https://doi.org/10.24036/jep/vol7-iss2/746

JEP (Jurnal Eksakta Pendidikan)
Volume 7, Issue 2, 274 - 288
ISSN: 2579-860X (Online), ISSN: 2514-1221 (Print)
https://jep.ppj.unp.ac.id/index.php/jep

Media Development Interactive Learning Based Articulate Storyline Materials Movement Systems on Humans Class XI High School

Raisa Novianti*, Noorhidayati[2], Bunda Halang[3]
[1,2,3] Biology Education Studies Program, Faculty of Education and Sciences, Lambung Mangkurat University, Banjarmasin, Indonesia.

Received: March 27, 2023 ▪ Revised: May 05, 2023 ▪ Accepted: November 27, 2023

ABSTRACT

The development of learning media that can be an option so that it can support the times is an interactive learning media based on Articulate Storyline. Effective and interesting interactive learning media, especially for the concept of the human motion system which is classified as complex, can help students achieve the expected learning objectives. This study aims to describe the needs of teachers and student needs, validity, and practicality of the results of the development of interactive learning media on human motion system material. This research is a research and development (R&D) with the 4D model (Thiagarajan et al., 1974). Data collection techniques used instruments of teacher needs and learner needs, validity, and practicality. The research subjects were 3 (three) experts consisting of Biology Education lecturers and one partner teacher and tested at SMA Negeri 9 Banjarmasin Class XI MIPA as many as 12 (twelve) students. The test results show the need to develop interactive learning media on the material of the human motion system, very valid in the validity test, and very practical in the practicality test. This shows that the results of the development of interactive learning media on the material of the human motion system are valid and practical. This interactive media can be used by students anytime and anywhere using devices.

Keywords: Articulate storyline, Interactive learning media, Human movement system

INTRODUCTION

Learning in the 21st century is oriented to activities to train skills in the pupils by leading to the learning process. Learning in the 21st century is characterized by the advancement of technology. According to Asrizal, et al. (2017) the learning implemented should be able to prepare graduates to face the 21st century well. The four skills you need to have are: ways of thinking, ways of working, tools to work, and skills to live in the world. 21st century competencies include a broad understanding focused on knowledge, attitudes and skills that emphasize what students need in school, in the workplace, and in their lives in line with the Industrial Revolution 4.0. (Bamalli, 2013; Chen, 2017: Sari, et al., 2020). The 21st century skills help learners to think critically, collaborate, communicate, present and implement innovative ideas.

The rapid development of the 21st century in the 4.0 era has led to changes in all areas

***Correspondence:**
Raisa Novianti, Biology Education Studies Program, Faculty of Education and Sciences, Lambung Mangkurat University, Banjarmasin, Indonesia..
✉ email : raisa.novianti10@gmail.com

of life, not except education. There are various media that can support the learning process. Interactive learning media can support planned learning in the 4.0 era. Nurdin (2016) highlighted the urgency of the media in the learning process has a function: 1) to clarify the presentation of the message so that it is not too verbal so as to make it easier for the student to understand the message delivered; 2) to overcome the limitations of the space of time and the senses; 3) to attract the interest of the student in the process of learning; 4) To arouse the student's passion for learning; 5) to allow for a more direct interaction between the student and the environment and reality; 6) to allow the child to learn independently according to his ability and interests; and 7) to match the experience and perception between students in receiving the message.

Information technology-based learning media can stimulate student activity, make it easier for teachers to deliver the materials they are taught, create fun, flexible learning. (Muhtar, et al., 2020; Syamsiani, 2022). The use of learning media can increase student interest in learning. Interactive learning media is a means of delivering material as an effort in achieving maximizing the achievement of educational goals. According to Lailiyah (2018) interactive learning media is a multimedia equipped with instructions and materials that can be controlled and used by the user, allowing the user to choose what to do first based on instructions.

Applications that can support the learning process include sigil, lectora, prezi, spring suite and Articulate Storyline. Af'idati, et al. (2022) explained that Articulate Storyline is a software that can combine various elements such as animated characters, slides, flash (swf), and video into one unity. The software was launched in 2014. The ease of operation of the Articulate Storyline software as well as its supporting elements make the developed media more attractive becoming a reason for the choice of software in developing. Components on Articulate Storyline can make students learn with auditorium and visual learning styles as well as kinesthesis so that they can maximize material reception in students.

Some related studies have been conducted, such as Suhailah et al. (2021) design validation test results show that the learning media created is very valid. The student's response to the learning media that has been made showed a very positive response, so in his overall research the development of interactive media based on Articulate Storyline was effectively applied by eleventh grade students of MIPA MA Pondok Qur'an. Wijayanti & Prayitno (2021) concluded that his research was validated by experts. The use of media has received a positive response from teachers and students. Overall, it's very decent and exciting when used by high school students X makes learning self-reliant and more interactive in learning. Husnah (2021) concluded in his research as a whole that the validation of the expert material is very valid. The student's response to the test was limited to a very good category.

Movement systems in humans are chosen as the subject matter of the study. In accordance with the requirement in the independent curriculum on the course of the learning objective is 11.24. to 11.27. The concept of the independent learning curricular emphasizes the granting of freedom in the field of education (Faiz dan Kurniawaty, 2020; Sari, et al., 2020). The Merdeka curriculum gives the educators the opportunity to create quality learning that fits the needs and learning environment of the student. Makhul (2020) explains that the material of the movement system of the eleventh grade high school has a high complexity so that in learning it is necessary things that can support such as accompanied with images, video media mobile learning.

Research Hanik et al. (2016) lack of reference and extensive scope of material on the material of the human movement system makes students difficult. Another factor is that students are less attentive to teachers during the learning process. Based on the problem description above to improve student learning outcomes with feedback strategies to

overcome student learning difficulties. The results of the lift analysis distributed at the State High School 9 Banjarmasin to teachers and pupils show that students need an interactive learning medium that helps learning especially on the material of the movement system. No research has yet been on interactive media on motion system material using Articulate Storyline application at 9 Banjarmasin State High School.

