

SE-005

THE DEVELOPMENT OF MEDIA DEVICE ON PROBLEM BASED LEARNING APPLIED MICROBIOLOGY

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ABSTRACT

This study aimed to develop a linear power point media devices on problem-based learning applied microbiology. Research development begins with a survey of the students the importance of needs analysis linear power point in the learning process, then do a linear power point media development with 4-D model of the stages comprising the step of defining, the design phase, stage of development, and the phase spread (disseminate). Subjects were two experts of microbiological matter, two experts of instructional technology, two experts of instructional media, and twenty-one students of Biology Education Master program at third semester, which is determined by purposive sampling technique. The research found that validation of linear media power point Nata de Coco material an average 84.75% (categorized as feasible), Nata de Pinna material on average 86.25% (categorized as feasible), Nata de Soya material on average 92.25% (categorized as very feasible), the material Nata de Cassava average of 82.25% (categorized as feasible) to be applied to the students of the Master of Biology Education in Applied Microbiology course.

Keywords: *Media Device, Linear Power Point, Problem Based, Applied Microbiology.*

INTRODUCTION

At present, the rapid development of educational technology advances affect the use of teaching aids in every educational institution, including universities. Application of teaching aids such as InFocus, media power point makes the learning process more effective and efficient to achieve the learning objectives. Similarly, in Applied Microbiology learning, lecturers need to empower all the equipment and supplies that are tailored to the demands of the curriculum, materials, methods, and the level of students' ability to achieve the learning objectives. Lecturers are expected to use the tools of the learning aids effectively and efficiently in the classroom, so that learning becomes more meaningful.

The use of information technology in learning tool shows provide a better learning outcomes. O'Day (2006) stated that the medium of animation as a visualization tool is more effective than a static image on cell biology lesson. Other research conducted O'Day (2008) states that students see the animation obtain test scores were significantly higher than students who do not see the animation, and the memory can be increased by 87-93% students of the

information obtained by viewing the animation. Thus it can be said that the use of instructional media can improve the quality of learning in schools.

The process of learning experience gained through the process, students can experience it directly through the act or process of observation and listening through a particular medium or maybe just through the process of listening through language. If the student learning experience through direct experience, it will provide concrete learning outcomes (Rusman, 2011).

According to Gerlach and Ely (in Rusman, 2011), there are three characteristics of the media is an indication why the media used, namely: (1) that describes the characteristics fixative media recording, storing, preserving, recommendation, and reconstruct an event or object, (2) manipulative traits that transform an event or object that takes a long time can be presented to students in an instant with the technique of shooting time-lapse recording, and (3) distributive characteristic that allows an object or event is transformed through space and simultaneously the incident served to a large number of students with the same stimulus relative experience of the incident.

The use of linear media in Applied Microbiology learning will be more meaningful to the process of problem-based learning. Chin and Li-Gek (2008) stated that the problem-based learning is an effective way to promote learning learning by doing in the classroom. Arends (2008) stated that the problem-based learning helps students to develop thinking skills and skill to overcome the problem, study the roles of adults and become independent learners. Araz and Sungur (2007) states that students who learned with problem-based learning, can better integrate and organize knowledge.

The importance of learning media production in Applied Microbiology, especially Nata de coco material, Nata de pinna, Nata de soya, and Nata de cassava, problem-based learning, so that students are more interested in the study them. Through research and development enables improved quality of the learning plan associated with the preparation of syllabi, lecture contract, lesson plan, student worksheets, and process assessment and student learning outcomes. Borg and Gall (1983) states that research and development approach is oriented research to develop and validate the products used in the study.

In this study, several stages of the development of media, namely: (1) the planning stages consists of identifying the needs and characteristics of students, the formulation of objectives, development of materials, and the development of measurement tools; (2) Writing media manuscript consists of: raise and enrich the idea or ideas, make a synopsis and treatment, write a script (script writing), evaluation and revision of the manuscript; and (3) Production of media (Sanjaya, 2012).



