

Development of Interactive Learning Media Assisted by *Lumio by SMART* to Increase The Learning Motivation of IPAS

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Received: September 14, 2024

Revised: November 12, 2024

Accepted: November 25, 2024

Published: November 30, 2024

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DOI: [10.29303/jppipa.v10i11.9161](https://doi.org/10.29303/jppipa.v10i11.9161)

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Abstract: The lack of technology utilization in the learning process at SDN Klepu 01 affects students' learning motivation. This research aims to develop interactive learning media assisted by *Lumio by SMART*, test the media feasibility, and test the media effectiveness in increasing IPAS learning motivation in fifth-grade students of SDN Klepu 01, Semarang Regency. The type of research used is Research and Development (R&D) with the ADDIE model. The research subjects included media experts, material experts, teachers, and fifth-grade students. The data collection techniques employed non-tests such as interviews, observation, and questionnaires. Media feasibility based on the validation of material experts and media experts obtained scores of 91,25% and 90%, respectively, in a very feasible category. Media feasibility based on teacher and student responses obtained scores of 100% and 96,5%, respectively, in a very feasible category. The effectiveness of the media to increase learning motivation, based on the results of observations by teachers, obtained an average score of 90%, which shows that student learning motivation looks very good. Based on the results of the pretest-posttest questionnaire, the effectiveness of the media in increasing learning motivation is shown by the Wilcoxon Signed Rank Test, which obtained an Asymp. Sig (2-tailed) of 0,000 < 0,05 shows a significant difference, while based on the N-gain results obtained a value of 0,69 with medium category. Thus, the interactive learning media assisted by *Lumio by SMART* that has been developed can be declared feasible and effective in increasing IPAS learning motivation.

Keywords: Interactive learning media; IPAS; Learning motivation

Introduction

IPAS (Natural and Social Sciences) is a unification of Natural Science (IPA) and Social Science (IPS) subjects studied by students at the elementary school level since the implementation of the independent curriculum (Nuryani et al., 2023; Sugih et al., 2023; Wijayanti & Ekantini, 2023). The consideration of the unification of science and social studies is that elementary school students are still in the stage of thinking concrete, holistically, and comprehensively but not in detail (Purnawanto, 2022; Sa'adah et al, 2023). The unification of Natural Science and Social Science has the aim of equipping students to understand the natural and social environment as a whole. Students not only learn about scientific facts and social concepts but also understand

the interrelationship of natural and social phenomena in everyday life (Alwi et al., 2024; Andreani & Gunansyah, 2023; Zakarina et al., 2024). Thus, IPAS is one of the important subjects to learn, so the need to design effective lesson plans so that learning objectives can be realized (Nadlir et al., 2024; Sanjani, 2021; Zaniyati & Rohmani, 2024; Zulfa & Bektiningsih, 2024).

However, the implementation of IPAS learning in the field faces several problems, one of which is the non-optimal utilization of technology in learning process (Handayani et al., 2023; Nurlaila et al., 2024; Rahma et al., 2023). In field, teachers still use conventional learning media that does not involve students actively, so learning runs monotonously and results in low student learning motivation. Although, technology can be an effective means to deliver abstract and complex IPAS

How to Cite:

Suryandani, A. D. A., & Asih, S. S. (2024). Development of Interactive Learning Media Assisted by Lumio by SMART to Increase The Learning Motivation of IPAS. *Jurnal Penelitian Pendidikan IPA*, 10(11), 9003–9011. <https://doi.org/10.29303/jppipa.v10i11.9161>

content in an interactive, engaging, and fun way so that it can increase student learning motivation (Dewi & Setyasto, 2024; Maharani et al., 2023; Maslakhah et al., 2024).

Based on the results of pre-research, researchers discovered the above problems in class V SDN Klepu 01, Semarang Regency. Teachers often use conventional learning media that have yet to optimally utilize technology, such as textbooks, pictures, and *PowerPoint* presentations, with the lecture method in IPAS learning. The implementation of IPAS learning using this media tends to run monotonously. Students are only asked to sit down, pay attention, and then answer the questions in the student handbook. As a result, during the IPAS learning process, students look bored, lack enthusiasm and focus, and do other activities. This behavior shows students' low motivation to learn when participating in IPAS learning (Darling et al., 2020; Kompri, 2015; Sapriyah, 2019).

