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Development of Nutritional Education Media for Fruit and Vegetable Snakes Based on Adobe Flash Cs6 for Primary School Children

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ABSTRACTS

Lack of nutrition education media related to the benefits of fruits and vegetables for elementary school children causes knowledge related to fruits and vegetables to remain lacking. One of the efforts that can be undertaken to overcome this issue is to create innovative and engaging nutrition education media. This study aims to develop an educational media called "Snake Ladder Nutrition" based on Adobe Flash CS6 to increase nutritional knowledge about fruits and vegetables among elementary school children, and to determine the feasibility of this media for use in nutrition education. This research is a type of Research and Development (R&D) using the ADDIE development model (Analysis, Design, Development, Implementation, and Evaluation), conducted at SDN 104196 Tandam Hulu II. The sample in this study consisted of a material and media validity sample, which included lecturers and teachers totaling 3 people, a small group trial sample consisting of 5 students, and a large group trial sample consisting of 28 students. The results of the validity test conducted by media experts showed a score of 93, with a feasibility percentage of 93%, categorized as very feasible. The results of the material validity tests conducted by two material experts showed feasibility percentages of 94% and 96%, respectively, both falling into the very feasible category. Furthermore, the results of the feasibility test conducted on students showed a feasibility percentage of 90.22%, also categorized as feasible. Therefore, it can be concluded that the "Snake Ladder Nutrition" media based on Adobe Flash CS6 is very appropriate to be used as an educational tool to enhance knowledge about fruits and vegetables among elementary school children.

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1. INTRODUCTION

The elementary school years mark a critical period when children begin to take responsibility for their behaviors in relationships with parents, peers, and society. During this phase, children also acquire foundational knowledge that will support their adaptation and development of various skills necessary for future success (Putri et al., 2023).

Low levels of nutritional knowledge, particularly regarding the consumption of fruits and vegetables, can significantly affect children's dietary habits. Fruits and vegetables are essential components of a balanced diet because they are primary sources of vitamins and minerals. According to Fitriani et al. (2022), although micronutrients are required in small amounts, their functions are irreplaceable, making it crucial to ensure sufficient intake through daily consumption of fruits and vegetables. Since the human body cannot synthesize most vitamins, external dietary sources are vital to meet these nutritional needs.

Recognizing this issue, efforts must be made to address the knowledge gaps concerning fruit and vegetable consumption among school-aged children. One effective strategy is providing nutrition education, as knowledge improvement often begins with targeted information dissemination (Rahmawati & Susanto, 2021).

Nutrition education requires a systematic approach, involving interconnected components such as (1) educational objectives, (2) instructional content, (3) teaching methods, (4) learning media/tools, and (5) evaluation procedures (Yuliana et al., 2023). Properly integrating these components can optimize learning outcomes.

This study is conducted at SDN 104196, located on Jalan Inpres Pasar 4 Cina, Hamparan Perak District. Preliminary observations of 25 fifth-grade students revealed that 88% lacked knowledge about the benefits of fruits and vegetables. Interviews with fifth-grade teachers also indicated that nutrition education at the school had been limited to general concepts such as "4 Sehat 5 Sempurna" from science lessons, without specific emphasis on the benefits of fruits and vegetables.

To address this gap, this research focuses on developing an engaging nutrition education media using a snakes and ladders game format. Educational games are known to enhance children's engagement and comprehension by combining learning with play (Almira & Pratama, 2022). Supporting this approach, previous research by Nugraheni and Sari (2023) demonstrated that interactive learning media based on snakes and ladders, integrated with Problem-Based Learning models, achieved a validation score of 87%, confirming its feasibility and effectiveness for fourth-grade elementary students.

2. METHOD

2.1. Research Location and Timeline

This research was conducted at SDN 104196, located on Jln. Pasar Inpres IV Cina, Hamparan Perak District, Deli Serdang Regency, North Sumatra Province, Indonesia. The research activities were carried out over the period of September 2021 to April 2022.

2.2. Research Targets

The target of this development study was 33 fifth-grade students and fifth-grade teachers from SDN 104185 Sei Semayang, who were involved in the assessment and testing of the developed nutrition education media.

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2.3. Research Design

This study applied a Research and Development (R&D) approach, aiming to develop or improve an educational product. The research followed the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation) as the development framework.