The research was carried out to make a learning product that the pupils liked, easy to use, and efficient. Selection of interactive learning media with material of human movement system based on the results of an analysis of the needs of teachers and pupils. Students liked the use of interesting learning media by combining various supporting elements in the study of the human movement system. The selection of media also adapted to the development of the era that most students have practiced. The objective of this development research is to describe the validity and practicality of the development of interactive learning media based on Articulate Storyline motion system material in humans of the eleventh grade of high school.

METHODS

The 4D development model of Thiagarajan (1974) consists of four main stages: Definition, Design, Development and Dissemination. (Disseminate). According to Sukmadinata (2015), Research and Development is a process or measures to develop an existing and accountable product. The development research model in this research aims to produce a decent learning medium, that is, valid and practical using the phases of 4-D development research (Thiagarajan et al., 1974). The research steps taken from the phase 4-D can be seen in Figure 1.

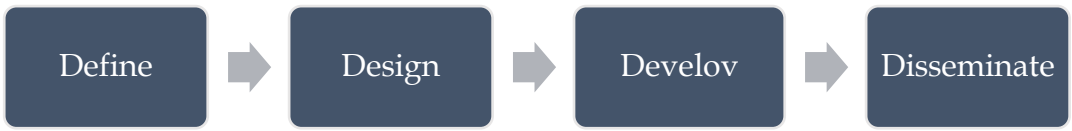


Figure 1. 4D Development Model Flow Diagram

The definition phase is carried out in order to establish the conditions that will be required later in the research phase. The definition phase is carried out through several steps: front-end analysis, learner analysis, conceptual analysis, task analysis, and specification of instructional objectives. Front-end analytics is done to analyze the fundamentals of the problems encountered. Learner Analysis analyzes the development of psychology, entering competencies, and background experiences. Concept analysis identifies the key concepts to be taught, organizes them in hierarchical order, and defines the concepts into attributes. Learning indicator analysis (Specifying Instructional Objectives) transforms the results of task and concept analysis into behavioral-related objectives.

The design stage is the next step in a 4D development model after definition. In the planning phase there are several steps, including the preparation of criteria reference tests, media selection, format selection and initial planning. In the design phase, the interactive learning media developed refers to the data obtained at the definition phase. The design stage aims to produce a product developed or referred to as Draft I. The Development phase the goal of this phase is to produce valid, practical and effective learning tools. The development phase of this research is divided into two activities: expert appraisal and development testing. (developmental testing). The test results are then revised to match the needs of the user. The results of the expert input are the basis for the revision of the existing interactive learning media to be subsequently drafted as Draft II. The product of the interactive learning media material of the human movement system has been revised based on the assessment, advice, and criticism of the experts as well as the test to the students of

State High School 9 Banjarmasin. The interactive learning media material of the human movement system is packaged in HTML 5 web form.

The research subject for the qualification test is an expert subject consisting of 3 people with 2 lecturers of Biology Education of ULM Banjarmasin and 1 Biology teacher of Class XI MIPA SMAN 9 Banjarmasin. Students with high, moderate and low cognitive abilities each consisted of over four people who have undergone the concept of movement systems in humans. The object of this research is an interactive learning medium based on Articulate storyline of the material of the movement system in humans class XI High School/MA. Data analysis obtained to describe the validity and readability of the Interactive Learning Media based on the Articulated Storyline Materials of the Movement System in Humans Class XI High school/MA was achieved with the calculation of the qualification scores and readiness of the interactive Learning Media:

$$M = \frac{\Sigma X}{N}$$

Description:
M = Average score of each aspect (mean)
ΣX = Number of scores obtained
N = Many aspects

To determine the validity and readability of interactive learning media based on Articulate Storyline material movement system in humans Class XI high school/MA results of development, then the initial data as a score is converted into qualitative data (interval data) with a likert scale. Based on Widoyoko's (2012) adaptation, for the ratio of X scores < 1.80 (very bad or very bad), 1.80 < X < 2.60 (less bad or bad), 2.60 < X< 3.40 (good enough or good enough), 3.40< X < 4.20 (valid or good), and X > 4.20 (very valid or very good). Furthermore, according to Riduwan (2009), validation and practicality analysis values can be obtained by dividing the scores received by the maximum score then multiplied by 100. In addition, the validity and practicality values categories are converted into several categories, namely the range 0-20 (invalid or not good), 21-40 (less valid or less good), 41-60 (sufficiently valid or good enough), 61-80 (valid and good), and 80-100 (very valid or very good).

RESULTS AND DISCUSSION

Results

Results of Needs Analysis

Based on the data that has been analyzed there are three results of the study according to the phase of 4D model design by Thiagarajan et al. (1974) which is the result of the analysis of needs, validity, and practicality. The first needs analysis is the needs of teachers and pupils in SMAN 9 Banjarmasin. The instrument used is a learning problem loader obtained from a teacher in SMan 9 Banjermasin and a pupil in the class of XII MIPA SMAN 9. The first need analysis is a biology learning experience analysis at the State High School of 9 Bankarmasin, and the instruments used are a teacher's needs loader. Analysis of learning patterns includes: curriculum (S), Learning Implementation Plan (LP), teaching material (TM), learning media (IM), LKPD (WS), enrichment book (EB), and remedial book (RB). Analysis of student characteristics can be seen as Figure 2.

