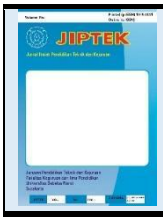

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Analysis of Game-Based Learning Models in the Motor Development Students 12th Grade Vocational High School in Surakarta

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ABSTRACT

This research is undermined by the need to understand the impact of Game-Based Learning (GBL) models on the motor development of 12th grade RPL Vocational High School in Surakarta. There is an analysis of the gaps associated with the application of GBL in the context of vocational education. The problem formula of this study covers the extent to which the game-based learning model contributes positively to the motor development of 12th grade students. The research method applied is qualitative, with qualitatively descriptive techniques involving the investigation of the motor development of the learners in the application of Game-Based Learning. Data collection on this research uses observation and interview. The participants in this study were 12th grade RPL A pupils and one of RPL Vocational High School teacher in Surakarta. There are four games that are followed by the pupils: Crossword, Matching Pictures, Guess Letters, and Snake Stairs, which discuss Mobile Device Web Programming subjects related to Android Studio and Flutter materials. Research findings suggest that applying the GBL model to the motor development of 12th grade pupils can improve typing skills, training rigor, agility, and caution. The application of this model is very good because it invites students to learn while playing, which makes them feel happy because so much knowledge is acquired. In addition, the majority of Vocational High School students orientation after graduation is working, so they are more likely to do practice than theory. It can be concluded that the GBL model contributes positively to the motor development of 12th grade RPL Vocational High School students in Surakarta.

Keywords: *Game-Based Learning, learn while playing, motor development, Vocational High School.*

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INTRODUCTION

Education plays a key role in the progress of a nation because a high level of education in that country can shape a better future. Education plays a crucial role in supplementing human resources to meet the challenges and complexities of the 21st century. One needs to master a variety of abilities and skills to compete against the challenges of a dynamic age (Ramadhanti et al., 2022). Vocational High School (SMK) is a formal education institution that is considered to be one of the determinants in preparing and providing candidates who are ready to work in the world of industry.

Vocational High School graduates are expected to have knowledge, skills, and character that correspond to the desires of the industry (Soleh et al., 2023).

The quick advancement of communication and information technology has transformed people's lifestyles and made them crucial markers of a nation's advancement and degree of development. The education sector was impacted by the significant advancements in information and technology much like any other (Utami et al., 2022). Learning media has developed significantly at the same time that knowledge and technology have advanced so quickly. This is seen in the growing array of approaches and learning resources that make use of Internet-enabled devices (Nurdin et al., 2021). Gamification is one of the teaching strategy that encourages pupils to play as they study by incorporating game features that learning for pupils will be enjoyable and interesting (Hidayat et al., 2023).

The use of games in the learning process by teachers can be an effective way to make learning more entertaining for students. By integrating games into learning, students are expected to be more interested in learning (Ulya, 2017). One of the innovations in learning that is increasingly gaining attention is the use of Game-Based Learning (GBL). Game-Based Learning (GBL) is a combination of educational learning theory, curriculum, and digital gameplay with the aim of improving the learning experience. GBL concept is fun learning through play and specially designed, structured game learning material that can stimulate the development of thinking and self-learning skills in Vocational High School students (Dahalan et al., 2022). In this context, the study focuses on Game-Based Learning analysis of the motor development of 12th grade Vocational High School students in Surakarta.

Motor development in children has significant relevance to their physical abilities and health, and with the increasing development of technology, the use of GBL is expected to make a positive contribution to those aspects. Handayani (2020) reveals that Development of a Game-Based Basic Motoric Skills Learning Model using the “Fun and Game” method was effectively implemented in Kindergartens to train preschool children Basic Movement Skills. Fitrianto et al. (2023) explains that used the Teaching Games for Understanding (TGfU) approach and found that after a game-based learning procedure, children's gross motor abilities significantly improved. These findings support the idea that play-based learning might support kids gross motor skill development.

The game plays a role in training the child's motor development. As they engage in a game that demands skill, the child's motor system develops along with the necessary movements. In addition, games also contribute to the development of children's nerves by stimulating changes that occur in their brains and nerves through the repetition of play activity. The positive impact of the game can be observed on the type of game associated with puzzles, detectives, or other subjects (Budiansi & Ningsih, 2023).

