International Journal of Business, Law, and Education
E-ISSN : 2747-134X
Publisher: IJBLE Scientific Publications Community Inc.
Volume 5, Number 1, 2024
https://ijble.com/index.php/journal/index

Computers Introduction for Elementary School Students Using Game-Based Learning

Doddy Satrya Perbawa[1*], Paulus Tofan Rapiyanta[2]
[1,2]Universitas Bina Sarana Informatika, Indonesia
e-mail: doddy.dwp@bsi.ac.id[1], paulus.pty@bsi.ac.id[2]

ABSTRACT
Learning media facilitates teacher's role in conveying knowledge to students. One of learning tools that teachers can use in their learning is interactive media. Introduction to computers is important in today's digital era because it can build knowledge and understanding about computers and improve learning skills. This is possible because computer's ability to combine text, sound, color, images, movement, and video and create an interactive process. This research aims to help students in grade 1 or 2 of elementary school to more easily understand and master basic computer use. In this application there are computer learning menu, typing and cursor learning. A computer learning menu consists of definitions, learning videos and quizzes. Learning to type and cursor consists of understanding, practice and mini games. The ADDIE (Analysis, Design, Development, Implementation, Evaluation) model is used in developing system used in this research.

Keywords:
Game-Based Learning, Elementary School, Interactive Learning, Computers Introduction.

INTRODUCTION

Efforts to improve Indonesia's human resources quality through the education sector face many challenges, this includes problems such as unequal distribution of education in Indonesia and school dropout rate which is still relatively high (Maulida, Sukadi, and Rahayu 2022). One of policies government regarding education as outlined in Ministry of Education and Culture strategic plan for 2015-2019 is to improve education quality in Indonesia. Efforts to improve education quality have been made and will continue to be made. These activities include provision of various learning facilities and materials (Sulaiman, Jamaludin, and Derasit 2023). With science and technology development, especially communication and information technology (ICT), existence of educational platforms has become something that cannot be avoided (Nasir et al. 2023). Education world is also influenced and brought about by changes in technological developments. Increasingly advanced advances in information technology currently have a huge impact on education world. Education world is required to adapt current technological developments to improve education quality, especially in using ICT for education world today (Nadeem, Oroszlanyova, and Farag 2023).

In learning process there is interaction that occurs between students and teachers. This is because students and teachers are elements of learning activities. Besides teachers and students, learning aids or teaching materials are also elements of learning (Daniyati et al. 2023). Learning media facilitates the process of transferring knowledge from teachers to students, in learning process there are several important things that teachers must always pay attention to, teachers must not focus on one medium and teachers must develop learning media that make students feel interested and motivated to learn (Kaldarova et al. 2023). One of learning media that can be applied by teachers in learning is interactive media. Interactive learning media is one of learning media which has advantages, including being flexible (you can choose material according to wishes and when it will be

used), being content rich (providing quite a lot of information according to the material presented) and being interactive (two-way communication). direction between media and users) (Nurlatifah, Hodijah, and Nestiadi 2021). By using interactive media, students can learn anywhere and anytime. Using interactive media in learning has experienced a tremendous increase, such as way of use which can involve almost all of students' sense organs, starting from uses images, colors, sounds and simulations in learning (Adipat et al. 2021).

An introduction to Computer Science is very important in digital era, because it can shape knowledge and insight into computer science and improve learning skills. Studies show that children who use computers have better academic performance (Fauzi, Boeriswati, and Khaerudin 2023). Computers have several important roles, for example to help make work easier, see the latest information about life around you of course with an internet connection and can be used for learning both related to computers and other sciences. remembering that information is always needed in education world, work, even in terms of communicating or interacting with other people (Ria and Susilowati 2023). Using computer media, especially in learning, can be used as a means of conveying information or ideas contained in learning to students. Apart from that, computers can also be used as a medium that allows students to learn independently in understanding a concept (Swantika, Harissandi, and Anwar 2023). This is very possible because computers have an ability to combine text, sound, color, images, motion and video, and are able to present interactive processes. Computers that can be used anywhere and at any time can increase students' enthusiasm for learning because they are not bound by time and place (KAVAK 2022).