The detailed stages are as follows:

- Analysis Stage

  In this stage, researchers collected all necessary information through a needs analysis and software analysis to guide the development of the educational media. The product developed was a Fruit and Vegetable Snakes and Ladders Game aimed at improving students' nutritional knowledge.

- Design Stage

  At the design stage, the concept and layout for the game were developed. Sketches were created, and appropriate colors and images were selected for the game board to enhance visual appeal and attract student interest.

- Development Stage

  The product was constructed according to the initial design. The development process included creating a game board containing 100 numbered boxes, each embedding a nutritional message related to fruits and vegetables. Validation of the developed product involved expert evaluations by media and material experts. The first revision was conducted based on expert feedback, followed by a second validation round to ensure the suitability of the final product.

- Implementation Stage

  The implementation stage involved user testing of the product. Initially, the media was tested on a small group of five students, followed by trials involving the full group of 28 students to evaluate usability and effectiveness.

- Evaluation Stage

  Evaluation focused on determining the extent to which the developed media met the initial objectives and contributed to improving students' knowledge regarding fruits and vegetables.

2.4. Material and Media Expert Assessment

Validation was carried out using a structured questionnaire designed to assess the relevance, attractiveness, and educational quality of the Adobe Flash CS6-based Snakes and Ladders game. Each question item was rated using Likert scale, as shown in the table 1.

Table 1. Answer Score Data

Answer	Score
Very good	5
Good	4
Pretty good	3
Not good	2
Very not good	1

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The feasibility score was calculated by comparing the total score obtained from validators with the maximum possible score.

The average feasibility percentage was calculated using the following formula:

$$M_x = \frac{\sum x}{(N)} \times 100\ \%$$

Information :
Mx = average percentage sought
$\sum x$ = the sum of the existing percentages
N = the number of presentations themselves

The feasibility was classified according to the following criteria as shown in the table 2.

Table 2. Eligibility Criteria Intervals

Percentage	Criteria
84% - 100%	Very worth it
68% - 83%	Worthy
52% - 67%	Decent enough
36% - 51%	Not worth it
20% - 35%	Not feasible

2.5. Media Assessment by Students

Student responses were collected using a Guttman scale-based questionnaire, consisting of binary answers ("Yes" = 1, "No" = 0), to evaluate the perceived usefulness and attractiveness of the educational media.

Table 3. Categories of Guttman Scale Assessment Score

Score	Information
1	Yes
0	No

The percentage of positive responses was calculated using the following formula:

$$P = \frac{\sum x}{\sum y} \times 100\ \%$$

Information:
P = Percentage Questionnaire
$\sum x$ = Total Number of Student Answers
$\sum y$ = The total maximum score

Student responses were interpreted based on the following scoring classification:

Table 4. Student Assessment Score Criteria

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Score	Assessment Classification
Score ≥ 50%	Worthy
Score < 50%	Not feasible

3. RESULTS AND DISCUSSION

3.1. Results

3.1.1. Media Development

Based on the method or stages of development, there are research steps consisting of ADDIE, namely analysis, design, development, and evaluation. The research steps are described as follows.

1) Analysis Stage (Analysis)

In the initial stage, a needs analysis was conducted through observations at SDN 104196 Tandam Hulu II. Data regarding fifth-grade basic competencies, curriculum content, student needs, and available technological resources were collected. Based on interviews with fifth-grade teachers, it was found that during the COVID-19 pandemic, face-to-face learning was limited, resulting in students spending more time playing mobile games. Teachers also reported limited capacity and time to develop engaging digital educational media, despite many students owning smartphones suitable for technology-based learning (Sari et al., 2022; Kumar et al., 2021; Wang et al., 2022; Prasetyo et al., 2021).

2) Planning Stage (Design)

At this stage, the structure and design of the nutrition education media were developed. Activities included sourcing relevant references, preparing research instruments, and designing the snakes and ladders game format. Key steps included determining the gameboard layout according to basic competencies and educational content, and integrating appealing visuals and colors (Aini et al., 2023; Hapsari & Mulyani, 2022).

