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PAPER

Exploring iSpring Suite for Android-Based Interactive Instructional Media in Electrical Lighting Installation Subject

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ABSTRACT

In today's digital era, interactive learning media is the right solution to improve the quality of effective and efficient learning. An active engagement between students and learning media using iSpring Suite can enhance student understanding and enthusiasm and motivate students in teaching and learning. This research aims to create Android-based interactive media using iSpring Suite for electric lighting installation learning materials. This research uses the Research and Development (R&D) method with a 4-D development model. This research consists of several stages: defining, designing, developing, and disseminating, and was conducted using validation sheet instruments. The results of this study indicated that the learning media experts confirmed that it was 93.8% valid. At the same time, the materials experts confirmed that it was 90.8% valid. Based on the validity percentage, Android-based interactive learning media using iSpring Suite is highly recommended for electric lighting installations subject. It has been well-tested and effectively applied as an Android-based interactive learning medium.

KEYWORDS

Interactive instructional media, iSpring suite, electrical lighting installation

1 INTRODUCTION

Quality education is critical for improving a country's human resources [1], [2], [3]. Media for learning is one of the few factors that can affect the quality of education. Choosing and using learning media appropriate to the context of the learning material provided is one way to produce and enhance education quality and effectiveness [4]. Learning media is a device that can be used as a communication tool to support the interaction between educators and students in learning [5], [6], [7]. Learning media can form both hardware and software.

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Technology's rapid growth benefits the education sector [8], particularly in advancing and developing technology-based learning media [9]. Because of these technological advances, learning media is growing and diverse, from video, audio, and image to interactive learning applications [10]. In this digital era, technology-based learning media is critical [11], [12], particularly during the COVID-19 pandemic, which causes physical restrictions on learning activities in schools [13], [14]. It has encouraged utilizing technology-based learning media to become more common and essential in maintaining the continuity of learning [15], [16], [17].

According to Statista, by 2023, the number of smartphone users in the world will reach 6.92 billion, which means 86.11% of the world's population owns a smartphone [18]. This figure is a rapid increase from 2016, when only 3.668 billion users constituted 49.40% of the global population in that year [18]. Smartphones have become one of the basic human needs, in addition to shelter, food, and clothing. The rapid development of smartphones is an unavoidable phenomenon, considering that everyone needs a means of communication and information and uses it to surf the Internet [19].

Mobile learning is a method using smartphone technology that can be used in various conditions to produce an effective learning process [20], [21]. Using mobile learning results in two different types of interaction: interpersonal interaction (between students and other students, students and teachers) and human system interaction (between students and content) [22]. Many advantages are obtained from smartphone technology to improve student learning outcomes [23], [24], especially if the application is well designed [25]. However, in reality, the utilization of technology such as smartphones is currently still not maximally used. Most students use smartphones to play games, use social media, take selfies, shop at online stores, etc. [26].

Based on observations and interviews at one of the vocational high schools in Padang City, some teachers still have not utilized technology fully in the learning process. They are still using lecture learning models, whiteboards, and projectors to deliver learning materials. In another case, the limited number of learning media, such as computers, makes the learning process less effective [27]. When using school computers, students still have to do it alternately. Therefore, students do not comprehend how to apply technology in learning. Education could be more effective if combined with technology. For example, teachers can use smartphones as learning media that can be accessed by students when classes are dismissed [28], [29].

An iSpring Suite is a software that can make interactive learning media. This software can integrate PowerPoint and change the presentation format into a file in Flash format [30], [31]. In addition, this software also has advantages, including tools for making various types of questions and processing scores automatically [32]. Ispring suite has been widely used to create interactive learning media. This is because it can increase student understanding and enthusiasm and motivate students in the teaching and learning process [33], [34].

Based on the explanation and observation results, the author provides a solution: an application in the form of interactive learning media that can help students improve learning outcomes. Using these applications can also help teachers develop more interesting learning strategies and models to make students understand the material given by the teacher. Researchers hope this Android-based application can positively impact achieving learning goals because this can develop the use of gadgets initially for playing games to be diverted to more

educational purposes and build independent learning that leads to learning independence.

