



# The Development of *Engklek* Game Media Based on Higher Order Thinking Skills in Learning Science of Class V Elementary School

Zahrah Kholidah<sup>1\*</sup>, Prima Mutia Sari<sup>1</sup>

<sup>1</sup>Elementary School Teacher Education, University of Muhammadiyah Prof. Dr. Hamka, Jakarta, Indonesia

Received: June 21, 2023

Revised: July 8, 2023

Accepted: August 25, 2023

Published: August 31, 2023

Corresponding Author:

Zahrah Kholidah

[zahrahkholidha@gmail.com](mailto:zahrahkholidha@gmail.com)

DOI: [10.29303/jppipa.v9i8.4406](https://doi.org/10.29303/jppipa.v9i8.4406)

© 2023 The Authors. This open access article is distributed under a (CC-BY License)



**Abstract:** The students still have a limited understanding of science learning, particularly the topic of food chains, due to the lack of diverse media, resulting in less engaging lessons that fail to spark the students' enthusiasm to actively participate in the learning process. This research aims to determine the feasibility of an *engklek* game medium based on higher-order reasoning skills in science learning in the V grade elementary school. This research uses the ADDIE model development research, which includes five phases: analysis, development design, implementation and evaluation. Data collection using questionnaires and observations. The research sample consisted of teachers and 5th grade students of one of the public elementary schools in Bogor regency. Media validation through media expert tests achieved a score of 84% with a very good category, material validation achieved a score of 83% with a very good category. After conducting tests, students and teachers also give ratings on the game media created. Based on the results obtained, it shows that the *engklek* game media based on higher-order thinking skills are suitable for instilling higher-order thinking skills in the participants.

**Keywords:** Elementary School; HOTS; Media Games; Science Learning

## Introduction

Natural Sciences is one of the subject content that must be studied and given at the elementary school (known with SD) level. Science learning in elementary school is one of the lessons that can train and provide opportunities for critical and concrete thinking for students. Science learning focuses on meaningful learning or learning that involves direct experience which aims to develop students' competencies in order to grow the ability to think, be scientific, and understand the universe (Mawaddah et al., 2022). The learning process aims to make students able to master various abilities, this will be achieved if during the learning process a teacher is right in choosing learning media.

According to media is a tool in the learning process used by a teacher to facilitate the delivery of material. Besides being very helpful for teachers in teaching activities in class, it is also a solution to make students happy when learning and not feel bored. In connection with this understanding, according to Agestiana (2019),

the category of good learning media is fun media and can train students' higher-order thinking skills. The category of good learning media is fun media and can stimulate the higher-order thinking skills of the students.

According to Wijnen et al. (2021), the definition of higher-order thinking skills or commonly called HOTS (higher order thinking skills) is a complex thought process involving decoding material, drawing inferences, building representations, analyzing and building relationships by involving the most basic mental activities. Meanwhile, according to Sitorus (2021), higher-order thinking processes are cognitive processes that can be categorized as remembering, understanding, applying, analyzing, evaluating, and creating.

The existence of HOTS-based learning media in the learning process can encourage students to be able to find solutions to problems and answer questions critically and creatively. In training higher-order

## How to Cite:

Kholidah, Z., & Sari, P. M. (2023). The Development of Engklek Game Media Based on Higher Order Thinking Skills in Learning Science of Class V Elementary School. *Jurnal Penelitian Pendidikan IPA*, 9(8), 6181–6187. <https://doi.org/10.29303/jppipa.v9i8.4406>

thinking skills can be applied in several ways, one of which is through the media of engklek games.

One way to stimulate the higher-order thinking skills of the students is to use game media. The *engklek* game is a traditional game of jumping onto a flat plane drawn by dragging blocks on the ground, then jumping from one square to the next with one foot. This game is mostly played individually and in groups, mostly by girls, but not infrequently boys also take part in the game. According to Asharianti & Yulia (2021), *engklek* games can train thinking skills, such as memory retention, thinking speed, and problem solving.

Based on observations that researchers have made at SDN dukuh 08 Pagi, students still do not understand science learning, especially food chain material because the media is less varied so that learning is less attractive to enthusiastic students to actively participate in the learning process, teachers need to understand learning media that are suitable and fun for students (Sari & Gautama, 2022).