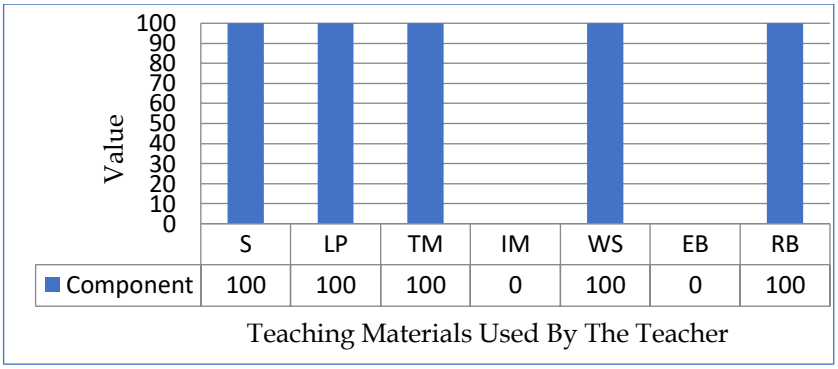


Figure 2. Aspect 1 Teacher's Needs

In Figure 2, it is shown that the learning tools that are often used in biology learning, especially in the strange eleventh semester class, are the curriculum, the implementation plan of learning, the teaching materials, the learner's work sheets and the remedial book. The value of the frequently used material is 100. While learning media and enrichment books are still rarely used. It shows that the biology learning devices of the strange eleventh semester are dominated by the use of curricula, RPPs, textbooks, student worksheets as well as remedial books. Learning media are so rarely used that learning is still not varied.

In the analysis of the learning resources used in biology learning in the eleventh semester, we analyzed several components: environment (SE), laboratory (LB), package book (PB), student work sheet (WS), handout (H), leaflet (L), brochure (BS), booklet (BL), and module. (MD). Below is the result of the third aspect of the need in Figure 3.

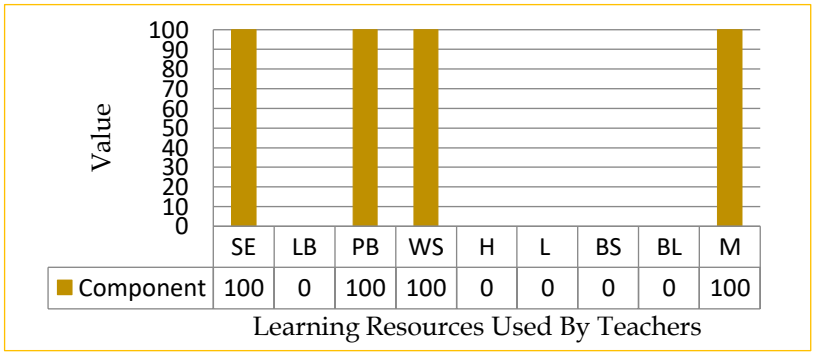


Figure 3. Aspect 2 Teacher's Needs

Based on the elevation of teacher needs in Figure 3, the result is that the learning resources that teachers often use when learning biology in the strange eleventh semester class are the surroundings, package books, pupil worksheets, and modules. For other learning resources, such as laboratories, handouts, leaflets, brochures, and booklets are still rarely used. It suggests that other learning resources are needed to support the learning process so that learning is more varied and students do not get bored easily.

The result of the third need analysis is the most difficult material according to the student based on the lift that has been filled by the students of the 12th grade who have passed through the biology learning of the 11th grade. As far as material is concerned, it consists of six components. These components include cells (C), structure and function of tissues in plants (SFTP), structures and functions of tissue in animals (S FTA), structural and functioning of bones, muscles, and joints (SfBM), structure of circulatory system and function, and structure of cells in the digestive system (sfcd). Based on the data obtained the most difficult material in biology learning in class XI in the semester weird can be seen in Figure 4.

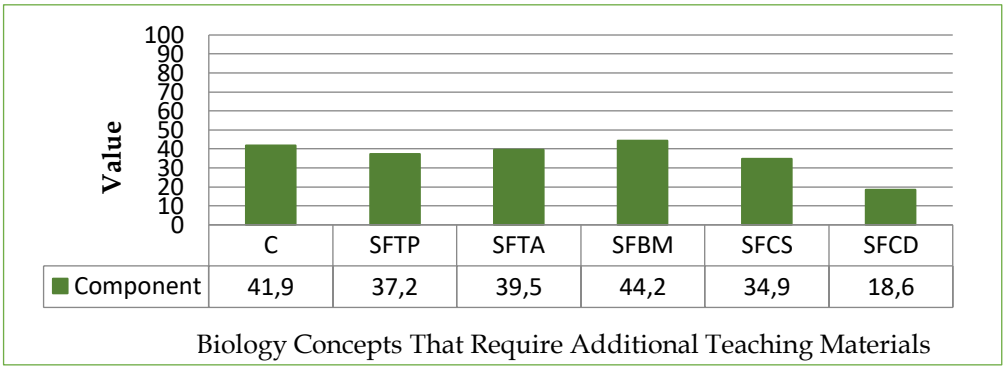


Figure 4. Aspect 3 Requirements of Students

Based on the results of the lift in Figure 4, it shows that motion system matter is the hardest material in Biology Class XI odd Semester. According to the students, the material system of motion is difficult because of the abundance of scientific terms so that students are difficult to understand. Besides, the explanation given by the teacher tends to be short and less interesting and the minimal support such as the human torso/skeleton is damaged so it cannot be used. Explanation is done only by lecture method and the student only sees the frames on the textbook so the student is difficult enough to understand the material of the movement system.

Students felt the need to develop additional learning media that could support learning, one of them on the concept of the human movement system which was considered quite difficult by the students. The material of the movement system in humans belongs to a complex material because of the abundance of discussions in it and amounts to 62.8%. The analysis on the aspect 3 needs of the pupils is about the needs of pupils towards interactive learning media. The need of the development of interactive learning media on the material of movement systems in human beings is divided into several categories. The category consists of very necessary (VN), necessary (N), less necessary (LN) and unnecessary (UN). The results obtained on aspect 3 can be seen in Figure 5 below.

