The Development of Thematic Fun Thinkers Flash Card Media in Improving Scientific Thinking Skills for Second Graders of Elementary Students

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Abstract: This research was motivated by the learning process, which still tends to use the explanation method on the material theme of the environment. The learning objectives have not been achieved optimally, affecting student learning effectiveness. One effort that can be used is by using Flash Card Fun Thinkers media. This study used a research and development (R&D) methodology. Flash Card Fun Thinkers media is based on ADDIE's development steps. The population in this study were 33 Second Graders of Elementary students at SD IT Iqro Stabat. The results of the research showed; (1) the material expert validity test scored 92% and was categorized very well, (2) the media expert validity test scored 86.67%, and it was said as in excellent qualifications, (3) the second graders of Elementary teachers' validity test score was 90%, and it was said in excellent qualifications, (4) individual trials score was of 91.11%, and it was said in excellent qualifications, Small Group trials score was of 90.13%, and it was said in excellent qualifications, Large Group trials score was 88 % and it was said in excellent qualifications. The results showed a significant difference between the learning outcomes of students taught using the thematic Flash Card Fun Thinkers learning media and the conventional learning media.

Abstrak: Penelitian ini dilatar belakangi oleh pembelajaran yang masih cenderung menggunakan metode menjelaskan, dalam materi pada tema Lingkungan tujuan pembelajaran belum tercapai secara optimal sehingga berpengaruh terhadap keefektifan belajar siswa. Salah satu upaya yang dapat digunakan yaitu melalui media Flash Card Fun Thinkers. Penelitian ini menggunakan metodologi penelitian research and Development (R&D). Media Flash Card Fun Thinkers dilakukan berdasarkan langkah-langkah pengembangan ADDIE. Populusi dalam penelitian ini adalah Siswa Kelas II SD Swasta IT Iqro sejumlah 33 oang. Hasil penelitian menunjukkan; (1) uji validitas ahli materi mendapatkan nilai sebesar 92% berdaa dikualifikasi sangat baik, (2) uji validitas ahli media mendapatkan nilai sebesar 86,67% berada pada kualifikasi sangat baik , (3) uji validitas Guru Kelas II mendapatkan nilai sebesar 90% berada pada kualifikasi sangat baik, (4) uji coba perorangan mendapatkan nilai sebanyak 91,11% berada pada kualifikasi sangat baik, uji coba Kelompok Kecil mendapatkan nilai sebanyak 90,13% berada pada kualifikasi sangat baik, uji coba Kelompok Besar mendapatkan nilai sebesar 88% berada pada kualifikasi sangat baik. Hasil penelitian menunjukkan bahwa terdapat perbedaan yang signifikan antara hasil belajar siswa yang dibelajarkan dengan menggunakan media pembelajaran *Flash Card Fun Thinkers* tematik dengan media pembelajaran konvensional.

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A. Introduction

Enhancing the quality of education in Indonesia is essential at this time. Through education, students can develop their self-potential, personality, intelligence, noble character, and competency. According to the Law of National Education System of Republic Indonesia No. 20, the year 2003, article 1, paragraph 1, states that to maximize the learning potential, learning must occur effectively, students must obtain meaningful experiences, and education can develop students who contribute to society and nation-building (Putri & Handayani, 2021).

Learning potential optimization can be implemented through a curriculum, *Kurikulum Tingkat Satuan Pendidikan* (KTSP) (Baedhowi, 2007). A thematic learning system implements the implementation of Kurikulum Tingkat satuan Pendidikan (KTSP) for the first, second, and third Elementary graders. A thematic learning system is a learning system which is used a specific theme combined with several learning materials.

Piaget's Psychology theory supports the thematic learning system, which emphasizes that learning must be meaningful and students need development oriented (Juanda, 2019). The thematic learning approach emphasizes the concept of learning by doing. Students will learn a theme and various subjects in the thematic learning system. Students learn not only one subject, but they can also explore their knowledge from various materials that have been studied.

A scientific approach should support thematic learning system development. A scientific approach is an approach that provides opportunities for students to be more active in expressing opinions based on their understanding. KTSP learning system contains five elements: observing, questioning, trying, reasoning, and communicating (Maulina et al., 2018).

