

# Developing Interactive Multimedia on Kindom Plantae for Senior High School

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**Keywords:** Interactive multimedia, drills and practice, kingdom plantae, development research

**Abstract:** This research aims to produce an interactive multimedia which is valid, practice and to know the effectiveness of interactive multimedia in the topic of the kingdom plantae for Senior High School .The interactive multimedia used in this study is the Drills and Practice model. The method being used is development research with the development model of Alessi and Trollip which consists of three stages, such as: planning, designing, and developing. Data analysis techniques for product trials using descriptive statistics. The results show that: (1) viewed from the aspect of media rated "very valid" with score 4.76 by media experts, (2) viewed from the material aspect rated "Valid" with score 3,04 by material expert; (3) viewed from the design aspect rated "Very Valid" with score 4.77 by design expert; (4) viewed from the aspect of the use rated "Very Practical" with a score of 4.26 by learners; (5) the increasing of student learning outcomes by interactive multimedia.

## 1 INTRODUCTION

Biology as a natural science that is born and developed based on observation and experimentation, demands innovative creative ways of presentation, emphasizing the provision of experience directly oriented to the process of discovering scientific concepts. Brown *et al.* (2009) suggested that biology is the study of life. Biology is studied not just theory, but direct experience of the results of observations from research. Observation of objects in research allows biology to be studied by direct observation.

In this regard, to improve the learning process that is expected to improve learning outcomes, an interesting media is needed to foster enthusiasm, interest, and also students in the process of teaching and learning activities in the classroom. One way to discuss problems related to this learning process is to use interactive multimedia. Khan *et al.* (2013) suggested that Biology is an eternal knowledge of life. Learning biology imposes great demands on students and lecturers, whereby instructors often have to use analogies, concept maps, mathematical formula, biological symbols and scientific measurement simultaneous to illustrate the non-visible scenario in Biology. Biology is not a theory but a direct experience of the results of research. Observation of objects in the study allows Biology to be issued by direct observation. Biology is more directed to

extracts using words that are not interspersed with practicum or teaching aids, but there is also the need to communicate with the description of the image. Biology is more concrete because the reason for explaining biology lessons to students requires proof of events. Biology put learning aids (media) to explain lessons that are abstract to students. The way to discuss abstract is to use interactive multimedia.

The existence of interactive multimedia using flash is very important in the teaching and learning process because in this activity the unclear material delivered can be helped by presenting interactive multimedia as an intermediary. In modern times, providing a concrete example of plant matter is very difficult. Examples of plants such as: ferns and moss, sometimes difficult to obtain. For the life cycle of moss and ferns, students are just fixated on the picture in the book. Por and Fang (2011) suggested that using interactive multimedia, educators can be facilitated in delivering material. Educators can overcome the learning difficulties of these students through the use of interactive media that can function as learning resources for students.

Research on interactive multimedia development was conducted by Yuliadi (2014) producing interactive multimedia that is valid, practical and has potential effects on student learning outcomes.

The effects of interactive multimedia on English language pronunciation performance of pupils in the

Nigerian primary schools has a potential effect on student learning outcomes (Oyeyemi, 2016). Likewise, from the results of the study (Lee & Osman, 2012; Bahadorfar *et al.*, 2014; Amine *et al.*, 2013; Sabu, 2018)

After using interactive multimedia, motivation and learning achievement of students experienced a significant increase. Research equations that will be developed with previous research are: 1) Having similarities in the use of computer media, 2) Research development produces interactive multimedia that is valid, practical and has potential effects on student learning outcomes, and 3) This learning media is designed to improve quality and learning outcomes of students. As for what distinguishes this research with previous research, this research will develop an interactive multimedia learning Biology that prioritizes the delivery of material especially the subject matter of the kingdom plantae.

Based on observations in one of the high schools in Palembang, the results of the identification of students' characteristics and learning materials are as follows: (a) Students are generally able to use computers and laptops, (b) Students are familiar with information technology, (c) Students are very interested in the lessons when use computers or laptops, (d) students consider that biology lessons are an abstract and difficult to understand because of indirect observation.

The success of learning in school cannot be separated from the learning design. Based on the description above, the researcher submits the title "*Developing Interactive Multimedia on Kingdom Plantae for Senior High School*". The formulation of the problem in this study is how to develop interactive multimedia material in the kingdom plantae in Biology subjects that have proven its validity? How to develop interactive multimedia material in the kingdom plantae in Biology subjects that has been tested for practicality? And how is the effectiveness of interactive multimedia material in the kingdom plantae on Biology subjects on the learning outcomes of students?

## 2 RESEACH METHOD

This research is a type of R & D (Research and Development) research. This study aims to produce interactive multimedia that is valid, practical and knows the effectiveness of interactive multimedia on the material kingdom plantae in Biology subjects in high school. The development model used in this study is the development model of Alessi and Trollip.