To overcome these problems, teachers must create a learning process by utilizing technology that actively involves students, attracts students' attention, and makes learning fun to increase learning motivation (Licorish et al., 2018; Sandang et al., 2022). Employing interactive learning media in the IPAS learning process can solve this problem. Interactive learning media is one type of learning media that integrates technology composed of several elements such as text, images, animation, audio, games, and videos that allow direct interaction between students and learning materials (Aulia et al., 2024; Surjono, 2017). Interactive learning media offers a solution to overcome the shortcomings of conventional learning media, which makes students not actively involved, so the learning process runs monotonously (Aulia et al., 2024; Dewi et al., 2021; Putra & Salsabila, 2021). This is supported by previous findings, which state that active student involvement, student interest and make learning fun when using interactive learning media can trigger high student learning motivation (Bunari et al., 2024; Julia et al., 2023; Mahsunah, 2017; Selviana & Ahmadi, 2024). One of the interactive learning media that can be used is *Lumio by SMART*. *Lumio By SMART* is a digital learning media platform that anyone can access just by visiting the linked website <https://www.smarttech.com/> via smartphone or PC without needing to install an application. *Lumio by SMART* is a blank canvas. With *Lumio by SMART*, teachers can add formulas, images, or text to the canvas and then design it using the tools and templates provided so the material can be packaged as creatively and interestingly as possible. The interactive learning media assisted by *Lumio by SMART* also has a feature that connects to *YouTube* to broadcast learning videos that can attract students' attention. In addition, *Lumio by SMART* has a game-based activity feature

containing various educational games that can actively involve students and make learning fun. (Zahrah, 2023; Zheng et al., 2024). The diverse features of interactive learning media supported by *Lumio by SMART* enable the presentation of educational materials in engaging design, actively involve students in the learning process, and make fun learning activities, thereby potentially increasing learning motivation in IPAS. That statement is in line with (Allsop & Jessel, 2015; Asnadi, 2018; Cachay-Gutierrez & Cabanillas-Carbonell, 2024; Daryanes et al., 2023; Ulimaz et al., 2024) which highlight the use of interactive learning media with an engaging design coupled with *YouTube* and games can increase student learning motivation because it makes fun of learning.

Based on this background, the researcher developed interactive learning media assisted by *Lumio by SMART* to increase learning motivation, especially in IPAS learning for grade V of SDN Klepu 01, Semarang Regency. The interactive learning media assisted by *Lumio by SMART* that researchers will develop contains material collected from various sources, learning videos, and several educational games that can be accessed through a website. The purpose of this research and development is to develop interactive learning media assisted by *Lumio By SMART*, test the media feasibility, and test the media effectiveness in increasing IPAS learning motivation in fifth-grade students from SDN Klepu 01 in Semarang Regency.

Method

The type of research used is Research & Development (R&D), aimed to develop interactive learning media assisted by *Lumio by SMART* to increase the learning motivation of fifth-grade students of SDN Klepu 01. The subjects of this research include media experts, material experts, class teachers, and fifth-grade students. This research uses the ADDIE model, which encompasses five stages: (1) Analysis, (2) Design, (3) Development, (4) Implementation, and (5) Evaluation (Hamzah, 2019). The stages of this research can be seen in Figure 1.

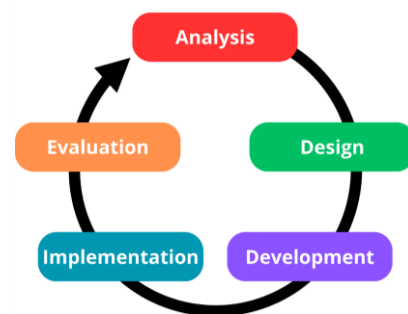


Figure 1. ADDIE Model

At the analysis stage, analysis activities are carried out to develop interactive learning media assisted by *Lumio by SMART* according to student needs and overcome existing problems in IPAS learning. Analysis activities include curriculum analysis, learning objectives analysis, and needs analysis. The analysis was carried out through interviews, observations, and the distribution of needs analysis questionnaires to teachers and fifth-grade students of SDN Klepu 01.

At the design stage, relevant materials for the learning media are collected. The materials are gathered and aligned with the specified learning objectives. Then, at this stage, the concept of interactive learning media assisted by *Lumio by SMART* will be designed based on the needs analysis results.

