

Development of Lumio-Based Interactive Learning Media by Smart for Taxation Elements in Class XI Accounting and Institutional Finance of State Vocational Schools in Surabaya

Fitri Mahendrastuti¹, Moh Danang Bahtiar²

State University of Surabaya

Corresponding Author: Fitri Mahendrastuti, e-mail: fitri.21031@mhs.unesa.ac.id

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ABSTRACT

The quality of education in schools, it can be focused on improving the quality of learning in the classroom. The selection of learning media must be in accordance with the Merdeka Curriculum so that learning runs properly and can improve the quality of learning. With the advancement of technology, researchers finally developed interactive learning media with the help of the *Lumio by Smart* Website for Taxation subjects. The purpose of this development research is to see the feasibility of the interactive learning media developed, as well as to see the response of students after using the product during the trial. This type of research is Research and Development (R&D) using the ADDIE development model which has five stages consisting of Analyze, Design, Development, Implementation, and Evaluation. The product trial was carried out at SMKN 1 Surabaya, SMKN 4 Surabaya, SMKN 6 Surabaya, and SMKN 10 Surabaya together with class XI Accounting and Institutional Finance students who had received Income Tax Article 21 material in the Taxation subject. The feasibility results based on the validation of subject matter expert obtained a score of 92%, media expert 98%, and language expert 100%, where the three percentage scores were classified as "Very Feasible". The results of the student response questionnaire obtained a score of 96% classified as "Very Good". From the two results, it means that interactive learning media based on *Lumio by Smart* in the Taxation subject is feasible to be used in learning.

Keywords: Interactive Learning Media, Technology, *Lumio by Smart*, Taxation

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INTRODUCTION

Producing a progressive generation requires quality education. Improving the quality of education can begin with and focus on teaching and learning activities with students. Learning is a crucial component of building a nation's quality. The better a nation's education quality, the more advanced it will become (Pristiwanti et al., 2022). Before conducting learning activities, a teacher needs to plan several aspects to ensure effective and efficient learning. This planning includes creating learning media, selecting learning methods, compiling learning materials, and evaluating them based on student needs. Creating engaging learning media can create a positive impression, motivating students to learn. Learning media is a tool used as a means of communication between teachers and students, between the transmitter of information and the receiver of information. The goal is to stimulate student motivation so that they can participate in learning activities thoroughly and meaningfully (Hasan et al., 2021). With the continuous advancement of technology, there are various ways educators can create engaging learning media. Technology can be utilized in developing learning media, such as using specific applications or websites, which are then implemented during learning with students. Interactive learning media is one type of learning media frequently used today. Interactive media provides opportunities for interaction between students and the learning media by applying their skills, with the hope that students will receive feedback on the material presented

(Swasti et al., 2022). The creation of interactive learning media creates a pleasant classroom atmosphere during learning and encourages positive interaction between teachers and students. The implementation of interactive learning media certainly facilitates teachers in conveying information in the form of material, while also stimulating students to respond to the material being taught.

This research was conducted at four well-regarded and advanced schools in Surabaya, that is SMKN 1 Surabaya, SMKN 4 Surabaya, SMKN 6 Surabaya, and SMKN 10 Surabaya. Observations at these four schools indicated that at class XI Accounting and Finance classes, the implementation of the Merdeka Curriculum still did not meet the curriculum's requirements. The demands of the Merdeka Curriculum here mean that students are the center of learning, but classroom activities remain teacher-centered. In the four schools, technology-based learning media such as PowerPoint are already being used in the XI grade Accounting and Finance classes, but the variety of learning media is still limited. Furthermore, given the limited time available for learning, these media can later be used as learning materials at home. For the Taxation element, having the right media is crucial so that students can properly absorb and understand the material, both theoretically and mathematically. This interactive learning media will cover Income Tax Article 21. The choice of Income Tax Article 21 material is based on the fact that in previous lessons, the old calculation used a progressive rate, while this lesson will apply a new calculation, namely the Average Effective Rate. Calculating tax payable with progressive rates is quite difficult for students to understand. Therefore, the creation of this learning media will encourage students to understand the material on calculating Income Tax Article 21, which will implement the Average Effective Rate (AER) scheme, making it easier for students to calculate tax payable.

