Android-Based Personal Hygiene Educational Game Application for Children

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Abstract

Presently, there remains a deficiency in educational games aimed at instilling in children an awareness of personal hygiene, and numerous health issues stem from a lack of adherence to good hygiene practices. This study seeks to develop an Android-based educational game catering to the hygiene needs of young children, with a focus on assessing the application's feasibility. The research collected system-building data through observations and interviews, employing the Black Box testing method to evaluate the application's usability. Field and library research contributed to the acquisition of comprehensive data. The study's outcome is the creation of an Android-based educational game dedicated to teaching personal hygiene to children. Utilizing the UML design method, the author constructed and integrated the game into the Unity 3D application, enabling children to grasp the significance of cleanliness and environmental hygiene through engaging gameplay. Evaluation results indicate the suitability of the personal hygiene education game, with a learning menu percentage of 78% and a play menu percentage of 77%, as determined by questionnaire-based tests, affirming the system's appropriateness for use.

Keywords: Game applications; Educational games; Android; Care for Cleanliness and the Environment.

Introduction

Personal and environmental cleanliness is important and must be considered in everyday life because cleanliness can affect human health, comfort, safety, and welfare (Handayani & Abbasiah, 2020). Maintaining cleanliness is an obligation for everyone (Amanda et al., 2023). because by maintaining cleanliness, we can implement a healthy lifestyle avoid all kinds of diseases, and not damage the environment (Nadiroh & Meilina, 2020). Many health problems are caused by not maintaining good personal hygiene. Physical disorders that often occur are disorders of skin integrity, disorders of the oral mucous membrane, infections of the eyes and ears, and physical disorders of the nails (Irnawati et al., 2018), (Prima, 2019).

The school environment is the second main educational environment after the family (Supriyono & others, 2019). A clean and healthy living environment is the dream of every community. Environmental cleanliness is also an important basic capital for Indonesian human development because environmental quality greatly influences people's quality of life (Nugroho et al., 2020). What is meant by environmental cleanliness is creating a healthy environment that is not susceptible to various diseases such as diarrhea, dengue fever, vomiting, and others. This can be achieved by creating a clean, beautiful, and comfortable environment (Mantilia, 2019).

Environmental problems are something that cannot be avoided (Pambudi et al., 2019). The most serious environmental problem facing the Indonesian nation is waste (Mulyani et al., 2021). Trash is discarded objects that are no longer used by their owners (Fajri et al., 2022). In general, waste is divided into two categories, namely inorganic and organic waste (Sutrisnawati & Purwahita, 2018). This waste has benefits for us, but it also has an impact on the environment (Jiwandhono, 2016). Organic waste is waste from the remains of living creatures (nature) such as humans, plants, and animals that experience weathering or decay (Putri et al., 2023), (Mustaqim, 2019). This waste is environmentally friendly because it can be broken down by bacteria or germs naturally and the process is fast. Inorganic waste is waste

from human remains that is difficult for bacteria or germs to decompose, therefore it takes quite a long time (up to hundreds of years) to be decomposed (Mikarsa et al., 2007), (Al Irsyadi et al., 2016).

Personal Hygiene is a form of effort or action to maintain a person's cleanliness and health for physical and psychological well-being (Marga, 2020). Personal hygiene includes cleanliness of the skin, hands and nails, hair, mouth, and teeth, nose, eyes, ears, but personal hygiene or personal hygiene that needs to be paid attention to in children is the cleanliness of the skin, nails, hands, and feet because the skin and Hands are the main media for germs entering the body (Laily & Sulistyo, 2012), (Wulansari et al., 2021).

Environmental education about throwing rubbish in its place should be given as early as possible to children at an early age so that they can instill the character of caring for the environment until they grow up (En & Ismail, 2020), (Putra, 2016). You can see the current condition, where there are still many children who don't care about what they are doing, namely throwing rubbish carelessly out of place (Efendi et al., 2020). This is due to examples from the surrounding environment which often throw rubbish carelessly (Utario et al., 2018), (Chatulistiwa & Rismayadi, 2021). Children need to have environmentally caring behavior from an early age because children will become the next generation who must preserve the environment so that living things and the environment remain in balance so that the earth remains suitable for habitation (Jayawardana, 2019).