The subject that will be applied to this interactive media learning model is electrical lighting installation. One of the compulsory subjects of the Electric Power Installation Engineering class will be tested during the graduation exam later. From the observation of the school, it was obtained that the subject of electrical lighting installation was considered difficult for students to learn. This is based on the theoretical material and dominant images that are difficult for students to understand quickly, primarily if the material is only delivered by the lecture method or written on the whiteboard.

Before being used, learning media must pass a series of tests to effectively overcome problems that arise during the learning process [35]. This application has been developed and tested by specialists in electrical lighting installation and learning media development. The next goal is to produce valid Android-based interactive learning media to be useful for use as new teaching materials following technological advances. In addition, this software is hoped to be developed to create interactive learning media in other subjects.

2 LITERATURE REVIEW

2.1 Interactive learning media

Learning media is a device that functions as a supporting means to make it easier for students to understand learning better [36], [37]. Learning media is a device that is interrelated with each other to create a fun learning atmosphere [38]. Learning media can facilitate and help the learning process by being more interactive and flexible because it combines verbal communication with media and allows students to do many activities such as observing, questioning, presenting, and demonstrating [39]. Many learning media use technology in today's technological developments [40]. Learning media use technology such as computers, multimedia, and the Internet [41]. This media has the advantage of improving students' motivation to know so that it can be more effective and efficient [42]. Interactive learning media displays and presents simultaneously in one application containing text images, videos, and animations [33]. It makes learners interact with learning content [43].

The concept of interactive learning is most closely related to computer media. The categories of interactive perception are (a) user (student to teacher, student to student, student to content), (b) application (perceived usability, perceived accessibility, perceived value of the educational materials), and (c) infrastructure (system and network quality) [22]. It undoubtedly increases learners' motivation during the learning process.

Learning media has many benefits for students, including (a) increasing the motivation of students because it provides an exciting teaching process; (b) helps in providing simple to understand learning experiences; (c) learning methods are more diverse, not just verbal communication through speech, which makes students bored; (d) students can see, do, and present learning in addition to listening to the teacher's topic [44]. These advantages certainly make interactive learning media one of the solutions to improving student learning outcomes in this lesson, especially in electrical lighting installation. The application of interactive learning media can make explaining the theories in the subject understandable to students because the

explanation of the theory is supported by learning media in the form of videos that can clarify and describe specifically related learning topics.

2.2 iSpring Suite application

An iSpring Suite is a software that can create educational media by uploading several aspects of media, such as audio, visual, and audiovisual [45]. An iSpring Suite changes presentation files to Flash and Sharable Content Object Reference Model/ Aviation Industry Computer-based Training Committee formats commonly used in e-learning management systems [46]. iSpring Suite is a tool to facilitate educational activists develop learning media. Users can connect the iSpring Suite application with Microsoft PowerPoint [16], [31]. This application also publishes power points in HTML [33]. In addition, teachers can easily use iSpring Suite to create interactive questions or quizzes online or offline. Then, it can make it easier for teachers to measure the achievement of student learning outcomes [32].

In this era of digital technology, learning media that use iSpring Suite as Android-based mobile learning can answer learning needs, motivate students in the learning process, and improve learning outcomes [47]. This iSpring Suite software is available in the free version [48]. As a result, users can use this program to create Android-based interactive learning media. Based on the effectiveness and aesthetics of the finest iSpring Suite 8, as well as its features and usability, this program is a good choice for a tool for creating interactive learning [16]. These advantages make Ispring Suite software one of the software that can be used in interactive learning media; specifically, this study applies Ispring Suite eight software as a tool to create interactive learning media in electric power installation subjects.

2.3 Related research

Ispring suite is one of the software that has been widely implemented as a tool to create interactive learning media. Most interactive learning media applications use Android and computers [29]. One is research by F. Stevani [48], who utilized the Ispring suite as a learning media in physics lessons during the COVID-19 pandemic, when the learning process happened online. The research results obtained a media and material validity value with an average percentage of 78.5% in the valid category. In addition, this study provides suggestions that this Android-based interactive learning media can be used as a reference in developing attractive, innovative, and imaginative learning media [47]. E. S. Pakpahan and W. Rajagukguk's research [50] also developed the same learning model to show how Ispring Suite-based mobile learning media affects students' mathematics learning outcomes. Student responses to mobile learning media based on Ispring Suite for learning were positive, with an average score of 88% in the very good category [49].