Based on the observation, the problem in elementary schools is the need for more media teachers to use in the thematic learning system. Teachers prefer teaching materials separately based on the subjects. Conversely, it was also found that teachers need more creative learning media. They only used whiteboards and books as teaching media. They tend to explain more, making students feel bored and need help understanding the learning material explained by the teachers (Shafa et al., 2022). Students sometimes do activities unrelated to learning, such as disturbing their friends, chatting, and doing uncontrolled behavior in the classroom. Therefore, the learning objectives carried out can not be achieved optimally.

Effective media in supporting scientific learning implementation has five elements such as (observing, questioning, trying, reasoning, and communicating). An effective medium in supporting those five elements of the learning process is the Flash Card Fun Thinkers media.

This research was conducted to identify whether the Thematic Fun Thinkers Flash Card Media can Improve the Scientific Thinking Ability of second graders at SD Swasta IT Iqro and become an interactive learning media supporting the scientific learning approach on the material of "Environment".

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B. Method

The type of this study was Educational Research and Development (R&D). Educational Research and Development (R&D) is a process used to design new products and procedures which are systematically field-tested, evaluated, and refined until they meet specified criteria of effectiveness, quality, or similar standards. R&D research in education is a process used to develop and determine the validity of a product (Hanafi, 2017). The development research carried out in this study was designing a product of Thematic Fun Thinkers Flash Card Media as a learning medium to Improve Scientific Thinking Ability for Second Graders of Elementary students at SD IT Iqro.

The experts validated the product (Aristia et al., 2020). The experts are the lecturers from PGSD Study Program and media experts. The learning resources and media were then tested on the second graders of Elementary students of SD Swasta IT Iqro Stabat on the material "Environmental Love". This stage showed the feasibility level of the Thematic Fun Thinkers Flash Card media product to be used as a learning resource for second graders of Elementary students of SD Swasta IT Iqro Stabat.

The development method used is the 4D method which was modified into 3D (Define, Design, Development) (Noverita et al., 2021). This method answered whether developing Thematic Fun Thinkers Flash Card media for second Graders of Elementary Students of SD IT Iqro Stabat could be valid, practical, and effective in improving students' scientific thinking skills.

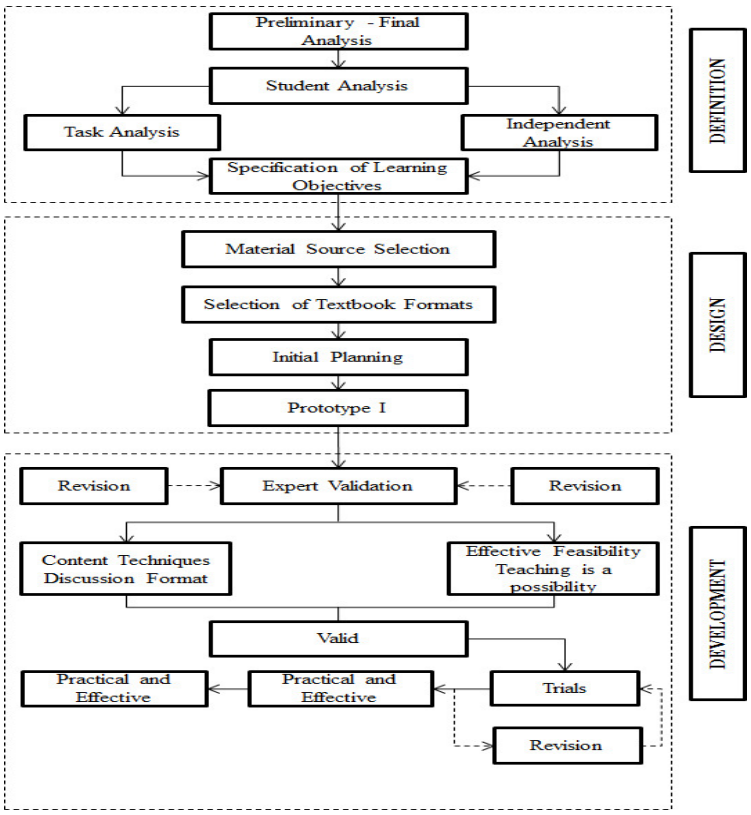

Figure 1. Scheme of Development Procedure

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There are ten steps in implementing the research strategy that has been selected in this study, namely the Borg and Gall strategy (Effendi & Hendriyani, 2016):

