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Development of Interactive Mobile Learning (IMOLE) Learning Media Assisted by *iSpring Suite* to Improve IPAS Learning Outcomes in Elementary Schools

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Abstract: The lack of student activity in the learning process at SDN 1 Loram Kulon has an impact on student learning outcomes. This research is Research and Development which refers to the ADDIE model. This research aims to develop and test the feasibility, practicality, and effectiveness of Interactive Mobile Learning (Imole) assisted by *iSpring Suite*. The population in this study was 32 people with 12 small-scale test subjects in class VI students and 21 large-scale test subjects in class V at SDN 1 Loram Kulon. Data collection techniques use test (pretest-posttest) and non-test techniques in the form of observations, questionnaires, interview results, and documentation data. Validation results by material expert validators and media experts show that Interactive Mobile Learning (Imole) assisted by *iSpring Suite* has met the valid criteria with an average score of 93%. Based on the pretest-posttest results, it is known that Interactive Mobile Learning (Imole) assisted by *iSpring Suite* is effective in improving student learning outcomes with the result of an increase in the average pretest score of 50.95 to 84 at the time of the posttest and the N-gain test results obtained <g> The gain value is 0.70 in the high category. Based on the results of the response questionnaire distributed, very positive responses were obtained from teachers and students. Based on these results, it can be concluded that Interactive Mobile Learning (Imole) assisted by *iSpring Suite* is effective in improving science and science learning outcomes and is feasible and practical to use in the learning of class V students at SDN 1 Loram Kulon.

Keywords: *Mobile learning*; IPAS; Outcomes; *iSpring Suite*

Introduction

Education at the elementary school level, particularly in the subject of IPAS (Natural and Social Sciences), faces significant challenges. IPAS combines concepts from both science and social studies, aiming to foster students' curiosity about surrounding phenomena and cultivate scientific attitudes such as critical thinking, analytical skills, and the ability to draw accurate conclusions (Rosidah et al., 2021; Winangun, 2022). However, in practice, the low interest and motivation of students in IPAS learning are major obstacles. Many students struggle to understand abstract materials because the learning process predominantly uses conventional methods such as printed materials and less interactive presentations (Dwiqi et al., 2020).

Observations at SDN 1 Loram Kulon show that learning is still teacher-centered, relying mainly on conventional media like printed teaching materials. This approach makes learning less engaging and less effective. Existing facilities such as Wi-Fi, LCD projectors, and Chromebooks are not optimally utilized in the learning process. Although most students have smartphones, their use in learning is still not maximized. Consequently, many students have not met the Minimum Competency Criteria (KKM) set at 70. Out of

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21 students in class V at SDN 1 Loram Kulon, 15 students (74%) have not met the KKM, while only 6 students (26%) have met the KKM.

Using engaging and interactive learning media is crucial to boosting students' enthusiasm and motivation for learning. Learning media can make the material more appealing, easier to understand, and interactive, thus enhancing students' motivation (Supriatna, 2020; Suri & Rachmadtullah, 2021). One potential learning media is mobile learning. Mobile learning utilizes mobile devices or handheld devices such as phones, laptops, and other information technology tools to help students learn anytime and anywhere (Nuri et al., 2023; Remch et al., 2019; Rosidah et al., 2021).

One technology that can be used to develop mobile learning is the iSpring Suite software. iSpring Suite is frequently used in creating learning media and can be integrated with Microsoft PowerPoint. Its advantages include the ability to create quizzes with final scores, record audio and video, and convert presentations into various formats such as MP4 video, HTML5, and mobile formats (Muskhir et al., 2023; Tuan et al., 2020). iSpring Suite allows the creation of interactive learning media without requiring complex programming skills, making it easier for teachers to deliver learning materials (Nurhairunnisah et al., 2023; Sulistiyo et al., 2023).