When viewed from the database of reputable journals such as Scopus or WOS or national journals such as Google Scholar, research related to the application of Ispring Suite in making learning media applications is not found much. Figure 1 is the result of the visualization of bibliometric analysis of the use of Ispring Suite in vocational education. The 54 publication data analyzed came from the dimension database from the 2013–2022 timeframe.

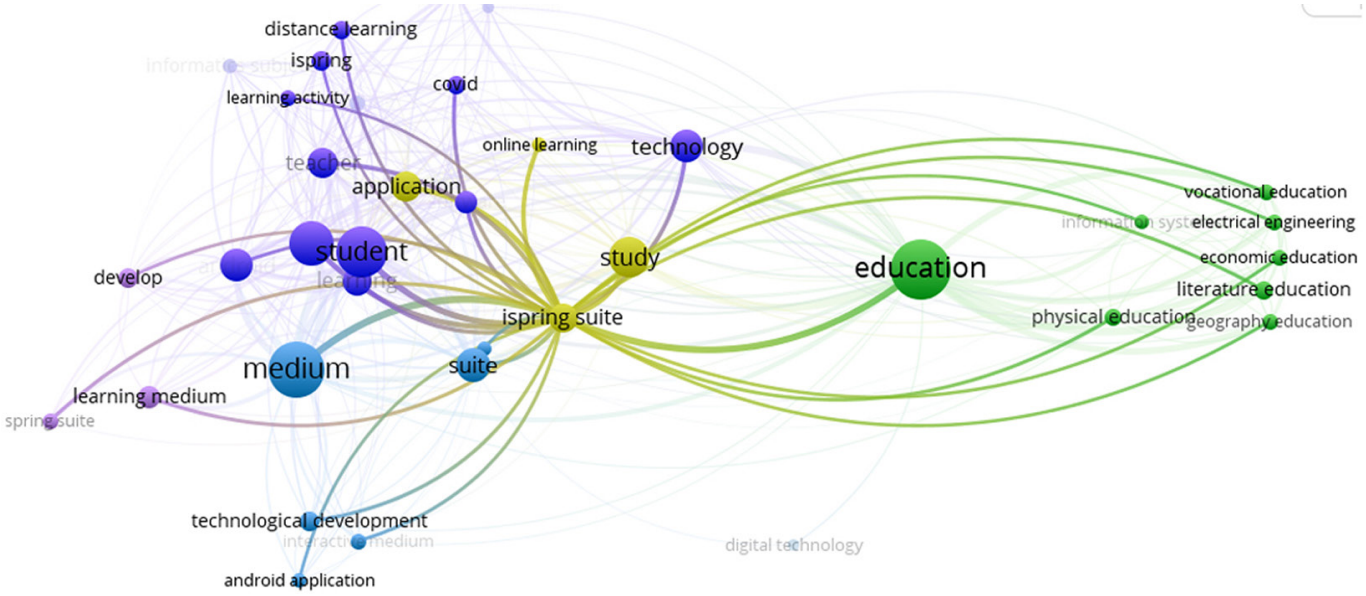


Fig. 1. Bibliometric analysis of the use of Ispring Suite in vocational education

There are only a few topics related to the application of Ispring Suite in creating interactive learning media in Vocational High Schools (VHS). One is the research conducted by D. Larasati [51], who developed the Android-based Ispring Suite learning media in basic electrical and electronics subjects at Vocational High School (VHS). Media development in this study uses the ADDIE model. The results of student responses obtained were 83.4%, which means good, and using Android-based media helped students understand the material independently [51]. The results of the bibliometric analysis show that research on the use of Ispring Suite in vocational education still has a considerable gap. This makes this research topic a potential area to be developed into new research because the Ispring Suite continues to grow and is increasingly popular as a tool for making learning media.