1) Research and information collecting. Measurement of a literature study, needs, small-scale research, and a particular consideration in terms of value;
2) Planning. Research planning, including the skills needed when carrying out the research, the formulation of the objectives to be achieved with the research, the steps of a study, and the possibility of testing in a limited scope;
3) Development of product drafts (develop a preliminary form of product). Develop a learning material, learning process, and evaluation instrument;
4) Preliminary field testing. Trials mean conducting observations, interviews, and questionnaires that are disseminated;
5) Revise the test results (major product revision). Improve or improve the results of the trial;
6) Field trial (main field testing). Trials conducted in the field;
7) Improvement of field test products (operational product revision). Refining products from results that have been tested in the field;
8) Operational field testing. Observation, interviews, questionnaires, and analysis of results carry out this test;
9) Final product revision. Refining products based on inputs from field implementation tests; and
10) Dissemination and implementation. Report the results in meetings with professionals and in journals.

Research Product Trials are designed for trials to determine how high the quality of the products developed by researchers is (Rifanty, 2019). The feasibility of the product is tested and then used as a learning resource for students. Material experts and media experts carried out product assessments. Phase I was revised, the product was reassessed by PGSD Study Program lecturers and Media Experts, and then a phase II revision was carried out.

After that, the product was tested by the students before it became the final product which became the source of learning material on the topic of Environmental Love (Rajagukguk et al., 2022). The validators in this study were PGSD Lecturers and learning media experts. The tested subjects in this study were second graders of Elementary Students of SD Swasta IT Iqro Stabat.

The task of the Head of the Research team was Analyzing Research needs, formulating research objectives, preparing learning media and research instruments, implementing research, collecting data, and compiling journal articles. The research team members helped to prepare learning media and research instruments, assisted in the implementation of research, collected data, and prepared reports.

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C. Results and Discussion

Result

Learning media development is based on the ADDIE model (Hayati, 2017). The procedure in the development of flashcard learning media on the subject of the diversity of Indonesian ethnic groups and cultures, second-grade of social studies subjects for students at SD Swasta IT Iqro Stabat is divided into five stages, namely: First stage: subject analysis, Second stage: making development designs The third stage: developing learning media, Fourth stage: installing learning media, and Stage five: implementation of trials (Mukhtar, 2015).

The flash card learning media product development testing is carried out in three stages, namely, individual test, small group test, and field test. In addition, trials are also carried out by subject matter experts, learning media expert tests, and teacher tests as users. This development product was tested on the second graders of SD Swasta IT Iqro Stabat Elementary students with a total of 33 students.

The types of data recorded in this development research were data types about: (1) Data types which were not the flashcard as learning media development products made by Material Experts, (2) Feasible data types are not flashcard learning media development products made by Learning Media Experts, (3) Feasible data types are not flashcard learning media development products made by Learning Media Experts, (4) Types of exciting data was whether flashcard learning media development products made by students.

The data analysis technique in this study was collected from several stages of product trials using content analysis of skin data and descriptive statistics with percentages of quantitative data. This data processing technique aims to describe and analyze the data groups without making or drawing conclusions from the observed data. To revise the products the Minimum Passing Grade Criteria were used to revise the product without any changes by the developer (Ahmad & Muslimah, 2021). In addition, an analysis of student learning outcomes was carried out, measured by minimum Passing Grade Criteria or KKM.

a. Material Expert Trials

The results of the Material Expert trials of *flashcard* media development products can be seen in Table 1 below.

Table 1. Material Expert Validity Test Results

No	Assessment Aspects	Assessment Aspects Statement	Total
1	Format	1. Conformity of the material to the learning objectives.	5
		2. Completeness of study aid materials.	5
		3. Quality of study aid materials	4
		Number of Variables	**14**
2		4. Presentation of the material following the formulated goals.	5
		5. The relevancy of learning objectives.	5
		6. The material is under the level of ability of the learners.	4

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	Content of the Material	7. The precision of the media with the truth of the material.	5
		8. The conformity of the media to the truth of the material.	5
		9. Depth of material presented	4
		Number of Sub Variables	**28**
3	Material	10. Appropriateness of the use of the language used.	
		Number of Sub Variables	**4**

Based on the calculations mentioned above, it can be concluded that the validity test of material experts is against obtaining a value of 92%. Furthermore, according to the Assessment Measures and the Weight of Material Experts, this 92% value belongs to the "Very Feasible" category.

b. Media Expert Validation

The results of the Media Expert validity test against *flashcard* media can be seen in Table 2 below.