Problem Formulation: (1). how to develop personal hygiene games for children, especially elementary school students based on Android, and (2). What is the feasibility of an Android-based personal hygiene game application? Research Objectives: (1). to find out how to develop a personal hygiene game for elementary school students based on Android and (2). to test the feasibility of an Android-based personal hygiene game application.

Method

The method that will be used in collecting important information and data that will be used to build this research system is conducting interviews to identify problems, then observing whether the problems exist and conducting literature studies which can be seen in Figure 1.
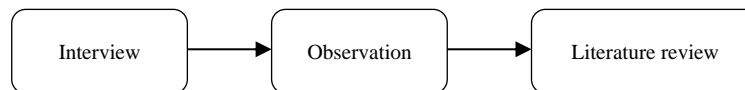

Figure 1. Research data collection

The data source used in this research is library research, which is a method of collecting data from several theses, theses, journals, books, or other literature that can be a reference for discussion on this issue as well as sources from the internet or online as well as the results of previous research as reference material for future researchers (Iskandar et al., 2023).

1. Designing Use Case Diagrams

    Player system use case diagram design (Kurniawan, 2018). The player is the actor of the software, the player can open the application, and select the game menu, where in the menu there are two menus, namely learning and playing, in the learning menu there is another material and video menu that discusses personal hygiene, and then there is a menu about where this menu is located. The identity of the maker can be seen in Figure 2In the Method section, you explain clearly how you conducted your research to (1) enable readers to evaluate the work performed and (2) permit others to replicate your research.
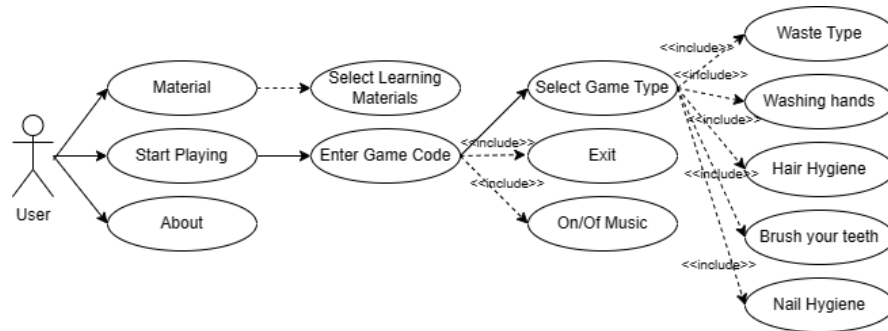
Figure 2. Use case diagram

2. Designing Activity Diagrams

*Activity*The diagram depicts the flow of the system display that will be played (Tanoto, 2020). Activity diagrams have a certain composition of shapes so they can be combined with arrows (Kulkarni & Srinivasa, 2022). Activity diagrams come from several use cases. Activity diagram playing, the user is instructed to select the playing menu. Then, the user will be directed to the game page. In the game, the player will be asked to answer the questions given and a diagram of the learning material. What the player must do is select the material or video menu. Next, players will enter the learning material and video page. Then the player will choose the type of material available (Juniarti, 2021). It can be seen in Figures 3a and 3b.
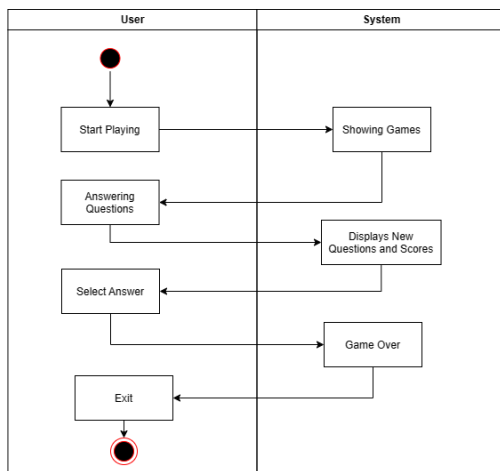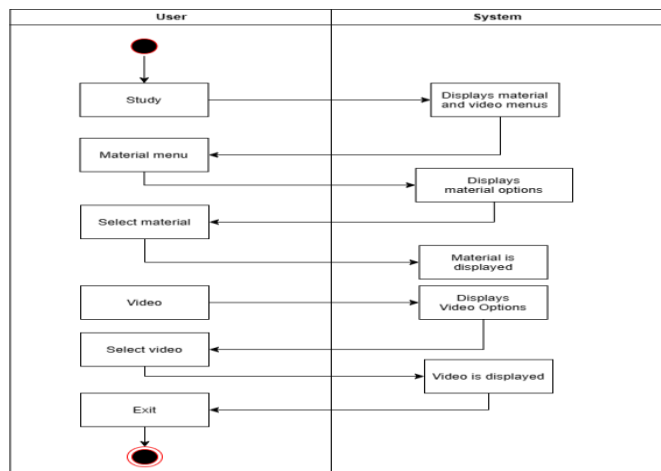