3 METHODOLOGY

3.1 Research methods

The research methods use a type of R&D (Research and Development) with the 4D model [52]. The R&D method is a process or steps in responsibly making, developing and improving an existing product [53]. This study develops an interactive learning media application based on Android using iSpring Suite software to optimize the learning process of class XI Electrical Power Installation Engineering students on electrical lighting installation.

3.2 Research procedures

The research procedure utilized is applying the 4-D development model and developing a new or existing thing [54]. This research develops an Android-based interactive learning media using the iSpring Suite application to optimize the learning and teaching process with students in electrical lighting installation at Vocational

High School (VHS). This model requires several stages. Figure 2 shows the steps of research and development of the 4-D model.

Fig. 2. The steps of research and development of the 4-D model

In developing a 4-D model, it is necessary to go through several stages. The first stage is the definition, which means developing and collecting product information. The second stage is making a design for the product obtained from the problems found in the defining stage. This stage consists of data collection, navigation, and user interface design. The third stage of development is to design and test product validity to produce a product according to specifications or initial plans. This stage consists of the media validation stage and learning media improvement. The fourth stage of dissemination, Android-based interactive learning media, can be considered feasible to distribute, therefore conducting a limited trial to teachers at Vocational High Schools (VHS).

3.3 Research instruments data

The application of instruments used in research aims to collect valid instrument data. This validity instrument contains several assessments and validator responses to Android learning media [55], [56]. Implementing a validation sheet instrument is aimed at obtaining data on the validity level of learning media. The questionnaire is an efficient data collection procedure using measured variables and validator responses. Questionnaires in the form of closed or open questions can be distributed directly to respondents or disseminated via post or the Internet [57]. If the Android-based interactive learning media fulfils the media and material aspects, then the learning media is considered valid in this study and appropriate for use. Material validation sheets and learning media are designed according to the grid. Before applying the research data collection instrument, researchers make validation sheets. Researchers submit validation to validators, namely lecturers and teachers of electrical lighting installations.

The validity of Android-based interactive learning media is essential if it meets two aspects: media and material. The material aspect guidelines help with the process of finding concepts, following the applicable curriculum, and the suitability of media content with subject matter that refers to the subject syllabus. The questionnaire grid is summarized in 4 aspects, including the achievement of objectives that must be achieved: aspect, the simplicity aspect, the elements of the message design aspect, and the organization of the message aspect. In addition, the media aspect relates to using images, sound, text, video, and message presentation in making Android-based learning media. The questionnaire grid is summarized in 3 aspects, including the display aspect, the interface aspect, and the application instructions aspect.

3.4 Data analysis technique

The data analysis technique used in this research is descriptive analysis, which is guided by the steps carried out by R. Riduwan [58]. all data collected were analyzed with quantitative descriptive statistical techniques [59]. It is separated by category to sharpen the assessment in conclusion. Lecturers and teachers carried out the results of the learning media validation sheet assessment to obtain suggestions and improvements to the media in deciding the level of validity after testing. The validation sheet consists of statements helpful in determining the validity of the learning media and provides answer options for the statements listed on the validation sheet. The validation score refers to the formula:

$$Presentation\ of\ \ feasibility = \frac{\sum The\ score\ obtained}{\sum The\ expected\ score}\ X\,100\%$$

Description:
The score obtained = Total score of respondents
The expected score = Total number of maximum scores
The reference for assessing the validity of this learning media is presented with three categories of validity levels contained in Table 1 as follows,

Table 1. Validity rating reference

No	Achievement Results (%)	Category
1	1% – 60%	Invalid
2	61% – 80%	Fairly valid
3	81% – 100%	Valid

4 RESULTS AND DISCUSSION

4.1 Results

Interactive learning media is made from computer-based software equipped with subject matter features, simulations with interactive animations for abstract material, test questions accompanied by answers, and made with ease of operation. The results of creating interactive learning media aim to determine the validity of press and material on learning media made from APK (Android Package Kit) file format or applications used for electrical lighting installation subjects using APK file format. So, the use of learning media using Android-based smartphones. The following steps explain the results of each stage of making Android-based interactive learning media for electrical lighting installation subjects.