At the development stage, interactive learning media assisted by *Lumio by SMART* is created based on the prepared material and concepts. After the interactive learning media assisted by *Lumio by SMART* is finished, material validation and media validation are carried out. The validation is conducted by two expert validators—a material expert and a media expert—both of whom possess relevant expertise. The expert validators use validation instruments that have been prepared to test the feasibility of interactive learning media assisted by *Lumio by SMART*.

At the implementation stage, trials of varying scales—small and large—are conducted to assess the feasibility and effectiveness of the interactive learning media assisted by *Lumio by SMART* in increasing the learning motivation of fifth-grade students. Trials were conducted using One Group Pretest-Posttest Design to compare the situation before and after treatment (Sugiyono, 2022). Activities in trials are distributing questionnaires of responses to learning media, pretest-posttest questionnaires of learning motivation, and observation sheets of learning motivation. The small-scale trial was attended by teachers and six fifth-grade students, while the large-scale trial was attended by teachers and 25 of fifth-grade students in SDN Klepu 01.

In the final stage, the evaluation stage, data collected at the previous stage is analyzed to assess the feasibility and effectiveness of interactive learning media assisted by *Lumio by SMART* in increasing the learning motivation of fifth-grade students at SDN Klepu 01. Quantitative data is generated from questionnaire scores and observations. Meanwhile qualitative data is generated from suggestions and observation detail.

The feasibility of interactive learning media assisted by *Lumio by SMART* was evaluated using data obtained from expert validation questionnaire and response questionnaires, analyzed through Formula 1.

$$P(s) = \frac{S}{N} \times 100\% \quad (1)$$

Description:

P(s) : percentage

S : number of scores obtained

N : maximum scores

The percentage results from the expert validation and the response questionnaire are then converted into the following assessment categories: (1) very feasible: $P(s) > 81$; (2) feasible: $61 \leq P(s) \leq 80$; (3) quite feasible: $41 \leq P(s) \leq 60$; (4) not feasible: $P(s) < 40$.

The effectiveness of using interactive learning media assisted by *Lumio by SMART* to increase learning motivation is measured based on observation results. Observation results were obtained from classroom teacher observation activities during the trial activities. The observation results were obtained from the analysis of the observation sheet filled in by the teacher during the trial activities. The observation sheet has assessment category, namely: (1) very good: $P(s) > 81$; (2) good: $61 \leq P(s) \leq 80$; (3) sufficient: $41 \leq P(s) \leq 60$; (4) low: $P(s) < 40$.

The effectiveness of using interactive learning media assisted by *Lumio by SMART* to increase learning motivation is also measured based on the pretest-posttest learning motivation questionnaire. The data from a pretest-posttest questionnaire of learning motivation were collected by having students complete the questionnaire both prior to and following the trial. The questionnaire has assessment category, namely: (1) very high: $P(s) > 83$; (2) high: $64 \leq P(s) \leq 82$; (3) relatively low: $45 \leq P(s) \leq 63$; (4) low: $25 \leq P(s) \leq 44$. The data analysis techniques used were the normality test, Wilcoxon Signed Rank Test, and N-Gain. The normality test used in this research is the *Shapiro-Wilk* Test, which is carried out to determine whether the data is normally distributed. The criteria for decision-making in the normality test are: (1) if the value of Sig. $> 0,05$ then the data is considered normally distributed; (2) if the value Sig. $< 0,05$ then the data is deemed not normally distributed.

The Wilcoxon Signed Rank Test was employed to evaluate the research hypothesis. The hypothesis in this research include: (1) H_0 is the pretest value is the same as the posttest (there is no significant difference) dan (2) H_a is the pretest value is not the same as the posttest (there is a significant difference). The criteria for decision-making in the Wilcoxon Signed Rank Test are: (1) if the value of Asymp. Sig $> 0,05$ then H_0 is accepted and H_a is rejected; (2) if the value of Asymp. Sig $< 0,05$ then H_0 is rejected and H_a is accepted.

The N-Gain test was used to measure the average increase in the *pretest-posttest* questionnaire results of learning motivation in small-scale and large-scale trials with Formula 2.

$$g = \frac{S_{post} - S_{pre}}{S_{max} - S_{pre}} \times 100\% \quad (2)$$

Description:

g : N-Gain
 S_{post} : average posttest score
 S_{pre} : average pretest score
 S_{max} : maximum score

The value of N-Gain (g) was then converted with the gain value category: (1) high: $g > 0,7$; (2) medium: $0,3 \leq g \leq 0,7$; and (3) low $g < 0,3$.