Figure 3a

Figure 3b

Figures 3. Activity diagrams

Results and Discussion

Results

From the character selection process, plot creation, and development process, an Android-based educational game application that cares about cleanliness and the environment for children is produced, according to the following display:

1. Initial Game Display

In the initial appearance of the game, where the author uses an Android cellphone to run and play the Let's Clean Game application, there are three menus, namely the start menu (Guspianto et al., 2023), the About menu and the learning game exit button which can be seen in Figure 4.

Figure 4. Initial appearance of the game

2. Game select display

Figure 5. Game select display

Figure 5 shows two menus in the game, namely the learning menu, playing and the back button.

3. View select learn

Figure 6. Select learning display

In Figure 6 there is a select learn display that can be accessed by players to learn about their hygiene, there is also a button to return to the main game menu.

4. View select material

The selection of personal hygiene care game material can be accessed after selecting the select study material menu, where there are three choices, namely material about toothbrushing, hand washing material, and bathing challenge material (Santoso et al., 2022). Each menu has a menu of options for playing that can be selected by the user, as in Figures 7a, 7b, 7c, and 7d.

(a)

(b)

(c)

(d)

Figures 7. Display select material and menu for each material

5. Video menu display

Apart from the picture menu, there is also a video menu about dental and oral hygiene, the habit of eating and drinking nutritious food, washing hands with soap, and the habit of throwing rubbish in its place. Each video contains an invitation and learn about personal hygiene and the surrounding environment. It is hoped that this will create awareness. from an early age about the importance of cleanliness in children can be seen in Figures 8a and 8b.

(8a)

(8b)
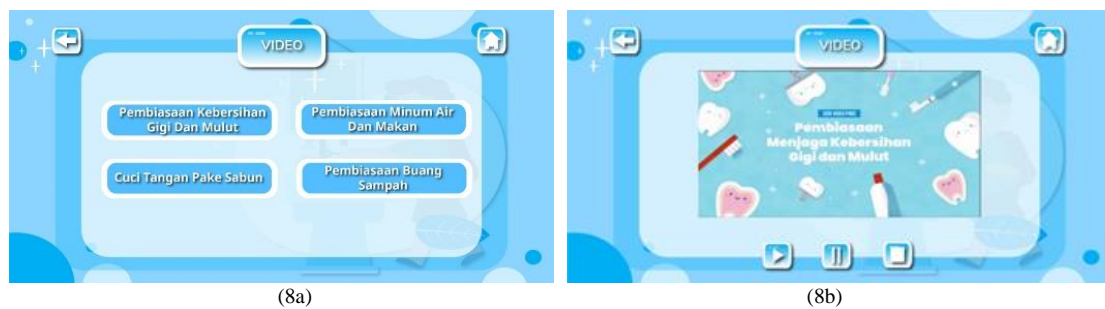
Figures 8. Play Video Menu

6. Play menu display

The choice of playing is true or false, where in this game players will be asked questions about personal hygiene and there is a choice of right or wrong, and in each game, there is a score for the questions that have been answered (Ridoi, 2018). After answering, the score will be displayed according to the answer results, as in Figures 9a and 9b.

