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UNY Hotel
Yogyakarta State University



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Institute of Research and Community Services
Yogyakarta State University



PROCEEDINGS
INTERNATIONAL CONFERENCE ON EDUCATIONAL
RESEARCH AND INNOVATION 2013 (ICERI 2013)
STRENGTHENING THE TIES BETWEEN EDUCATION AND RESEARCH

May 16 – 17 , 2013 | UNY Hotel | Yogyakarta State University

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Editor :
Bambang Sugeng, Ph.D
Sumarno, Ph.D
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INTRODUCTION

Research is one of the three activities that should be conducted by the academic community of a university. Through research activities lecturers get empirical facts that are valuable for the improvement and development of theories and practices to bring about a qualified education.

In relation to the essence of a research to improve the quality of education, it is highly recommended that they do not conduct researches perfunctorily. Researches that are conducted should show special qualities recognized internationally. One effort to realize it is by conducting researches in the field of education and teaching and the field of community service integratedly.

Another important effort is by updating the knowledge and insights in the educational field either through reading related references or having discussions and meetings with other researchers and educational practitioners. In this context an international conference on educational researches and innovations constitutes a strategic forum to improve the researchers' insights and studies in contributing themselves to solve the educational problems through reseraches.

Hopefully, all materials in this conference are compiled into a proceeding that all related parties can read and are useful for us to improve the quality of education.

Yogyakarta, 10th of May 2013
Rector of Yogyakarta State University

Prof. Dr. Rochmat Wahab, M.Pd., M.A.

PREFACE

First of and above all, all praises and thanks be to Allah, the Lord of mankind and all that exists for His blessings and grace without which this international conference on educational researches and innovations would never be realized. This conference is a forum for the local, national and international educational researchers and practitioners to discuss strategic issues in the field of educational researches and innovations that are and will have been developing to realize effective schools.

This proceeding consists of three parts. The first is research policies, which include the management of educational researches, the development of teacher training in researches, and the participation of students and teachers in researches. The second part covers the model and implementation of educational researches, including collaborative researches between the educational world and industry, as well as society based researches. The third part includes researches on teaching and learning innovations in the areas of educational sciences, sport sciences, mathematics and science, engineering and vocational education, and informal education.

Hopefully, this proceeding can be beneficial for all of us to improve the quality of education.

Yogyakarta, 10th of May 2013

Head of Research and Community Service Institute of
Yogyakarta State University

Prof. Dr. Anik Ghufron

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The Quality of Content and Performance of Modules Evolution

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Abstract

Printed material is a main material for the students of Universitas Terbuka. Therefore, printed material should be designed as self-instruction and self-content material. Modules Evolution is a part of Evolution and Systematic Living Organisms printed material. This printed material was published in 2007 for Biology Education students.

This paper will discuss about the evaluation of the content and performance of the modules of Evolution. This study aims to determine the quality of the substance, including the validity and recent concepts, readability material, as well as the relevance of the material evolution on the modules with its curriculum in high schools.

Respondents of the study are the experts of evolution material, lecturer from other university, biology teacher of high school, and the students who took the course Evolution and Systematic Living Organisms.

As the results, according to the expert, the concept that existed at the printed material of Evolution was quite sophisticated. However, its presentation was too many so it was hard to digest; there are misconceptions and lack of sample; the depth of discussion among the topics is uneven. This is consistent with the opinion expressed the lecturers that the concepts is fairly advance. However, there are some concepts that have not been valid and erroneous. Meanwhile, according to the biology teacher, there was material which is relevant and not relevant to the high school biology curriculum.

According to the students, if given the score range 1 to 4, the average score of recentness of the concept for each module was 3,137; the relevancy of the example of its concept to the development of science is 2,744; Completeness and language is 2,844.

Keywords: evaluation, printed material, evolution, expert.

Introduction

In the context of distance education especially Universitas Terbuka, printed material or often called module has a strategic role as a main learning material. Modules can be studied independently or be self-instructional. Module not only contains the materials, but also clearly explains instructional objectives, examples, exercises, summaries, formative tests, and feedback. Module contains the complete material (self-contained). Student can study independently through following learning activities suggested by the developers of learning materials. Therefore, UT module is designed as a comprehensive, complete, and valid substance and able to motivate student to do independently study.

Assessment or evaluation is one of the necessary steps in the process of developing distance learning materials, especially when it has used about 3-4 years. Assessment can be done by reviewing the contents of the learning materials and its learning design.