Result and Discussion

The product of this research and development is an interactive learning media assisted by *Lumio by SMART*. It is produced through the five stages of the ADDIE model, which include Analysis, Design, Development, Implementation, and Evaluation.

Analysis

At this stage, researchers conducted a needs analysis to develop a product that suits the needs of students and can overcome existing problems. This stage involved conducting interviews, making observations, and distributing questionnaires. Based on interviews and observations, problems were found, especially in IPAS learning process with the subject matter of the human digestive system. Teachers utilize conventional learning media, such as textbooks and pictures, with the lecture method in a learning process that has yet to optimally utilize technology. The implementation of IPAS learning process using that media tends to run monotonously, where students are only asked to sit still and pay attention, then do the questions in the student handbook. As a result, IPAS learning makes students bored quickly, resulting in low motivation for learning. This can be seen from the needs analysis questionnaire, where as many as 61% of students claimed to be less excited, 67% claimed to be bored, 58% were often sleepy, and 46% were less focused on participating in IPAS learning process. So, to overcome these problems, interactive learning media assisted by *Lumio by SMART* can be one solution in increasing student learning motivation because it can package learning materials with attractive designs and have various interesting activity features that can actively involve students so that IPAS subject matter of the human digestive system material tends to run fun and not monotonous.

Design

At this stage, researchers prepare materials and design interactive learning media products assisted by

Lumio by SMART in accordance with the Learning Outcomes and Learning Objectives in the IPAS subject matter of the human digestive system. Interactive learning media assisted by *Lumio by SMART* is designed by containing elements of text, comics, images, videos, and educational games packaged in the form of slides.

Development

At this stage, researchers develop interactive learning media with the help of *Lumio by SMART* website. Interactive learning media products are developed based on the design established in the prior stage. The steps in developing this product are preparing materials, design plans, and making product designs. The outcomes of the development of interactive learning media assisted by *Lumio by SMART* that has been developed by researchers consist of covers, preface, material identity, Learning Outcomes and Learning Objectives, learning materials (text, images, comics), learning videos, label reveal games, game show games, word search games, rank order games, reference lists, and developer profiles. In each display, there are various features that can be utilized, including menu buttons, zoom in/out, next and previous buttons, randomizer (randomly selecting students), timer, adding text, adding and deleting scribbles, adding formulas, and adding stickers.

Feasibility of Interactive Learning Media Assisted by Lumio By SMART

At this stage, the media validation test was conducted to test the feasibility of interactive learning media assisted by *Lumio by SMART* by media expert and material expert as validators, specifically lecturers at the Elementary School Teacher Education study program who possess expertise in their fields. The assessment in the validation test was carried out using a validation Likert scale questionnaire that included a column of suggestions or input so that researchers could revise the developed product if necessary. The assessment aspects in the material expert validation questionnaire encompass content, language, and material presentation. Meanwhile the assessment aspects in the media expert validation questionnaire encompass display, clarity of material content, language, and utilization of media.

Table 1. Expert Validation Result

Type of Validation	Validation Score (%)	Category
Material Expert	91.25	Very Feasible
Media Expert	90.00	Very Feasible

Table 1 shows that media feasibility based on material expert validation of interactive learning media assisted by *Lumio by SMART* obtained a score of 91.25%,

categorizing it as very feasible. The material expert validator provided input in the suggestion column, namely the need for additional introductory material and a glossary. Meanwhile, media feasibility based on media expert validation of interactive learning media assisted by *Lumio by SMART* obtained a score of 90% categorizing it as very feasible. The media expert validator did not provide input in the suggestion column, so the product was suitable for testing without revision. Based on the validation test, interactive media assisted by *Lumio by SMART* is feasible to be tested as an IPAS learning media in field with some revisions.

Design Revision

At this stage, the researchers revised the interactive learning media assisted by *Lumio by SMART* based on the suggestion from expert validators. The revised interactive learning media assisted by *Lumio by SMART* that have been developed by researchers can be accessed through the link: <https://lum.io/student/share/f2835aff-160c-4817-afdb-3cd33358d815>. After revision, the interactive learning media assisted by *Lumio by SMART* is ready to be tested as a learning media for the IPAS learning in fields.