Previous research indicates that mobile learning is effective in improving student learning outcomes and motivation due to its attractive design and ease of access (Fathurohman et al., 2023; Sukardia et al., 2020). Mobile learning developed with iSpring Suite can include various learning materials, audio, video, and quizzes, making the learning process more engaging and less monotonous for students (El-Sofany & El-Haggar, 2020; Nugroho et al., 2023).

Based on this background, this study aims to develop interactive mobile learning aided by iSpring Suite to improve students' learning outcomes on ecosystems and food webs in the IPAS subject for class V at SDN 1 Loram Kulon. This research will assess the feasibility, practicality, and effectiveness of the developed Imole, with the hope of facilitating students in accessing learning materials anytime and anywhere, as well as enhancing their interest and learning outcomes.

Method

The type of research used is Research & Development (R&D) research which will produce Interactive Mobile Learning assisted by *iSpring Suite* to improve science and science learning outcomes regarding ecosystems and food webs in class V of SDN 1 Loram Kulon. In the research and development of Interactive Mobile Learning assisted by *iSpring Suite*, researchers implemented development according to the procedure developed by (Sugiyono, 2019) which consists of 5 steps, including (1) analysis, (2) design, (3) development,(4) implementation, and (5) evaluation. The research scheme can be seen in Figure 1.

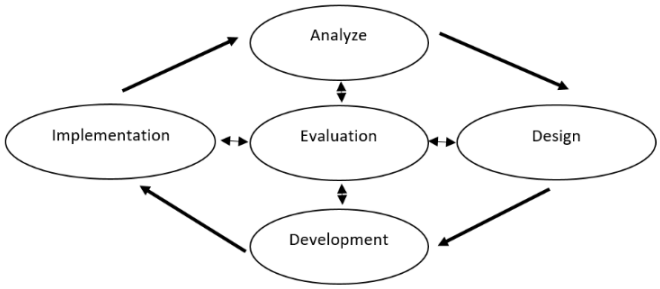

Figure 1. ADDIE model

The analysis stage is carried out by analyzing the curriculum used, the needs of students and teachers, the characteristics of students, and the technology available in the school through interviews, observations, and documenting data in the form of learning outcomes for class V students at SDN 1 Loram Kulon. After analyzing the curriculum, teacher, and student needs questionnaires, student characteristics, and the technology owned by the school, the researchers then carried out several activities, including designing products both in terms of appearance and materials. The appearance of the product is adjusted to the Learning Outcomes (known as CP) and the targets to be achieved, namely ecosystem material and food webs in class V science subjects in the Learning Outcomes, namely Students investigate how the interdependence relationship between biotic-abiotic components can influence the stability of an ecosystem in the surrounding environment. After the product is designed, the design will be validated by expert validators who are competent in their fields, in this case, media experts and material experts, by filling in a validation sheet that has been prepared by researchers in the form of a Likert scale.

The next stage is design revision, the product that has been assessed by the expert validator is then revised based on the suggestions given by the expert validator so that the product is ready to be tested. After the product was revised, the product was then tested on students on a small scale, namely in class VI consisting of 12 students using a purposive sampling technique based on different levels of cognitive ability. At the product trial stage, learning was carried out using Interactive Mobile Learning with the help of *iSpring Suite*. From the results of the questionnaire, teacher and student responses are analyzed, if there are suggestions they can be used as material for revising products that have been tested. The final stage is the use trial where

the product that has been developed is tested on a large scale. Researchers conducted a large-scale trial in class V for the 2023/2024 academic year, totaling 21 students, to determine the effectiveness of the product developed based on the learning outcomes obtained by students.

The type of data used in this research is primary data. Primary data is data obtained directly when conducting research, in this case, qualitative and quantitative data. Qualitative data in this research was obtained from observations, questionnaires, and teacher interviews conducted at SDN 1 Loram Kulon. Quantitative data in this research was obtained from the learning results of class V students at SDN 1 Loram Kulon in the science and sciences subject as well as the results of pretest and posttest assessments.

