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Development of Interactive Multimedia Based on Learning Cycle 5E in IPAS Learning for Fourth Grade Elementary School

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Abstract: This research aims to develop interactive multimedia based on the 5E learning cycle called MIKBI in science and social learning for grade IV elementary schools. The method in this research uses R&D by adapting the ADDIE development model with stages, namely: 1) Analysis, 2) Design, 3) Development, 4) Implementation, and 5) Evaluation.. The research was carried out at SDN Tanjung Barat 07 with 28 test subjects. Product validity is measured through the assessment of material experts obtained an average score of 92.00% with very decent criteria, media experts gain value 91.76% with very feasible criteria, and linguists gain marks 92.00% with very feasible criteria.Product validity results shows an average value of 91.92% with very feasible criteria. Product testing is carried out in 3 stages, namely one-to-one evaluationan average score of 85.13% with a very decent category, small group evaluation obtained a score of 85.85% in the very feasible category, and the field test evaluation trial obtained a score of 87.08% in the very feasible category so that the average feasibility percentage score obtained at the student trial stage was 86.02% with very feasible criteria. The results of the research show that MIKBI is very suitable for use as science learning media for Indonesian Cultural Wealth material for class IV elementary schools.

Keywords: Interactive multimedia, Leaning cycle 5E, IPAS

PRELIMINARY

In the current digital era, teachers have great demands in improving students' skills in the 21st century, known as the 6Cs, namely character, citizenship, critical thinking, creativity, collaboration, and communication (Triana et al., 2023). It is hoped that teachers can develop 21st century learning plans to develop students' potential through the use of computer-based technology and online media. Students potential can be developed through assignments that require the use of computer-based technology and online media. The combination of Ilmu Pendidikan Alam (IPA) and Ilmu Pendidikan Sosial (IPS) subjects into Ilmu Pendidikan Alam dan Sosial (IPAS) in the independent curriculum provides a new nuance of learning in education. Natural science and social studies subjects are combined into one at elementary school level because elementary school age

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children tend to see everything as a whole and integrated. Apart from that, they are still in the concrete/simple, holistic and comprehensive thinking stages, but not in detail. It is hoped that the combination of science and social studies lessons will trigger children to be able to manage the natural and social environment in one unit.

Learning Social Sciences (IPS) in IPAS is one of the mandatory lessons at the elementary school, junior high school and high school education levels in Indonesia. The definition of social studies learning according to the Republic of Indonesia Minister of National Education Regulation Number 22 of 2006 is learning that examines a set of events, facts, concepts and generalizations related to social issues. The National Council for the Social Studies (NCCS) states that the main objective of IPS is to support the younger generation to improve their ability to assemble information and make rational decisions for the good of society due to cultural differences (Nashrullah, 2022). Students will experience serious challenges in the future because society is always changing. Hamid Hasan believes that the characteristics of social studies learning are based on aspects of intellectual objectives in the development of social studies education, namely intellectual aspects, social life and individual life (Rezania & Afandi, 2020). Science learning directs students to become responsible, democratic and peace-loving Indonesian citizens (Parni, 2020). According to Muh. Numan Soemantri, IPAS is a streamlined version of social science and humanities courses, along with fundamental human activities, that are arranged and presented in a way that is both psychologically and scientifically pedagogical for teaching purposes in elementary and secondary education (Fatmawati & Dewi, 2023).

Learning Social Sciences (IPS) in science learning in elementary school is a field of study that studies how life is in society which contains facts, concepts and issues related to scientific disciplines such as anthropology, archaeology, economics, geography, history, law, philosophy, science. politics, psychology, religion, and sociology, as well as appropriate content from the humanities, mathematics, and natural sciences. The focus of social studies learning in science learning is to form responsible, democratic and peace-loving behavior in students and increase knowledge about social life and the culture within it. The social studies curriculum at the basic education level focuses only on issues and social phenomena that are covered in geography and history. In particular, the signs

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and social issues of everyday living that affect elementary school pupils' surroundings (Yusnaldi et al., 2023).