Problems in this study: (1) How is the category of eligibility power point linear media of Nata de coco material in terms of media experts, expert field of study, and a limited group of students?; (2) How is the category of eligibility power point linear media of Nata de soya material in terms of media experts, expert field of study, and a limited group of students?; (3) What is the eligibility category of power point linear media Nata de pinna material in terms of media experts, expert field of study, and a limited group of students?; and (4) How is the category of eligibility power point linear media of Nata de cassava material in terms of media experts, expert field of study, and a limited group of students?

METHODOLOGY

The study was conducted in the Master of Education Biology, State University of Medan. The development research through needs analysis phase, aims to collect information relevant to the need for the development of media power point linear, goal formulation and beads of material aimed at developing instructional design in accordance with the syllabus. The next stage, doing media design, aiming to plan learning materials in accordance with the syllabus subsequent media creation process and produce instructional media in the form of a CD that contains an outline of learning, competency standards, and basic competence, description of materials, conclusions, and references. The next stage of media experts and expert validation of each material by 2 people. After revision, further testing on a limited group of students of biology education as a pilot phase media products, was conducted to determine the attractiveness of students to instructional media production test performed on individual groups (3 people), test a small group (9 persons), confined field trials (21 people) with a low ability student characteristics, medium, and high and data collection using a Likert scale questionnaire). The final stage of this research is a product of Nata de coco instructional media, Nata de soya, Nata de pinna, and Nata de cassava which has a valid and revised in accordance with the input and suggestions, thus forming a linear form of media power point learning CD is ready for use in Applied Microbiology learning.

Data obtained using a Likert scale questionnaire with 5 options (Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree). The respondents will give numerical scores on each item questionnaire based on defined criteria. Data were analyzed using techniques percentage (Arikunto, 2012). Stages of development of these media can be seen in Figure 1.

Collecting data in this study, through: (1) aspects of the simplicity of design programs, such as the clarity of the material and content of the suitability of the implementation plan of learning and learning indicators to achieve the learning objectives derived from expert learning materials; (2) integration, such as images and text clarity and quality of the programs used were

obtained from individual testing, piloting small groups, and limited field trials; (3) emphasis, clarity of image display quality and presentation of the material, obtained from the testing of individual, small group and limited field; (4) The balance, in the form of clarity sizes, writing, and the suitability of the page on the image to make it look attractive, obtained from individual testing, small group testing, and field testing is limited; (5) the form of images, such as clarity and color match the image of each page to be easily understood, obtained from individual testing, small group testing, and field testing is limited; and (6) of color images, such as color images on paper should fit so easy to read, obtained from individual testing, test a small group, and limited field tests.