The define stage determines the learning requirements and school conditions to make Android-based interactive learning. This stage consists of several steps: (a) needs analysis, whose source is from the background of problems in the learning process. For these problems, there needs to be a solution to develop interactive learning media that optimizes the learning process, especially on the subject of electrical lighting installations; (b) establish competency standards for one semester in the electric lighting structural subjects for class XI majoring in Electrical Power Installation Engineering (EPIE) at VHS; (c) defines concepts,

functions to identify, detail and compile the main idea of the material based on competency standards and essential competency of electrical lighting installation subjects. This concept is a material for making Android-based interactive learning media; (d) analysis of students to find out the characteristics and barriers students feel in the learning process. In observations and teaching experience activities, problems and obstacles were found, including the difficulties experienced by students in understanding the learning material presented by the teacher because they still use conventional methods, especially when the learning process is online, so that it can make the atmosphere of the learning process ineffective.

The design stage at this stage, is adjusted to the essential competencies in the electrical lighting installation subject. This stage consists of several processes: (a) data collection to collect teaching materials and questions coordinated by VHS teachers following essential competencies for one semester in electrical lighting installation. They were looking for references for using the correct text in terms of colour, size, type, and attractive images in making applications. So that students can feel interactive when using learning media; (b) navigation design to facilitate the manufacturing process and make it easier when using learning media. In the navigation design, several prominent features will be applied to this learning media application, starting from the intro menu, initial menu, main menu, material, job sheet, syllabus, and quiz. In this main menu, several sub-menus contain lessons such as lectures and questions; (c) user interface design, design of each menu slide, and sub-menu of interactive learning media applications.

a) b)

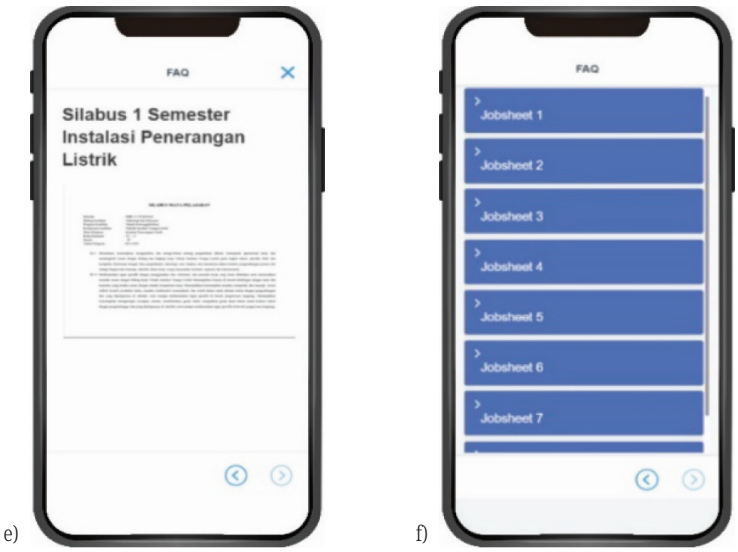
Fig. 3. (a) Intro page and (b) Start page

Figure 3a is the appearance of the intro page when the application is opened and will appear automatically in the form of motivational words to students about the importance of studying. On this page, it will be presented automatically in four seconds. Then, it will automatically proceed to the next page in Figure 3b, which displays the start page of learning on interactive learning media applications. On this page, there is information about the subject that the user is studying. Furthermore, when the user clicks, the start icon button will redirect to the main menu page and start learning with the available options.

c) d)