Referring to this, there is a need for an innovative learning approach that is able to accommodate learning activities to be more enjoyable (Izzuddin, Andri, and Hardiyansyah 2023). Through innovative learning, students can learn computer basics in a fun way and can understand things more quickly. This innovative learning approach is game based learning. game based learning is a system applied in educational process, where users (teachers) can adopt a game to meet their cognitive interest and learning motivation needs (Aini 2021). Game based learning is also a form of learning that is centered on learning using electronic games to achieve learning goals. Game based learning process utilizes a digital game as a medium for delivering learning so that it can increase students' understanding and knowledge, especially in science learning (Pan et al. 2021). This phenomenon is certainly not something new because game-based learning methods are commonly used during the learning process, especially in urban schools. Even though there are rural schools, there are still few who apply the game based learning method (Rahayu et al. 2023). Educational games are very interesting to develop. There are several advantages of educational games compared to conventional educational methods. One of educational games main advantages is the visualization of real problems. Massachusetts Institute of Technology (MIT) has succeeded in proving that games are very useful for improving players' logic and understanding of a problem through a game project called Scratch (Rahmadi and Triawan 2021).

Previous research written by Bayu Saputro developed an introductory computer learning application using Adobe Flash Player. The learning application focuses on subject of introduction to computers in Information and Communication Technology which includes discussion of introduction to computers, hardware,

software, brainware as well as evaluation tests and videos. Two dimensional learning application is designed using waterfall method (Saputro, Prasetyo, and Aflaha 2020). Journal research results by Robby Andry developed an interactive learning application to get to know android based computers using Adobe Flash CS6. Material contained in this application includes: understanding computers, input devices, processes and output and there is a quiz (Andry and Mauliana 2020). Research results that have been published in journal by Hayu Ika Anggraini have produced a digital game application to improve mastery of skills in calculating and reasoning. Research method used is a literature review by reviewing literature from books and articles, then analyzed using descriptive qualitative methods to solve the problem. The application called "Budi's Mathematics Learning Adventure" links students' cognitive skills, that are skills to remember, understand, apply, analyze, evaluate and create (Anggraini, Nurhayati, and Kusumaningrum 2021).

This research aims to help students in grade 1 or 2 of elementary school to more easily understand and master basic computer use so that they can improve their skills and competitiveness in the current digital era. Apart from that, development of game-based basic computer learning media applications can also open up opportunities for similar applications development for other subjects, so that it can help improve education quality in Indonesia. In this application there are a computer learning menu, typing and cursor learning. Computer learning menu consists of definitions, learning videos and quizzes. Learning to type and cursor consists of understanding, practice and mini games.

METHOD

Data collection techniques used include observation, interviews, and literature study. Observation was carried out by observing learning and teaching computer process subjects at SDN 13 Surakarta. From this observation, existing learning process, obstacles faced, and opportunities to increase efficiency in teaching and learning activities can be seen. Interviews were conducted by interviewing 5th grade students and teachers who were responsible for computer learning. From this interview, found out in detail how computer learning process takes place, as well as hopes and needs of the school, especially from teaching staff. Literature study is carried out by looking for references from various literary sources, such as books, research, journal articles and documentation related to learning using the game method. From this literature study, various concepts, methods and technologies related to learning media regarding computer introduction using game-based learning methods can be identified.

System development stages use the ADDIE model (Analysis, Design, Development, Implementation, Evaluation) as a reference step in development process. The ADDIE model is a generic design method and serves as a guideline in building application program tools and infrastructure that are effective, dynamic and support the application's objectives (Rusdi, Sirajuddin, and Alfah 2022). This method is more rational in solving problems compared to other methods because it covers all aspects that need to be researched and developed and has an evaluation stage that provides feedback for research being developed (Barrameda 2024). The ADDIE stages can be seen in Figure 1.