In learning activities, teachers can apply various variations of learning media. The choice of learning media must be in accordance with the learning material, needs, and characteristics of students. Gagne stated that media are all elements in the student's environment that can arouse the student's desire to learn (Sapriyah, 2019). On the other hand, the AECT (Association of Education and Communication Technology) Institute stated the limitations of media as a means of conveying messages or information using all forms and channels (Kustandi, C & Darmawan, D, 2020). The function of learning media is to focus students' attention, trigger students' emotions and motivation, and synchronize perceptions (Pagarra et al., 2022). Media aims to attract students' attention, increase motivation and interest in learning. Therefore, learning media is really needed in learning so that students can more easily digest learning material.

One of the learning media that can be used in learning is interactive multimedia. Multimedia is a term consisting of two words, namely "multi" from Latin which means many or various, and "medium" from Latin which means an intermediary or tool for delivering, conveying or carrying something (Indrawan, Irjus., 2020). Learning using interactive media provides opportunities for students to explore and study the material. The previous statement is in accordance with the definition of interactive multimedia according to Sarwiko. According to Sarwiko, interactive multimedia is a combination of various media. Interactive multimedia is a combination of text, graphics, audio, moving images (video and animation) into one unit with appropriate links and tools using a computer. Multimedia users can navigate, interact, create and communicate (Saputra & Alexon, 2023).

Undoubtedly, a learning model is necessary for the learning process. According to Joyce and Weil, a learning model is a scheme or pattern that may be applied to create learning resources, formulate curriculum (long-term learning plan), and direct learning in a classroom or other setting. When developing curricula and learning materials, the learning model serves as a guide. Teachers can accomplish their learning objectives with the aid of an effective and suitable learning model.(Putri & Umar, 2023). A learning model is a design or guideline in learning that is used to form a curriculum and design learning materials to achieve learning objectives. One learning model that can be applied

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in schools is Learning Cycle 5E. Sayuti believes that Learning Cycle 5E (LC) is a learning model that focuses on exploration before students are taught scientific principles (Putri & Umar, 2023). In the 5E Learning Cycle model, students actively build their knowledge, while teachers play more of a role as facilitators and learning mediators. Students learn actively at every stage so that students' learning outcomes can improve (Arifin et al., 2024). The stages of the Learning Cycle 5 learning model are engagement, exploration, explanation, elaboration, and evaluation (Fadly, 2022). The 5E Learning Cycle model emphasizes problem-solving and exploration as key components of the learning process. The teacher serves as a facilitator for the students' learning, and learning is accomplished by fusing newly acquired and previously acquired knowledge (constructivist).

Geniallly is one of the software that teachers can use to develop interactive multimedia. Genially is an online learning media that can help teachers create creative and innovative teaching materials in the form of presentation materials, games, learning videos, and others (Enstein et al., 2021). Teachers can easily create interactive multimedia by utilizing templates, features and buttons that are provided free of charge by Genially. Some of the disadvantages of Genially are that it requires additional costs if you need more complete features, it is only available in English, Spanish and French and requires an internet network when accessing Genially.

The development of interactive multimedia needs to be adapted to the characteristics of students. Meanwhile, elementary school children enter the stage of concrete operational understanding. Among the most well-known theories of cognitive development is Piaget's developmental theory. According to Piaget's theory, children in primary school, who are typically between the ages of 7 and 11, are in the concrete operational stage, which is the third of his six phases of cognitive development. The infant is said to be capable of logical thinking at this point about anything that is concrete, but they are not yet able to reason about abstract concepts.(Khaulani et al., 2020). Characteristics of class IV students according to Nursidik, namely, they like to play, like to move, like to work in groups, and like to feel, do, or demonstrate something directly (Midiyanto & Hunaifi, 2022). Therefore, teachers must be able to implement interesting, creative and innovative learning in accordance with student development so that students can understand the learning being taught.