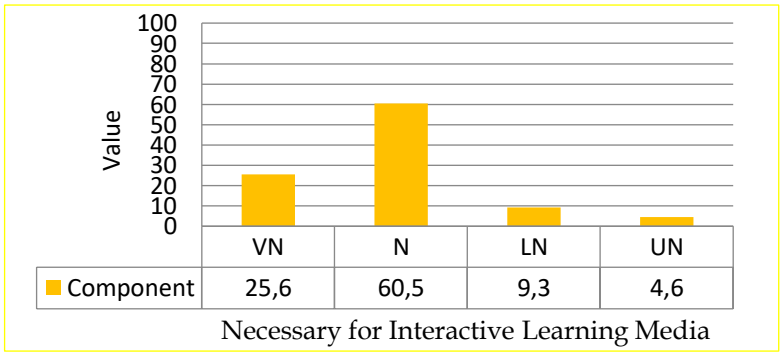


Figure 5. Aspect 4 Requirements of Students

Based on Figure 5, students with a score of 60.5 stated that there is a need for the development of interactive learning media of motion material in humans. Interactive learning media is chosen as a learning resource developed because the selection is based on the characteristics of the students known from the analysis of the needs of students of State High School 9 Banjarmasin. The development of interactive learning media should be done on the material of the movement system in order to support the learning of students.

Description Interactive Learning Media Based Articulate Storyline

The product developed is an interactive learning medium of the material of the movement system in humans. The interactive learning media is created using Articulate

Storyline software. The entire animation command can be done with the "trigger" menu so it can make it easier for the teacher to create an interactive learning medium. The Articulate Storyline program has several advantages that are simple smart brainware. The program also makes it easy for users to publish both online and offline so it can be formatted in CD, word processing, personal pages and LMS formats. (Ghozali & Rusimamto, 2016 dalam Rizky, 2020). Here is the front cover and main menu of the designed interactive learning media that can be seen in Figure 6.

Figure 6. (a) Interactive Learning Media Cover Display, (b) Main Menu Display of Interactive Learning Media

Movement System of Human Body (Mosyman) is an interactive learning medium that contains the material of the human movement system that is intended for the 11th grade of high school. The selection of the material is based on the requirements of the students who state that the material movement system is the most difficult according to the demands of the pupils. The Movement system of human body contains features that can be accessed by pupils that can support the learning process. The advantages of the interactive teaching media are based on Articulate Storyline, which means that the learning media is accessible online, and also the interactive learning media (mosyman) can be accessible offline as long as the pupil has a file that is accessible in the form of HTML 5 and features connected to YouTube as well as articles accessible if the participant connects his device to the Internet. A simple media display so that it can be easily used by pupils. These interactive media can be used independently and outside of class. Besides, it also uses independent learning curriculum benchmarks so that the developed products are more up-to-date.

Another peculiarity of the interactive learning media is the presence of additional elements. Biological information is additional information about the concepts being studied. Biological info contains translations in a simple and short language that will add to the knowledge of the student. Hernawan, et al. (2012). Using Indonesian language terms, verbs, true symbols, and standards can make it easier for learners to understand, so that the sentences used are in accordance with the level of maturity and development of learners Hopefully the development of interactive learning media based on Articulate Storyline means that learners can the expected learning goals and can improve the learning outcomes of students after developing these interactive media.

Validity Test Results

The validity test is carried out to assess the objectivity and content of the interactive learning media material movement system in humans developed according to the purpose of learning. In this validity test there are four components, namely material (M), usage (U), format (F) and language (LG). With regard to the recapitulation of the validity of interactive learning media studied in Figure 6 below.

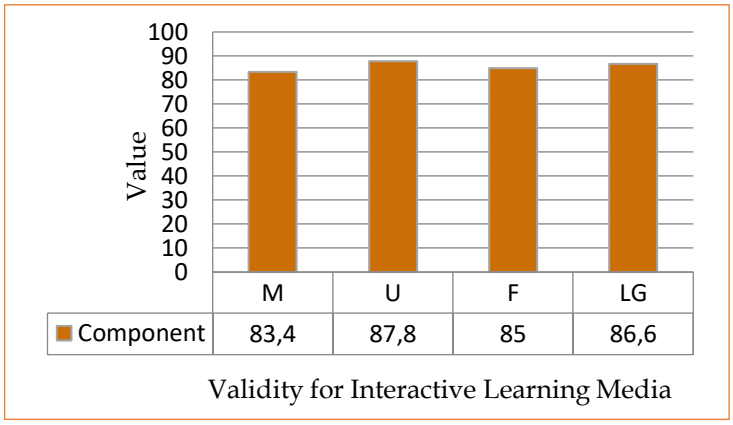


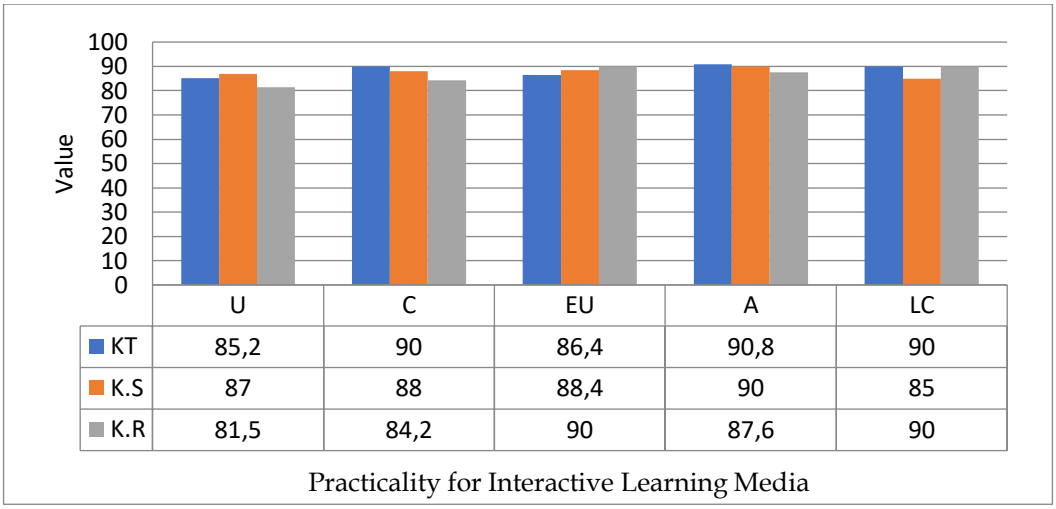
Figure 6. Recapitulation of the Validity of Interactive Learning Media

Based on the analysis of the data on the image, it can be explained that the value of each component varies with the lowest value of 83.4 and the highest value 87.8. The component material gets the value 83.4, the component usage gets the rating 87.8, the format component gets the score 85, and the language component has the rating of 86.6. The value of the validation test results according to the skilled strength of the interactive learning media can be determined by finding the average value of all the components of the evaluation. The mean value of validation results of interactive educational media based on Articulate Storyline material movement system in humans Class XI high school/MA according to skilled force is 85.7 which is in the category very valid.