Game-Based Learning (GBL) and gamification exhibit advantages across various educational contexts and levels, contingent on

the specific setting. The systematic review revealed multiple benefits, such as enhancements in motor control, academic achievement, and overall health (Camacho-Sánchez et al., 2023). GBL environments provide valuable chances for students to engage with curriculum content using various instructional methods. By utilizing predictive student models that incorporate encoded information from these questions, along with observations of student gameplay behaviors, there is an enhancement in the accuracy of predicting students (Emerson et al., 2023).

The research also becomes relevant in filling the knowledge gaps related to the application of GBL in the context of vocational education. Therefore, this research can provide valuable insights in design effective learning strategies in Vocational High School by integrating game elements into the learning process. In order to a comprehensive understanding of research, this research uses a qualitative approach to collecting and analyzing data. This approach is expected to provide a comprehensive picture of the influence of GBL on the motor development of 12th grade Vocational High School students in Surakarta. Thus, the results of this research can make a significant contribution to vocational education literature and practice in Indonesia, as well as offer recommendations that can be widely applied in various educational contexts.

RESEARCH METHOD

Qualitative research method is a method of research based on philosophy, which is used to investigate in experiments where researcher as instruments, data collection and analysis techniques of a qualitative nature are more pressing on meaning (Sugiyono, 2018). This study used a descriptive qualitative analysis research methodology. Abdussamad and Sik (2021) that research techniques known as qualitative research methods produce descriptive data from people written or spoken words or from their observed behavior. Arikunto (2010) reveals in qualitative research, there are various methods of data collection that are commonly used. One of them is an interview, which is a method of collecting data that is done by asking answers directly to the source concerned in order to dig further data.

Purposive sampling is a sample-taking method that is carried out using certain considerations, in which researcher select participants based on certain criteria relevant to the research objectives (Sugiyono, 2019). In this case, the author chose purposive sampling because the teacher who participated had two years of teaching experience in the Mobile Device Web Programming subjects.

A participant is a person who is involved in the day-to-day activities of a person being observed or a source of data used as a research (Sugiyono, 2018). In the context of this research, the participants not only involved students, but also the researcher searched for data from RPL Vocational High School teacher in Surakarta. The research participants were RPL teachers with a female gender who had experience teaching Web Mobile Device Programming subjects in the 12th grade RPL Vocational High School for 2 years. Then, for the students of 12th

grade RPL A who followed the application of this GBL there were 34 students, consisting of 31 male and 3 female. Details of the participant order as shown in Table 1.

Table 1. Detail participants order

Participants	Gender	Total
Students	Male	31
	Female	3
Teacher	Female	1

Data collection on this study uses observation and interview. Details of the data collection are as follows:

2.1.1 Observation

Observation in qualitative research are used to observe and fully understand the research object so that researcher may gather and analyze the necessary data to fully understand the research that is being conducted. Instruments used in observation can be observation guides, tests, questionnaires, image recording and sound recording (Ulfatin, 2014).

In the context of this study, observations were carried out on November 22, 2023 to 12th grade RPL A students at one of the Vocational High School in Surakarta for one meeting, namely, at the 5th Lesson Hour that starts at 10.15 a.m. until the 7th Class Hour is completed at 1.00 pm. Observations were made by observing the behavior of students when following the GBL model which consists of 4 games namely Crossword, Matching Figure, Guess the Letters, and Snack Stairs.

2.1.2 Interview

Interview is a meeting of two people to exchange information through questions and answers so that meaning can be constructed in a particular topic. In this context, structured interviews are used as data collection techniques if researcher have known for certain what information is obtained. In this structured interview, the researcher have prepared an instrument of written questions to which alternative answers have been prepared. (Sugiyono, 2019).

Researcher use in-depth structured interview methods to obtain valid data and information from sources. The interviewer answers questions given by the researchers online through the Google Form by answering questions in a structured manner. The interview included four questions related to the application of the GBL model and its impact on the motor development of the pupils:

1. Application of 4 games on Model GBL in 12th grade Vocational High School students in Surakarta.
2. The uniqueness of the application of GBL to vocational education.
3. The contribution of GBL at Vocational High School level can be significant in motor development according to the needs of industry in Indonesia.
4. The benefits of GBL to the motor development of the pupils in addition to the ability to type in the context of vocational education.