International Journal of Business, Law, and Education
E-ISSN : 2747-134X
Publisher: IJBLE Scientific Publications Community Inc.
Volume 5, Number 1, 2024
https://ijble.com/index.php/journal/index

Figure 1. Development of the ADDIE Model System

The following are the stages of system development using the Game based learning method that can be done:

a. Analysis: defining the material that students will study. The processes carried out include needs analysis and content analysis to determine the learning material and objectives that will be delivered through learning media.
b. Design or create a blueprint for learning media. Game based learning includes content design, visual design and interaction design.
c. Development is the process of realizing a blueprint that has been created into a game-based learning program using game creation software.
d. Implementation is the application of the learning program that has been created. The form of application is by testing students to see the suitability of the learning media and students' responses to the learning media (Chairuddin and Nasrum 2023).
e. Evaluation of learning media using expert assessment questionnaires, student assessment questionnaires, and learning outcomes tests.

RESULTS AND DISCUSSION

a. System Design

At the needs analysis stage the focus will be given to identifying the learning media needs needed. In the development of this learning media there is only one user, namely the user. Functional requirements are a type of requirement that contains what processes will be carried out by the system. This learning media can display a main menu which contains a start or play button to start the learning media and there is an exit button to exit the learning media. User needs include selecting the menu options you want to learn, learning from learning media, playing and completing all available competencies.

International Journal of Business, Law, and Education
E-ISSN : 2747-136X
Publisher: IJBLE Scientific Publications Community Inc.
Volume 5, Number 1, 2024
https://ijble.com/index.php/journal/index

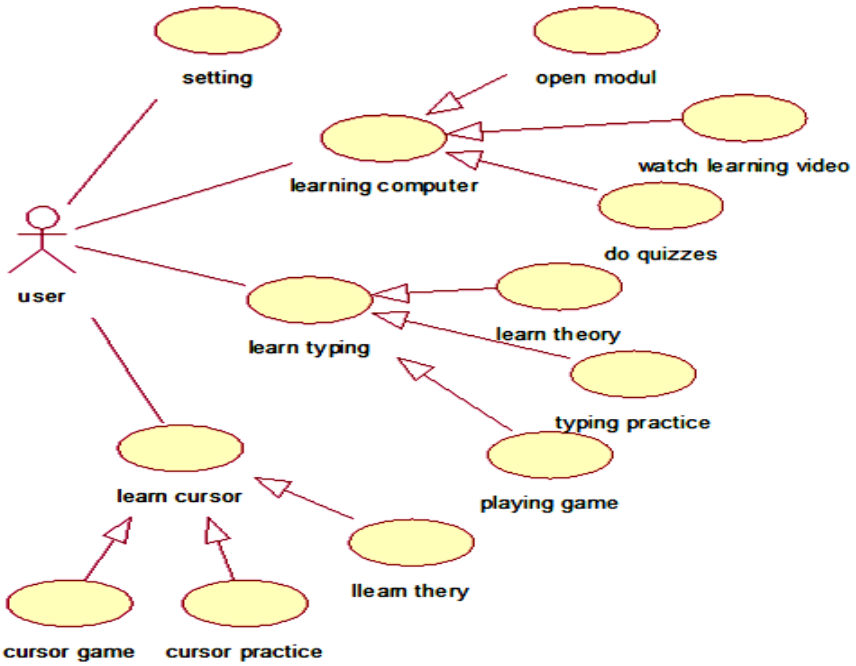

Figure 2. Use Case Diagram

Users can make several configurations in the game, including sound settings, screen settings and player settings. In the main menu there are three options, namely learning computers, learning typing and learning cursors. The computer learning material consists of opening the learning module, watching a learning video introducing computers and taking quizzes. In learning to type there are features to learn theory or introduction to typing, practice typing and play typing games. The material for learning cursors is no different from learning to type, which also includes modules, exercises and quizzes. Here only one activity diagram is presented in the research, namely activities for learning the cursor when choosing a mini game.

b. System Implementation

When a user opens the learning media application "Computopia", they will be greeted with a start page containing the application title and a button to start the application. The main page displayed contains 3 learning theme menus about basic computer learning, such as the computer learning menu which contains basic computer knowledge, the learning typing menu containing material about typing, and also the cursor learning menu containing material about cursors. And there are buttons for settings, returning to the main page, and exiting.