The research design used is a pre-experimental design with a one-group pretest-posttest design model, namely, there is a pretest before treatment is given and a post-test after the research. The aim is to find out more precisely the results of the treatment to compare conditions before and after treatment (Sugiyono, 2019). Data collection techniques use test and non-test techniques, test techniques in the form of 30 multiple choice questions, and non-test techniques in the form of observation, questionnaires, interview results, and document data. To determine the feasibility of the product being developed, data analysis was carried out in the form of assessments from material expert validators and media expert validators using a Likert scale. To determine the practicality of the product, a student and teacher response questionnaire was used after using the product developed using the Guttman scale.

To determine the effectiveness of the product being developed, data analysis was carried out in the form of a Normality test, T-test, and N-Gain test based on students' pretest and posttest scores in small-scale and large-scale trials.

Result and Discussion

Analyze

The analysis stage includes curriculum analysis, needs analysis, student characteristics analysis, and technology analysis. In curriculum analysis, it is known that class V of SDN 1 Loram Kulon uses the independent curriculum. Curriculum analysis is carried out by considering several aspects including Learning Outcomes (CP), Learning Objectives (TP), and Learning Objective Flow (ATP).

Based on pre-research results, at the needs analysis stage, it was discovered that the learning approach used in class V of SDN 1 Loram Kulon was teacher-centered learning. The application of this approach is less effective because students only receive information from the teacher and are less active. The use of learning media is still minimal, especially digital media so students' enthusiasm for participating in learning is less than optimal. This has an impact on the learning outcomes of students who have not met the Minimum Completeness Criteria (known with KKM) where the KKM set is 70. Of the total 21 students, only 6 (26%) students met the KKM value while there were 15 students (74%) whose value did not meet the KKM. So it is necessary to develop digital media to increase activity and attract students' interest in learning.

In the analysis of student characteristics, it is known that students in class V of SDN 1 Loram Kulon like learning using Android. It is necessary to develop learning media in the form of Android which can increase students' motivation and interest in learning by selecting interesting color designs, writing, audio, learning videos, and quizzes.

At the technology stage, researchers found that SDN I Loram Kulon had facilities to support classroom learning such as WI-FI, LCD projector, speakers, and Chromebooks. However, these facilities have not been used optimally during the learning process.

Based on the analysis that has been carried out, it is known that teachers need technology-based learning media, one of which is using Interactive Mobile Learning assisted by *iSpring Suite* with material adapted to the student's environment. The use of language in Interactive Mobile Learning is short and clear so that students can easily understand the material presented. Students need learning media that is interesting and can improve learning outcomes. Students agree with the development of Interactive Mobile Learning media assisted by Android-based *iSpring Suite* software during the learning process. The material provided in Interactive Mobile Learning media is accompanied by learning videos and quizzes to increase students' understanding.

Design

Interactive Mobile Learning (Imole) is designed with learning outcomes (CP) and learning objectives (TP) to be achieved. Imole was developed with a concept consisting of writing, audio, video, and images according to the characteristics of students so that students can understand them easily. Imole is made by preparing materials and creating designs via the Canva application. The material and design results will be entered into PowerPoint which has been connected to the *iSpring Suite* software to be edited again regarding the addition of audio, learning videos, and quizzes along with the scores. The final product will be an Android application that can be shared with students so it requires an internet network to use it. The Interactive Mobile Learning section consists of:

Figure 2. Cover

Figure 3. Menu *imole*

Figure 4. Instructions for use

Figure 5. Introduction *imole*

Figure 6. Menu content *imole*

Figure 7. Content

Figure 8. Trigger Question

Figure 9. Learning Video

Figure 10. Quiz

Figure 11. Reference List

The steps in designing a product include (1) designing a media draft (2) compiling a prototype (3) collecting graphic and animation materials, (4) creating a product design, and (5) using *iSpring Suite* to finish Interactive Mobile Learning (Imole).

Development

At this stage, the researcher will validate the product with validators who are media experts and material experts who are competent in their field, namely lecturers in arts and science courses in elementary school teacher education study programs. After being assessed by an expert validator, there will be input regarding the product developed by the researcher, so that the researcher can revise the product developed.