Based on several existing problems, it can be seen that *engklek* game-based learning media has great potential to eliminate existing problems. Therefore, researchers tried to develop *engklek* game-based learning media with the title "Development of *Higher Order Thinking Skill* Media Based on *Engklek* Games in Elementary School Class V Science Learning"

**Method**

This research was conducted in one of the public elementary schools in Bogor Regency from January 2023 to May 2023. This study involved educators and grade V learners as samples. The type of this research is the development research (research and development). (research and development). According to Putranta, (2023) Development research is an activity that helps develop and test products in production. From this it can be concluded that development research is a type of research that is carried out to edit existing products according to the needs of the community and is carried out according to the rules of the problem at hand (Maydiantoro, 2019).

The development model used in this study is the ADDIE model which has five phase of the development process, they are Analysis or analysis stage, design or product design stage, development or product development stage, implementation or product trial stage, and evaluation or the production media stage (Yu, Hsueh, Sun, & Liu, 2021). In the first stage of an analysis of the development of the study, researchers begin to analyze the work, character of students and needs. Through the results of observations used by teachers, learning activities become monotonous so that students find it difficult to think higher-order.

The second stage of the ADDIE development model is product design which is a follow-up to the analysis stage, but it starts with designing a concept. The third stage is the stage of producing *engklek* game media that has been designed to determine the validity of learning media.

At the development stage, validation of the *engklek* game media to validators, namely material experts who are science lecturers, media experts who are learning media lecturers. Validators provide ratings, suggestions and comments about the developed media. From the results of the assessment, validators' suggestions and comments are used as a reference for product revisions to improve so that the learning media developed become feasible for use in terms of material and appearance (Yuanita, 2021). The next step is to make improvements based on input and suggestions from experts, and then conduct trials to test and perfect the product. The application phase is carried out after the *engklek* game has been validated.

The final stage of the ADDIE development model is evaluation. This stage is carried out to find out whether the media that has been made is in accordance with expectations or not, successfully used in real situations or not. This stage is also carried out to determine the disadvantages and advantages that exist in the *engklek* game media, so that later researchers can improve the shortcomings and develop existing advantages (Antonius et al., 2021).

Data collection used in this study included questionnaires from materials experts, media experts, responses from educators and students. From the reference of Pranatawijaya, Widiatry, Priskila & Putra, (2019), Questionnaire Validation Sheet using the Likert scale with a scale of 5. The following is the formula for the validation percentage:

$$P = \frac{f}{n} \times 100\% \tag{1}$$

Description:

- P = Validation percentage
- f = Number of data collection scores
- n = Max score

After analyzing the results using the formula above, the percentage of product quality will be obtained based on the level of feasibility and product revision. Percentage and eligibility are shown in Table 1.

**Table1.** Media Percentage and Eligibility Criteria

Valuation (%)	Category
76 - 100	Very Worth It
51 - 75	Proper
26 - 50	Not Worth It
0 - 25	Very Unworthy

(Jannah & Julianto, 2018)

In addition to determining the success rate of media development based on the results of expert validation, determining the success rate is also obtained through media development based on the responses of students and educators. The percentage and eligibility criteria of the media are shown in Table 2.

**Table2.** Percentage and Eligibility Criteria for Media Educators and Learners.

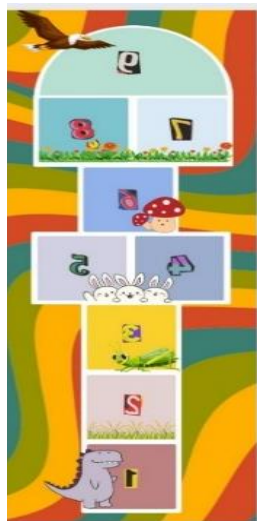
Valuation (%)	Category
81 - 100	Very good
61 - 80	Good
41 - 60	Good enough
21 - 40	Not Good
0 - 20	Very Not Good

(Jannah & Julianto, 2018)

### Result and Discussion

Based on the results of research using the ADDIE development model in the analysis phase, information was obtained that some educators in conducting evaluation activities still use simple media, especially in science learning. The use of simple media in learning evaluation activities results in students feeling bored, bored, and lack of training higher-order thinking skills (Sari & Sutihat, 2022)

At the design stage, media design was carried out using the *Canva* application, besides that researcher also made media using flannel material that was made colorful and also interesting according to the level of students by adding several images. The results of media design in general can be seen as follows:



**Figure 1.** Engklek Game Media Design

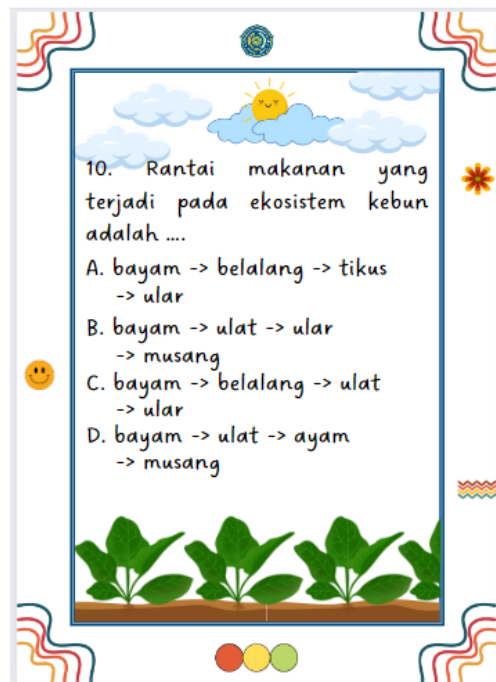
Figure 1 shows the overall design of the engklek game media equipped with interesting images and colors. This is because primary school-age students tend

to be more interested in learning media that contain attractive images and colors (Fitria & Nugroho, 2023).



**Figure 2.** Sun Chip

Figure 2 shows a piece of sun where researchers developed a tool commonly used in *engklek* games into a new work made of flannel and filled with *drakon* then it was named the Sun Piece.



**Figure 3.** Question Card Media Design

In figure 3 shows the design of the question card where the question is a card in which there are HOTS questions, the question card is obtained by students before throwing the sun chip. Then students must answer the HOTS questions, if the answer is wrong, students are not welcome to throw the sun chip and return to the back row to wait their turn.



Figure 4. Infringement Card Media Design

Figure 4 shows the violation card design where the violation card is obtained by students if students step on the boundary line. A violation is a card in which there are also HOTS questions. The use of HOTS questions in learning evaluation activities can improve students' higher-order thinking skills (Agustin Mutia, 2021).



Figure 5. Manual Book Design

The Figure 5 showing the design of the manual book. Manual book is a manual for the use and media guide of *engklek* games based on higher order thinking skills in learning science of class V Elementary School (Eka., 2021).

The third phase of development is the creation of *engklek* game media based on *higher order thinking skills* in science learning in Grade V Elementary School. Products from this game media consist of *engklek* media printed using 280gr flexy std material that is safe and non-slippery, question cards, violation cards, sun chips, and manual books. After completion of the media product, validation by media and material experts takes place in this phase. Media and material experts can help identify weaknesses in media and learning materials (Sidabutar & Reflina, 2022). The following table shows the result of media expert validation.

Table 3. Media Validation Results

Aspects	Acquisition Score	% Average	Category
General View	14	93	Very Worth It
Display Special	12	80	Very Worth It
Serving Media	8	80	Very Worth It
Average and Percentage		84	Very Worth It

Table 3 shows the results of media validation consisting of aspects such as general appearance obtained 93% with a very feasible category, namely media design in accordance with the material food chain. Then the special display aspect obtained a score of 80% with a very decent category, namely color selection, size and media presentation. Furthermore, the aspect of media presentation obtained 80% with a very decent category, namely media that is easy to use anywhere and anytime. So, the average percentage of all aspects is 84% with a very decent category.

This has received revisions from media experts, namely changing the size of question cards and violation cards to be larger. The large size of the learning media can help the students understand the material taught by the educators more easily. The table 4 shows the results of material validation.

Table 4. Material Validation Results

Aspects	Acquisition Score	% Average	Category
Material	17	85	Very Worth It
Construction	15	75	Proper
Language	18	90	Very Worth It
Average and Percentage		83	Very Worth It

Table 4 shows the results of material validation containing aspects such as the material aspect obtained 85% with a very feasible category, that is food chain material in accordance with competence measured. Then aspect construction obtained 75% with the feasible category, that is, the food chain material is clearly formulated. And the language aspect obtained 90% with a very decent category, namely the language used in



accordance with KBBI. So, the average percentage of all aspects is 83% with a very decent category.

Then, material experts give advice on using animal images instead of just animated animal images. The use of images of real animals in the media can make learning activities more interesting and help students to better understand the material presented (Meilani., 2022).