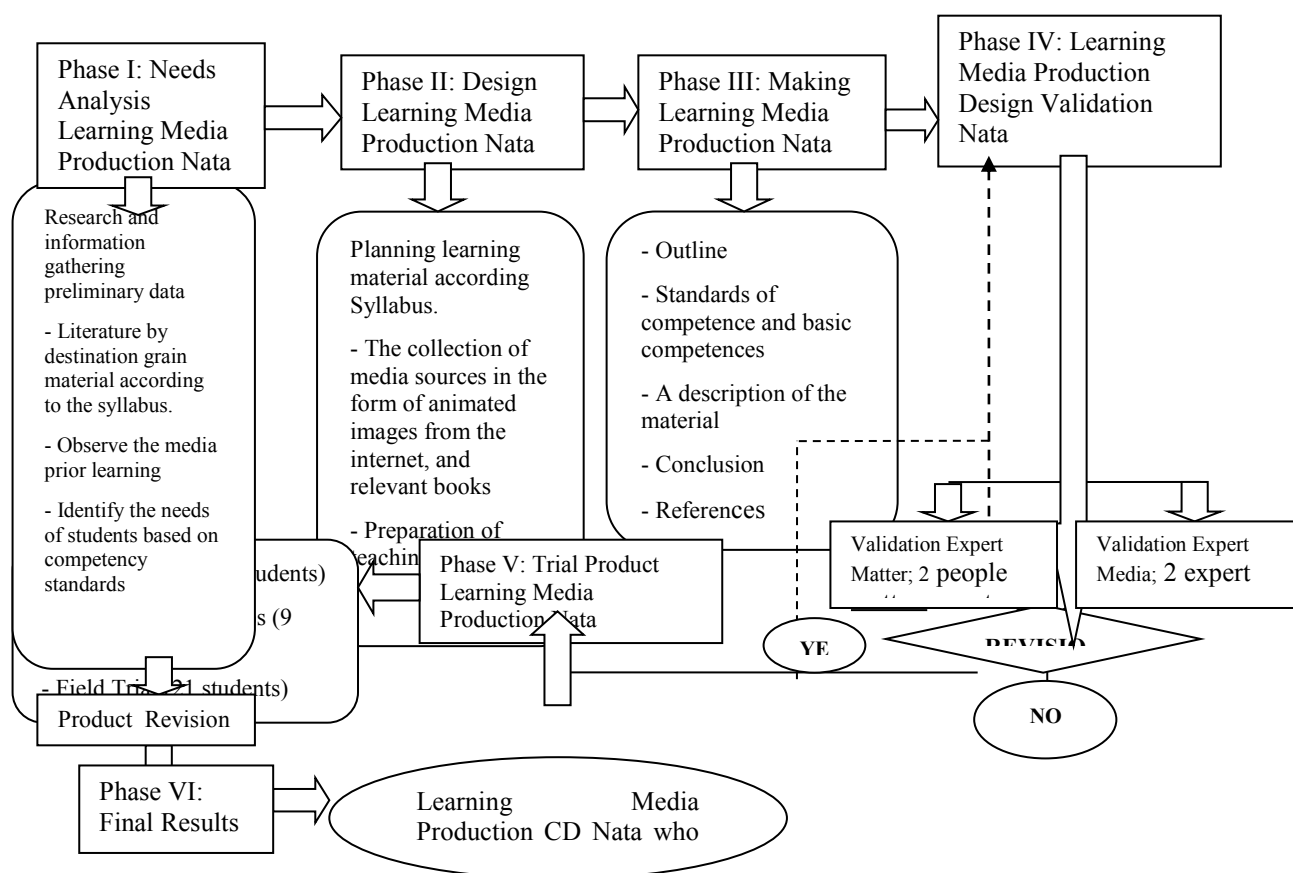


Figure 1. Procedure Research and Development Learning Media Production Nata

RESULTS AND DISCUSSION

Based on the results of the analysis of the needs of the students that the development of linear media power point to materials nata, need to be developed in Nata de coco production material, Nata de soya, Nata de pinna, and Nata de cassava is needed to support the learning process as seen from the media before a very difficult to get media that effectively and efficiently

to deliver the materials that are abstract. The following Table 1 through Table 4 the average results of expert assessment of instructional media.

Assessment of learning media expert on media power point Nata de Coco linear materials developed are "good", that setting the learning content to the purpose of learning. With the use of power point linear media can be felt meaning students learn, this is in line with Davis (2013) which states that invite students in activities do, think, and feel the learning process.

Table 1. Persentase average results Assessment Nata de Coco by Media Learning Media Expert

No	Categorization	Media Expert Assessment Percentage (%)	Criteria
1	Aspect of the program	84%	Good
2	Aspects of Design	85%	Good
3	Aspect of visualization	86%	Good
4	Aspects of animation	84%	Good
	An average of	84.75%	Good

Table 2. Persentase Average Results Assessment Media Nata de Pinna by Learning Media Expert

No	Categorization	Media Expert Assessment Percentage (%)	Criteria
1	Aspect of the program	85%	Good
2	Aspects of Design	88%	Good
3	Aspect of visualization	87%	Good
4	Aspects of animation	85%	Good
	An average of	86.25%	Good

Assessment of learning media expert on media power point Nata de Pinna linear materials developed are "good" are setting the learning content to the purpose of learning. By looking at the power point that deserves to be presented to the students, this is in line with the view Fry (2013) which states that it is important for students is what they learn is not what is learned lecturer.