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Researchers found some data from observations when implementing Teaching Skills Practices (PKM) and from interviews with class IV C teachers, it was discovered that the learning carried out used media in science learning such as PowerPoint, videos and pictures. However, teachers still have difficulty developing cultural material learning media because additional learning resources are limited. The teacher stated that the available learning media did not cover enough science learning material in class so teachers needed to use additional learning media which contained more complete material. The use of digital technology in learning is not optimal so that the learning process becomes less meaningful and makes students feel bored and sleepy. Meanwhile, in interviews with students, students said that they still had difficulties in studying science because there was quite a lot of material about Indonesia's cultural riches and required analytical skills in determining cultural differences between one region and another. The learning media that teachers use also displays more writing and is only limited to pictures and videos so there is less variety.

Based on previous research by Lovandri Dwanda Putra and Nuryah Afrina in 2023 with the title "The development of genially-based interactive learning multimedia for elementary school students." The results of this research were validation from media experts with a score of 71, validation from material experts got a score of 86.6, and validation from learning experts got a score of 80. The validation results showed that Genially-based interactive multimedia learning was made feasible and interactive to be applied in the learning process (Putra & Afrina, 2023).

Based on the problem description above, the problem formula of this research is how to develop interactive multimedia based learning cycle 5e on learning IPAS cultural wealth of Indonesia material in grade IV elementary school and how the level of interactive multimedia qualification based on the 5e cycle is called MIKBI in the learning of IPAS material about Indonesian Cultural Wealth in class IV elementary school. The aim of this research is to find out how to develop interactive multimedia based on learning cycle 5E and know the level of interactive multimedia based learning cycles 5E named MIKBI on learning IPAS material Cultural Wealth Indonesia class IV elementary school. Therefore, researchers will conduct research and development (R&D) entitled "Development of Interactive Multimedia Based on the 5E Learning Cycle in Class IV Elementary School Science Learning".

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METHOD

This research uses the R&D (Research and development) research method, which is a process applied to develop and validate educational products or procedures (Rashid, 2022). The focus of this research is on the creation and assessment of the feasibility of a product, especially learning media. The feasibility of this learning media is assessed based on its relevance to the problems identified in the needs analysis. The product was then tested by a number of experts to assess the suitability of the media for use in the students' learning process.

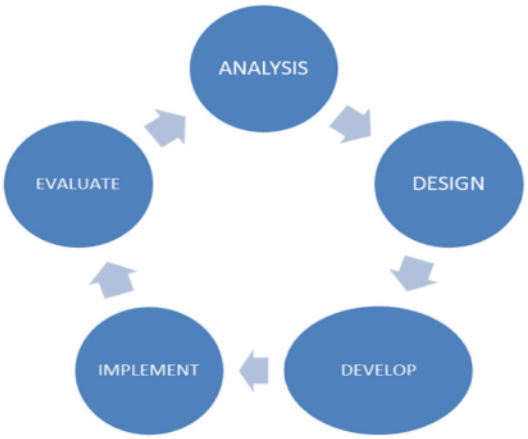

Figure 1. ADDIE stages (Rayanto & Sugiyanti, 2020)

This development research implements the ADDIE model because this model highlights excellence in each stage of the development process. The ADDIE model stages include several stages. First, the analysis stage, namely carrying out a needs analysis to find information related to learning strategies, learning processes, student characteristics, and the learning media used. Data collected from several aspects was collected using interview techniques conducted with one of the class IV teachers and 3 students in class IV at SDN Tanjung Barat 07 am. Second, the design stage, where a sketch or design of learning needs is created which will be developed by making a flowchart or storyboard. Technology-based design requires additional supporting tools, such as software, computer hardware, internet networks, and others (Budiman et al., 2019). Third, development, namely developing interactive multimedia based on plans or designs that have been created previously. The multimedia that has been developed is then given to experts for the review and testing process. The assessment was carried out by three