Fig. 4. (c) Main menu page display and (d) Material sub-menu page display

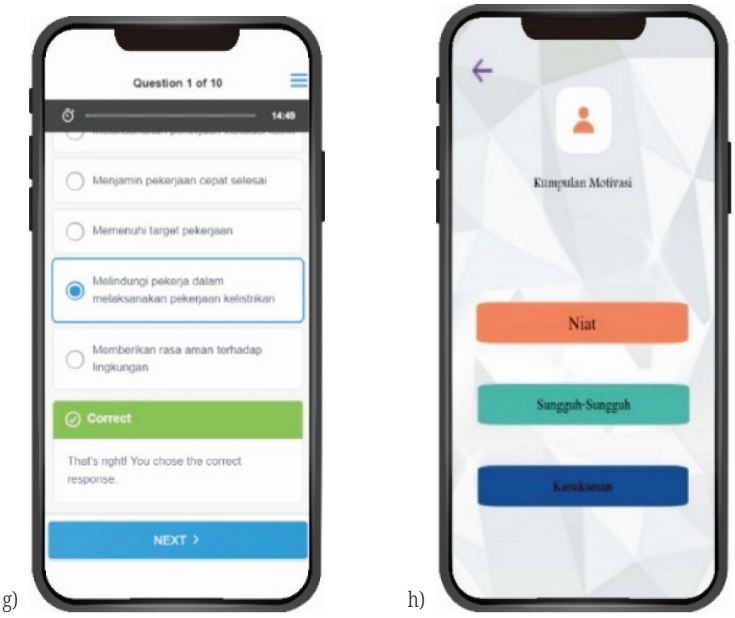
Figure 4c is the main menu display comprising sub-menu material, syllabus, lesson plan, quiz, and profile. There is also a main menu button on this menu with supporting features such as motivational words, motivational videos, Qur'an, games, questions, and other instructions. Figure 4d displays the material sub-menu page. Students can use the feature to select essential learning competencies. Once clicked, it will be directed to the primary material page prepared following student achievement competencies.



e) f)

Fig. 5. (e) Syllabus page view and (f) Jobsheet page view

Figure 5e displays the syllabus page of the electrical lighting installation subject, which has eight choices of essential competencies for one semester. Therefore, students find it easier to understand the critical competencies in the issues to be studied. Figure 5f is a job sheet page displayed as an e-job sheet. This page will display eight job sheets, which, when clicked, can be reviewed and take the user into the lesson plan page based on the learning needs.



g) h)

Fig. 6. (g) Quiz page view and (h) Motivational words page view

Figure 6g displays a quiz feature page with a function to see learning ability or evaluation. The quiz feature page has ten sub-menu options consisting of 8 quizzes, midterm exams, and semester final exams. These questions relate to material on the installation of electric lighting. It consists of objective questions. Then, the results of the answers are emailed to students and teachers. Figure 6h is the appearance of a page of motivational words that students will contemplate when they want to learn well, to focus on learning and get maximum results. These motivational words also positively encourage learners to keep getting up and trying.

The development stage is to produce the final form of valid Android-based interactive learning media after revisions based on expert input or suggestions and trial results. This stage consists of the validation stage to test the feasibility of interactive learning media applications. This feasibility test uses a validity instrument sheet or questionnaire. The validator team for the feasibility test of this learning media consists of three validators, two of whom are lecturers from the electrical engineering department of the Universitas Negeri Padang (UNP) engineering faculty, and, one VHS teacher from the electrical engineering department.

Table 2. List of validators

No	Validator	Expertise	Position
1	Validator 1	Electrical Installation Materials and Media	Electrical Engineering Lecturer UNP
2	Validator 2	Electrical Installation Material	Electrical Engineering Teacher VHS
3	Validator 3	Media	Electrical Engineering Lecturer UNP

Table 2 shows the distribution of validators to assess this interactive learning media. Each of these validators has a role in determining the media and material used, whether it is feasible or not when applied to the electrical lighting installation class XI Vocational High School (VHS).

Table 3. Material expert validation results

No	Material Aspect	Validator 1	Validator 2	Average
1	Achievement of objectives that must be achieved	85%	100%	92.5%
2	Simplicity	93.3%	93.3%	93.3%
3	Elements of Message Design	100%	80%	90%
4	Organization of the message	80%	95%	87.5%
Percentage of validity score				**90.8%**

Table 3 is a table of material expert validation results by collecting scores, suggestions, and opinions from material experts. Data acquisition by providing an assessment sheet of the suitability of learning materials based on the current curriculum and the usefulness of media content with subject matter referring to the syllabus. Four aspects are evaluated, including the achievement of objectives that must be achieved aspect, the simplicity aspect, the elements of the message design aspect, and the organization of the messaging aspect.