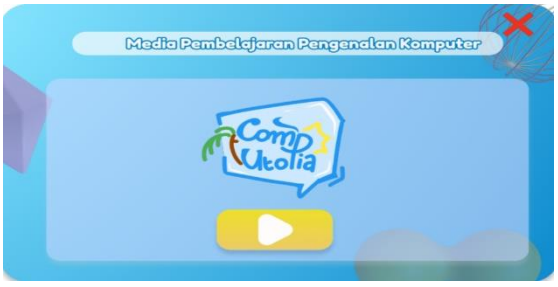

Figure 3. **Initial Display**

Figure 4. Main Menu

International Journal of Business, Law, and Education
E-ISSN : 2747-134X
Publisher: IJBLE Scientific Publications Community Inc.
Volume 5, Number 1, 2024
https://ijble.com/index.php/journal/index

The learning types page contains the types of learning methods that can be used to study learning themes. Each learning theme has a different type of learning that is adapted to the learning theme. Here there is also a home button to return to the home page, a settings button to adjust the display according to the user's wishes, a back button at the bottom of the page to return to the previous menu, a music button to briefly turn the background sound on and off without needing to go to settings, and finally an exit button.

Figure 5. Computer Learning Display

Figure 6. Learning Typing Display

Figure 7 is the display of the settings page when pressing the settings button. These settings are used to customize the application as the user wishes. Figure 8 is the video player display when the user selects the type of learning in the form of a learning video from the computer learning theme. This page contains an animated video that explains basic computer knowledge.

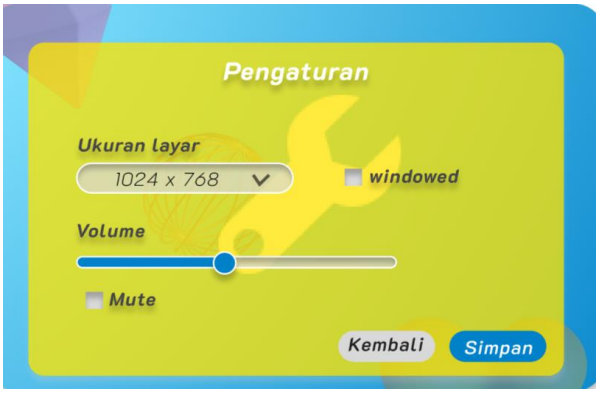

Figure 7. Settings Page Display

Figure 8. Learning Video Display

Figures 9 and 10 are displays of cursor mini games which contain simple games to train the user's ability to use a mouse. Users need to complete the game at each level which has a different level of difficulty at each level. Before starting the game, an instruction page will be displayed first.

International Journal of Business, Law, and Education
E-ISSN : 2747-1384
Publisher: IJBLE Scientific Publications Community Inc.
Volume 5, Number 1, 2024
https://ijble.com/index.php/journal/index

