



Development of ILeMBA to Improve Class V Student Learning Outcomes in Science and Technology Lesson Content in Tegal Regency Elementary Schools

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ABSTRACT

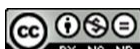
In learning, to make it easier for students to understand the material, it is necessary to use media. This research aims to develop and test the feasibility, practicality, and effectiveness of ILeMBA in improving student learning outcomes in Natural and Social Sciences (IPAS) material on the structure of the earth's layers in class V elementary school. This type of research is Research & Development (R&D) with the Borg and Gall model which is limited to the eighth stage of this research. The research subjects involved 27 students (14 female students and 13 male students). The instruments used are expert validator sheets, needs questionnaires, responses, and test questions. The validation results from media experts reached 91% and 93% from material experts showed that the media was "very feasible". Teachers and students responded well, with a teacher response score of 100% and an average student score of 95%, entering the "very practical" criteria. The calculated t-test value is greater than the t-table on a small scale of $4.973 > 2.228$ and on a large scale of $11.998 > 2.2021$. The results of the N-Gain test scores on a small scale of 79% and a large scale of 91%, show a very high significant difference and improvement in student learning outcomes on the pretest and posttest. Thus, it can be concluded that ILeMBA is proven to be able to improve the learning outcomes of class V students in Natural and Social Sciences (IPAS) material on the structure of the earth's layers (natural and artificial features in waters and land).



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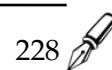


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INTRODUCTION

Education in Indonesia continues to experience changes following the times. The government is making a lot of efforts to improve education in Indonesia in order to create a quality Indonesian society. One of them is by implementing an independent curriculum for class V in elementary schools. The Independent Curriculum changes almost all aspects, including subjects. One of them is Natural and Social Sciences (IPAS) which is contained in the Regulation of the Minister of Education, Culture, Research and Technology (Permendikbudristek) Number 7 of 2022 concerning Content Standards. Science and Technology is a combination of 2 science and social studies subjects which in one discuss the natural and social environment that occurs in this world (Khoirur et al., 2022; Komariah et al., 2023). Science and social learning are subjects that are able to optimize cognitive intelligence, environmental and social awareness as well as students' attitudes and skills (Tanjung et al., 2022).

Learning process planning in the Independent Curriculum is more student-centered, not teacher-centered. Student-centered learning means students are free to be independent and active



when learning so they can find out for themselves knowledge competencies or other things needed to develop themselves (Sihombing et al., 2021; Triyatno & Fauizati, 2022; Prasetyo et al., 2023). Thus, the importance of teachers as managers in learning activities really determines the success of learning implementation, one of which is increasing good learning outcomes. Learning outcomes are students' abilities or successes obtained after carrying out the learning process including knowledge, skills, and attitudes (Nurrita, 2018). So that the learning process can run without obstacles, teachers need to make it easy for students to learn, namely using teacher creativity to make changes in learning, namely changing media (Abidin et al., 2019). In the era of revolution 4.0, technology has penetrated the education sector and has created new challenges in learning. Therefore, teachers can utilize technology in the form of interactive and effective media as a learning tool to help students learn more easily. In learning, media is a need that cannot be ignored and is an integral part of education. Media has become a communication tool and information channel for teachers towards students in learning. Learning media is the focus of learning because it helps clarify material that students do not yet understand (Saniah et al., 2021; Winangsih et al., 2023). It is hoped that the use of media will make it easier for students to understand the material (Rahma, 2019).

However, the current reality is that there are still many learning problems in elementary schools, one of which is communication in the learning process which is boring, boring, and passive because it only focuses on the teacher with lectures (Saputro et al., 2022). This has been proven to cause the existence of learning objectives that have not been achieved, characterized by low student learning outcomes (Sadirman, 2010; Abidin et al., 2019; Mercier, 2024). The use of technology-based learning media is a problem because it is not optimal in the teaching and learning process of Natural and Social Sciences (IPAS). Another problem is the fact that in the field we still use conventional learning which only uses simple concrete media, pictures, student books, and worksheets which makes students less motivated to learn (Afrilia et al., 2022).