The next stage of development is a trial of higher order thinking skill-based *engklek* game media in Class V science learning in one of the public elementary schools in Bogor Regency. Testing activities for *engklek* game media based on higher order thinking skills in science learning in Class V are shown in figure 6.



Figure 6. *Engklek* game media trials

After the trial of the oak *engklek* game media was carried out, then an analysis was carried out related to the response of students & educators to the *engklek* game media in order to determine its quality. The results of the assessment by educators are shown in Table 5.

Table 5. Educator Assessment Results

Aspects	Acquisition Score	Average (%)	Category
Material	12	80	Very good
Learning	8	80	Very good
Media	19	95	Very good
Percentage Mean		85	Very good

Table 5 shows the results of educator assessments containing aspects of material, media and learning obtained a percentage of 85% with very good categories and the results of student assessments shown in Table 6.

Table 6. Student Assessment Results

Aspects	Score Acquisition	Average Percentage	Category
Learning	1124	85	Very good
Media	502	88	Very good
Percentage Mean		86	Very good

Table 6 shows the results of assessment or student responses containing aspects of learning obtained a score of 85% with very good categories including interest in learning after using the *engklek* game media, getting motivation in learning, can grow and develop high-level thinking and media aspects get a percentage of 88% with the very good category i.e. media display, and media is easy to use. Then the average percentage yields 86% with the very good category.

The final stage is an evaluation of the learning media developed and looking for what are the disadvantages and advantages of this learning media. The development of this game media consists of a manual book, *engklek* game media, question cards, violation cards, and sun chips to replace the clove playing equipment.

Media and material experts commented that the media and material were good enough by going through the previous revision stages. Furthermore, this media is applied in science learning with food chain material to grade V students in one of the public elementary schools in Bogor Regency. After the learning evaluation activity takes place, educators and students assess the game media through questionnaires. Research shows that the use of *engklek* game media can help students practice higher-order thinking skills related to their understanding of chain material food.

Higher order thinking skill-based *engklek* game media provides benefits for students and educators. In line with research conducted by Alika & Radia, (2021) that *engklek* game media has the advantage of having attractive, easy-to-use, and usable images repeatedly. While the weakness of this game media is that it requires a large place or land in carrying out activities using this *engklek* game media.

### Conclusion

Based on the results of this study that the *engklek* game media based on higher order thinking skills is feasible and can be used as a tool for learning evaluation activities in order to train higher-order thinking skills, especially grade V elementary school students in learning science food chain material.

### Acknowledgments

Thanks to the Elementary Teacher Training Study Program of the Faculty of Teacher Training and Education, Muhammadiyah University Prof. Dr. Hamka, who gave researchers the opportunity to conduct this research. Thank you to all parties involved in this research.

### Author Contributions

Conceptualization, Z.K. and P.M.S.; validation, P.M.S.; writing – original draft preparation, Z.K.; writing – review and editing, Z.K. and P.M.S.

### Funding

This research received no external funding

### Conflicts of Interest

The authors declare no conflict of interest.