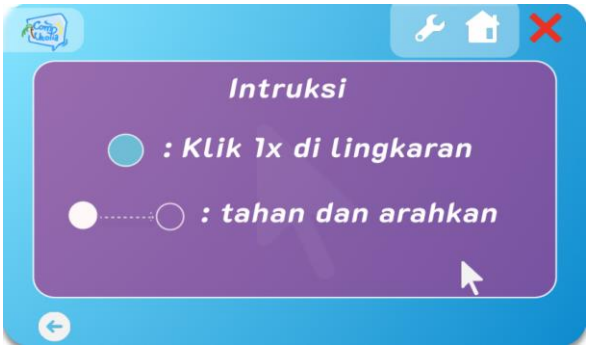

Figure 9. Game Instructions Display

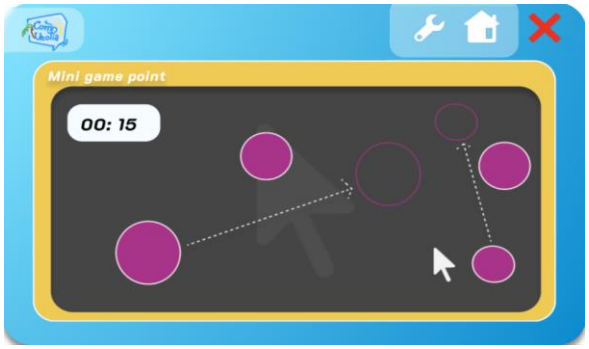

Figure 10. Cursor Game Display

CONCLUSION

Through design process, interesting and interactive learning media has been created using game-based learning methods. This media includes game elements such as challenges, points, difficulty levels, and direct feedback to motivate students to learn basic computer concepts. Apart from that, this media also provides learning material that is clearly structured and can be accessed easily. In this research, an evaluation has been carried out on learning media designed to involve several students. The evaluation results show that the use of game-based learning methods in this learning media is effective in increasing students' interest and understanding of introductory computer material. Students feel more involved and motivated to learn through this media compared to conventional learning methods.

Reference

Adipat, Surattana, Kittisak Laksana, Kanrawee Busayanon, Alongkorn Ausawasowan, and Boonlit Adipat. 2021. “Engaging Students in the Learning Process with Game-Based Learning: The Fundamental Concepts.” *International Journal of Technology in Education* 4(3):542–52. doi: 10.46328/ijte.169.

Aini, Jihan Nawal. 2021. “Virtual Implementation of Mobile-Game Based Learning : Enhancing Students ’ Vocabulary Mastery and Self -Motivation ISSN.” *ELT Worldwide: Journal of English Language Teaching* 8(2):343–51. doi: https://doi.org/10.26858/eltww.v8i2.22631.

Andry, Robby, and Phitsa Mauliana. 2020. “Aplikasi Pembelajaran Interaktif Mengenal Komputer Berbasis Android Studi Pada Sdn 01 Tegalgede.” Pp. 89–98 in *eProsiding Sistem Informasi (POTENSI)*. Vol. 1.

Anggraini, Hayu Ika, Nurhayati Nurhayati, and Shirly Rizki Kusumaningrum. 2021. “Penerapan Media Pembelajaran Game Matematika Berbasis Hots Dengan Metode Digital Game Based Learning (DGBL) Di Sekolah Dasar.” *Jurnal Pendidikan Indonesia* 2(11):1885–96. doi: 10.36418/japendi.v2i11.356.

Barrameda, Margie. 2024. “Computer-Aided Strategic Intervention Material (CA-SIM) in Chemistry 7.” *International Journal of Business, Law and Education (IJBLE)* 5(1):133–47. doi: https://doi.org/10.56442/ijble.v5i1.142.

Chairuddin, Chairuddin, and Akbar Nasrum. 2023. “Combination of Ispring Suite and Chamilo in Creating Online Math Assessments.” *International Journal of Business, Law, and Education* 4(2):738–46. doi: 10.56442/ijble.v4i2.235.

Daniyati, Ani, Bulqis Ismy Saputri, Ricken Wijaya, Siti Aqila Septiyani, and Usep Setiawan. 2023. "Konsep Dasar Media Pembelajaran." *Journal of Student Research (JSR)* 1(1):282–94. doi: https://doi.org/10.55606/jsr.v1i1.993.

Fauzi, Muh, Endry Boeriswati, and Khaerudin Khaerudin. 2023. "Distance Learning Strategy Model Based on Interactive Online Test Game To Improve Student Learning Outcomes." *International Journal of Business, Law, and Education* 4(1):1–14. doi: 10.56442/ijble.v4i1.120.

Izzuddin, Muhammad Azzam, Andri Andri, and Hardiyansyah Hardiyansyah. 2023. "Leveraging Prototype Method for Designing Tajweed Mobile Based Learning." *Journal of Information Systems and Informatics* 5(2):615–29. doi: 10.51519/journalisi.v5i2.488.

Kaldarova, Bolganay, Bakhytzhan Omarov, Lyazzat Zhaidakbayeva, Abay Tursynbayev, Gulbakhram Beissenova, Bolat Kurmanbayev, and Almas Anarbayev. 2023. "Applying Game-Based Learning to a Primary School Class in Computer Science Terminology Learning." *Frontiers in Education* 8(February):1–10. doi: 10.3389/feduc.2023.1100275.