This problem was also discovered by researchers at one of the elementary schools in Tegal district. Based on the results of observations, the existing problems are that student learning outcomes are still low due to the lack of innovative learning media, media in the form of books, pictures, the surrounding environment used by teachers, and the lack of IT-based media which makes students difficult and interested in understanding the material in the content, learning Natural and Social Sciences (IPAS). Apart from that, there is a lack of maximum use of existing facilities in schools such as tablets/Androids, laptops, and LCDs in learning. These problems cause student learning outcomes to not be achieved. This can be proven by students who get relatively low scores in Natural and Social Sciences (IPAS) subjects. The KKM determined at the school is 70. There are 27 students in class V at the school. With the results of the recapitulation of score data, there were 8 students (30%) who completed scores above the KKM and 19 students (70%) who did not complete scores below the KKM.

The solution to overcome these problems is to develop effective, creative, innovative and interactive learning media based on technology. Media is very important in the learning process, namely influencing whether the information is clear or not, as well as influencing the final results of the learning process (Anyan et al., 2023). Learning media can reduce problems, especially when communicating new things to students (Nurfadhillah et al., 2021). In addition, learning media can stimulate students' thoughts, feelings, attention, and interest to achieve learning goals (Marjuni et al., 2019). To improve learning in Natural and Social Sciences (IPAS), you can use interactive learning media based on Adobe Animation (ILeMBA). Interactive media is media that presents combined content of images, animation, sound, and text through user interaction. In general, the benefits of interactive media are that it can attract students' attention and curiosity, become more interactive and efficient, and improve the quality of learning and student attitudes. The learning process can be carried out flexibly (Praditya, 2019; Oktafiani et al., 2020).

The development of this interactive media will be based on Adobe Animate (ILeMBA). Adobe Animate is software that is presented in the form of images, animation, sound, text, and

video (Aini & Mufit, 2022) which can clarify learning information and give students the freedom to use Adobe Animate-based media with control buttons that make the learning atmosphere more interactive. Apart from that, Adobe Animate is software that has complete features and is up to date with previous software, namely Macromedia Flash/Adobe Flash (Audhiha et al., 2022). The advantage of Adobe Animate is that it has a variety of displays that can be used on various platforms such as computers, laptops, tablets, and even Android. The output from Adobe Animate is an application that becomes a sophisticated and interactive multimedia device capable of making learning successful (Aini & Mufit, 2022).

Several previous studies related to the use and development of ILeMBA state that this learning media is feasible, practical, and effective in the teaching and learning process at the elementary school level (Rahayu et al., 2022). Other findings also state that it can improve the quality of learning and student enthusiasm for learning (Silvia & Bukhori, 2021). Also helps students understand the material quickly (Audhiha et al., 2022). Apart from that, it has also been proven to be effective in improving students' final results in learning (Aribowo & Sukarjo, 2022). It is considered to be able to change the learning process from being fun to being fun, and students' goals are achieved (Cholifah & Rahayu, 2021).

The studies mentioned above have one thing in common, namely that the media developed can be used on computers or laptops and received a good response from teachers and students. However, researchers updated previous research regarding the use of ILeMBA in Natural and Social Sciences (IPAS) learning materials on the structure of the earth's layers ((Natural features and artificial features in waters (Hydrosphere) and on land (Lithosphere)) which can be accessed through the same thing. for Android/tablet use so that it is more comfortable for students to use, because the size of the Android is more flexible in the hand, so it is effective and efficient and allows students to learn independently.

The benefit of the research and development of ILeMBA is that this media can be a means for teachers to easily convey material so that students can understand the material well, besides helping teachers improve the quality of education and teacher skills in making media as well as increasing the motivation of teachers and students to use appropriate learning media. interesting and innovative.