### References

- Agestiana, V. (2019). *Development of hots-based interactive learning media using applications*.
- Agustin Mutia. (2021). The Effect of Higher Order Thinking Skill (HOTS) Questions on Critical Thinking Skills and Student Learning Outcomes in Theme 8 Sub Theme 3 in Grade IV Elementary School. *Journal of Education: Educational Studies*, 7(2), 18–24. <https://doi.org/10.51836/je.v7i2.234>
- Alika, O., & Radia, E. H. (2021). Development of Learning Media Based on Cross Puzzle Game in Science Learning to Improve Learning Outcomes. *Journal of Science Education Research*, 7(2), 173–177. <https://doi.org/10.29303/jppipa.v7i2.667>
- Antonius Alam Wicaksono & Firsta Bagus Sugiharto. (2021). Implementation of Digital-Based Learning. *Faculty of Tarbiyah Uin Raden Intan Lampung*, 07(1), 6.
- Asharianti, T., & Yulia, E. R. (2021). The Effectiveness of Ethnomathematical Engklek Games on Students' Mathematical Problem Solving Abilities. *Proceedings of the National Seminar on Mathematics Education (SNPM)*, 53–61.
- Eka Yuda Wibawa, A. (2021). Implementation of digital platforms as online learning media at Mi Muhammadiyah Pk Kartasura during the Covid-19 pandemic. *Berajah Journal*, 1(2), 76–84. <https://doi.org/10.47353/bj.v1i2.15>
- Fedinand Banamatuan, M., & Linda Tandjung, F. (2022). *THE EFFECTIVENESS OF LEARNING CHRISTIAN RELIGIOUS EDUCATION USING VISUAL MEDIA IMAGES DURING A PANDEMIC*. (1), 7.
- Fitria, E., & Nugroho, B. P. (2023). *Arabic interactive learning media at SDIT Tiara Az-Zahra Palangkaraya based on Android*. 1(1), 8–16.
- Jannah, M., & Julianto, J. (2018). Development of Digestive System Animation Video Media to Improve Student Learning Outcomes in Class V Science Subjects. *Journal of Elementary School Teacher Education Research*, 6(2), 254798.
- Mawaddah, R., Triwoelandari, R., & Irfani, F. (2022). Eligibility of STEM-Based Science Learning LKS to Improve Collaboration Skills of Elementary / Mi Students. *Journal of Cakrawala Pendas*, 8(1), 1–14.
- Maydiantoro, A. (2019). Research and Development Models. *Journal of Research Methods*, (10), 1–8.
- Meilani, M., Suyadi, S., & Nurdianyah, N. (2022). The Effectiveness of Using Image Media in Learning. *Educational : Journal of Educational Sciences*, 4(5), 7286–7293. <https://doi.org/10.31004/edukatif.v4i5.3370>
- Pranatawijaya, V. H., Widiatry, W., Priscilla, R., & Putra, P. B. A. A. (2019). Application of Likert Scale and Dichotomy Scale to Online Questionnaire. *Journal of Science and Informatics*, 5(2), 128–137. <https://doi.org/10.34128/jsi.v5i2.185>
- Putranta, H. (2023). *Moral Development of Senior High School Students in Physics Learning Based on Traditional Game*. 9(5), 2521–2532. <https://doi.org/10.29303/jppipa.v9i5.2352>
- Sari\*, P. K., & Sutihat, S. (2022). Development of STEAM-Based E-Modules to Improve Higher Order Thinking Skills in Thematic Learning in Elementary Schools. *Indonesian Journal of Science Education*, 10(3), 509–526. <https://doi.org/10.24815/jpsi.v10i3.24789>
- Sari, P., & Gautama, M. I. (2022). Failure Factors for the Development of Learning Media for Sociology Teachers at SMAN 15 Padang. *Educator: Journal of Education and Pedagogy*, 1(1), 78–83. <https://doi.org/10.24036/nara.v1i1.8>
- Sidabutar, N. A. L., & Reflina, R. (2022). Development of High School Mathematics Learning Media with Animaker Application on Vector Material. *Journal of Scholar : Journal of Mathematics Education*, 6(2), 1374–1386. <https://doi.org/10.31004/cendekia.v6i2.1362>
- Sitorus, M. M., Silalahi, L. H., Rajagukguk, H., Panggabean, N., & Nasution, J. (2021). IDEAS Journal of Language Teaching and Learning, Linguistics and Literature THE EFFECT OF HIGHER-ORDER THINKING SKILL (HOTS) IN READING COMPREHENSION. *IDEAS Journal of Language Teaching and Learning, Linguistics and Literature*, 9(1), 455–463.
- Sukmanasa, E., Novita, L., & Maesya, A. (2020). Assistance in making Powtoon learning media for teachers of Cluster 1 Elementary School Bogor City. *Transformation: Journal of Community Service*, 16(1), 95–105. <https://doi.org/10.20414/transformatasi.v16i1.2140>

- Wijnen, F., Walma van der Molen, J., & Voogt, J. (2021). Primary school teachers' attitudes toward technology use and stimulating higher-order thinking in students: a review of the literature. *Journal of Research on Technology in Education*, 0(0), 1-23.  
<https://doi.org/10.1080/15391523.2021.1991864>
- Yu, S. J., Hsueh, Y. L., Sun, J. C. Y., & Liu, H. Z. (2021). Developing an intelligent virtual reality interactive system based on the ADDIE model for learning pour-over coffee brewing. *Computers and Education: Artificial Intelligence*, 2, 100030.  
<https://doi.org/10.1016/j.caeai.2021.100030>
- Yuanita, Y. (2021). Development of Learning Media during the Pandemic Based on Audio Visual and Islamic Values for Elementary Schools. *DIDACTICS TAUHIDI: Journal of Primary School Teacher Education*, 8(1), 31.  
<https://doi.org/10.30997/dt.v8i1.4060>