Tabel 2. Media Expert Validity Test Results

No	Assessment Aspects	Alternative Answers Statement	Total
1	Display	1. The text is well-legible.	5
		2. Proportional layout (layout of text and images).	4
		3. Background selection suitability.	4
		4. Color proportion compliance.	5
		5. Conformity of the choice of typeface and font size.	4
		Number of Variables	**22**
2	Content/Material Cohesiveness	6. Image fidelity used for clarity	4
		7. Compatibility of the image with the material.	5
		8. Order of presentation of the material	3
		9. Clarity of material description	4
		Number of Sub Variables	**16**
3	Communication or Visual	10. Communicative	5
		11. Simple and alluring	5
		12. Creative	4
		Number of Sub Variables	**14**

Based on the calculations above, it can be concluded that the validity test of media experts got a value of 86.67%. According to the assessment measure along with the weight of the media expert, this 85% value belongs to the category of "Very Worthy"

c. Trials of Second-Grade Elementary Teachers

The results of the Second Grade Elementary Teachers trial at SD Iqro Stabat Private Primary School can be seen in Table 3 below.

Tabel 3. Second Grade Elementary Teachers Validity Test Results

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No	Assessment Aspects	Alternative Answers Statement	Total
1	Format	1. The text is well-legible.	9
		2. Proportional layout (text and image layout).	8
		3. *Background* selection suitability.	8
		4. Color proportion compliance.	8
		Number of Variables	**36**
2	Display	5. Interesting images	8
		6. Clear/non-blurry images	8
		7. Interesting color combinations	7
		8. Easy-to-read text	9
		9. The text helps clarify the image in the card	8
		10. Use learning objectives	10
		11. The material under the learning objectives	10
		12. The image clarifies the material you want to convey	10
		13. Easy-to-follow material	8
		14. Media supports learners in self-study	10
		15. Media using paper that is suitable for use	8
		16. Flash Card media size meets the standards	10
		Number of Sub Variaels	**106**
3	Language	17. The language used is easy for learners to understand	8
		18. The sentences used are already effective	9
		19. Use of words according to enhanced spelling (EYD)	9
		Number of Sub Variables	**26**
4	Fill	20. How to use *flashcards* for teachers is appropriate	10
		21. The *flashcard* media material is by the indicators	8
		22. *Flashcard* media material is under the learning objectives	9
		23. *Flashcard* media material is under RPP	10
		24. The *flashcard* media material is under the learning syllabus	10
		25. The sentences/information needed by students are complete	7
		26. There is an error in the writing of scientific names	7
		27. The general description of the image is correct	8
		28. There is a caption explaining the intent of the image	8
		29. *Flashcard* media is suitable for use in social studies learning	9
		30. *Flashcard* media can help make it easier for students to understand the subject matter of the diversity of Indonesian Ethnic Groups and Cultures.	10
		31. The content of *flashcard* media can increase the motivation of students to learn social studies.	10
		32. The exploration of the Diversity of Indonesian Ethnic Groups and Cultures in general in the picture.	8
		33. How to use *flashcards* for teachers is clear	10
		Number of Sub Variables	**124**

Based on the calculations mentioned above, it can be concluded that the validity test of second-grade Elementary Teachers gets a score of 90%. According to the assessment's size and weight, this 90% value belongs to the "Very Worthy" category.

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d. Individual Trials

Based on the trial data obtained from the three students, the results can be seen in table 4 below.