Therefore, this research aims to facilitate and support students in learning to achieve learning objectives, namely increased learning outcomes in science learning about the structure of the earth's layers (natural features and artificial features in waters (Hydrosphere) and on land (Lithosphere)) class V in Tegal district elementary schools by developing, calculating, knowing, testing the feasibility, practicality, and effectiveness of ILeMBA.

RESEARCH METHOD

The type of Research & Development (R&D) research used in this research aims to develop, perfect, and test media to be applied in learning in certain organizations whether they are effective or not (Widodo & Hanifah, 2020; Khasanah et al., 2020). In research and development, there are several steps, with the Borg and Gall model which has the advantage of being able to produce high and accurate data results (Maydiantoro, 2021). This model consists of 10 stages, namely (1) potential and problems; (2) data collection; (3) product design; (4) design validation; (5) design revision; (6) product testing; (7) product revision; (8) trial use; (9) product revision; (10) manufacturing mass products (Sugiyono, 2019). However, in this research, only 8 stages were used by researchers due to limited time and costs. This research will produce an ILeMBA to improve the learning outcomes of class V students in the content of the science and science lesson on the structure of the layers of the earth (Natural features and artificial features in waters (Hydrosphere) and on land (Lithosphere)) in elementary schools in Tegal district. The research scheme can be seen in Figure 1.

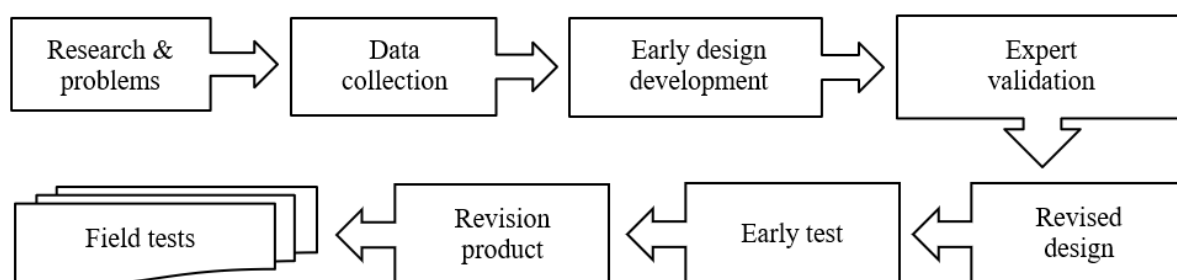


Figure 1. Modified from the Borg and Gall model

Potential and problem steps were taken to determine the potential and problems that exist in the school by conducting observations, interviews, and documenting data in the form of learning outcomes for class V students at school. The next step is to plan a product that will be developed to overcome the problems found by distributing questionnaires to teachers and students needs. After analyzing the data from the needs questionnaire, the researchers carried out product design in terms of design, materials, and language. The product design will be adjusted to the Learning Outcomes (CP) and targets to be achieved, namely material on the structure of the layers of the earth in natural and social science (IPAS) class V subjects. After the product design is complete, the design validation will be carried out with expert validators who are competent in their fields. This is done by media and material experts by filling in a validation sheet that has been prepared by the researcher in the form of a Likert scale.

The next step is design revision, the product that has been assessed by the expert validator is then revised based on the suggestions and input provided by the expert validator so that the product is ready to be tested. After the product had been revised, the product was tested on small-scale students, namely in class V, consisting of 6 students using a purposive sampling technique based on different levels of cognitive ability. At the product trial stage, learning was carried out using ILeMBA and after carrying out the learning, teachers and students were asked to fill out a response questionnaire regarding the use of ILeMBA. From the results of the questionnaire, teacher and student responses are analyzed, and if there is input, it can be used as material for revising products that have been tested. The final step is trial use where the product that has been developed is tested on a larger scale. Researchers tested its use on class V, totaling 21 students, to determine the effectiveness of the product developed based on the learning outcomes obtained by the students.