In this study, researchers utilized a website that can be used to develop interactive learning media products, namely *Lumio by Smart*. The use of this website is supported by a study conducted (Dyah et al., 2024), which showed that the interactive learning media developed using *Lumio by Smart* was deemed feasible and effective for increasing motivation to learn science. This was seen through validation by experts and responses from teachers and students, all of which were categorized as very feasible. The advantage of interactive learning media using the *Lumio by Smart* website is that it provides numerous features that can be used in developing interactive learning media. Furthermore, it is easy to use for all levels, thus assisting teachers in developing interactive learning media. This is supported by (Fajrianti et al., 2024), who stated that Lumio has advantages over other e-learning media. Lumio has many functions, including the ability to create reflection questions, create mind maps, and can be used collaboratively to facilitate interactive student learning.

Finally, the researcher intends to conduct a study entitled "Development of Interactive Learning Media Based on *Lumio by Smart* for the Taxation Element of Class XI Accounting and Institutional Finance at a State Vocational High School in Surabaya". This research is expected to add interactive learning media to the four schools, facilitating communication between teachers and students. Furthermore, the *Lumio by Smart*-based interactive learning media is expected to enhance students' knowledge and insight into taxation elements and assist them in understanding the material contained within. The purpose of this development research is to analyze the product development process, analyze product feasibility, and analyze student responses to the research product, namely interactive learning media based on *Lumio by Smart* for the Taxation element.

METHOD

The type of research used is research and development, commonly referred to as R&D, an abbreviation of Research and Development. The development model used is the ADDIE model, which has five stages: analysis, design, development, implementation, and evaluation. In selecting the ADDIE development model, the researcher has clearly considered all aspects related to the development model. Several reasons can be outlined by the researcher: the ADDIE development model is highly appropriate for this research because it is more systematic and structured, relatively simple, and easy to learn. Another reason is supported by (Waruwu, 2024), who states that the resulting product is guaranteed valid because each stage goes through an in-depth process of analysis, design, development, and implementation. Furthermore, each stage is evaluated before proceeding to the next. The development research procedure is illustrated in the diagram below:

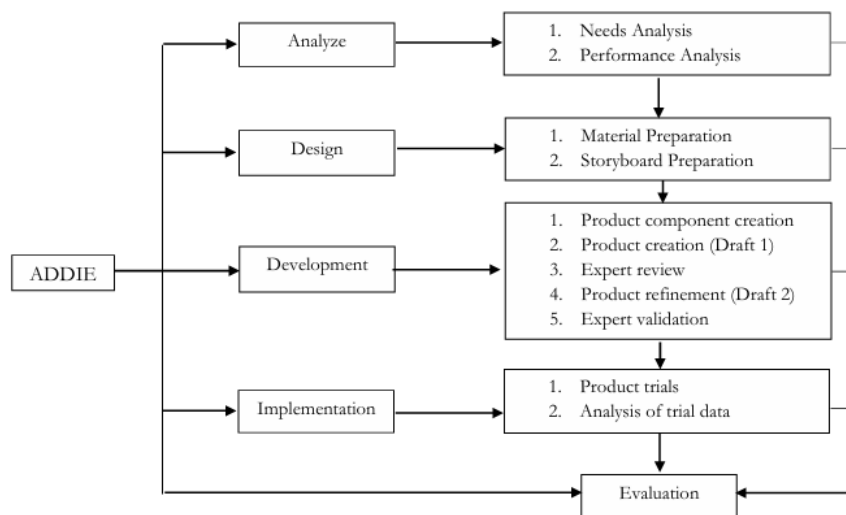


Figure 1. ADDIE Development Procedure
Source: (Rayanto & Sugianti, 2020)

The subjects used in this development research trial were two subject matter expert validators: one lecturer from the Accounting Education study program Faculty of Economics and Business, State University of Surabaya and one teacher in charge of the Taxation element at SMKN 1 Surabaya; one media expert validator, a lecturer from the Educational Technology study program, Faculty of Social and Political Sciences, State University of Surabaya; and one language expert validator, a lecturer from the Indonesian Language and Literature study program, Faculty of Social and Political Sciences, State University of Surabaya. The data used in this development research consisted of quantitative and qualitative data derived from expert review and validation sheets, as well as student response questionnaires. The data analysis technique used in this development research was quantitative descriptive analysis.