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experts, including the assessment by material expert Prof. Dr. Arifin Maksum, M.Pd., assessment by linguist Dr. Uswatun Hasanah, M.Pd., and assessment by media expert Drs. Dudung Amir Soleh, M.Pd. Fourthly, implementation was done using student tests, including one-on-one evaluation tests with three students, small-group assessment tests with ten students, and field evaluation trials with fifteen students. The test was conducted to measure the level of viability of interactive multimedia based on the 5E cycle and to find out whether the multimedia developed is in line with the learning needs in the classroom. Fifth, evaluation is carried out simultaneously with the development and implementation stages. In this research, researchers chose the ADDIE model because the ADDIE development model has the advantage of systematic stages. Apart from that, each process can be evaluated and revised from the stages passed, so that the resulting product is valid. The data collection techniques for this research are observation, interviews and questionnaires. The data analysis techniques used in this research are qualitative descriptive analysis and quantitative descriptive analysis. The assessment in this questionnaire uses a Likert scale with five scales, including scale 1 is very inadequate, scale 2 is not feasible, scale 3 is quite feasible, scale 4 is feasible, scale 5 is very feasible. The subjects of this research were 28 class IV students at SDN Tanjung Barat 07 Pagi. The percentage results are then interpreted in a qualitative sense based on the feasibility table according to Riduwan (Riduwan & Sunarto, 2017) in the following table:

Table 1. Interactive Multimedia Eligibility Criteria

Percentage	Criteria
0% - 20%	Totally Not Worth It
21% - 40%	Not feasible
41% - 60%	Decent Enough
61% - 80%	Worthy
81% - 100%	Very Worth It

RESULTS

This development research produced interactive multimedia called MIKBI (Multimedia Interaktif Kekayaan Budaya Indonesia) in class IV science and social learning in elementary schools, material on Indonesian Cultural Wealth which is found in Chapter 6 "Indonesia is Rich in Culture" Topic B "Indonesian Cultural Riches". This product is tested for suitability through expert testing and product trials on students. The results of the trial assessments that have been carried out are as follows:

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Table 2. Material Expert Recapitulation Results

No.	Aspect	Question Items	Earned Score	Maximum Score	Percentage
1.	Content Components	6	29	30	96.67%
2.	Presentation Components	7	31	35	88.57%
3.	Model Learning Cycle 5E	2	9	10	90.00%
Amount		15	69	75	275.24%
Overall Average					92.00%
Eligibility Category					Very Worth It

Based on validation results from material experts, namely Prof. Dr. Arifin Maksum, M.Pd. It can be concluded that the material content of MIKBI chapter 6 "My Indonesia is Rich in Culture" material on "Indonesian Cultural Riches" class IV elementary school is good and very worthy of being tried out with revisions for students. The validation results show the category is very feasible with a percentage of 92.00%. This is proven by the achievement of scores from 15 questions reaching a value of 69 out of 75.

Table 3. Linguist Expert Recapitulation Results

No.	Aspect	Question Items	Earned Score	Maximum Score	Percentage
1.	Linguistic Components	8	37	40	92.50%
2.	Typography	2	9	10	90.00%
Amount		10	46	50	182.50%
Overall Average					92.00%
Eligibility Category					Very Worth It

Based on validation results from language experts, namely Dr. Uswatun Hasanah, M.Pd. It can be concluded that the linguistic and typographic components of MIKBI in learning science and social chapter 6 "My Indonesia is Rich in Culture" material on "Indonesian Cultural Riches" for class IV elementary school are good and very worthy of being tried out with revisions for students. The validation results show the category is very feasible with a percentage of 92.00%. This is proven by the achievement of a score from 10 questions reaching a value of 46 out of 50.

Table 4. Media Expert Recapitulation Results

No.	Aspect	Question Items	Earned Score	Maximum Score	Percentage
1.	Graphics	17	78	85	91.76%
Overall Average					91.76%
Eligibility Category					Very Worth It

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Based on validation results from media experts, namely Drs. Dudung Amir Soleh, M.Pd. it can be concluded that MIKBI science and social chapter 6 "My Indonesia is Rich in Culture" material on "Indonesian Cultural Riches" class IV elementary school is good and very worthy of being tried out with revisions for students. The validation results show the category is very feasible with a percentage of 91.76%. This is proven by the achievement of scores from 17 questions reaching a value of 78 out of 85.