Table 4. Individual Trial Results

No	Assessment Aspects	Alternative Answers Statement	Total
1	Tampilan	1. The text is well legible.	15
		2. Proportional layout (text and image layout).	11
		3. Background Selection Suitability.	14
		4. Text size and legible typeface.	12
		5. Illustrations, colors, and supporting images	14
		6. Media appeal	15
Jumlah Variabel			**81**
2	Content of the Material	7. Suitability of the image to the material	14
		8. Clarity of the structure of the material presented	14
		9. Terms of Use	15
		10. Material according to the formulated purpose	14
		11. Easy to understand the material	15
		12. Depth of material presented	15
Number of Sub Variaels			**87**
3	Benefits	13. Suitability of language use.	14
		12. Increase motivation in the teaching and learning process	14
		13. The subject matter will be more clearly understood	14
Number of Sub Variables			**42**

Based on the calculations mentioned above, it can be concluded that individual trials get a value of 91.11%. According to the "Assessment Measure along with the Weight of Student Response Values", this score of 91.11% belongs to the "Very Attractive" category.

1. Small Group Trials

The results of the data collection of small group trials (10 students) can be seen in Table 5 below.

Table 5. Small Group Trial Results

No	Assessment Aspects	Alternative Answers Statement	Total
1	Display	1. The text is well-legible.	46

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		2. Proportional layout (text and image layout)	48
		3. Background Selection Suitability	44
		4. Text size and legible typeface	41
		5. Illustrations, colors, and supporting images	46
		6. Media appeal	44
Number of Variables			**269**
2	Content of the Material	7. Suitability of the image to the material	48
		8. Clarity of the structure of the material presented	44
		9. Terms of Use	48
		10. Material according to the formulated purpose	44
		11. Easy to understand the material	41
		12. Depth of material presented	46
Jumlah Sub Variael			**271**
3	Benefits	13. Make it easier for learners to understand.	
		14. Increase motivation in the teaching and learning process	14
		15. The subject matter will be more clearly understood	14
Number of Sub Variables			**42**

Based on the calculations mentioned above, from all aspects, the instrument for students in the Small Group trial got a score of 90.13%. According to the Assessment Measure along with the Weight of the Student Response Value, this 90.13% score belongs to the "Very Attractive" category.

16. Large Group Trials

The results of this large group trial (20 learners) can be seen in Table 6 below.

Table 6. Results of Large Group Trials

No	Assessment Aspects	Alternative Answers Statement		Total
1	Display	1. The text is well-legible.	5	95
		2. Proportional layout (text and image layout)	5	91
		3. Background Selection Suitability	6	96
		4. Text size and legible typeface	7	97
		5. Illustrations, colors, and supporting images	4	94
		6. Media appeal	5	95
Number of Variables				**568**

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2	Content of the Material	7. Suitability of the image to the material	5	95
		8. Clarity of the structure of the material presented	7	96
		9. Terms of Use	8	98
		10. Material according to the formulated purpose	5	95
		11. Easy to understand the material	4	94
		12. Depth of material presented	5	92
Number of Sub Variaels				**570**
3	Benefits	13. Make it easier for learners to understand.	7	96
		14. Increase motivation in the teaching and learning process	5	92
		15. The subject matter will be more clearly understood	4	94
Number of Sub Variables				**282**

Based on the results of the calculations mentioned above, it can be concluded that from all aspects the instrument for learners in the Large Group trial got a score of 88%. According to the Assessment Measure along with the Weight of the Student Response Value, this 88% score belongs to the "Very Attractive" category.

e. Data Analysis

1) Material Expert Validation Data Analysis

The results of the material expert validation data (Elfi Lailan Syamita Lubis, M. Pd.) against using *flashcard* media based on data collection obtained a score of 92%. The score gained was (92%), it can be concluded that the score was in "Very Worthy". Category. Meanwhile, when reviewed, the score was 92%, including "Very Feasible, does not need to be revised".

The notes put forward by Elfi Lailan Syamita Lubis, M. Pd as a Material Expert Validator include (a) "Format" media *flashcard*, especially about: (1) the suitability of the material with learning objectives and (2) the completeness of learning aid materials. Meanwhile, regarding the quality of learning aid materials in the form of *flashcard* media according to the Material Expert, it includes the category of "Feasible", (b) "Content of Material," which includes: the presentation of material under the formulated objectives, the relevance of learning objectives, the accuracy of media to the truth of the material, and the suitability of the media with the truth of the material, categorized as "Very Feasible", and (c) "Language", namely "Suitability of the use of the language used", judged "Feasible", (Ramastuti et al., 2018).