Implementasi: Product Trial

At this stage, researchers conducted product trials of interactive learning media assisted by *Lumio by SMART* on a small-scale and large-scale trial. After IPAS learning using interactive learning media assisted by *Lumio by SMART* was completed, the researcher gave a response questionnaire in the form of a Guttman Scale, which contains responses regarding IPAS learning using interactive learning media assisted by *Lumio by SMART* to teachers and students. The aspects of assessment in the response questionnaire include appearance, material presentation, ease of use, and benefits.

Table 2: Results of Questionnaire Responses in Small-Scale Trial

Respondents	Score (%)	Category
Teacher	93.3	Very Feasible
Student	98.8	Very Feasible

Table 2 shows that feasibility of the interactive learning media assisted by *Lumio by SMART* in small-scale trial based on responses from teacher obtained a score of 93.3%, categorizing it as very feasible. Meanwhile, feasibility of the interactive learning media assisted by *Lumio by SMART* based on responses from teacher obtained a score of 98.8%, categorizing it as very feasible. Therefore, the interactive learning media assisted by *Lumio by SMART* is ready to be tested on a large-scale trial.

Table 3. Results of Questionnaire Responses in Large-Scale Trial

Respondents	Score (%)	Category
Teacher	100	Very Feasible
Student	96.5	Very Feasible

Table 3 shows that feasibility of the interactive learning media assisted by *Lumio by SMART* in large-scale trial based on responses from teacher obtained a score of 100%, categorizing it as very feasible. Meanwhile, feasibility of the interactive learning media assisted by *Lumio by SMART* based on responses from teacher obtained a score of 96.5%, categorizing it as very feasible. Thus, the interactive learning media assisted by *Lumio by SMART* is very feasible to use as a learning media for IPAS learning.

Evaluation: The Effectiveness of Interactive Learning Media Assisted by *Lumio by SMART* to Increase Learning Motivation

The effectiveness of interactive learning media assisted by *Lumio by SMART* in increasing learning motivation can be known by analysing teacher observation data and pretest-posttest questionnaire of learning motivation data result. The data were obtained in small-scale and large-scale trials. The data results can be analysed using data analysis techniques of observation results, normality test, Wilcoxon Signed Rank Test, and n-gain.

Table 4: Observation Results

Class	Score (%)	Category
Small-Scale	91.6	Very Good
Large-Scale	90.0	Very Good

Based on Tables 4, the results of observations on small-scale and large-scale trials obtained a result of 91,6% and 90% from the teacher as an observer. These results have very good category according to observation assessment category. The very good category shows that the use of the interactive learning media assisted by *Lumio by SMART* has a significant influence on learning motivation before and after implementation. Meanwhile, based on the observation details, high learning motivation is present in all students. Thus, based on the observation results, the interactive learning media assisted by *Lumio by SMART* effectively increases student learning motivation.

Table 5: Learning Motivation Questionnaire Results on Small-Scale Trial

Action	Average	Category
Pretest	42.2	Relatively Low
Posttest	83.3	Very High

Table 6: Results of the Learning Motivation Questionnaire on the Large-Scale Trial

Action	Average	Category
Pretest	43.0	Low
Posttest	82.4	High

Table 7: Normality Test Results of Trial

Class	Sig.	Information
Pretest Small-Scale	0.195	Normally distributed
Posttest Small-Scale	0.330	Normally distributed
Pretest Large-Scale	0.140	Normally distributed
Posttest Large-Scale	0.143	Normally distributed

Based on the normality test results from pretest-posttest questionnaire of learning motivation data in small-scale trials and large-scale trials, the significance value (Sig.) on each pretest-posttest is greater than 0.05. If the value of Sig. (2-tailed) <0.05, it can be declared that the pretest and posttest data are deemed not normally distributed. Likewise, if the value of Sig. (2-tailed) >0.05, it can be declared that the pretest-posttest data are considered normally distributed. Based on the normality test results in Table 7, it can be concluded that the pretest-posttest data on learning motivation in both the small-scale and the large-scale trial are considered normally distributed.

After the pretest-posttest questionnaire of learning motivation data result is declared normally distributed, the next step is to evaluate the effectiveness of the interactive learning media assisted by *Lumio by SMART* in increasing learning motivation using Wilcoxon Signed Rank Test. Wilcoxon Signed Rank Test is a non-parametric test that can be used to test ordinal scaled data (Karmini, 2020). In this research, the Wilcoxon Signed Rank Test was used to determine whether there was a significant difference between the pretest and posttest questionnaire results of learning motivation.