The subjects of this research were 27 students. The data collection method in this research is the primary data method, primary data is data obtained directly in research, in this case, qualitative and quantitative data. Qualitative data consists of data obtained from observations, questionnaires, and interviews with class V teachers. Quantitative data is obtained from documentation of class V student learning outcomes and tests carried out before (pretest) and after (posttest) in product use trials (Sugiyono. 2019). The data instruments for this research are expert validator sheets, needs questionnaires, responses, and test questions totaling 28 questions. The following is an example of a media expert validator instrument in Table 1.

Table 1. Media validation instrument

Aspect	Score			
	1	2	3	4
Suitability of the media to the material and learning outcomes and objectives				
Media display (images, animations, sound, text)				
Appropriateness of the language used				
Program feedback				
Instructions for use are clear				



This research uses data analysis techniques through assessments from media and material expert validators using a Likert scale to determine product suitability. Data analysis using the Guttman scale (cumulative scaling) was used to determine the practicality of the product using a teacher and student response questionnaire after learning using the product being developed. The Guttman scale is carried out by giving a score of 1 if the answer is yes, and a score of 0 if the answer is no. Data analysis in the form of the N-Gain test is to determine the effectiveness of the product based on students' pretest and posttest scores in large-scale trials with the formula:

$$N - Gain = \frac{Posttest\ score - Pretest\ score}{Ideal\ score - Pretest\ score}$$

Table 2. N-gain grouping criteria

N -Gain value	Criteria
N-gain > 0.70	High
0.30 < N-gain < 0.70	Medium
N-gain < 0.30	Low

(Jelita et al., 2022)

RESULTS AND DISCUSSION

Results

The results of research and development products are ILeMBA. The advantages of the learning process using ILeMBA are that it makes the learning process effective, and fun, increases enthusiasm for learning, and helps students understand the learning material easily (Zahroh et al., 2019). The following research results were obtained based on research stages in accordance with Borg and Gall.

In the first stage, the potential and problems are first looked for by researchers in schools through observation, interviews with class V teachers, distribution of questionnaires, and documentation. Several things regarding the potential and problems found were that the use of learning media was not optimal in Natural and Social Sciences (IPAS) is limited to only using images, and the surrounding environment, and has not used IT-based media. Apart from that, there is also less than optimal use of existing facilities in schools such as tablets/Androids, laptops, and LCDs to support the learning process. And another problem is that the lack of media use causes student learning outcomes in subjects Natural and Social Sciences (IPAS) Chapter 4 Topic A structure of the earth's layers (Natural appearances and artificial appearances in waters and on land) in the odd semester 2023/2024, namely not increasing or classified as low, namely the results of there were 8 students (30%) who completed the score above the KKM and 19 students (70%) who did not complete the score below the KKM with the KKM score being 70 out of the number of class V students is 27 students.

Second, initial data collection by researchers through observations and interviews with class V teachers at school. The results of interviews with teachers focused on the use of media and facilities at school which were less than optimal resulting in less interesting learning so that student learning outcomes were less than optimal. This data collection can be a strong basis for designing and developing new products. Apart from that, data collection was also carried out through a literature review via the Internet as reference material.

In the next third stage, researchers designed the product by distributing media needs questionnaires to students and teachers. The following is an example of a teacher needs questionnaire for media in Table 3 below.

Table 3. Teacher needs questionnaire for learning media

Question	Answer	
	Yes	No
Does the media need to be adjusted to the learning outcomes and objectives?		
Do you need new, more interesting, and innovative media in learning science and science?		
Do you agree that learning uses technological tools?		
Does the media need to be equipped with examples of material explanations?		
Do you need an attractive media display such as bright colors, clear sound, and writing?		

Then carry out an analysis of the needs questionnaire that has been distributed, with answers focused on the lack of maximum use of media in learning by teachers and students' lack of interest in the media used. With that, the teacher agrees that in learning there is an innovation, namely using IT-based media, one of which is ILeMBA which is able to attract and foster enthusiasm and increase student learning outcomes. Which contains material through images, audio, text, and animation, making it easier for students to understand the material. In developing media, teachers want the media to contain learning outcomes and objectives as well as appropriate examples of material related to students' daily lives. Apart from that, the teacher also wants the media display to suit the characteristics of the students, namely choosing bright color harmonies, having background sound, and clear explanations of the material and fonts.