Qualitative data collection was obtained from review sheets containing general comments and suggestions for product improvement by the experts, and from student response questionnaires containing general comments and suggestions about the product. Quantitative data collection was obtained from validation sheets assessing product feasibility by subject matter experts, media experts, and language experts, as well as from student response questionnaires containing product assessments after the trial. The validation results by experts will then be analyzed using a Likert scale which will be presented in the table below:

Table 1. Likert Scale Assessment

Criteria	Mark
Very Good	5
Good	4
Currently	3
Not Good	2
Very Not Good	1

Source : (Dr. Riduwan, 2015)

Analysis of validation sheet data obtained by three expert validators according to their fields:

$$\text{Presentation (\%)} : \frac{\text{Total Score (X)}}{\text{Maximum Score (Xi)}} \times 100$$

Description:

X = Total score of all respondents

Xi = Total maximum score of validation sheet x total respondents

After analyzing the assessment results, a conclusion can be drawn regarding the feasibility of the developed product by examining the Likert scale criteria in the table below:

Table 2. Interpretation Criteria

Assessment	Interpretation Criteria
81% - 100%	Very Feasible
61% - 80%	Feasible
41% - 60%	Enough
21% - 40%	Not Feasible
0% - 20%	Very Not Feasible

Source : (Dr. Riduwan, 2015)

If the research and development product achieves a score of >61%, it can be considered feasible according to the interpretation criteria above.

Furthermore, the student questionnaire responses regarding the research product will be analyzed using the Guttman scale (Dr. Riduwan, 2015). This scale is used to obtain definitive answers, with a "Yes" response receiving a score of 1, while a "No" response receiving a score of 0.

Analysis of the student questionnaire response data:

$$\text{Presentation (\%)} : \frac{\text{Total Score (X)}}{\text{Maximum Score (Xi)}} \times 100$$

Description:

X = Total score of all respondents

Xi = Total maximum score of validation sheet x total respondents

After analyzing the results of the student questionnaire assessment, the results can be interpreted according to the Likert scale presented in the table below:

Table 3. Interpretation Criteria

Assessment	Interpretation Criteria
81% - 100%	Very Good
61% - 80%	Good
41% - 60%	Enough
21% - 40%	Not Good
0% - 20%	Very Not Good

Source : (Dr. Riduwan, 2015)

FINDING AND DISCUSSION

This research, developing interactive learning media using *Lumio by Smart*, uses the ADDIE development model, which has five stages: Analysis, Design, Development, Implementation, and Evaluation.

Analyze

The initial stage that researchers must carry out is analysis, which serves as a starting point or reference for designing and developing a research product. The analysis stage consists of a series of steps, namely needs analysis and performance analysis. According to (Arifiyani & Susanti, 2020), needs analysis is conducted to identify information regarding what is needed and learning innovations to be implemented to improve student skills, thus optimally achieving learning objectives. In the needs analysis, researchers will identify the needs of students and teachers and analyze the impact of emerging problems at the research site. Observations indicate that the schools used for the research: SMKN 1 Surabaya, SMKN 4 Surabaya, SMKN 6 Surabaya, and SMKN 10 Surabaya, have implemented the Merdeka Curriculum. The four schools also support increasingly sophisticated learning, such as the use of computers in laboratories, which students can access and use for learning. However, the use of technology as a learning medium in these schools is still lacking, especially in the Taxation element. For example, during lessons, only PowerPoint is used to deliver material with the aid of a projector, so learning is still dominated by the teacher. The learning media needed here are interactive and engaging to encourage students to learn. Furthermore, media is also needed that can be accessed anytime so it can be used as learning material in class or at home.

The second stage of analysis is performance analysis, where the researcher analyzed student characteristics, classroom learning activities, particularly those related to taxation, and learning outcomes and the flow of learning objectives within the taxation element. According to (Cahyadi,

2019), student analysis is the study of student characteristics based on their knowledge, skills, and development. The analysis of student characteristics revealed observations indicating that students in grade XI Accounting and Institutional Finance at a public vocational school in Surabaya struggled to calculate monthly Income Tax Article 21. Therefore, a learning medium capable of supporting students' understanding of the monthly Income Tax Article 21 material was needed. A new method for calculating monthly Income Tax Article 21 using the AER scheme was also needed to simplify the calculations. Furthermore, the analysis of learning activities revealed observations indicating that learning in grade XI Accounting and Institutional Finance at a public vocational school in Surabaya utilized technological assistance, such as projectors, Wi-Fi, and school computers in the laboratory. The results of this analysis demonstrate the need for media that can be used as a means of conveying information in the form of more diverse learning materials, such as utilizing students' smartphones for learning activities. The goal of this innovation is to help teachers motivate students to be more enthusiastic about learning, particularly regarding taxation elements.