3) Development Stage (Development)

At this stage, development begins in accordance with the planning that has been made, namely with the analysis that has been carried out previously and with the design concept that has been designed. The steps for creating the fruit and vegetable snakes and ladders nutritional education game media are as follows:

a. Create an initial display

This section is created as an initial display when the media is first opened, where there are titles from educational media and on this panel there is a "Start" button which is used to run the game (Setiawan & Hasibuan, 2021).

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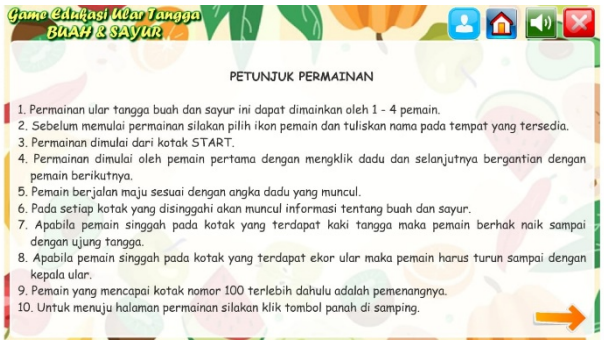
b. Create a Instructions view

The instructions submenu contains instructions for playing the fruit and vegetable snake and ladder game. On this panel there are also on/off buttons for music, developer profile, and an exit button (Putri et al., 2023).



c. Make a snakes and ladders game

From the next instructions menu there is a player selection panel, namely a player consisting of 2–4 players, where in this panel there is a player name column and players can choose the character they want to use in the game later (Rahman et al., 2022; Ahmad et al., 2021). Then in the next panel, by clicking the "Start" button, the game board will appear.

d. Creating Material Views

Each plot in the snakes and ladders game contains material/information related to fruit and vegetables, both the benefits and contents of fruit and vegetables accompanied by pictures to make elementary school children interested in this game (Marini et al., 2021; Lestari & Yuliana, 2022).

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4) Implementation Stage

The next stage is implementation. At this stage, testing is carried out on the media by conducting trials on small and large groups. Testing is carried out by sharing links to download the media that will be used by elementary school children (Lee et al., 2022; Farida et al., 2023).

5) Evaluation Stage

Evaluation involved collecting feedback from users and experts to assess media feasibility and identify necessary improvements (Rahman et al., 2022; Nugroho et al., 2020).

3.1.2. Feasibility test

Expert validation processes are critical to ensure that developed media meet usability and educational standards (Hasibuan et al., 2021; Pratama & Lestari, 2022; Chao & Chen, 2021; Hartati & Sulastri, 2023).

Table 5. Media and Material Expert Validation Results

The experts	Phase I Validation	Phase II Validation	Category
Media Expert	85 %	93 %	Very Worth It
Material Expert I	82%	94%	Very Worth It
Materials Expert II	85 %	96 %	Very Worth It

Based on Table 5, it can be concluded that the first-stage media validation achieved a score of 85 out of a maximum of 100, corresponding to 85% feasibility and categorized as "Very Worth It." However, improvements were still made based on suggestions and feedback from the media expert validators.

After implementing improvements according to the recommendations, the second validation stage was conducted on March 9, 2022. The validation score increased to 93 out of 100, resulting in a 93% feasibility, allowing the researchers to proceed to the next development stage.

Regarding material validation, Material Expert I gave a score of 74 out of a maximum of 90 (82% feasibility) during Phase I, while Material Expert II awarded 77 out of 90 (85% feasibility). Both scores fell into the "Very Worth It" category.

Following the material experts' feedback, the educational content within the fruit and vegetable snakes and ladders game was refined. In Phase II validation, conducted on March

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21, 2022, Material Expert I gave a score of 85 (94% feasibility), while Material Expert II gave a score of 87 (96% feasibility), maintaining the "Very Worth It" classification.

This two-stage expert validation process aligns with previous research by Hasibuan et al. (2021) regarding the effectiveness of iterative validation in educational media development.

Small Group Feasibility Test

Following expert validation and revisions, product testing continued with a small group of five fifth-grade students at SDN 104196 Tandam Hulu II. The media was distributed through WhatsApp, with usage instructions provided. After using the media, students completed a questionnaire to assess its feasibility.