The results of the questionnaire also showed that all class V students (27 students) enjoyed learning using media. Students also need new, more interesting, and innovative media that makes them more enthusiastic about learning by utilizing technology. As many as 85% (23 students) did not know about Adobe Animate-based media so this was something new for students. Students agree to use media using laptops or Androids by loading lots of menus with interesting and fun pictures and animations. The following is Table 4, the results of a questionnaire on student needs regarding the use of learning media.

Table 4. Results of the questionnaire on student needs for learning media

Question	Answer	
	Yes	No
Do you like interactive learning media?	27	0
Do you need new, more interesting, and innovative media in learning science?	26	1
Do you agree if learning uses technological tools?	27	0
Have you ever seen/used learning media using Adobe Animate-based multimedia?	4	23
Do you agree to use learning media that contains text, images, sound, and animation and is carried out using a laptop or cellphone in science learning?	25	2

The fourth stage, the use of the latest Adobe Animate software is a development in interactive media design. The design is designed according to the needs of teachers and students, namely learning outcomes and objectives, student characteristics, and attractive media displays. In the development of ILeMBA, the features of images, text, animation, navigation, background sound and sound explanation of the material will be used which will sound when the icon explanation page for each appearance appears. The material contained in the development of this media is Natural and Social Sciences (IPAS) in chapter 4, topic A, material on the structure of the layers of the earth (Natural features and artificial features in waters (Hydrosphere) and on land (Lithosphere)). In developing this media, researchers created 2 interactive application outputs produced by Adobe Animate, namely 1 application containing natural appearance material and 1 application containing artificial appearance material. Here's the ILeMBA design.



Figure 2. Designing the homepage of the natural appearance application which contains sound icons, CP, TP, developer profile, supervisor, bibliography, and start



Figure 3. Designing the homepage of the artificial appearance application containing sound icons, CP, TP, developer profile, supervisor, bibliography, and starting



Figure 4. Contains explanations of usage instructions to make it easier for students to use the media



Figure 5. Containing writing learning outcomes according to the material



Figure 6. Contains learning objectives according to the material



Figure 7. Explanatory page media developer profile starting from name, agency and others



Figure 8. A page explaining the supervisor's profile starting from name, institution and so on



Figure 9. Contains a bibliography or source of material content



Figure 10. A page of natural appearance icons that students can choose directly by clicking on one of the icons



Figure 11. Explanations of natural appearance icons that appear after students choose an icon and are accompanied by explanatory sounds



Figure 12. A page of artificial appearance icons that students can select directly by clicking on one of the icons



Figure 12. Explanation of the artificial appearance icon that appears after the student selects the icon and is accompanied by an explanatory sound

Fifth, the finished ILeMBA is then assessed by media and material experts to test the suitability of the media. The media validation assessment was carried out by fine arts lecturers in elementary school teacher education and material validation by social studies lecturers in elementary school teacher education.

Table 5. ILeMBA Expert Validator Assessment Results

Expert	Score	Percentage (%)	Eligibility criteria
Material	63 of 68	93%	Very worthy
Media	80 of 88	91%	Very worthy

Table 5 shows the feasibility value of expert validators who received a percentage score above 76% with the criteria being very feasible and declared valid so it is suitable to be used to proceed to the next stage. Assessment indicators including material, media appearance, and language as a whole were declared valid. Thus, ILeMBA can be used in science and science learning with a note of several revisions.

Design revision is the sixth stage in the research, design revision is obtained from the ILeMBA validation assessment which must be carried out so that the media developed is better. As for revisions, suggestions, and input from media validators, namely adjusting the volume between the sound of the back sound music and the sound of explaining the material, that is, the volume of the sound explaining the material is higher than the sound of the back sound music so that the content of the material can be heard clearly and understood by students. Apart from that, you can also add a location icon to each animated appearance image, both natural and artificial. Below are the results of the revised ILeMBA design.