9a 9b

Figures 9. Correct answer display and score display

Discussion

Testing the usability of the application was carried out by asking questions to users after using the Android-based educational game application that cares about cleanliness and the environment for children, there were 30 respondents and the test was carried out by dividing two questionnaires, namely questionnaires for testing in learning and playing. To calculate the results of this test, calculations will be carried out using the Likert Scale method. In testing the learning menu, the user is asked to open the learning menu in the game, where later the user will be asked questions about the lessons that can be taken from watching videos in the game about personal hygiene, following are the results of the questionnaire, seen in Table 1.

Table 1. Results of the Learning Menu Testing Questionnaire

Question	Answer				
	SS	S	N	T.S	STS
Easy-to-access application	16	11	3	0	0
Interesting character appearance	9	15	6	0	0
Can practice in everyday life	15	10	5	0	0
Interesting video	11	16	3	0	0
Information about cleanliness is complete	12	14	4	0	0
The text can be read easily	15	12	3	0	0
The characters are suitable for children	12	17	1	0	0
The material is suitable for children	13	15	2	0	0
Got a valuable lesson from this game	14	15	1	0	0

Calculation of the system feasibility presentation value obtained from the questionnaire data in Table 1. From the sum, the value obtained is 1169, from the results of the calculation above then divided by 150 this value is obtained from the maximum score = 30 x 50 = 150 (number of respondents x highest score), then divided by 100%, the result is 77.98%. To test playing the game, the user is asked to open the learning menu in the game, where later the user will be asked questions after playing the personal hygiene game, The following are the results of the questionnaire, seen in Table 2.

Table 2. Results of the playing menu questionnaire

Question	Answer				
	SS	S	N	T.S	STS
The application is easy to use	14	11	5	0	0
The application's appearance is attractive	10	15	5	0	0
The menu is complete	10	10	10	0	0
Buttons work	11	16	3	0	0
Music is nice to hear	12	14	4	0	0
All features work well	12	13	5	0	0
The application is easy to install	12	17	1	0	0
The colors match the theme	12	14	4	0	0
It can come out easily	15	12	3	0	0

Calculation of the system feasibility presentation value obtained from the questionnaire data in Table 2. From the sum, the value obtained is 1148, from the results of the calculation above then divided by 150 this value is obtained from the maximum score = 30 x 50 = 150 (number of respondents x highest score), then divided by 100%, the result is 76.53%.

Conclusions and Suggestions

Conclusions

The successful development and implementation of an Android-based educational game application centered on children's hygiene represent a significant achievement in the realm of technology-assisted learning. The author applied the Unified Modeling Language (UML) design method to meticulously create and structure the game, seamlessly integrating it into the Unity 3D application framework. This innovative approach offers children an engaging platform where they can play while simultaneously acquiring a heightened awareness of the importance of cleanliness and environmental care, as highlighted (Muslihudin & others, 2016).

The practicality and effectiveness of the personal hygiene care educational game were assessed through systematic testing, yielding promising results. Notably, the learning menu within the game attained a commendable score of 78%, underscoring its efficacy as an educational tool. Simultaneously, the play menu achieved a score of 77%, emphasizing the entertainment value embedded in the gameplay. These percentages, derived from comprehensive questionnaire-based tests, serve as a reliable metric to gauge the system's suitability for its intended purpose.

The utilization of a questionnaire in the assessment process is crucial, as it offers insights into user perceptions and preferences. The data obtained reinforces the notion that the Android-based educational game not only meets its educational objectives but also provides an enjoyable and user-friendly experience for children. This research underscores the potential of technology-driven educational tools in promoting personal hygiene awareness among children, offering a dynamic and interactive approach to learning in the digital age.

Suggestions

The suggestions for further research are as follows:

1. Involve child psychology experts to assess the psychological impact of using the game application.
2. Study children's emotional reactions and motivations to interactions with applications.
3. Conduct long-term research to evaluate the app's effectiveness in maintaining changes in personal hygiene behavior in children.
4. Check whether the habits taught by the app persist over time.
5. Engages ethnographic studies to better understand the cultural and environmental context in which the application is used.