This research procedure has three stages: In the planning stage, the first steps taken include; (1) the researcher determines the boundaries, conducts needs analysis, (2) analyzes the characteristics of students, (3) analyzes the curriculum of facilities and infrastructure analysis, (4) media analysis, and (5) analyzes of learning outcomes. The second step include; (1) developing the concept of learning, (2) creating storyboards, (3) developing flash action scripts, and (4) preparing prototypes. The third step include; (1) preparing supporting material, (2) making relevant images, (3) making animation and audio, (4) combining media, (5) doing alpha test (expert validation), to find out the validity of the developed media, (6 ) revised the product, (7) conducted a beta test to see the practicality of the media, (8) product revisions, and (9) conducted a trial to determine the effectiveness (Alessi and Trollip, 2001).

### 2.1 Trial Design

A trial was conducted to test the feasibility of the product that has been developed. The trials in this study include alpha test and beta test. Alpha test is carried out by three experts, namely material experts, learning design experts and media experts.

Beta tests are conducted on students of class X Srijaya Negara High School to find out the user's response for interactive multimedia. Aspects tested in the beta test include ease of use and clarity of material.

### 2.2 Trial Subject

The subjects tried in this study were 30 students of class X SMA Srijaya Negara for beta testing and obtaining an assessment of the response of interactive multimedia users from the user side.

### 2.3 Data Collection Technique

The techniques used to collect data in this study include, interviews, walk-troughs, questionnaires, observations and tests of learning outcomes. The instruments used in this study were interview guidelines, media expert validation questionnaires, expert validation questionnaires, expert learning design validation questionnaires and user response questionnaires.

Data analysis techniques data obtained from this research instrument are qualitative and quantitative data. Data analysis techniques used in obtaining data in this study used qualitative data analysis techniques,

qualitative descriptive data analysis for product results developed, while quantitative analysis was analyzed by changing the average score into quantitative values with assessment criteria to assess the feasibility of multimedia learning media products interactive material kingdom plantae in high school. The conversion of quantitative data refers to the conversion formula with a scale of five (Surachman, 2017) presented in Table 1.

Table 1: Media practicality category

Average	Category
4,21 – 5,00	Very good
3,41 – 4,20	Good
2,61 – 3,40	Enough
1,81 – 2,60	Less
1,00 – 1,80	Very less

The results of the conversion of scores become the criteria used as recommendations in determining the feasibility and quality of a product being developed. Quality must also be supported by the effectiveness of a product that is developed. A product can be known to be effective through learning outcomes. Learning outcomes of students become a measuring tool for knowing the cognitive abilities of students. Improved learning outcomes can be known through the calculation of the gain value (normalized gain or n-gain) (Hake, 2007).

### 3 RESULT AND DISCUSSION

#### 3.1 Planning

In the planning stage that has been carried out is needs analysis, student characteristics analysis, curriculum analysis, analysis of characteristics of learning media, and analysis of infrastructure facilities.

#### 3.2 Design

The design stage is to develop initial ideas, analyze functions and concepts, perform initial program descriptions, prepare prototypes, create flowcharts and storyboards, prepare scripts, obtain approval from the client.

#### 3.3 Development

In the development stage, the preparation was done by preparing text, writing program codes, creating

images, producing audio/video, assembling parts, preparing supporting material, and producing prototypes.

### 3.4 Alpha Test

#### 3.4.1 Result of Expert Learning Media Validation

Quantitative data from instructional media experts can be seen in Table 2. Based on Table 2 interactive multimedia teaching materials for kingdom plantae material that have been made are declared valid and can be used in research.

Table 2: Media validation results on the alpha test

Aspect	Validator	Total value	Average	Category
Media expert	RE	162	4,76	Very valid

#### 3.4.2 Result of Expert Material Validation

Quantitative data can be seen in Table 3 and based on the table of validity categories, interactive multimedia material for kingdom plantae for high school is declared valid so that it can be used in research.

Table 3: Material validation results on the alpha test

Aspect	Validator	Total value	Average	Category
Material expert	EY	74	3,04	Enough

#### 3.4.3 Results of Learning Design Experts

The quantitative data from the teaching design experts can be seen from Table 4. Based on the table of validity categories, interactive multimedia teaching materials for kingdom plantae material for high school students that have been made are declared valid and can be used for research

Table 4: The results of the learning media validation in the alpha test.

Aspect	Validator	Total value	Average	Category
Learning media expert	SMS	167	4,77	Valid

### 3.5 Beta Test

After revising the Alpha Test phase, interactive multimedia was re-tested to see the practicality of interactive multimedia developed through Beta Test. At this stage, the Beta Test was given to 10 students of Class X IPA Srijaya State High School Palembang who were selected randomly representing the target population, namely students with low, medium and high abilities, the aim was to find out the products developed could be easily used by learners.

The results of the overall media assessment of 10 students towards interactive multimedia obtained a value of 4.22 which included a very practical category, so that interactive multimedia on kingdom plantae for high school is worthy of being tested in research.

### 3.6 Product Trial

This interactive multimedia product was tested by research subjects, namely students of class X IPA1 Srijaya Negara High School Palembang on May 2 - 9, 2018.