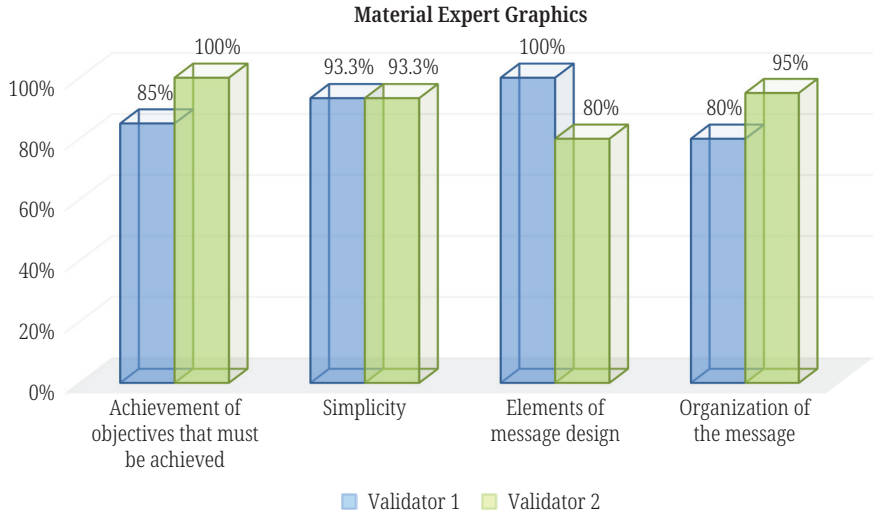


Fig. 7. Graphical representation of material assessment aspect

Figure 7 shows a graphical representation of the difference in the assessment by two subject matter experts on the four aspects of the evaluated material. Based on the assessment of the material expert on the achievement of objectives that must be achieved, validator 1 obtained a score of 85%, while validator 2 obtained a score of 100%. The simplicity aspect in Validator 1 scored 93.3%, and Validator 2 also scored 93.3%. The elements of the message design aspect in Validator 1 obtained a score of 100%, while Validator 2 obtained a score of 80%. The organization of the message aspect in Validator 1 scored 80%, while Validator 2 scored 95%. When summed up as a whole, the assessment of the material aspects of this application obtained a score of 90.8%. Suppose these results are converted using the validity assessment category reference. In that case, the assessment by the material expert is included in the "valid" category to be used as an interactive learning media.

Table 4. Media expert validation results

No	Media Aspect	Validator 1	Validator 2	Average
1	Display	96%	92%	94%
2	Interface	90%	95%	92.5%
3	Instructions and usage	100%	90%	95%
Percentage of validity score				**93.8%**

Table 4 shows media expert validation results by collecting scores, suggestions, and opinions from media experts. Data is acquired by providing assessment sheets on the suitability and aesthetics of interactive learning media applications. Three aspects are assessed, including the display aspect, the interface aspect, and the application instructions aspect.