Furthermore, the analysis of Learning Outcomes and Learning Objective Flow can be seen in the Taxation learning module developed by the teacher, who teaches taxation elements at a public vocational school in Surabaya. This alignment indicates that the material taught is relevant and aligned with the educational objectives established in the curriculum. The Learning Outcomes in the learning module include students understanding General Provisions and Tax Procedures, types of taxes, and applying tax calculations, underpayment tax payments, and tax reporting. In the learning module there is a Learning Objective Flow for many materials, while this media will only focus on one material so that the Learning Objectives can be formulated, namely (1) Explaining the meaning of Article 21 Income Tax. (2) Examining the subjects and objects of Article 21 Income Tax. (3) Classifying Non-Taxable Income. (4) Analyzing the legal basis for withholding Article 21 Income Tax. (5) Classifying the Average Effective Rate (AER) scheme. (6) Analyzing Article 21 Income Tax rates using TER scheme. (7) Calculating Article 21 Income Tax using the Average Effective Rate (AER) scheme.

Design

The second stage is where researchers begin designing the product, namely interactive learning media, through two stages, that is material preparation and storyboard development. The initial stage in product planning is material preparation, which involves gathering the materials needed for the media, and most importantly, ensuring that they align with the established learning objectives. The aforementioned statement aligns with a study conducted by (Afifaturochmah & Bahtiar, 2024), which stated that the material preparation stage aims to ensure the media's content aligns with the predetermined learning objectives. The content of the media will cover the definition of Article 21 Income Tax, the subjects and objects of Article 21 Income Tax, the definition of Non-Taxable Income, the legal basis for Article 21 Income Tax deductions, the definition of the Average Effective Rate (AER), the Article 21 Income Tax deduction rate using the AER scheme, and the calculation of Article 21 Income Tax using the AER scheme.

According to (Imbar et al., 2021), a storyboard is a graphical arrangement of a group of representations presented sequentially with the aim of depicting moving tabulations or a series of interactive media including interactivity on a website. The storyboard is designed as a sequence for reference in developing the learning media to be developed. This arrangement starts from the opening page, the content, and the closing. The form of this interactive learning media based on *Lumio by Smart* will be a presentation slide containing an opening page or home page, developer profile, learning menu, user instructions, Learning Outcomes and Learning Objectives, a video explaining the material, a learning video on calculating Article 21 Income Tax, a quiz, an interaction space, a bibliography, and a closing page or final page.

Development

According to (Imbar et al., 2021), the development stage is a mechanism for realizing a previously formed image into reality, or transforming all the elements required for product development into a more concrete form. Researchers must implement several stages in developing a research product. The first stage is the creation of product components. These components include

backgrounds, animations, buttons, images, and videos. The second stage involves creating the product using the *Canva* application to edit the learning media, resulting in a draft 1. After the product is edited using *Canva*, it is exported to the *Lumio by Smart* website to be used as a learning medium, adding several features to enhance its interactive elements. At this stage, the researchers submit the draft 1 product to experts for review. The results of this review provide input and suggestions for product improvements to ensure it is suitable for testing with students. The following are general comments and suggestions for product improvement from the experts:

Table 4. Expert Review Result

Subject Matter Expert	
1	Further narrowing down the Learning Objectives Flow into Learning Objectives, and the Learning Objectives need to be adjusted to be HOTS-based.
2	It is necessary to add Regulation of the Minister of Finance No. 168/2023 concerning AER and update several of the latest regulations in force.
3	There needs to be a video guide to explain the AER calculation in full.
4	Non-Taxable Income Classification needs to be added.
5	The quiz questions need to be revised, there should be no question sentences.
6	Bibliography needs to be added.
Media Expert	
1	Match animations or visuals to the text used in the media.
Language Expert	
1	The use of Indonesian is good, inspiring, creative, and easy to understand for users/readers.
2	It is necessary to re-check the Big Indonesian Dictionary and the General Guidelines for Indonesian Spelling for the use of standard and non-standard words and punctuation.

Source: Data Processed by Researchers (2025)

After passing the expert review stage and making product improvements, the next stage is expert validation of the product in the development process and after it has been refined. The expert validation sheet contains a rating scale between 1 and 5, based on the Likert scale score calculation according to (Dr. Riduwan, 2015). The results are then analyzed using quantitative descriptive methods with percentage techniques, which can then be interpreted as ranging from very feasible to very unfeasible according to the feasibility criteria according to (Dr. Riduwan, 2015).