Table 8: Wilcoxon Table Test Statistics

Class	Asymp. Sig. (2-tailed)
Small-Scale	0.028
Large-Scale	0.000

Table 8 shows that the Wilcoxon Signed Rank Test result from pretest-posttest questionnaire of learning motivation data in small-scale trials obtained an Asymp. Sig. (2-tailed) = 0.028, while the Wilcoxon Signed Rank Test on large-scale trials obtained an Asymp. Sig. (2-tailed) = 0.000. The Wilcoxon Signed Rank Test results from both trials get an Asymp. Sig. (2-tailed) more minor than 0,05. If the value of Asymp. Sig. (2-tailed)>0,05 then H_0 is accepted and H_a is rejected so that it can be declared that there is no significant difference between the pretest-posttest of learning motivation. Likewise, on the contrary, if the value of Asymp. Sig. (2-tailed)<0,05 then

H_0 is rejected and H_a is accepted so that it can be declared that there is no significant difference between the pretest-posttest of learning motivation. Based on the results of the Wilcoxon Signed Rank Test in Table 8, it can be concluded that H_0 is rejected and H_a is accepted, so there is a significant difference between the pretest and posttest of learning motivation in small-scale and large-scale trial. The significant difference shows that the use of the interactive learning media assisted by *Lumio by SMART* has a significant influence on learning motivation before and after implementation. Then, to measure the average increase in pretest-posttest learning motivation, the N-Gain Test was conducted.

Table 9: N-Gain Result

Class	N-Gain	Category
Small-Scale	0.71	High
Large-Scale	0.69	Medium

Based on Table 9, the results of the pretest and posttest learning motivation questionnaires in small-scale trials obtained an N-Gain value of 0.71 with high category according to the N-Gain score category. Meanwhile, the results of the pretest-posttest questionnaires of learning motivation in the large-scale trial N-Gain results obtained a value of 0.69 with medium category according to the N-Gain score category. The results show that the use of the interactive learning media assisted by *Lumio by SMART* can increase the learning motivation before and after implementation. This is in line with score obtained from the Wilcoxon Signed Rank Test results in small-scale and large-scale which also showed that there was a significant difference between the pretest-posttest of learning motivation. Thus, the interactive learning media assisted by *Lumio by SMART* effectively increases student learning motivation.

According to the findings in this research, the interactive learning media assisted by *Lumio by SMART* effectively and feasibly increases student learning motivation of fifth-grade students at SDN Klepu 01. This is corroborated by the results of other research studies, which state that *Lumio by SMART* is declared very valid and practical for use as learning media at elementary school (Wirda, 2024). Using *Lumio by SMART* as learning media can attract students' attention and encourage them to be actively involved in learning Fontes et al., 2024). Other studies state that the using *Lumio by SMART* as learning media can make the learning process interesting, fun, not boring, and increase student understanding (Relawati et al., 2024; Zahrah, 2023). In addition, other findings also corroborate, which indicating that the use of *Lumio by SMART* learning media can foster learning motivation, a sense of learning enthusiasm, and student learning enthusiasm with the

activity features that have been provided (Harningsih, 2024).

Conclusion

Interactive learning media assisted by *Lumio by SMART* is produced through the five stages of the ADDIE model. Media feasibility based on teacher and student responses obtained scores of 100% and 96,5%, respectively, in a very feasible category. The media effectiveness to increase learning motivation, based on observations result, obtained an average score of 90%, which shows that student learning motivation looks very good. Based on the pretest-posttest questionnaire data result, the effectiveness of the media to increase learning motivation is shown by the Wilcoxon Signed Rank Test, which obtained an Asymp. Sig (2-tailed) of 0.000 <0.05 shows a significant difference, while based on the N-Gain results, obtained a value of 0.69 with medium category. According to the findings in this research, interactive learning media assisted by *Lumio by SMART* that has been developed can be declared feasible and effective in increasing IPAS learning motivation.

Acknowledgments

Thank you to the thesis advisor who guided the research and writing of this article to completion. Thanks to SDN Klepu 01 for the permission and assistance provided during the research process. Thank you to the University of Mataram for facilitating the production of the article and the editors who have helped review it. Thank you to my parents and friends for their prayers and support.

Author Contributions

Anike Dyah Ayu Suryandani contributed to developing the product, analyzing data, writing and drafting the article. Sri Sami Asih contributed as research supervision and article writing advisor.

Funding

This research did not receive any funding from external sources.

Conflicts of Interest

The authors state no conflict of interest.

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