Based on the test results of media experts, material experts and language experts, the following are the results of the expert review recapitulation of MIKBI in science and social learning for grade IV elementary schools:

Table 5. Expert review data recapitulation results

No.	Respondent	Percentage
1.	Materials Expert	92.00%
2.	Linguist	92.00%
3.	Media Expert	91.76%
Overall average		91.92%
Eligibility category		Very Worth It

Based on validation results by material experts, language experts and media experts, it was found that the validity level of MIKBI was 91.92% with a very feasible category. After the interactive multimedia has been validated by experts, product trials are then assessed to students. The trials carried out included one-to-one evaluation trials, small group evaluations, and field test evaluations. The results are as follows:

Table 6. Results of one-to-one evaluation recapitulation

No.	Name	Question Items	Earned Score	Maximum Score	Percentage
1.	Z	15	52	65	80.00%
2.	RSAH	15	58	65	89.23%
3.	AZA	15	56	65	86.15%
Amount					255.38%
Overall Average					85.13%
Eligibility Category					Very Worth It

Based on the results of a one-to-one evaluation trial which was attended by 3 class IV students at SDN Tanjung Barat 07 Pagi, interactive multimedia received a score of 85.13% and was included in the very feasible category with a range of 81%-100%. This assessment indicates that interactive multimedia is good and suitable for use.

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Table 7. Recapitulation results of small group evaluation

No.	Name	Question Items	Earned Score	Maximum Score	Percentage
1.	AS	15	55	65	84.62%
2.	MD	15	61	65	93.85%
3.	DAF	15	57	65	87.69%
4.	E	15	52	65	80.00%
5.	AF	15	54	65	83.08%
6.	KRP	15	57	65	87.69%
7.	NABH	15	61	65	93.85%
8.	TMH	15	53	65	81.54%
9.	VA	15	56	65	86.15%
10.	IDP	15	52	65	80.00%
Amount					858.46%
Overall Average					85.85%
Eligibility Category					Very Worth It

Based on the results of the small group evaluation trial which was attended by 10 class IV students at SDN Tanjung Barat 07 Pagi, interactive multimedia received a score of 85.85% and was included in the very feasible category with a range of 81%-100%. This assessment indicates that interactive multimedia is good and suitable for use.

Table 8. Recapitulation results of field test evaluation

No.	Name	Question Items	Earned Score	Maximum Score	Percentage
1.	ALQIA	13	53	65	81.54%
2.	MGS	13	50	65	76.92%
3.	HA	13	51	65	78.46%
4.	DRH	13	52	65	80.00%
5.	NNK	13	54	65	83.08%
6.	WI	13	57	65	87.69%
7.	VI	13	59	65	90.77%
8.	RS	13	53	65	81.54%
9.	KJG	13	62	65	95.38%
10.	S	13	63	65	96.92%
11.	MI	13	58	65	89.23%
12.	AZS	13	63	65	96.92%
13.	DCZ	13	56	65	86.15%
14.	CB	13	61	65	93.85%
15.	RSR	13	57	65	87.69%
Amount					1306.15%
Overall Average					87.08%
Eligibility Category					Very Worth It

Based on the results of the field test evaluation which was attended by 15 class IV students at SDN Tanjung Barat 07 Pagi, interactive multimedia received a score of 87.08% and

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was included in the very feasible category with a range of 81%-100%. This assessment indicates that interactive multimedia is good and suitable for use. The following are the recapitulation results of product trials through one to one evaluation, small group evaluation, and field test evaluation:

Table 9. Product Trial Recapitulation Results

No.	Product Trial	Percentage
1.	*one-to-one evaluation*	85.13%
2.	*small group evaluation*	85.85%
3.	*field test evaluation*	87.08%
Overall Average		86.02%
Eligibility Category		Very Worth It

Based on the results of one-to-one evaluation, small group evaluation and field test evaluation, the percentage level of feasibility for MIKBI was 86.02% with a very feasible category.