Figure 13. Natural appearance icon page before revision (There is no location icon on each appearance icon yet)

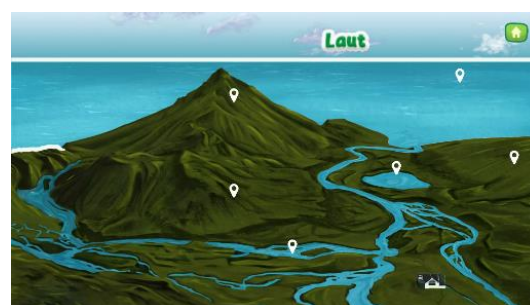


Figure 14. Natural appearance icon page after revision (There is already a location icon on each appearance icon)



Figure 15. Artificial appearance icon page before revision (There is no location icon on each appearance icon yet)



Figure 16. Artificial appearance icon page after revision (There is already a location icon on each appearance icon)

The next stage, test the practicality of media-based interactive media by conducting product trials through small-scale and large-scale trials in class V of SD Negeri Dukuh 01. Researchers took 6 students taken from the top 2 criteria, the middle 2 criteria, and the last 2 criteria to small scale test. This selection aims to ensure that the trial runs evenly and in balance. The number of large-scale test students was 21 students. The small-scale and large-scale trial process involves researchers preparing laptops and Androids as media to display ILeMBA and learning is taught according to the teaching modules that have been created. The small-scale trial began by displaying learning media created by the researcher as an introduction to new learning media to students, directed by the researcher and accompanied by the teacher. However, in the large-scale test, the direct guidance was the class V teacher. The students seemed enthusiastic about taking part in the implementation of this small-scale and large-scale test. After completion, the researcher distributed student response questionnaires to the media so that the researcher knew how the students responded.

Table 6. Results of Teacher and Student Responses to ILeMBA

Scale	Respondent	Evaluation percentage (%)	Criteria
Small scale test	Teacher	100%	Very worthy
	Student	96%	Very worthy
Large scale test	Teacher	100%	Very worthy
	Student	94%	Very worthy

Table 6 shows the results of teachers' responses to the media in small group tests with an evaluation percentage score of 100% and 96% of students declared very worthy. Next, a large-scale test in class V (21 students). In a large-scale test, according to the data in the table, the results

of teacher and student responses to the media were very decent, namely percentages of 100% and 94%. It was concluded that ILeMBA is feasible, practical, efficient, and interactive and makes it easier to deliver material in the learning process.

The final stage is to test the effectiveness of ILeMBA by conducting trials on media use in class V through small-scale trials (6 students) and large-scale trials (21 students). In the trial stage of using the product, the data taken are the results of the Natural and Social Sciences (IPAS) scores obtained from test activities, namely pretest, and posttest, and the aim is to determine whether the progress of student learning outcomes before and after using ILeMBA has increased or not.

Table 7. Student pretest score results

Mark	Frequency	Information
0-20	0	Not finished
20-40	6	Not finished
40-60	15	Not finished
60-80	6	Complete
80-100	0	Complete
% Completeness	22 %	Complete

Table 8. Student posttest score results

Mark	Frequency	Information
0-20	0	Not finished
20-40	0	Not finished
40-60	0	Not finished
60-80	6	Complete
80-100	21	Complete
% Completeness	100%	Complete

Table 7 shows that of the 27 class V students who completed the pretest score, only 6 students had a percentage of 22%. In table 8, it shows the results of the posttest scores for students who have completed the criteria, totaling 27 students with a percentage of 100%. All data were analyzed using Microsoft Excel, through a normality test using the Liliefors (L) parametric statistical test technique, homogeneity test, t-test using the paired t-test test technique, and the N-Gain test.