RESULTS OF RESEARCH AND DISCUSSION

In the implementation of the Game-Based Learning model, the focus is on developing

motor skills, especially typing skills in front of a laptop/PC screen. This learning model utilizes 4 games, namely Crossword, Matching Figure, Guess the Letters, and Snake Stairs as a tool to combine learning with the elements of interest. The game is designed in such a way that learners not only get information from a computer screen, but also engage actively in responding to the game by pressing the keyboard buttons. The typing process becomes an important thing in which learners must read the information presented on the screen and respond to it by pushing the keys quickly and accurately.

Through the use of games, learners not only improve eye and hand coordination, but also experience more active and deep learning. This learning model creates an interactive learning experience, in which the motor skills acquired by the students are practiced in a fun and challenging way. Thus, the development of motor skills in the context of Game-Based Learning is not only physical activity, but also an integral part of a thorough and exciting learning process.

Previous research conducted by (Fitriana, 2023), that the Game-Based Learning model through board game activities is effective enough to improve fine motor skills in early childhood education (PAUD). The media also makes it easier for teachers to convey material to children. Game-Based Learning media development gains qualifications from experts. In addition, other research conducted by (Pujayanti et al., 2023), that there is an influence of Game-Based Learning Method on Raspberry Motor Skills, there is a influence on Social Skills of Games Based learning Method, as well as a combined effect of Game-Based Learning method on Rasps Motor Skill and Emotional Social Skill in group B children at Nurul Fatah Banyuwangi school for the full semester of the 2022-2023 academic year. From the two studies, it can be concluded that the application of the Game-Based Learning model has influenced and improved the motor skills of pupils in PAUD and kindergarten.

Application of the Game-Based Learning learning model presents a pleasant learning atmosphere on vocational education. Students of 12th grade Vocational High School in Surakarta presented 4 games including Crossword, Matching Figure, Guess the Letters, and Snack Stairs. The game contains about Mobile Device Web Programming topics on Android Studio and Flutter materials. The pupils were very enthusiastic about following the game during their learning so the application of this model had an impact on the motor skills of the pupils of 12th grade Vocational High School in Surakarta.

Game 1. Crossword

Figure 1. Crossword

The author presents the game Crossword created through wordwall.net. Crossword is made with 10 questions to be answered by the students. Crossword is a kind of cognitive game that blends elements of knowledge and language skills. Students are invited to break the words and fill the empty boxes based on the

instructions given. By introducing elements of the game, such as the learning context of Mobile Web Programming, this game not only tests students' knowledge, but also involves problem solving skills and creativity.

Wordwall.net as a game provider platform allows writers to easily create and present Crossword. The advantage of this platform lies in the availability of a variety of customization options, ranging from the display design to the difficulty level. Thus, the game can be adapted to the learning needs, creating an environment that supports the development of conceptual understanding and mastery of material effectively. Overall, Crossword through wordwall.net is not only a fun evaluation tool.

Game 2. Matching Figure

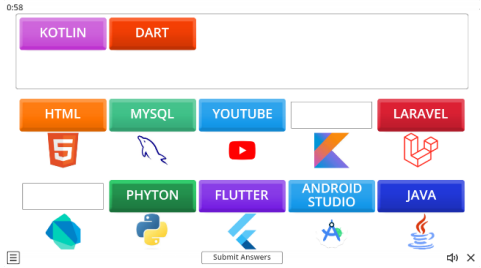

Figure 2. Matching Figure

A drag and drop matching figure game is an innovative approach to learning programming. In this game, students are confronted with a series of images related to the programming material, which must then be paired with the corresponding writing through the drag and drop process. This approach not only requires an understanding of the concept, but also tests the ability the concept in practice.

Through these games, students can sharpen problem-solving skills and identify relationships between images and programming concepts. The use of the drag and drop method strengthens the interactive aspect, making learning more interesting and in-depth. Game matching images with writing not only builds visual memory but also improves comprehension of concepts holistically. With these games, the learning process of programming becomes more enjoyable and interactive, helping students internalize the material in a more effective way.