Module Evolution and Systematic Living Organisms, is one of book used by students of Biology Education. This book consists of 9 modules, which 4 modules explain evolution, and 5 modules explain systematic Living Organisms. This book was developed in 2005/2006 and written by 6 writers. The first edition was launched on January 2007.

Since published in 2007, it has not evaluated yet the readability, the recentness and the use of the book of Evolution and Systematic. Is the book easy to read and to understand by the students? Does the content of the book follow the newest knowledge of evolution? Do its contents have met the teacher need for teaching evolution at school?

The aims of the research are to determine recentness concepts contained in the material, readability and relevance to biological materials in schools, as well as the enrichment of the evolution material necessary for the biology teachers.

At distance education, learning materials is a strategic and vital media for learning. By learning materials, students can independently study, interact, reflect and do self-evaluation. Students can also communicate virtually with the writer of the module as their lecturer.

UT's printed materials, therefore, not only contain materials but also learning strategy, evaluation, and other item instructional (Yunus and Pannen 2004).

UT's printed material contains materials which students must study based on the goal of learning that stated in the Outline Learning Program. The printed material is *self-learning or self-contained learning* that means the students need to study to achieve learning goal. Therefore, the printed material is designed for students to do self-study.

The learning materials are developed by a team of developer, which are the writer, reviewer, instructional designer, media expert and course material. The writer is responsible

for the content. He writes based on the outline of learning program. The reviewer is responsible for the validity content also. He supposed to review the scripts that already written by the writers. The instructional designer is responsible for the learning design. He has to ensure that the learning material developed consist of several modules (depends on the number of sks). He has to ensure that each module consist of some components such as general and specific competency goal, introduction, content (topic and sub topic), exercise, resume, formative test, feedback, reference, and glossary. Instructional designer is also responsible to ensure module has its characteristics (*self-instruction*) to facilitate students study independently with a minimum facilitator.

UT's Printed material has a function as lecturer, so that it has to evaluate after three or four years use and revise each 5 to 7 years.

There are two kinds of evaluation of product at distance education, which are evaluation of learning materials and evaluation of alumni. Summative evaluation of learning materials is done to obtain the effect of learning materials to students' achievement. The result of this evaluation is used for making decision, to continue or to change the learning materials (Suparman, 1992). The quality of learning needs to be evaluated to accommodate interactive process between student and the newest information, through both aligning substances and package (Subagjo, 1999).

Since the book Evolution and Systematic Living Organisms has published in 2007, Study Program of Biology had never evaluated this book. To anticipate the development of information and knowledge, and the needs of students as well, it is needed to evaluate this learning material. As Suparman (2004) said that formative evaluation is a must in the development of instructional product. Formative evaluation is a process to provide and use information in making a decision in order to improve the quality of learning materials. Formative evaluation can be done by reviewing the content or the package by content experts, students, or alumni.

Abedon in Suparman (2004) said that the quality of learning materials after evaluation is higher than before. Related to this problem, the profession of the students must be considered. Therefore, evaluation of learning material is a crucial step in the development and enhances the quality of learning materials.

The topic and subtopics that are explained in the book of Evolution and Systematics Living Organisms are the history of evolution theory for living organisms, mechanism of evolution, evolution of Prokaryote, Protista, a plant, fungi, and animal. On the other hand, the topic related evolution that are taught at third class senior high school theory of Evolution, comparison Darwin Theory and other evolution theory, Variation as determination for evolution, the Effect of distribution geography to evolution, Fossils as evidence for Evolution, Comparative anatomy, embryology, biochemistry, domestication,

and the remaining organs as evidence for evolution., Natural selection, Mutagen, Hardy-Weinberg Law, Speciation, Human Evolution, a new trend on the theory of evolution.

Evaluative Research is research method that is used in this study. Its procedure are preparation phase including the development of the questionnaire, readability test for questionnaires, questionnaire revisions, and production of the questionnaire, second phase is data collection by sending questionnaires to the respondents, and finally, the data analyzing phase.

The subject of this research is the book of Evolution and Systematics Living Organisms (PEBI4204), and the respondents of this research are content experts, lecturers, students of Biology Education, and teachers of Biology at Senior High School.

Variable of this reserach are 1) quality of the content, 2) the recentness of the concepts, 3) readability of the concepts of evolution, 4) Relation concepts between of the modules and topics at school.

Questionnaire is used to collect the data. Instruments developed are based on the book of Evolution and Systematics and Living Organisms, Syllabi for Biology Senior High School, and Evaluative Format.