There are four components comprising 15 aspects of the language component consisting of detail (A1) and relevant supporting material (A2). The usage component consists of continuously usable aspects (A3), self-used (A4), cost-of-production (A5), usage guidance (A6), usage procedures (A7) and ease of use (A8). The format component includes the availability aspect (A9), the scope aspect of the learning materials (A10), the allocation aspect of time (A11) and the scheduling element (A12). The linguistic component is composed of the requisite aspect of special knowledge (A13), the acceptance aspect of students (A14), and the acceptability aspect of teachers (A15). The highest aspect in the validation test is that the aspect can be used continually, the aspect is used on its own, and the requirement aspect is available with an average value of 100 categories with a very validity. The minimum value aspect is the supporting aspect in which the guide, the relevant aspect, the usage aspect is highly valuable, the storage aspect of use is very valuable.

Practicality Test Results

The practicality results on the development of interactive learning media are assessed through a practicality test. The practicality test is done using the practicality lift. The practicality test consists of several components, namely useful (U), clear (C), easy to use (EU), attractiveness (A), and cost-effectiveness (LC). A summary of the practicality results of 12 pupils is presented in Figure 7 below.



	U	C	EU	A	LC
KT	85,2	90	86,4	90,8	90
K.S	87	88	88,4	90	85
K.R	81,5	84,2	90	87,6	90

Figure 7. Recapitulation of the Practicality of Interactive Learning Media

The practicality test was conducted by 12 pupils with different levels of cognitive (high cognition (K.T), moderate cognitiveness (C.S), and low cognitiveness (B.R)) in Class XI of State High School 9 Banjarmasin. In this study, practicality is done with a lift of practicality consisting of 25 elements. Based on Figure 7 on the results of the practicality test, it is known that the component with the highest average rating is 99.44 with a very good category. Average value of the useful component 84.57, clear 87.4, cost-effective 88.33 and easy to use 88.24 which generally components belong to the category very good.

There are 5 components on 25 aspects. The useful components are A1-A6, including the aspect of pleasant use (A1), the aspect being a self-learning medium (A2), the aspect stimulating the student's cognitive abilities (A3), the aspect increasing student reading interest (A4), the aspect more effective use time (A5), and the aspect fulfilling the learning objective requirements (A6). The component clearly consists of the following A7-A12, the elements listed as user instructions (A7), the multimedia-loaded aspect (A8), the language-use aspect clear (A9), the content aspect related to the curriculum (A10), the material-related aspect of basic competence (A11) and the additional information aspect relevant (A12). For the easy-to-use component, the component is grouped on the A13-A17, i.e. the aspect is easily accessible anytime and anywhere (A13), the practical aspect of the usage (A14), the aspect helps the student understand the learning concept (A15), the aspects help enhance the interest of the student (A16), and a systematic layout aspects (A17). (A23). The cost-saving aspect consists of A24-A25, that is, the relatively low cost aspect (A24) and the valuable aspect for the student. (A25). The highest-rated aspects are the useful material aspects of everyday life with a rating of 98.33 with a very good category. The other aspects that get the lowest score are the aspects being an independent learning medium, the stimulation of the cognitive abilities of the pupils, and the additional information aspects relevant with an average of 80 with an excellent category. So, on the practicality test, the interactive learning media has an average total score of 87.47. These values mean that the practicality test results of the interactive learning media based on Articulate Storyline belong to the category of excellent.

Discussion

Based on the process of development of interactive learning media based Articulate Storyline material human movement system with need tests, validity tests, and practicality tests obtained results that are on the need tests obtaining a score of 65.1 with good category. It shows that students need interactive learning media to support students in their learning.

The students felt that there was a need for the development of additional learning media that can support learning, one of which is on the material of the movement system in humans which is considered quite difficult by the students. The less attractive and monotonous delivery of material makes students less attentive to existing learning so it will be more difficult for students to understand the material of the human movement system. Students feel the need for a learning resource other than a textbook for the concept.

The Movement System of Human Body (Mosyman) contains the material of the human movement system that is assigned to the eleventh grade of high school/MA because the human motion system is a difficult material. According to Afida et al. (2020) Students' understanding of the matter of movement systems requires a learning medium like a human skeleton torso. Biological learning requires a high degree of reasoning, understanding, understanding and application to obtain a concrete picture. Practical experience and tools serve to help concrete the experience in the learning process. The use of torso on indiscriminate indicators relates to the topic of the function of the system as the constructor of the movement system in humans and the subject of the structure of the bone in human beings. Makhul (2020) added that the material of the movement system is one of the biology subjects in the eleventh grade of high school. This material has a high level of difficulty (complexity) that requires a high supporting power anyway. If the minimum supporting force (learning media) used then the delivery of material becomes ineffective. The difficult material and the lack of supporting tools in learning, so the need for a supporting learning medium or can display the learning material in the form of images or videos. One of them is using mobile learning media.