References

Al Irsyadi, F. Y., Sholihah, S. L., & Sudarmilah, E. (2016). Game Edukasi Merawat Diri Untuk Anak Tunagrahita Tingkat Sekolah Dasar Berbasis Kinect Xbox 360. *Simetris: Jurnal Teknik Mesin, Elektro Dan Ilmu Komputer*, *7*(2), 693–700.

Amanda, N. D., Nurhidayah, T. M., Ramadhani, T. Y., & others. (2023). Menjaga Kesehatan Tubuh dalam Perspektif Islam. *Religion: Jurnal Agama, Sosial, Dan Budaya*, *1*(5), 373–380.

Chatulistiwa, L. C. S., & Rismayadi, A. A. (2021). Perancangan Game First Person Shooter Edukasi Pengenalan Bakteri dan Virus Berbasis Augmented Reality. *EProsiding Teknik Informatika (PROTEKTIF)*, *2*(2), 129–139.

Efendi, N., Baskara, R. S., & Fitria, Y. (2020). Implementasi Karakter Peduli Lingkungan di SDN 13 Lolong Belanti Padang. *Jurnal Pendidikan Ilmu Sosial*, *29*(2), 155–165.

En, L. L., & Ismail, A. (2020). *Aplikasi Gamifikasi Kebersihan dan Sanitasi Diri Bagi Kanak-kanak Orang Asli*.

Fajri, I. A., Elvis, P. A., Fitri, S. R., Sari, D. P., & Karlinda, A. E. (2022). Mengenal Pengolahan Sampah Organik Menjadi Eco Enzyme Di Kampung Tematik Kelurahan Andalas. *Community Development Journal: Jurnal Pengabdian Masyarakat*, *3*(2), 948–951.

Guspianto, G., Nina, E. Y., Mohamad, I., Shabira, D., & others. (2023). Development of Health Educational Game Application "Worm Free" Based on Android. *JAMBI MEDICAL JOURNAL" Jurnal Kedokteran Dan Kesehatan"*, *11*(2), 123–135.

Handayani, G. L., & Abbasiah, A. (2020). Hubungan Perilaku Kebersihan Perorangan dan Lingkungan Serta Status Gizi dengan Kejadian Infeksi pada Anak Usia Sekolah di Sekolah Dasar Kota Jambi. *Jurnal Ilmiah Universitas Batanghari Jambi*, *20*(1), 232–236.

Irnawati, C., Widyana, R., & Sriningsih. (2018). Hipnoterapi Untuk Peningkatan Perilaku Personal Hygiene Anak Jalanan Di Ppap Seroja Kodya Surakarta. *Journal of Chemical Information and Modeling*, *53*(9), 1–74.

Iskandar, A., Fitriani, R., Ida, N., Sitompul, P. H. S., & others. (2023). *Dasar Metode Penelitian*. Yayasan Cendekiawan Inovasi Digital Indonesia.

Jayawardana, H. (2019). Pendidikan Karakter Peduli Lingkungan Sejak Dini sebagai Upaya Mitigasi Bencana Ekologis. *Symbion (Symposium on Biology Education)*, *5726*, 49–64.

Jiwandhono, A. (2016). *Game edukasi sebagai media pembelajaran kesehatan gigi sejak dini berbasis android*. Fakultas Sains dan Teknologi UIN Syarif Hidayatullah Jakarta.

Juniarti, Y. (2021). Pengembangan Aplikasi game edukasi dalam membentuk karakter anak. *Widya Wacana: Jurnal Ilmiah*, *16*(1), 26–34.

Kulkarni, R. N., & Srinivasa, C. K. (2022). Abstraction of Activity Diagram from Sequence Diagram. In *Data Engineering and Intelligent Computing: Proceedings of 5th ICICC 2021, Volume 1* (pp. 145–156). Springer.

Kurniawan, T. A. (2018). Pemodelan use case (UML): evaluasi terhadap beberapa kesalahan dalam praktik. *J. Teknol. Inf. Dan Ilmu Komput*, *5*(1), 77.

Laily, I., & Sulistyo, A. (2012). Personal Hygiene. *Konsep, Proses Dan Aplikasi Dalam Praktik Keperawatan. Yogyakarta. Graha Ilmu*.