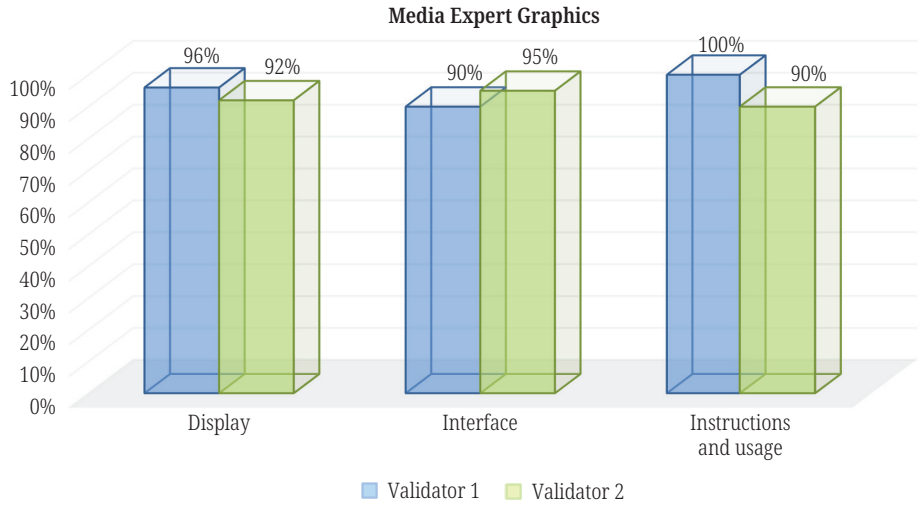


Fig. 8. Graphical representation of media assessment aspect

Figure 8 shows a graphical representation of the difference in the assessment by two media experts on the three aspects of the validated media. Based on the assessment of media experts on the display aspect, validator 1 scored 96%, while validator 2 scored 92%. The interface aspect in Validator 1 scored 90%, while Validator 2 scored 95%. The instructions and usage aspect in Validator 1 obtained a score of 100%, while Validator 2 obtained a score of 90%. When summed up as a whole, the assessment of the media aspects of this application obtained a score of 93.8%. If these results are converted using the validity assessment category reference, then the assessment by media experts is included in the "valid" category to be used as interactive learning media.

4.2 Discussion

The analysis results show that the validator's assessment of the material aspects of this interactive learning media follows the content and objectives of the electrical lighting installation subject. The information presented is also clear and easy to understand. In addition, it has also been feasible to implement the media aspect

related to using images, sound, text, video, and message presentation in the application as an Android-based interactive learning media application. This makes the role of Android-based media as an abstract learning media more concrete [60], [61]. Applying Android-based media in learning makes students active and more independent, adds motivation, and improves student learning outcomes [62], [63].

Based on the media and material validation results, it can be concluded that the Android-based learning media application using Ispring Suite in electrical lighting installation is declared valid and feasible to be used as interactive learning media and can meet the requirements in development research. This follows related research conducted by A. Fadillah [34], who used Ispring Suite to create interactive learning media in mathematics. In addition, in research conducted by D. Larasati [51] developed the Android-based Ispring Suite learning media in basic electrical and electronics subjects at Vocational High School (VHS) [51]. Based on D. Larasati [51] research, there are differences with this research, namely, in the model used. This study used the ADDIE model, while this study applied the 4-D model development. The 4-D model in this study also refers to research developed by I. P. Dewi [19], who used the 4-D model to develop Ispring Suite-based learning media in programming engineering subjects. The research obtained a validation score of 93% and reached the testing stage for students. The research also obtained the results of the practicality test assessment stage to students of 91% with a convenient category. These results showed that teachers and students could use the Android-based learning media application using the Ispring Suite application. In addition, from the use of this application, of course, there are challenges, such as in the teacher's manufacturing process, because there are still teachers who are not too familiar with the technology. So, they are complex in making and developing this application. From these challenges, of course, exceptional training and guidance can be provided for teachers in making interactive learning media applications.

5 CONCLUSION

This study aims to create and develop interactive instructional media on electrical lighting installation at grade XI of electrical engineering. The development of this learning media is because there is still little utilization of technology such as Android-based smartphones in the learning process at school. Therefore, this research is developing to facilitate the learning process. Making applications is carried out with procedures and steps according to the stages of the 4-D model research, which has sets of definition, design, development, and dissemination. Review the feasibility of interactive learning media applications by testing the validity of media and materials on learning media. The summary results of the validity questionnaire assessment, namely the percentage of validation indicators from learning media experts who state it is valid is 93.8 %, and the validation assessment from material experts is who declared it valid is 90.8 %.

Based on the results of this study, it is expected that Android-based learning media using Ispring Suite software is adequate to be used as a learning medium in electrical lighting installation subjects. However, this research can be said to be valid to be tested on students in the learning process. This study still has limitations, namely the process stages that have not reached the dissemination stage. It is hoped that later, it can develop testing to obtain practicality and effectiveness data results when implementing the media.

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