Table 1. Imole Expert Validator Assessment Results Assisted by *iSpring Suite*

Eligibility Aspect	Validation Index (%)	Information
Content	95	Very Valid
Appereance	91	Very Valid

Table 1 shows that the validation results provided by the validator have valid results because they obtained a score above 80% which is included in the very feasible criteria (Sugiyono, 2019). Interactive Mobile Learning assisted by iSpring Suite is declared valid in its entirety of content or material, and display or media and is ready to be tested.

This is in line with research (Astuti & Suratman, 2022) that the validation results of mobile learning development from the material expert team obtained a percentage of 90.25%, then validation from media experts obtained a percentage of 91.00% with a very feasible category. This shows that the mobile learning product developed is feasible and can be used as a digital learning medium in the science and science learning process in elementary schools. In another study conducted by (Widiastika et al., 2021) the validation results of the Android-based mobile learning development carried out obtained an average score of 84% from material experts and media experts which were included in the "Very Valid" category. Other research was conducted by (Uma'iyah et al., 2023) that the validation results of Android-based mobile learning development obtained an average result from three validators of 91%, so it was declared suitable for use to increase students' digital literacy.

Next, the researcher revised the design according to suggestions from media and material experts. Suggestions given by the media validator included changing the color of the writing on the cover, moving the video into the material, and changing the concept map of the material to make it more interesting. Suggestions given by material expert validators include adding trigger questions and adjusting the composition of the material to the learning steps.

Figure 12. Cover before revision

Figure 13. Cover after revision

Figure 14. Menu Imole before revision

Figure 15. Menu Imole after revision

Figure 16. Introduction Before revision

Figure 17. Introduction after revision

Figure 18. Concept maps before revision

Figure 19. Concept maps after revision

Figure 20. Addition of the lighter question

Implementation

After the integrated Interactive mobile learning product has gone through a validation and revision process and is deemed valid, it will continue to be tested.

In this trial, there were 12 class VI students with heterogeneous selection based on the level of student ability, namely 4 students with low scores, 4 students with medium scores, and 4 students with high scores. Teachers can encourage student-centered learning by utilizing imole which was developed with the help of *iSpring Suite* software.

After students have carried out learning, students and teachers are given a response questionnaire containing 14 questions with the Guttman scale which must be filled in based on their experience in using the product that has been developed by the researcher. The questionnaire has the following assessment criteria: (1) Assessment with very positive criteria if the value is 76%-100%, (2) Assessment with positive criteria if the value is 51%-75%, (3) Assessment with negative criteria if the value is 26%-50 %, (4) Assessment with very negative criteria if the value is 0%-25%. The calculation to measure the percentage of teacher response questionnaire answers is as follows (Formula 1).

$$NP = \frac{R}{SM} x100\% \quad (1)$$

To test the practicality of imole assisted by *iSpring Suite*, a questionnaire was distributed regarding teacher and student responses which had 3 aspects, namely content or material, media quality, and language which were then divided into 17 indicators for the product being developed.

Table 2. Results of Teacher and Student Responses to Imole Assisted by *iSpring Suite*

Respondent	Evaluation(%)	Information
Teacher	100%	Very Positive
Students	94%	Very Positive

Table 2 shows that the results of the teacher and student responses to imole assisted by iSpring Suite obtained very decent results because they obtained a score above 75%. So imole assisted by iSpring Suite can be practically used in learning activities. Imole assisted by iSpring Suite was declared very feasible and practical based on 14 Guttman scale questions.

Table 3. Results of Teacher and Student Responses to Imole Assisted by *iSpring Suite*

Respondent	Evaluation (%)	Information
Teacher	100%	Very Positive
Students	88%	Very Positive

Table 3 shows that the results of teachers' and students' responses to the developed *Imole* obtained a score above 75%. *Imole* assisted by *iSpring Suite* was declared very practical based on 14 questions. This is by research that has been carried out previously, which explains that the teacher and student response questionnaire to the *Imole* that was developed obtained very practical results, this shows that *Imole* is practical for use in learning. (Razilu, 2021; Rini Mariani & Marzal, 2021).