Table 5. n-gain result

Value Gain		Gain	N-gain	Criteria	
Pre-test	Post-test				
Average	27.09	87.3	57,25	0,82	High

In Table 5, the results of the pretest and post test show a value increase of 60.21 and an N-gain value of 0.82 which means the effectiveness of interactive multimedia in the Biology lesson the kingdom plantae material that has been developed has a very good category, this is based on the N value classification table which gets a value of 0.82 with a high category.

### 3.7 Observations of Activeness of Students

Aspects pay attention to teacher explanations, aspects of response, and aspects of discipline, independence, student collaboration in learning can be seen in Table 6.

Table 6. Results from observations on field test activeness

No	Assessment Aspect	Value	Average	Category
1.	Pay attention to the teacher's explanation	137	4,42	Very Active
2.	Spirit of learning	133	4,29	Very Active
3.	Express opinions	117	3,77	Active
4.	Asking question	120	3,87	Active
5.	Record important material	121	3,90	Active
6.	Interested in multimedia programs	130	4,19	Active
7.	Run multimedia programs independently	133	4,29	Very Active
8.	Study the material as a whole	133	4,29	Very Active
9.	Answering questions	135	4,35	Very Active
10.	Punctuality	136	4,39	Very Active
Average		129,5	4,18	Active

The use of interactive multimedia to improve student learning outcomes when done posttest. During the learning process using interactive multimedia, the researchers also carried out observations on the activeness aspects. The results of the observations during learning show that the activeness aspects of students get an average based on active categories. The total score 4.18 which is in very active category. The use of media in the learning process can encourage new interests and interests, motivation to learn while bringing motivation to students. During the learning process in the classroom using interactive multimedia with plant material, students become more active because they are interested in the material presented so that it is more interesting and can foster a positive attitude towards learning materials and learning and teaching activities in the classroom that can be improved. The same was

stated also by Khan and Masood (2013), related to multimedia, student learning outcomes, a significant increase in Biology lessons. The documentation results when the field test can be seen in Figure 1.



Figure 1: Students in field test activities.

This research produces interactive multimedia products of kingdom plantae materials on Biology subjects. The product was then validated by media experts, learning media experts and material experts. After that, a learning trial was carried out in class X IPA 1 at Palembang Srijaya Negara High School. To see an increase in student learning outcomes, using pre-test and post-test score data. This interactive multimedia development uses the Allesi and Trollip (2001) model through stages, 1) planning: 2) design, and 3) development. This research produces interactive multimedia that has proven its validity. Based on the results of the validity test by the validator, it shows that the interactive multimedia developed meets the requirements of the validity of the media aspects, aspects of learning design, and material aspects.

This research produces interactive multimedia that has proven its validity. Based on the results of the validity test by the validator, the interactive multimedia used is the validity of the media aspects, aspects of learning design, and material aspects. Validation from media experts fulfilled the assessment with a score of 4.46 with the "very valid" category. Validation of material experts, this multimedia product fulfill the assessment with a score of 3.04 with the category "quite valid". Validation from learning media experts fulfill the assessment with a score of 4.47 with the category "very valid". The results of the beta test, this multimedia product meet the assessment with a score of 4.26 with the category "very valid". The results of learning trials to see an increase in student learning outcomes using pre-test score and post-test data showed a mean pre-test score of 27.09 and a mean post-test score of 87.3. This shows that

the media products developed in this study proved effective. During the learning process using interactive multimedia, researchers also carried out observations on the activeness aspects. The results of the observations during the learning show that the activeness aspects of the students get an average of 4.18 with the active category.

The practical categories obtained from the results of student evaluations due to the interactive multimedia developed have met the needs of students who have been carried out by previous researchers, namely interactive multimedia developed by including video, animation, sound, music in interactive multimedia, so that students are more interested in learning Biology on the material kingdom plantae.

#### 4 CONCLUSIONS

Based on the results of research conducted on the development of interactive multimedia material in the kingdom plantae in the subject of Biology in High School, it can be concluded interactive multimedia material of the kingdom plantae in Biology subjects in High School which has been developed through the stages of planning, design and development has been tested for validity after being tested through 3 aspects, namely material aspects, aspects of learning design, and media aspects.

Interactive multimedia material in the world of plants in Biology subjects in High Schools that have been developed through the stages of planning, design, and development have been proven practical. This can be seen after doing the Beta Test there are 10 students. Through guided interviews and questionnaires at the Beta Test stage, obtained suggestions and input which is used as a reference for revising the interactive multimedia products developed, also in the form of quantitative assessment of students. The results of the assessment of students regarding interactive multimedia were developed in a very practical category, so that the interactive multimedia developed was very practical for students in learning.

Interactive multimedia developed has a potential effect on student learning outcomes. This can be seen from the results of the post-test of students where 31 students at the time of post-test get scores above the KKM with the complete category of KKM and three students is declared to have not completed the KKM because they received grades below 70.

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