The product feasibility validation conducted by two material experts: Dr. Suci Rohayati, S.Pd., M.Pd., a lecturer in the Accounting Education Study Program, Faculty of Economics and Business State University of Surabaya, and Ms. Yourini Erawati, S.Pd., M.M., the head of the Accounting and Institutional Finance program and a teacher in charge of tax elements at SMKN 1 Surabaya, showed that the material feasibility score was 92%, according to the percentage scale, which is categorized as "Very Feasible". Furthermore, the validation conducted by the media expert, Dr. Syaiputra Wahyuda Meisa Diningrat, M.Pd. as a lecturer in the Educational Technology study program, Faculty of Education State University of Surabaya, showed the results that the media feasibility obtained a score of 98% if the percentage scale is classified as "Very Feasible". The final validation was given by a linguist, namely Mr. Yermia Nugroho Agung Wibowo, S.Pd., M.Pd. as a lecturer in the Indonesian Language and Literature study program, Faculty of Languages and Arts State University of Surabaya, showed the results that the language feasibility obtained a score of 100% if the percentage scale is classified as "Very Feasible". Based on the three validation results above, the average validation score for the product feasibility was 97%. Therefore, these results show that the interactive learning media based on *Lumio by Smart* is classified as "Very Feasible" to be applied to classroom learning activities. This statement is in line with the study conducted (Ramdani et al., 2020) which said that the average percentage of validation results or feasibility of the product developed reached 84% which is classified as very feasible, this shows that the product in this development process can be applied during learning activities. The following is an interactive learning media with the help of the *Lumio by Smart* website which will later be used for product trials, presented in the image below:



Figure 2. Interactive Learning Media Display Based on *Lumio by Smart*
Source: Data Processed by Researchers (2025)

Implementation

The implementation phase consists of two stages: product trials and analysis of the trial results. Once the product's feasibility has been validated by experts, the researchers will then pilot the learning media in four schools: SMKN 1 Surabaya, SMKN 4 Surabaya, SMKN 6 Surabaya, and SMKN 10 Surabaya. The product trials at each school will be conducted with students from the same class. However, the trial sample will only consist of five representative students from each of the four schools. This aligns with a study (Oktaviara & Pahlevi, 2019), which stated that the trial subjects were 40 students in grade X OTKP 3. However, the trial sample will only be 20 students based on small group evaluations. This development research will use a trial sample of 20 students. This is in line with a study (Muthoharoh & Sakti, 2021), which stated that to achieve accurate results, a maximum sample of 20 students is required. During the trial, researchers also distributed questionnaires to students to gather feedback and responses. In this development research, the results of the student questionnaire responses showed a final score of 96%, falling into the "Very Good" category. Therefore, students from the four research schools participating in the product trial demonstrated a very positive response to the *Lumio by Smart*-based interactive learning media. This aligns with a study conducted by Kamilah & Susanti (2022), which found that the average student response rate for the developed media reached 94.66%, falling within the "Very Good" criteria. Therefore, the conclusion is that the Articulate Storyline-based interactive learning media for tax administration, particularly the basic competency of Income Tax Article 21, is highly suitable for use as supporting teaching materials in the classroom, according to students.

Evaluation

The final stage in the ADDIE model is evaluation, which aims to determine the suitability of the developed product to field needs and whether it can help address problems at the research site. In this ADDIE development model, each step must go through an evaluation stage until the final stage so that this research produces a product that is truly valid and suitable for use both for current

and future research. According to (Cahyadi, 2019) evaluation is a stage carried out to provide an assessment of the development of teaching materials in learning. So that the final evaluation stage is carried out with the aim of determining the feasibility of the product based on the validation results by three experts, as well as based on the results of the student response questionnaire who has assessed the product. So that the final product produced is an interactive learning media based on *Lumio by Smart* for the Taxation element of class XI Accounting and Finance at a State Vocational High School in Surabaya.

CONCLUSIONS

Based on the research results and discussions that have been explained previously, the conclusion of the research on the development of interactive learning media based on Lumio by Smart on the Taxation element shows that, the product development process in the form of interactive learning media based on Lumio by Smart uses the ADDIE development model which consists of five stages, namely Analyze, Design, Development, Implementation, and Evaluation. This development research produces a product, namely learning media with the final result in the form of presentation slides containing learning materials, learning videos, quizzes related to the material, and also an Interaction Space. The feasibility of interactive learning media based on Lumio by Smart on the Taxation element is declared very feasible based on the validation results from material experts, media experts, and language experts who have been assessed from several assessment aspects. Based on the results of the feasibility validation by experts with a final score of 97%, it shows that the Lumio by Smart-based learning media that was developed is “Very Feasible” to be used in further learning, both for learning in class and outside the class according to needs. The results of student responses based on the questionnaire that was completed after the trial, with a final score of 96%, showed that the Lumio by Smart-based learning media that was developed received a “Very Good” response from students.

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