Table 9. Normality test results on pretest and posttest effectiveness tests

Scale	Test type	Alpha	Average ($\bar{x}$)	Standard deviation (S)	Liliefors (L)	
					Count	Table
Small scale test	Pretest	0.05	50.5	17.13	0.193	0.319
	Posttest		88.6	7.73	0.305	0.319
Large scale test	Pretest	0.05	49.1	11.9	0.185	0.19
	Posttest		86.3	7.78	0.189	0.19

Based on Table 3, the normality test calculation data on a small scale and a large scale above shows that on a small scale, the pretest value of L count is $0.193 < L.\text{table } 0.319$, and the posttest value of L.count is $0.305 < L.\text{table } 0.319$. For the large group, the pretest value of L.count was $0.185 < L.\text{table } 0.19$, and the posttest value of L.count was $0.189 < L.\text{table } 0.19$. So if the Lillefors calculation from the Lillefors table results are smaller, then the pretest-posttest value data is declared to be normally distributed. In line with (Yusup et al., 2022) which obtained normal distribution results with normality test results on the media being developed, namely a value of 0.070, not smaller than the significant value of 0.005 but greater.

Table 9. Homogeneous test results pretest and posttest values

Scale	Test type	Df	Average ($\bar{x}$)	Variance	F-count	F-table
Small scale test	Pretest	5	50.5	293.5	4,902	5.05
	Posttest		88.6	59.8		
Large scale test	Pretest		50.9	121.3	2,166	2,217
	Posttest		87.3	56.02		

Data is said to be homogeneous if the calculated F data results are smaller than F table. In Table 9, the results of the pretest and posttest scores in the small-scale and large-scale tests show homogeneous data. Because in the small group test F count was $4.902 < F$ table 5.05 and in the large group test F count was $2.166 < F$ table 2.217.

Table 10. T-test results pretest and posttest values

Scale	Test type	Alpha	Average ($\bar{x}$)	t-count	t-table
Small scale test	Pretest	0.05	50.5	4,973	2,228
	Posttest	0.05	88.6		
Large scale test	Pretest	0.05	49.1	11,998	2,021
	Posttest	0.05	86.3		

Based on the calculations in Table 10, obtained in a small-scale test the calculated t value was 4.973 and t table 2.228 ($4.973 > 2.228$). In the large-scale test, the calculated t value was 11.998 and t table 2.021 ($11.998 > 2.021$). In the Paired Sample t-Test test, it can be stated that there is a difference if t count $>$ t table. Therefore, the results of small-scale and large-scale tests on pretest and posttest scores show differences in student learning outcomes.

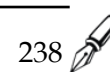
Table 11. N-gain test results pretest and posttest values

Scale	Test type	Average ($\bar{x}$)	N-Gain	N-Gain (%)
Small scale test	Pretest	50.5	0.79	79%
	Posttest	88.6		
Large scale test	Pretest	63.8	0.91	91%
	Posttest	96.5		

Based on the data in Table 11, it shows that the N-Gain results of the small-scale test obtained a value of 0.79 (79%) including the high criteria, and for the results of the large-scale N-Gain test the value obtained was 0.91 (91%) including the high criteria. The results of these scores show that there is an increase in student learning outcomes in the pretest and posttest scores that have been carried out.

Discussion

The development of interactive learning media based on Adobe Animate (ILeMBA) was carried out in order to support learning in science and science subjects on the structure of the earth's layers (natural features and artificial features in waters and on land). The development of this media product is based on what explains that media is a tool in the scope of education that helps students achieve goals that are used to channel messages in the form of learning materials (Mawardi, 2018). The development of this media using the Borg and Gall model has obtained very feasible results. Based on the results of validation by media experts reaching 91% and material experts at 93%, these results show that the media is "very feasible". Another result is the same, namely by (Baihaki et al., 2022) received an assessment with a percentage of 73.84% material assessment and 87.69% media assessment which was said to be appropriate and valid. Other research by Saputra et al. (2023) shows a value for media of 89.3% and for material of 87.5%



with very valid criteria. Apart from that, research by (Hasanudin et al., 2024) got a score for the first validator material 95.6%, the second validator 89.7%, and a score for the first validator media 86.3%, the second validator 96.6%, each of which was declared very worthy. Adobe Animate is software that can produce media with various subject matter create innovative and interactive media and optimize learning (Wirawan et al., 2020; Sanusi & Haq, 2021). Another opinion (Purnamasari, 2019) stated that Adobe Animate can also foster learning motivation so it influences student learning outcomes.