After carrying out small-scale trials, we then continued with large-scale trials using imole with the help of *iSpring Suite* in science and science subjects on ecosystems and food webs to determine the effectiveness of the product based on student learning outcomes. The design used is a pre-experimental design with a one-group pretest-posttest design model, namely, there is a pretest before treatment is given and a posttest after treatment is given.

Evaluation

Next, the researcher compiled the students' learning outcomes from the pretest and posttest results to determine the average difference. If the components for assessing student learning outcomes meet the Minimum Completeness Criteria (KKM) with 85% completeness or more, then the product is considered effective.

Table 4. Result of Normality Testing in Usage Trials

Test type	Average	Average Difference
Pretest	50.95	33.05
Posttest	84	

Based on Table 4, it is known that the average student learning outcomes show an increase of 33.05 in large-scale product trials. The data shows that there are differences in student learning outcomes regarding the content of the science and science subject material about ecosystems and food webs in class V of SDN 1 Loram Kulon, there are differences before and after using imole assisted by iSpring Suite. To find out the pretest average criteria, an N-gain analysis was carried out by comparing the difference between the SMI and the pretest.

Table 5. Average N-Gain Test Results

Average Difference	N-Gain	Criteria
33.05	0.70	High

Based on Table 5, it is known that the average difference is 33.05 in large-scale product trials. This shows that the grades of class V students at SDN 1 Loram Kulon have increased on average by 0.70 and are included in the high criteria. This increase in average shows that the use of *Imole* assisted by *iSpring Suite* in science and science learning on ecosystems and food webs in class V at SDN 1 Loram Kulon has succeeded in improving student learning outcomes. The use of

mobile learning has been proven to significantly improve student learning outcomes. Research shows that mobile learning can enhance students' learning results (Fathurohman et al., 2023), while its implementation can also expand students' thinking skills (Ninghardjanti, 2022; Suyatmo et al., 2023). Through mobile learning, students can more easily access diverse information and learning materials, thus helping them develop critical and analytical thinking skills.

Additionally, several other studies highlight various benefits of mobile learning. Mobile learning can create positive student perceptions, facilitate concentration, provide flexible access to learning materials through m-services, and enhance students' skills in using mobile technology for e-learning (El-Sofany & El-Haggar, 2020). Android-based mobile learning is also beneficial in improving students' science literacy (Rosidah et al., 2021). Interactive mobile learning, particularly using tools such as iSpring Suite, can increase students' understanding and enthusiasm, as well as motivate them in the learning process (Megawati et al., 2021; Muskhir et al., 2023). These studies provide a strong foundation regarding the benefits of mobile learning in education. However, this research differs from those studies as it focuses on improving student learning outcomes in the IPAS subject for fifth-grade students at SDN 1 Loram Kulon. Thus, this research aims to fill this gap by examining the specific impact of mobile learning on the IPAS subject, thereby contributing new insights to the field of mobile learning.

Conclusion

Based on the results of the research that has been carried out, it can be concluded that Interactive Mobile Learning (Imole) assisted by *iSpring Suite* can improve student learning outcomes in science and science subjects on ecosystems and food webs. This is proven by the results of the media validation assessment which obtained an average of 93% with a very feasible category. Data analysis of students' pretest and posttest scores increased with an average difference of 33.05 and an N-gain of 0.70, which is included in the high criteria. This proves that Interactive Mobile Learning (Imole) assisted by *iSpring Suite* is feasible, practical, and effective for improving the learning outcomes of class V students in science and science subjects on ecosystems and food webs.

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Author Contributions
Nikma contributed to conducting research, developing products, analyzing data, and writing articles. Novi Setyasto as a supervisor in research activities to article writing.

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Conflicts of Interest
The author declares that he has no conflict of interest.

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