Game 3. Guess the Letters

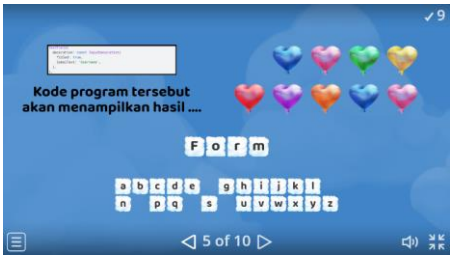

Figure 3. Guess the Letters

In this "Guess the Letters" game, players are faced with the challenge of guessing letters or words related to Flutter's material. Each player is given 10 questions, and for each question, they have an allocation of 10 lives, giving more chances to answer correctly. Once the player selects a letter, the system will verify the answer. If the letter is correct, it will be expressed in the correct position. However, if the answer is wrong, one life will be deducted from the total of 10 lives given for each question. The player's score will be given based on the number of correctly guessed letters.

Game 4. Snack Stairs

Figure 4. Snack Stairs

The Snake Stairs game consists of nine issues related to Android Studio material. Each right answer then the player advances to the next ladder/question, while the wrong answer can result in remaining in the same position until the right answer. This design not only tests the student's understanding but also presents fun learning. The right answer will allow the player to advance to the next ladder or question, while the wrong answer can result in the player staying in the same position until they give the right answer. It creates motivation for players to improve their understanding as the game progresses. These designs can also include additional features such as points, rewards, or interesting graphical visualizations to enhance the level of engagement and motivation of learners. In addition, each issue can be accompanied by a brief explanation or solution to ensure the player understands the concept thoroughly.

Discussion based on an interview with RPL Vocational High School teacher in Surakarta:

1. **Application of 4 games on Model Game-Based Learning (GBL) in 12th grade Vocational High School students in Surakarta**

Application of the four game GBL on 12th grade Vocational High School students in Surakarta is rated very good. In the context of learning Mobile Web Programming, crossword, matching figure, guessing letters, and snack stairs, allow students to learn while playing. When students are invited to play, they'll be happy. If they learn in a pleasant state, then much knowledge will be acquired.

2. **The uniqueness of the application of GBL to vocational education**

Vocational education at Vocational High School has the uniqueness of applying GBL, especially because students tend to be more interested in practical learning relevant to the world of work. By using games as a learning tool, GBL overcomes the gap between learning theory and practice. GBL not only provides knowledge, but also involves students in activities that create a direct connection with the skills required in the industry. It makes learning more contextual and increases the attraction of students to the learning material.

3. **The contribution of GBL at Vocational High School level can be significant in motor development according to the needs of industry in Indonesia**

The GBL model contributes positively to the motor development of students at the Vocational High School level. By presenting the Mobile Device Web Programming material through the

game, students not only learn the concepts of programming, but also engage in tasks that require motor coordination, rigour, and rapid response. This relevance is crucial in vocational education, where practical skills have a high value in the preparation of students to enter the world of work.

4. **The benefits of GBL to the motor development of the pupils in addition to the ability to type in the context of vocational education**

In addition to improving typing skills, the application of GBL provides additional benefits to students. Through Crossword, Matching Figure, Guess Letters, and Scales, students can develop careful skills through problem-solving, improve efficiency through quick response to games, and build awareness through strategic planning in completing tasks. GBL also brings an intrinsic motivation element, making learning more interesting and effective for comprehensive understanding of concepts.

CONCLUSIONS AND SUGGESTIONS

Conclusion

The application of the Game-Based Learning (GBL) learning model presents 4 games: Crossword, Matching Figure, Guess the Letters, and Snack Stairs. The results of the study show that the application of GBL models to the motor development of 12th grade students can improve typing skills, train rigour, agility, and caution. The application of this model is very good because it invites students to learn while playing that makes them feel happy so much knowledge is acquired. In addition, the majority of Vocational High School students orientation after graduation is working so they are more likely to do practice than theory. It can be concluded that the GBL model contributes positively to the motor development of 12th grade RPL Vocational High School students in Surakarta.

Suggestion

Based on the results of the research, the recommendation of this research is that the use of Game-Based Learning is continuously expanded and integrated more widely into vocational education curricula. Teachers are expected to take advantage of the advantages of GBL in increasing the involvement of pupils and strengthening the development of motor skills. In addition, there is a need for training and support for teachers to optimize the application of GBL in the learning process. It can be a strategic step to improve the quality of vocational education by exploiting the positive potential of GBL innovations.

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