2) The Data Analysis of Media Expert Validation

The results of the data analysis from the Media expert validator (Kiki Pratama Rajagukguk, M. Pd). It was found that using *flashcard* media, it was scored 86.67%. It can be

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concluded that the score belongs to the "Very Worthy" category and does not need to be revised" (81%-100%).

The notes put forward by Kiki Pratama Rajagukguk, M. Pd as a Media Expert Validator include (a) "Very Worthy" on the aspects of "Display" assessment, especially about: (1) the text can be read well, and (2) the appropriateness of color proportions. "Feasible" (1) symmetrical layout (text and image layout), (2) *suitability of background selection,* and (3) suitability of typeface and font size selection; (b) "Very Worthy" of the assessment aspect of "Content/Material Cohesion", in particular on "Conformity of the image to the material". "Decent" on "Accuracy of images used for clarity of material" and "Clarity of material description". "Quite Worthy" is about "Order of presentation of material"; (c) "Very Worthy" of the assessment aspects of "Visual Communication", in particular on "Communicative" and "Simple and alluring". "Decent" is given to "Creative", and (d) The color that is the background of the *flashcard* media needs to be given the same color (Rajagukguk et al., 2021).

3) Students' Trials

Individual Trials

The calculation results of student trials, especially for individual trials, indicated a score of 91.11%. This 91.11% score belongs to the "Very Interesting" quantitative assessment category with the eligibility level category "Worth it, no revision needed".

Small Group Trials

The results of the trial calculation of small group students got a score of 90.13%. This score of 90.13% belongs to the "Very Interesting" quantitative assessment category. An individual trial score of 90.13% is confirmed to be in the "Eligible once, no revision" eligibility category.

Large Group Trials

The results of the calculation of student trials, especially for large group trials, received a score of 88%. This 88% value belongs to the "Very Interesting" quantitative assessment category.

f. Product Revisions

Based on the validation of material experts, media experts, teacher trials, and student trials, both individual group trials, small group trials, and large group trials, it can be concluded that development products in the form of *flashcard* media are suitable for use without going through revisions. Revisions only to *the flashcard media background* need to be changed in color so that it becomes one color only.

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Discussion

*Flashcard*s are a practical and applicable graphic media (Mulyorini & Hariani, 2014). From the definition of *flashcard* above, a practical study card has two sides, with one side containing an image, text, or symbol sign and the other side being a definition, image caption, answer, or description that helps remind or direct students to something related to the image on the card. Thus, it can be concluded that *flashcards* have the following characteristics (Akbar, 2022): (1) *Flashcards* are effective picture cards, (2) they Have two front and back sides, (3) The front side contains images or symbol marks, (4) The back side contains definitions, image captions, answers, or descriptions, and (5) It is simple and easy to make them.

The development of this learning media produces a learning media where the media produces differences in the learning process. The difference can be seen from the differences produced in this research (Maryanto & Wulanata, 2018), where students who are in the learning process using learning media Thematic Fun Thinkers Flash Card Media in Improving Scientific Thinking Ability to second graders of Elementary Students. After going through several stages of development and trials, the development product with flashcard media is suitable for use in the learning process for second graders of elementary students.

D. Conclusion

Based on the research findings and discussion, it can be concluded as follows: (1) After going through the preparation process of developing Thematic Fun Thinkers Flash Card Media in Improving Scientific Thinking Ability for second graders of Elementary Students of Social Studies subjects at SD IT Iqro Stabat for the Competency Standards "Understanding the history, appearance of nature, and diversity of ethnic groups in the district/city and provincial environment", then the *flashcard*s media was arranged according to competency standards, (2) The validation process starts from the validation of material experts, media experts, teachers, Second graders of Elementary Students of SD Swasta IT Iqro. Based on this validation, then revisions and improvements were conducted based on the input from the material experts, media experts, teachers, and students, (3) After suggestions for the improvement, the thematic Fun Thinkers flashcard media then determined "worthy" to be used for social studies of second graders of elementary students, and (4) The final product of development was in the form of *a flashcard* The Competency Standard "Understanding the history, appearance of nature, and ethnic diversity in the regency/city and province" has been revised and improved as material experts and media experts suggested it.

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