops, smartphones, and other media platforms. The game was created by the researcher, utilizing the teaching module and objective learning flow (ATP) within an autonomous curriculum. Based on the aforementioned information, the researcher devised a game comprising five distinct subjects, each encompassing two tiers. The efficacy of website games as educational tools is widely acknowledged, thus making them suitable for integration into instructional practices by educators. The website game exhibits a high level of quality, making it a viable option for implementation as an instructional tool for teaching English to fourth-grade students during the second semester. Primarily, errors or bugs may be encountered while using this platform. However, it is worth noting that efforts are being made to rectify these weaknesses in future iterations. Additionally, it is worth mentioning that the implementation and evaluation process of this website game has been conducted with a limited number of users. Consequently, it is recommended that future implementations and evaluations involve a larger population in order to obtain more comprehensive and valuable data pertaining to the efficacy of website games as educational tools.

Author contributions

The authors made significant contributions to the study's conception and design. The authors was in charge of data analysis, interpretation, and discussion of results. The final manuscript was read and approved by the authors.

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Conflict of interest

The authors declare that there is no potential conflict of interest.

Data availability statement

All data are available from the authors.

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