DISCUSSION

This research and development research produces a product in the form of MIKBI in Natural Sciences and Social Learning in chapter 6 topic B "Indonesian Cultural Riches" to help the learning process of Class IV elementary school students and provide benefits for users, both teachers and Class IV students SD. This interactive multimedia was developed with help from Genially, which provides templates for free without having to do coding. Apart from Genially, to design interactive multimedia pages, backgrounds, menus, images, videos and illustrations, researchers use several online platforms. others such as the Canva application for designing and using the help of the Mentimeter site to create practice questions. After all the required components have been created, the researcher combines all the components into MIKBI that the researcher has developed which will contain five main page menus with The first menu is learning outcomes and learning objectives. Next, the second menu is the material menu which will contain additional illustrations and two sub-menus, each sub-menu consisting of a sequence of material adapted to learning outcomes and learning objectives. Then, the third menu is the games menu which consists of two games adapted to the material contained on the material page. The fourth menu is the Practice menu which contains 10 questions

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regarding material regarding Indonesia's cultural riches and respect for cultural diversity in Indonesia. The fifth menu is the information menu which will contain two submenus, namely there is a bibliography menu which contains source material and a list of images, then there is a developer profile menu which contains the researcher's identity. The process of developing MIKBI in learning sciences and social chapter 6 "My Indonesia is Rich in Culture" Topic B "Indonesia's Cultural Riches" was carried out in January-June 2024. Experts conducted interactive multimedia trials or evaluations first. A Likert scale is used by researchers to assess media compatibility, with the following categories: <20% being extremely not feasible, 21–40% being not viable, 41-60% being Fairly Appropriate, 61–80% being practicable, and 81–100% being extremely feasible.

Another study was conducted by Damar Septian, Cari, and Sarwanto in 2017 under the title “Development of Interactive Multimedia Based Learning Cycle on Optical Tool Materials Using IPA Learning Flash for Grade VIII High Schools”. From the results of the study, IPA Interactive Learning Multimedia based on the learning cycle developed qualified based on indicators of media component validity both in terms of media display, media content, grammar in the media, and interactivity obtained an average score of 70,1 with an average percentage score of 92% and was in the range of "very good" category and student learning achievement after following the learning process using interactive multimedia learning based on IPA improved (Septian et al., 2017).

Based on the explanation of the results of research and development of MIKBI with previous research, it can be seen that MIKBI is highly qualified with expert validation results obtaining an average score of 91.92% and student test results with a score of 86.02%. interactive multimedia MikBI is very suitable for use as a learning medium in learning IPAS and can make students interested in learning and students can more easily understand the material.

CONCLUSION

In the research and development of MIKBI in learning chapter 6 "My Indonesia is Rich in Culture" Topic B "The Richness of Indonesian Culture" for grade IV elementary school, there are texts, images, illustrations, videos, games and exercises that can be accessed online. This interactive multimedia development uses the ADDIE model with 5 stages, namely 1) Analysis. Conduct interviews with teachers and students in class IV

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elementary school. 2) Design. Do planning. 3) Development. Realizing interactive multimedia that has been designed. 4) Implementation. Carrying out expert validation and trials on Class IV elementary school students. 5) Evaluation. Get responses, make revisions and see the feasibility of the product being developed.

Validation carried out by Material Experts obtained a percentage of 92.00% in the "Very Eligible" category. Validation carried out by Linguistic Experts obtained a percentage of 92.00% in the "Very Eligible" category. Validation carried out by Media Experts obtained a percentage of 91.75% in the "Very Eligible" category. The results of the trials carried out on Class IV elementary school students in the one-to-one trial stage with three students obtained a percentage of 85.13% which entered the "Very Eligible" category, small group user trials by ten students obtained the percentage 85.85% entered the "Very Eligible" category, and field test user trials by fifteen students obtained a percentage of 87.08% entering the "Very Eligible" category. MIKBI in learning chapter 6 "My Indonesia is Rich in Culture" Topic B "Indonesia's Cultural Riches" for class IV elementary school has proven to be very feasible.

The following are recommendations regarding MIKBI that researchers provide to assist this research and development: 1) It is hoped that teachers can use it as a reference and inspiration when teaching material on the richness of Indonesian culture in grade IV elementary schools. 2) It is hoped that it can become a reference for future researchers and the researcher recommends conducting summative evaluations and experiments to determine improvements in student learning outcomes.

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