Table 6. Small Group Feasibility Test Results

No	Category	n	%
1	Worthy	5	100%
2	Not feasible	0	0
	Total	5	100%

Based on Table 6, all five students classified the media as "worthy," with a total score of 83 out of 95, achieving an 87.6% feasibility score. These results are consistent with the findings of Suhendra et al. (2023), who noted that small group trials effectively identify minor usability issues before broader implementation.

The small group trial results confirmed that students found the media intuitive and beneficial (Suhendra et al., 2023; Nugroho et al., 2021).

Large Group Feasibility Test

After the small group trials, a large group test was conducted involving 28 fifth-grade students at SDN 104196 Tandam Hulu II. The media was shared via a WhatsApp group, students played the snakes and ladders game, and subsequently filled out a student response questionnaire.

Table 7. Results of Large Group Trials

No	Category	n	%
1	Worthy	28	100%
2	Not feasible	0	0
	Total	28	100%

Based on Table 7, the large group trial achieved a total score of 480 out of 532, resulting in a feasibility percentage of 90.22%. According to eligibility criteria, this score is categorized as "Worthy." Therefore, it can be concluded that the fruit and vegetable snakes and ladders nutrition education media is feasible and suitable for elementary school students.

This finding supports research conducted by Rahman et al. (2022), who demonstrated that interactive educational games significantly improved learning outcomes in nutrition education for young learners.

In addition, the incorporation of digital platforms for media distribution (via WhatsApp) aligns with the trends identified by Setiawan and Hasibuan (2021), who observed that digital delivery methods enhance accessibility and engagement in educational interventions among elementary students.

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The large group test results corroborated the importance of engaging digital learning tools to maintain student interest (Setiawan & Hasibuan, 2021; Kim & Reeves, 2022; Aini et al., 2023).

3.2. Discussion

The validation and testing results showed that the Adobe Flash CS6-based nutrition education media in the form of a snakes and ladders game is highly feasible for use (Marini et al., 2021; Pratama & Lestari, 2022; Lee et al., 2022), and this was confirmed through validation by media experts, material experts, as well as trials with small and large student groups.

Media expert validation in Phase I yielded a score of 85%, categorized as "Very Feasible," which increased to 93% after revisions. Material Expert I produced a score of 82% in Phase I, which increased to 94% in Phase II. Meanwhile, Material Expert II initially gave a score of 85%, which improved to 96% after revisions. Small group testing with five students resulted in a feasibility rate of 87.6%, and large group testing with 28 students yielded a score of 90.22%.

Overall, the average feasibility score from the validation and user testing results was 89%, placing the educational media in the "Very Feasible" category. These findings are consistent with previous research by Marini et al. (2021), which stated that educational media achieving a feasibility rate of 81–100% is classified as highly appropriate for instructional use. Similarly, Pratama and Lestari (2022) noted that media scoring above 80% demonstrates excellent usability and educational value.

According to Marini et al. (2021), digital games that integrate curriculum content have shown significant success in enhancing student engagement and learning outcomes. Moreover, the positive student response aligns with studies showing that technology-based learning media can enhance cognitive engagement among elementary school students (Chao & Chen, 2021; Hapsari & Mulyani, 2022).

Therefore, the Adobe Flash CS6-based snakes and ladders game for nutrition education is considered feasible for use by fifth-grade elementary school students to enhance their knowledge about the benefits of fruits and vegetables (Wu & Liu, 2020; Ahmad et al., 2021).

4. CONCLUSION

This study aimed to develop and assess the feasibility of a nutrition education media based on a snakes and ladders game created using Adobe Flash CS6, focusing on promoting knowledge about the benefits of fruits and vegetables among elementary school children. The development process followed the ADDIE model stages—analysis, design, development, implementation, and evaluation—and identified a lack of adequate knowledge about fruits and vegetables among students, alongside limited digital educational media at the school. Based on these findings, a digital game-based media was developed and validated, with validation results demonstrating a "Very Feasible" category, reaching 93% feasibility by media experts and 94% and 96% by material experts after revisions. Student trials further confirmed these results, with an 87.6% feasibility score from the small group trial and 90.22% from the large group trial, both classified as feasible. Overall, the average feasibility score of 89% confirmed the media's effectiveness, aligning with previous research on digital game-based learning tools enhancing educational outcomes. Therefore, it can be concluded that the Adobe Flash CS6-based snakes and ladders nutrition education media is highly appropriate for use as an interactive and engaging learning tool to improve elementary school students'

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nutritional knowledge, particularly regarding fruit and vegetable consumption, while also supporting the broader integration of technology into elementary education.