Selection of development in the form of interactive media because it positions the elements of audio, visual, and kinesthetic, so that it can attract the interest of students in studying it. Yulia, et al. (2022) mentioned that implicitly, interactive multimedia can make the learning process not boring due to the presence of interaction. Because, with the use of interactive multimedia can make the lesson material will appear in an eye-catching way, thus stimulating the various senses to interact with each other. Plus, with a variety of visualizations displayed by interactive multimedia, it will work, so more remembered by the user's senses.

Validation of the product is carried out by presenting some experts or experts who are already experienced to evaluate the product. (Sugiyono, 2013). Based on validation tests that have been carried out, the results show that the interactive learning media developed is so valid that the media developed can be used. Overall, the interactive learning media material of the human-developed movement system belongs to very valid which means that the interactive learning media is technically very valid used as a learning resource. Learning resources are important for conducting qualification assessments because the quality of the learning resources can be identified from such assessments. (Primandiri et al., 2016). Island (2008) adds that a good design technique on a learning resource can improve the understanding of the student and a poor design technique can make the student difficult even though the content of the learning source is excellent.

The highest aspect of the validation test is that the aspect can be used continuously. The media developed can be used by the students continuously because it can be accessed online and offline, so as long as the students have exercises then this interactive learning media can continue to be used. Susiyanti (2018) says that reusable teaching materials make it easier to learn anywhere and anytime, making it more flexible and enjoyable because it is accessible using a smartphone. The more often the students repeat the material, the more they will understand the material that has been submitted. This is also reinforced by Lubis & Ikhsan (2015) adding that repeated use or learning with high frequencies can improve the learning performance of the student. Therefore, improvements have been made to make the

interactive learning media more attractive and understandable so that it can be used independently and continuously.

The aspect is used alone, and the aspect of the requirement is available is the next highest aspect. This is because the interactive media is developed with simple features so that it can be easily used by students. In addition, on interactive media there are learning requirements that make it easier for the user. Statement Jazuli et al. (2017) that ease of access can be seen from the functionality of its elements such as navigation features and user instructions. Evidence & Nurcahyo (2017) reveals that the placement of the elements of a learning resource will greatly affect the information messages displayed. Inappropriate placement will cause a less attractive impression, while a perfect placement would cause the appearance to become more attractive.

Aspects with the lowest value, i.e. on the relevant supporting material aspects, the scope aspects of the learning material, the scheduling aspects and the time allocation aspects are the least valued because the material presented on the interactive learning media is still not so in depth that at the time of the development process additional information is added to various video links as well as reliable website links on the information related to the material, which allows the learners to deepen the material of the human movement system. Qodriyah (2019) stated that the materials taught should be sufficient in helping students master the basic competences taught, so that the depth to be achieved can be considered. This means that teaching materials which are facts, principles, concepts, and generalizations very much require the help of appropriate teaching material to make it easier for students to understand. Fahrurz, et al. (2019) adds that when reviewed in terms of ease of use, the material presented on the teaching material is clear and simple, the language used is easy to understand, the size and type of letters are easy to read, and have a size that is practically easy to carry.

The next aspect that gets the lowest rating are the user manual aspects, the procedural aspects of use, the ease of use aspects and the aspects requiring specialized knowledge. This is because the interactive learning media developed was modified in the form of HTML 5. Therefore, there are some menus that are considered less common in other learning media so it takes time to get used to such interactive learning media. The use of media-based technology in the world of education is an attempt to improve the learning process to be effective and functional, but in this case teachers have not used it optimally because they have not mastered the existing features. (Poerwanti & Mahfud, 2018). The optimization of this utilization can be done in a practical way using technology-based learning media such as the interactive learning media that has been developed or other technologically based learning media.

The practicality test is structured with consideration of convenience. Facilities that mean easy to understand, implement or use (Hartini et al., 2017). Based on the practicality test carried out on the interactive learning media showed excellent values. The readability results showed excellent grades in students with different cognitive levels, namely high, medium and low. This suggests that the interactive media developed can be understood and read well both by all students with various cognitives and also well received by students. Jufri & Nurhabibi (2016 in Amalia, 2018) mentioned that readability has an influence on the success of the students in understanding the material presented at an optimal speed of reading because when the material is difficult to read, then the students have to read it slowly and repeatedly in order to understand the content.

The highest-rated aspect is the useful material aspect in daily life with a rating of 95 with a very good category. The material presented is connected with everyday life so that it makes it easier for the student to understand the material of the movement system. Jailani & Hamid (2016) explains that the suitability of the materials packaged with the curriculum is a

guarantee for achieving the expected learning results. Examples relating to everyday life and examples of a state-of-the-art nature will increase the knowledge of the students and of course benefit. The examples uploaded in the learning media aim to consolidate the reader's understanding of facts/data, concepts, principles, theories, values, skills and problems. (Sungkono, 2009). The more attractive the learning media used by the teacher will be the higher the level of student learning motivation and in order to be able to the goal of learning in the teaching learning process optimally. (Tafonao, 2018).

The lowest-rated aspects include the aspect of being a self-learning medium, the aspects of stimulating the cognitive abilities of the pupils, and the additional information aspects that are relevant because the materials studied in the interactive learning media come from package books frequently used by pupils where the material presented is not very different from the previous ones. Besides, the article links and also the video links on the interactive learning media are still not too many to make the latest and up-to-date information less. According to Novitaningrum et al. (2014) that through up-to-date information that describes current events by adding facts, concepts, and symptoms present in society, by providing examples that exist in the surrounding environment can help learners more easily in deepening the material. Khusna (2018) explains that the teaching material is in fact the content of the subjects given to the students according to the curriculum used. The teaching material must be appropriate and conducive to the achievement of the learning objective, in the form of a general line, not in detail, must be consistent with the order of the purpose of learning, and pay attention to continuity.