The trial use of ILeMBA has practicalities that can be used in the teaching and learning process. Both teachers and students responded well, the teacher gave a response score of 100% and the students gave an average score of 95%, this score was categorized as very practical. Findings by (Setiawan et al., 2022) also show the results of the teacher's response to the media being developed, namely 87.86%, and the student response, namely 90.8%, which is stated to be very practical. Another research obtained the same response results, namely the very practical category with a score of 78.82% from teachers (Baihaki et al., 2022) and 76.93% of students (Prakasiwi & Gusemanto, 2021). The results in other research are the results of teachers' responses (Wahyuliana & Andrian, 2022) amounted to 84.025% and student responses were within (Asmarany et al., 2023) by 77%. ILeMBA can include learning styles according to student characteristics, namely visual and auditory learning styles. Utilizing media in the era of digitalization will provide benefits, namely flexibility in time and place and the use of interactive media can attract students' interest (Haniko et al., 2023; Said, 2023).

Adobe Animate-based media has a significant effect on students' thinking abilities, thereby improving learning outcomes. The learning outcomes obtained by students were increasing, in the pretest results only 6 students completed scores above the KKM, and in the posttest results the scores changed to 27 students completing scores above the KKM. Based on the results of the t-test analysis and the N-Gain test, it shows that there are differences in student learning outcomes in the pretest and posttest so it is clear that there is a significant increase. Namely, the calculated t-test value is greater for the t-table in the small group of $4.973 > 2.228$ and in the large group of $11.998 > 2.021$. As well as the results of the N-Gain test value on a small scale of 79% and a large scale of 91%. So these results show the effectiveness of ILeMBA in the learning process with very high results. Previous research also found the same results, namely that there were differences in student learning outcomes, research by (Prasetyo et al., 2022) with the results of the t-test value $5.65 > 0.05$.

Learning activities using interactive media are expected to make learning more effective, less boring, and challenging and able to motivate students. ILeMBA is an innovative breakthrough that can change boredom in learning into joy because it will not only be teacher-centered but can educate students to be more independent and develop (Widiyastuti et al., 2018).

In a study, there must be obstacles or shortcomings so that the research does not run smoothly. The obstacles or shortcomings experienced by researchers in this research were the accumulation or reflection of sound produced by the media from each device used, namely laptops and Android. Where the implementation of learning in one room with a large number of students and the use of devices that are fairly evenly distributed causes quite a lot of sound collisions so that the sound becomes louder and noisier because headsets/headphones are not used which are useful for clarifying and focusing the sound.

CONCLUSION

The results of data analysis in this study show that ILeMBA is declared very valid and feasible given by experts and is very practical and effective based on the results of a very good student and teacher responses and based on a series of pretest-posttest tests with results showing there are significant differences between the results. study pretest and posttest. It was concluded that ILeMBA is very useful and can improve the learning outcomes of fifth-grade students in Natural and Social Sciences (IPAS) material on the structure of the layers of the earth. The implication of

this research is that ILeMBA can be used as an alternative to train students' focus in capturing what is conveyed when studying so that it can improve student learning outcomes in the teaching and learning process effectively and change students' views regarding boring learning to be more exciting. It is recommended that teachers use more innovative digital media to make learning Natural and Social Sciences (IPAS) more interesting and enjoyable. In the future, researchers hope that this research will lead to exploring learning using media which not only influences learning outcomes but also the effectiveness of student character formation.

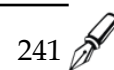
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