Mantilia, J. (2019). *Pengaruh lingkungan sekolah terhadap motivasi belajar siswa pada mata pelajaran Pendidikan Agama Islam di SMAN 1 Kibang*. IAIN Metro.

Marga, M. P. (2020). Pengaruh Personal Hygiene Terhadap Kejadian Penyakit Skabies. *Jurnal Ilmiah Kesehatan Sandi Husada*, *9*(2), 773–778.

Mikarsa, H. L., Taufik, A., & Prianto, P. L. (2007). Pendidikan anak di SD. *Jakarta: Universitas Terbuka*.

Mulyani, I., Putri, E. S., Muliadi, T., Ayunda, H. M., & others. (2021). Upaya pengendalian sampah plastik di lingkungan sekolah dasar. *Indonesian Journal Of Community Service*, *1*(1), 111–114.

Muslihudin, M., & others. (2016). *Analisis dan perancangan Sistem Informasi menggunakan model Terstruktur dan UML*. Penerbit Andi.

Mustaqim, R. B. (2019). *Game Edukasi Pengelompokkan Jenis Sampah Berbasis Android*. Program Studi Teknik Informatika.

Nadiroh, N., & Meilina, Z. (2020). Pentingnya Kebersihan Lingkungan serta Dampaknya bagi Lingkungan Sekitar. *Project: Tugas Ujian Akhir Semester*, *211010054*.

Nugroho, S., Kaswinami, A., & Prasetiyo. (2020). Pengelolaan Kebersihan Kesehatan Lingkungan Masyarakat Kalicari Kecamatai Pedurungan Kota Semarang. *IKIP PGRI Semarang, Fibria*.

Pambudi, E. H., Ardiantoro, L., Yanuarini, N. S., & others. (2019). *Pembuatan Game Edukasi Pintar Memilah Sampah Berbasis Android*. Universitas Islam Majapahit Mojokerto.

Prima, D. Y. (2019). *Analisis Interaksi Anak Tunagrahita Terhadap Game Edukasi Bina Diri*.

Putra, N. N. (2016). *Game "LET'S CLEAN UP" Untuk Pembelajaran Kebersihn Anak*. Fakultas Ilmu Komputer, UNIKA Soegijapranata.

Putri, R. T. H., Aisa, A., Taubah, M., Arrokhman, R. Y., Abdillah, M. A., & Fitriyah, I. N. (2023). Sosialisasi dan Pelatihan Pemanfaatan Sampah Organik sebagai Pupuk Alami Eco-Enzyme di Desa Sidomulyo. *Jumat Pertanian: Jurnal Pengabdian Masyarakat*, *4*(1), 1–5.

Ridoi, M. (2018). *Cara mudah membuat game edukasi dengan Construct 2: tutorial sederhana Construct 2*.

Santoso, B., Wiyatini, T., & others. (2022). Android-Based Educational Model Cross Puzzle to Improve Dental Health Behavior among Elementary Schools. *International Journal of Nursing and Health Services (IJNHS)*, *5*(6), 464–474.

Supriyono, H., & others. (2019). *Aplikasi Game Android Pengenalan Kebersihan Lingkungan untuk Anak Usia 6--7 Tahun*. Universitas Muhammadiyah Surakarta.

Sutrisnawati, N. K., & Purwahita, A. A. A. R. M. (2018). Fenomena sampah dan pariwisata Bali. *Jurnal Ilmiah Hospitality Management*, *9*(1), 49–56.

Tanoto, U. (2020). *Activity Diagram: Pengertian, Fungsi, Contoh serta Cara Membuatnya*. https://www.jojonomic.com/blog/activity-diagram/

Utario, Y., Rustina, Y., Krianto, T., Ayubi, D., & others. (2018). Arbi Care application increases preschool children's hand-washing self-efficacy among preschool children. *Enfermeria Clinica*, *28*, 27–30.

Wulansari, M., Sinrang, A. W., Syarif, S., Ahmad, M., Bahar, B., & Maddepungeng, M. (2021). The Effectiveness of Android-based Education Media of Growth and Development Care Towards Mother's Knowledge Improvement. *International Journal of Health and Medical Sciences*, *4*(2), 238–245.