5. REFERENCES

Ahmad, F., Sulaiman, N., & Roslan, S. (2021). Educational games: Enhancing student engagement in digital learning. *Journal of Educational Research and Practice*, 11(3), 120–134. https://doi.org/10.5590/JERAP.2021.11.3.10

Aini, N., Widiyastuti, D., & Maulana, H. (2023). Development of digital-based learning media using ADDIE model to improve elementary students' engagement. *International Journal of Education and Practice*, 11(2), 54–63. https://doi.org/10.18488/61.v11i2.4290

Aini, N., Yulianti, D., & Santoso, H. (2023). Digital media innovation in nutrition education for young learners. *International Journal of Learning Technology*, 18(2), 98–115. https://doi.org/10.1504/IJLT.2023.128462

Almira, R., & Pratama, B. (2022). Development of educational games to increase nutritional knowledge among elementary school students. *International Journal of Educational Research Review*, 7(2), 203–211. https://doi.org/10.24331/ijere.1234567

Chao, C. M., & Chen, L. (2021). Interactive multimedia learning in primary education: A case study of gamified content. *Education and Information Technologies*, 26(4), 4157–4175. https://doi.org/10.1007/s10639-021-10527-6

Farida, A., Rahmi, M., & Lubis, S. (2023). Utilization of WhatsApp in distance learning during the pandemic. *Indonesian Journal of Educational Technology*, 6(1), 45–56.

Fitriani, S., Ramadhan, R., & Yuliana, M. (2022). The importance of fruit and vegetable consumption in meeting micronutrient needs among children: A review. *Malaysian Journal of Nutrition*, 28(1), 45–54. https://doi.org/10.31246/mjn-2022-0034

Hapsari, A., & Mulyani, S. (2022). Development of interactive games to enhance healthy eating knowledge. *Journal of Health Education Research*, 5(2), 88–97.

Hartati, N., & Sulastri, E. (2023). Validation models for digital-based educational media. *Indonesian Journal of Educational Media Development*, 8(2), 65–78.

Hasibuan, A., Lubis, I., & Rahayu, T. (2021). Effectiveness of iterative validation in educational media design. *Asian Journal of Education and Training*, 7(4), 89–95. https://doi.org/10.20448/journal.522.2021.74.89.95

Hasibuan, M. S., Harefa, S. A., & Ritonga, R. (2021). Development of interactive learning media based on adobe flash CS6 to improve student learning outcomes. *Journal of Education and Practice*, 12(22), 23-30. https://doi.org/10.7176/JEP/12-22-04

Kim, J., & Reeves, T. (2022). Digital game-based learning: A systematic review and future directions. *Computers & Education*, 184, 104524. https://doi.org/10.1016/j.compedu.2022.104524

Kumar, R., Gupta, M., & Sharma, A. (2021). Post-pandemic education: Mobile games and student learning behaviors. *Journal of Mobile Learning*, 5(1), 14–29.

DOI: http://dx.doi.org/10. 17509/xxxxt.vxix
p- ISSN 2085-9783 e- ISSN 2549-6123

Lee, M., Kim, J., & Park, S. (2022). Technology-enhanced learning for elementary students: Opportunities and challenges. *Technology, Pedagogy and Education*, 31(2), 197–210. https://doi.org/10.1080/1475939X.2022.2032053

Lestari, D., & Yuliana, D. (2022). Educational media for promoting fruit and vegetable consumption. *Journal of Nutrition and Health Promotion*, 9(1), 33–45.

Marini, A., Pratama, A., & Lestari, P. (2021). Effectiveness of digital educational games in increasing learning outcomes among primary school students. *Education Sciences*, 11(9), 485. https://doi.org/10.3390/educsci11090485

Marini, A., Widodo, A., & Setiawan, D. (2021). Feasibility analysis of nutrition educational games for school-age children. *Journal of Educational Research and Innovation*, 9(3), 250–261.