The results of this study show that interactive learning media based on Articulate Storyline material movement system in humans class XI high school/MA stated very valid and excellent practicality. Interactive learning media deserves to be used as a learning medium that will support the learning process of pupils. The interactive learning media developed is decent, practical and easy to read by the pupils. Haryanto & Bagas (2018: Annisa & Rahmawati, 2023) stated in his research that the development of interactive multimedia well developed and in line with the learning objectives will benefit both teachers and pupils. The development of multimedia will make it easier for students to understand the learning material because it is supported by interactive components. Innovations in interactive multimedia will also benefit by increasing the interest of students in learning.Implications of this study are that interactive learning media can be used by students in a direct manner along with teachers to support learning and facilitate students in learning the material of the movement system in humans. Interactive media can be accessed online and offline through exercise.

CONCLUSION

Based on the results of the research and discussion, it can be concluded that First, the analysis of the needs of teachers and pupils obtained as the basis of interactive learning media based on Articulate Storyline is well stated, this suggests that the need for the development of the interactive Learning Media based on Articulate storyline material movement system in humans in class XI High School/MA. Second, the validity of the interactive learning medium based on articulate storyline is stated very valid and in accordance with the material, usage, format and language. Third, the test of practicality of interactivity learning media on the basis articulate storyline is very good, meaning it is very practical and easy to read student. It shows that the interactive medium developed is valid and practical so it deserves to be used as a learning medium to support students. Implications of the study are that students can use interactive media anytime and anywhere independently through practice.

REFERENCES

Afida, F., Zulfarina, Z., & Fauziah, Y. (2020). Hasil Belajar Dan Permasalahan Pembelajaran Tatap Muka Terbatas Pada Materi Sistem Gerak Di Kelas XI MIPA. *Biogenesis*, *18*(2), 98-108.

Af'idati, N., Suntari, Y., & Putra, A. (2022). Pengembangan Media Pembelajaran Articulate Storyline Pada Muatan Ips Materi Proklamasi Kemerdekaan Indonesia Kelas V Sekolah Dasar. *Educational Technology Journal*, *2*(1).

Annisa, Nurul & Rahmawati D. (2023). Validitas dan Praktikalitas Pengembangan Multimedia Interaktif pada Materi Sistem Koordinasi untuk Kelas XI SMA/MA. *Jurnal Biologi Dan Pembelajarannya (JB&P)*, *10*(1), 49-57.

Asrizal, A., Festiyed, F., & Sumarmin, R. (2017). Analisis Kebutuhan Pengembangan Bahan Ajar IPA Terpadu Bermuatan Literasi Era Digital untuk Pembelajaran Siswa SMP Kelas VIII. *Jurnal Eksakta Pendidikan (JEP)*, *1*(1), 1-8.

Bamalli, H.S. (2013). Competencies and Strategies for the Teaching of 21st Century Learners in Vocational Home Econo mics Education. *Journal of Educational and Social Research*, 3 (9) : 105-108.

Chen, H.L.S., & Huang H.Y. (2017). *Advancing 21st Century Competencies in Taiwan*. National Taiwan Normal University: 1- 21

Faiz, A., & Kurniawaty, I. (2020). Konsep Merdeka Belajar Pendidikan Indonesia dalam Perspektif Filsafat Progresivisme. *Konstruktivisme: Jurnal Pendidikan dan Pembelajaran*, 12 (2): 155-164.

Hanik, U., Setiadi, E., Anandita., & Kurniawan, D. (2016). *Penerapan Strategi Umpan Balik untuk Mengatasi Kesulitan Belajar Siswa pada Mareti Sistem Gerak Manusia di Kelas VIII SMP Negeri 20 Pontianak* (Doctoral dissertation, Universitas Muhammadiyah Pontianak).

Hartini, S., Misbah, M., & Resy, R. (2017). Pengembangan Modul Fisika Berintegrasi Kearifan Lokal Hulu Sungai Selatan. *Jurnal Inovasi Dan Pembelajaran Fisika*, 4(2), 157-162.

Haryanto, H., & Bagas Friana. (2018). Aplikasi Permainan Edukatif Mengaji Berbasis Multimedia Interaktif. *Jurnal Teknik Informatika Unis*, 6(1), 8–16.

Hernawan, A. H., Permasih, H., & Dewi, L. (2012). *Pengembangan Bahan Ajar.* Direktorat UPI.

Husnah, A. (2021). *Pengembangan Media Pembelajaran Interaktif Menggunakan Articulate Storyline 3 pada Materi Ekosistem Kelas X MIPA di SMA Negeri 1 Yosowilangun Lumajang Tahun Pelajaran 2020/2021* [Doctoral dissertation, Fakultas Tarbiyah dan Ilmu Keguran Program Studi Tadris Biologi]. Institut Agama Islam Negeri Jember.

Island, P. E. (2008). *Evaluation and selection of learning resources: A guide. Departement of Education.* Charlottetown: PEI Department of Education.

Jailani, M. S., & Hamid, A. (2016). Pengembangan Sumber Belajar Berbasis Karakter Peserta Didik (Ikhtiar Optimalisasi Proses Pembelajaran Pendidikan Agama Islam (PAI)). *Nadwa : Jurnal Pendidikan Islam*, 10(2), 175–192.

Jazuli, M., Azizah, L. F., & Meita, N. M. (2017). Pengembangan Bahan Ajar Elektronik Berbasis Android sebagai Media Interaktif. *Jurnal Lensa (Lentera Sains): Jurnal Pendidikan IPA*, 7(2), 47-65..

Khusna, I. L. (2018*). Kesesuaian Tujuan dan Materi Pembelajaran pada Rencana Pelaksanaan Pembelajaran terhadap Pelaksanaan Pembelajaran Sastra Kelas XII SMK Batik 2 Surakarta*. [Skripsi, Universitas Muhammadiyah Surakarta].

Lailiyah, N. (2018). Pengembangan Media Pembelajaran Interaktif Berbasis Flash Untuk Pembelajaran Keterampilan Menuliskan Kembali Cerita Siswa Kelas IV SD. *Jurnal Pendidikan Guru Sekolah Dasar*, 6(7): 1150-1159.