KAVAK, Şule. 2022. "Digital Game-Based Learning Model As an Educational Approach." *Prizren Social Science Journal* 6(2):62–70. doi: 10.32936/pssj.v6i2.311.

Maulida, Nabila Nur, Sukadi Sukadi, and Sri Rahayu. 2022. "Effectiveness of The Implementation Game-Based-Learning in Increasing Student Learning Outcomes." *Jurnal Penelitian Pendidikan* 22(3):252–65. doi: 10.17509/jpp.v22i3.50977.

Nadeem, Muhammad, Melinda Oroszlanyova, and Wael Farag. 2023. "Effect of Digital Game-Based Learning on Student Engagement and Motivation." *Computers* 12(9):1–23. doi: 10.3390/computers12090177.

Nasir, Agus, Akbar Nasrum, Nurul Haeniah, and Nurul Haeniah. 2023. "Utilization of Chamilo LMS in Learning Media Courses as an Effort to Digitalize Education." *International Journal of Business, Law, and Education* 4(2):1394–1407. doi: 10.56442/ijble.v4i2.284.

Nurlatifah, Siti Chusni, Siti Romlah Noer Hodijah, and Adi Nestiadi. 2021. "Pengembangan Modul Berbasis Multimedia Dengan Menggunakan Flip PDF Professional Pada Tema Udara Yang Sehat." *PENDIPA Journal of Science Education* 6(1):226–32. doi: 10.33369/pendipa.6.1.226-232.

Pan, Liuxia, Ahmed Tlili, Jiaping Li, Feng Jiang, Gaojun Shi, Huiju Yu, and Junfeng Yang. 2021. "How to Implement Game-Based Learning in a Smart Classroom? A Model Based on a Systematic Literature Review and Delphi Method." *Frontiers in Psychology* 12(December):1–13. doi: 10.3389/fpsyg.2021.749837.

Rahayu, Isti, Gilang Fakhri Listyawan, Primanita Setyono, and Noor Endah Cahyawati. 2023. "The Influence of Game-Based Learning on Business Literacy." *Journal of Contemporary Accounting* 4(3):159–68. doi: 10.20885/jca.vol4.iss3.art3.

Rahmadi, Lendy, and Medi Triawan. 2021. "The Game 'Quiz Besemah' Sebagai Media Untuk Memperkenalkan Budaya Kota Pagar Alam." *Journal of Information Systems and Informatics* 3(4):673–85. doi: 10.51519/journalisi.v3i4.200.

Ria, Reny Refitaningsih Peby, and Dyah Susilowati. 2023. "LEARNING OUTCOMES

OF A COMPUTER BASED TEST FOR COMPUTATIONAL THINKING BASED ON LOCAL WISDOM." *International Education Trend Issues* 1(2):58–65. doi: https://doi.org/10.56442/ieti.v1i3.303.

Rusdi, Muhammad, Haji Sirajuddin, and Rina Alfah. 2022. "Implementation of the Addie Model (Analysis, Design, Development, Implementation, Evaluation) in Php-Based E-Learning in the Era of Pandemic." *Jurnal Teknologi Informasi Universitas Lambung Mangkurat (JTIULM)* 7(1):49–56. doi: 10.20527/jtiulm.v7i1.74.

Saputro, Bayu, Cahyo Purnomo Prasetyo, and Dwi Sari Ida Aflaha. 2020. "Perancangan Aplikasi Multimedia Pembelajaran Interaktif Pengenalan Komputer Pada Siswa Di SDN Mojoroto 6 Kota Kediri." *Jurnal Technoscienza* 4(2):320–30. doi: 10.30737/technoscienza.v6i2.1411.

Sulaiman, M. S., M. H. I. Jamaludin, and Z. Derasit. 2023. "Code Cody: A Game-Based Learning Platform for Programming Education." *Journal of ICT in Education* 10(1):79. doi: https://doi.org/10.37134/jictie.vol10.1.7.2023.

Swantika, Ika, Refin Harissandi, and Rossya Diva Anwar. 2023. "The Analysis of Students' Difficulties in Using Computer Terms." *Formosa Journal of Science and Technology* 2(2):713–22. doi: 10.55927/fjst.v2i2.3154.