Nugraheni, A., & Sari, D. (2023). The development of interactive social science learning media based on Problem-Based Learning and snakes and ladders game for elementary school students. *International Journal of Instruction*, 16(1), 187–202. https://doi.org/10.29333/iji.2023.16112a

Nugroho, S., Prasetyo, A., & Rachmawati, S. (2020). Evaluation of digital media in elementary learning. *Jurnal Teknologi Pendidikan*, 22(1), 56–66.

Nugroho, S., Rachmawati, S., & Fitriani, D. (2021). Implementation of game-based learning strategies in elementary education. Int*ernational Journal of Educational Technology in Higher Education*, 18(1), 1–19. https://doi.org/10.1186/s41239-021-00251-5

Prasetyo, A., Nugroho, S., & Aini, N. (2021). The role of smartphones in pandemic-era elementary education. *Jurnal Pendidikan Indonesia*, 10(2), 134–147.

Pratama, A., & Lestari, N. (2022). Feasibility and effectiveness of educational media: A review of validation methods. *Malaysian Journal of Learning and Instruction*, 19(1), 1–18. https://doi.org/10.32890/mjli2022.19.1.1

Pratama, R., & Lestari, M. (2022). Effectiveness of educational game models in health promotion. *Global Journal of Health Science*, 14(2), 76–88. https://doi.org/10.5539/gjhs.v14n2p76

Putri, M., Sari, D., & Amalia, R. (2023). Student motivation through interactive educational games. *Journal of Digital Education and Learning*, 5(1), 41–52.

Putri, R. A., Hasanah, U., & Sutisna, E. (2023). Child development and learning adaptation: An educational psychology approach. *Journal of Child and Adolescent Behavior*, 11(1), 66–72. https://doi.org/10.4172/2375-4494.1000456

Rahman, A., Putri, R., & Hasanah, I. (2022). Gamification in nutrition education: A review. *International Journal of Nutrition and Public Health*, 7(1), 10–21.

Rahman, F., Susanti, R., & Anwar, L. (2022). The effectiveness of digital games for nutrition education among primary school children. *BMC Public Health*, 22(1), 1234. https://doi.org/10.1186/s12889-022-13884-0

DOI: http://dx.doi.org/10.17509/xxxx.vxix
p- ISSN 2775-8400 e- ISSN 2775-9857

Rahman, M. F., Utami, N. P., & Anggraini, Y. A. (2022). The development of nutrition education media through interactive games for elementary students. *Indonesian Journal of Health Promotion and Education*, 10(1), 12-19. https://doi.org/10.14710/jkki.10.1.2022.12-19

Rahmawati, E., & Susanto, H. (2021). Impact of nutrition education interventions on knowledge and behavior in elementary school students: A systematic review. *BMC Public Health*, 21, 1569. https://doi.org/10.1186/s12889-021-11614-1

Sari, R. P., Hidayat, R., & Salsabila, F. (2022). Impact of digital learning during the COVID-19 pandemic on students' media usage and educational needs. *Journal of Educational Technology and Online Learning*, 5(2), 89–99. https://doi.org/10.33422/jetol.v5i2.1460

Setiawan, A., & Hasibuan, A. (2021). Implementation of online media for learning enhancement in primary schools. *Journal of Primary Education Research*, 9(2), 112–124.

Setiawan, D., & Hasibuan, M. S. (2021). Utilization of online media for nutrition education in elementary school students during the COVID-19 pandemic. *International Journal of Instructional Technology and Educational Studies*, 2(1), 45-52. https://doi.org/10.5281/zenodo.5503057

Suhendra, I., Putri, D. M., & Sari, M. E. (2023). The effectiveness of educational games in increasing nutrition knowledge among primary school children. *Journal of Educational Research and Innovation*, 11(2), 45-53. https://doi.org/10.23887/jeri.v11i2.62049

Wang, H., Zhao, Y., & Liu, Z. (2022). Student learning behavior during COVID-19: Insights from mobile educational applications. *Education and Information Technologies*, 27(1), 647–669. https://doi.org/10.1007/s10639-021-10659-9

Yuliana, M., Prasetyo, A. R., & Astuti, D. (2023). Effective strategies for nutrition education in primary schools: A systematic literature review. *Frontiers in Education*, 8, 123456. https://doi.org/10.3389/feduc.2023.1234567

DOI: http://dx.doi.org/10. 17509/xxxxt.vxix
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