Lubis, I. R., & Ichsan, J. (2015). Pengembangan Media Pembelajaran Kimia Berbasis Android untuk Meningkatkan Motivasi Belajar dan Prestasi Kognitif Peserta Didik SMA. *Jurnal Inovasi Pendidikan IPA*, 1(2), 191- 201.

Makhul, F. (2020). *Terhadap Hasil Belajar Biologi Siswa Pada Materi Sistem Gerak Kelas XI MIPA SMA Negeri 2 Gowa*. [Skripsi. Jurusan Pendidikan Biologi Fakultas Keguruan Dan Ilmu Pendidikan Universitas Muhammadiyah Makassar].

Muhtar, Azizah. N., Nugraha, A., & Giyartini, R. (2020). Pengembangan Media Pembelajaran IPA berbasis Information Communication and Technology (ICT). *Pedadidaktika: Jurnal Ilmiah Pendidikan Guru Sekolah Dasar. Vol*. 7, No. 4 20-31.

Mukti, I. N. C., & Nurcahyo, H. (2017). Pengembangan Media Pembelajaran Biologi Berbantuan Komputer untuk Meningkatkan Hasil Belajar Peserta Didik. *Jurnal Inovasi Pendidikan IPA*, 3(2), 147-149.

Novitaningrum, M., Parmin, P., & Pamelasari, S. D. (2014). Pengembangan Handout IPA Terpadu Berbasis Inkuiri pada Tema Mata untuk kelas IX Siswa MTs Al-Islam Sumurejo. *Unnes Science Education Journal,* 3(2), 542-548.

Nurdin, Syaffruddin. (2016). *Kurikulum dan Pembelajaran*. Jakarta: Rajawali Pers.

Poerwanti, J. I. S., & Mahfud, H. (2018). Optimalisasi Penggunaan Media Pembelajaran Interaktif Dengan Microsoft Power Point pada Guru-Guru Sekolah Dasar. *JPPM (Jurnal Pengabdian Dan Pemberdayaan Masyarakat),* 2(2), 265–271.

Primandiri, P. R., Amin, M., Zubaidah, S., & Maftuchah. (2016). Profil Bahan Ajar Genetika yang Digunakan di Program Studi Pendidikan Biologi Universitas Nusantara PGRI Kediri. *Prosiding SNPBS (Seminar Nasional Pendidikan Biologi dan Saintek) Kesatu, Surakata*. 905-909.

Primandiri, P. R., Amin, M., Zubaidah, S., & Maftuchah. (2016). Profil Bahan Ajar Genetika yang Digunakan di Program Studi Pendidikan Biologi Universitas Nusantara PGRI Kediri. *Prosiding SNPBS (Seminar Nasional Pendidikan Biologi dan Saintek) Kesatu, Surakata*. 905-909.

Purwanto, M. N. (2020). *Prinsip-Prinsip dan Teknik Evaluasi Pengajaran*. PT Remaja Rosdakarya.

Qodriyah, L. (2019). *Kelayakan Bahan Ajar pada Rancangan Pelaksanaan Pembelajaran Bahasa Indonesia Kurikulum 2013 yang Disusun Oleh Pendidik SMA Kelas XI di Kabupaten Demak.* Demak: [Skripsi] Universitas Negeri Semarang.

Rizky, Yahya. (2020). Pengembangan Perangkat Pembelajaran Flipped Classroom Bercirikan Mini-Project. *SJME (Supremum Journal of Mathematics Education)*. Vol.4. No.1.

Sari, S. Y., Sundari, P. D., Jhora, F. U., & Hidayati, H. (2020). Studi Hasil Bimbingan Teknis Pengembangan Perangkat Pembelajaran Berbasis Keterampilan Abad-21 dalam Rangka Penerapan Program Merdeka Belajar. *Jurnal Eksakta Pendidikan (JEP)*, *4*(2), 189-196.

Sugiyono. (2010). *Metode Penelitian Kuantitatif, Kualitatif dan R&D. Bandung* : CV Alfabeta.

Suhailah, F., Muttaqin, M., Suhada, I., Jamaluddin, D., & Paujiah, E. (2021). Articulate Storyline: Sebuah Pengembangan Media Pembelajaran Interaktif Pada Materi Sel. *Pedagonal: Jurnal Ilmiah Pendidikan*, 5(1), 19-25.

Sukmadinata, N.S. (2008). *Metode Penelitian Pendidikan*. Bandung: Remaja Rosdakarya.

Sungkono. (2009). Pengembangan dan Pemanfaatan Bahan Ajar Modul dalam Proses Pembelajaran. *Majalah Ilmiah Pembelajaran*, 1.

Syamsiani, S. (2022). Transformasi Media Pembelajaran Sebagai Penyalur Pesan. *CENDEKIA: Jurnal Ilmu Sosial, Bahasa dan Pendidikan*, 2(3), 35-44.

Tafonao, T. (2018). Peranan Media Pembelajaran dalam Meningkatkan Minat Belajar Mahasiswa. *Jurnal Komunikasi Pendidikan*, 2(2), 103–114.

Thiagarajan, S., Semmel, D., & Semmel, M. (1974). *Instructional Development for Training Teachers of Exceptional Children.* Washington DC: National Center for Improvement Educational System.

Widoyoko, E. P. (2012). *Evaluasi program pembelajaran*. Penerbit Pustaka.

Wijayanti, W., & Prayitno, T. A. (2021). Pengembangan Multimedia Interaktif Berbasis *Articulate Storyline* Sebagai Media Pembelajaran Siswa Kelas X SMA. In *Prosiding Seminar Nasional IKIP Budi Utomo* (Vol. 2, No. 01, pp. 515-522).

Yulia, R., Susanti, E., & Rizal, R. (2022). Pengembangan Multimedia Interaktif Berbasis Android Pada Materi Elastisitas Bahan untuk SMA Kelas XI. *Jurnal Eksakta Pendidikan (JEP)*, *6*(1), 1-10.