Table 3. Persentase Average Results Assessment Media Nata de Soya by Learning Media Expert

No	Categorization	Media Expert Assessment Percentage (%)	Criteria
1	Aspect of the program	91%	Very Good
2	Aspects of Design	94%	Very Good
3	Aspect of visualization	93%	Very Good
4	Aspects of animation	91%	Very Good
	An average of	92.25%	Very Good

Table 4. Persentase Average Results Assessment Media Nata de Cassava by Learning Media Expert

No	Categorization	Media Expert Assessment Percentage (%)	Criteria
1	Aspect of the program	81%	Good
2	Aspects of Design	84%	Good

3	Aspect of visualization	83%	Good
4	Aspects of animation	81%	Good
An average of		82.25%	Good

Assessment of learning media expert on media power point Nata de Soya linear materials developed are "very good" learning content settings attention to the learning objectives. Media synchronization with the aim to bring the students' learning motivation, this is in line with McKeachie (2006) which states that the learning objectives presented will increase student motivation in learning.

Assessment of learning media expert on media power point Nata de Cassava linear materials developed are "good" are setting the learning content to the purpose of learning. The results based on expert assessment of the field of study, that the power point linear developed as contained in Table 5 through Table 8 below.

Table 5. Persentase average results Assessment Nata de Coco by Media Matter Expert Microbiology

No	Categorization	Matter Expert Assessment Percentage (%)	Criteria
1	Eligibility content	88%	Good
2	Presentation	91%	Very Good
3	Linguistic	93%	Very Good
4	Base Problems	89%	Good
An average of		90.25%	Very Good

Assessment expert microbiological studies on media power point Nata de Coco linear materials developed are "very good" that is setting the content of learning materials aligned with the learning objectives.

Table 6. Persentase Average Results Assessment Media Nata de Pinna by Matter Expert Microbiology

No	Categorization	Matter Expert Assessment Percentage (%)	Criteria
1	Eligibility content	91%	Very Good
2	Presentation	89%	Good
3	Linguistic	94%	Very Good
4	Base Problems	89%	Good
An average of		90.75	Very Good

Assessment expert microbiological studies on media power point Nata de Pinna linear materials developed are "very good" that is setting the content of learning materials aligned with the learning objectives.

Table 7. Persentase Average Results Assessment Media Nata de Soya by Matter Expert Microbiology

No	Categorization	Matter Expert Assessment Percentage (%)	Criteria
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1	Eligibility content	87%	Good
2	Presentation	85%	Good
3	Linguistic	84%	Good
4	Base Problems	86%	Good
An average of		85.50%	Good

Assessment expert microbiological studies on media power point linear Nata de Soya materials developed are "good" that is setting the content of learning materials aligned with the learning objectives.

Table 8. Persentase Average Results Assessment Media Nata de Cassava by Matter Expert Microbiology

No	Categorization	Matter Expert Assessment Percentage (%)	Criteria
1	Eligibility content	89%	Good
2	Presentation	88%	Good
3	Linguistic	90%	Very Good
4	Base Problems	87%	Good
An average of		88.50%	Good

Assessment expert microbiological studies on media power point Nata de Cassava linear materials developed are "good" that is setting the content of learning materials aligned with the learning objectives.

The results of the pilot group assessment of individual states nata instructional media that have been developed declared "excellent" with a score of 91.50%. In the small group trial increased to the attractiveness (90%), the balance (84%), the form of images (93%), and clarity (94%) with the criteria "excellent". In the test phase of small groups expressed very well, then there should be a revision so that it can be continued on a limited field trials. Furthermore, the limited field trials conducted on 21 students. In this trial the results obtained student responses to the instructional media nata that have been developed to get the criteria of "very good", with the average percentage of 92.38%.

Media development with attention to students' ability to solve problems. This is in line with Arends (2008) stated that the problem-based learning (problem based learning), conducted with five stages (phases) of learning, namely: (1) direct students to the problem; (2) organize the students in learning; (3) guiding individuals and groups conducting investigations; (4) develop and present work; and (5) analyze and evaluate the problem-solving process.

According to Sharon (2011) that the study is to develop new knowledge, skills, and behaviors that constitute the interaction of individuals with the information and the environment. Musfiqon (2012), said the factors that affect learning include: (1) the talent and speed of learning, (2) the ability to master a lesson, (3) the quality of the learning program, (4) resistance (perseverance), and (5) time.

CONCLUSION

Based on the results and discussion of the research it can be concluded that the media device overall linear power point included in the category of " very good " and fit for use on student learning in Applied Microbiology course, where the subject matter becomes more interesting and challenging for solving the problem.

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