To get the quality of learning materials, data was analyzed by descriptive analyses.

Result and Discussion

The result of research was divided by 4 categories, which are 1) evaluation of the content quality from content experts, 2) evaluation of the content quality from the lecturers, 3) teacher comments on the relation of materials and curriculum of senior high school, and 4) readability of the content from the students.

1. Comment of the content experts on the quality of modules

Module 1 (History of Theory Evolution)

1. Lack of theory Synthesis and modern Evolution
2. Content too wide but not depth
3. More memorizing of the concepts
4. The recentness on the content is enough, but hard to understand
5. Explanation of the concept and theory is not perfect.
6. Quite systematics.
7. Illustration too small and unclear.

8. Picture, example and non-example are relevant to the context.
9. Reading tool helps students to understand the contents but not eye-catching.
10. Less original reference.

Module 2 (Mechanism of Evolution)

1. There are misconception
2. No competency statements.
3. Quite recentness, but poor example of species from East Asia.
4. Material is not standard as other institution
5. Concepts and theory is not perfect.
6. The materials is hard to understand and can cause misconception
7. Illustration, example and non-example available does not help student to understand the material
8. Illustration and examples relevant to materials.
9. Illustration, examples and non-examples is unclear and not attractive.
10. Reading tool helps students to understand
11. Less original reference.
12. Answer key TF 1.10 and TF2.3-4 wrong
13. Need more explanation about the kingdom of organisms.
14. Process and mechanism of speciation lack of explanation.

Module 3 (Evolution of Prokaryote, Protista and Plant)

1. Misconception in interpreting adaptation, adaptive, adaptable and fitness.
2. The recentness of the content is enough but genetic evolution needs more explanation.
3. Contents are too wide but not depth.
4. Illustration and example are relevant to the materials.
5. Reading tool helps students to understand the contents but not eye-catching.
6. Less original reference.

Module 4 (Evolution of Fungi and Animal)

1. It is found misconception in classification of animal and fungi.
2. Too many memorizing materials.
3. Material is less up to date.
4. The content is not standard compare to other institution.
5. Content is too wide but not depth.

6. Need more elaboration.
7. Illustration and example are relevant to the materials but not help students to understand materials.
8. Materials is not attractive
9. Reading tool helps students to understand the contents but not eye-catching.
10. Less original reference.

Comments of the lecturer on the quality of the content

Module 1 (History of Theory Evolution)

1. It is found misconception.
2. The wideness of the contents appropriate for students.
3. The contents appropriate to the students competencies.
4. The content is up to date.
5. The content is standard for the course.
6. The depth of the content appropriates for students.
7. A part of concept and theory was explained holistically except for religion view need addition.
8. This module is a coherent presentation of the material, systematic and logical so easy to understand, not confusing, and does not easily lead to misinterpretation
9. Illustration, examples and non-examples can help students to understand the contents.
10. Reading tool helps students to understand, but it is not attractive
11. Answer key is clear.
12. Reference is complete and clear.

General Comments:

1. Pictur need to be added to make more attractive.
2. Guidance of study for students need to be revised
3. Glossary need to be added.

Module 2 (Mechanism of Evolution)

1. There is no misconception
2. The wideness of the contents appropriate for students.
3. The contents appropriate to the students competencies.
4. The content is up to date.
5. The content is standard for the course
6. The depth of the content appropriates for students.
7. Concept and theory was explained holistically

8. The content has a coherent, systematic and logical presentation so it is easy to understand.
9. Illustration, examples and non-examples can help students to understand the contents.
10. Reading tool helps students to understand, but it is not attractive
11. Answer key is clear.
12. Reference is complete and clear.

General comments:

- a. Page 2.6 words is met should be changed with can be used.
- b. population size must very big should be changed with ...is big.
- c. Need more additional examples for theory Hardy weinberg, consanguinity and autogamy, mutation, and sexual recombination
- d. Population rather constant should be changed with relatively constant.
- e. Guidance of study for students need to be revised

Module 3 (Evolution of Prokaryote, Protista and Plant)

1. There is no misconception
2. The wideness of the contents appropriate for students.
3. The contents appropriate to the students competencies.
4. The content is up to date.
5. The content is standard for the course
6. The depth of the content appropriates for students.
7. concept and theory was explained holistically
8. The content has a coherent, systematic and logical presentation so it is easy to understand.
9. Illustration, examples and non-examples can help students to understand the contents.
10. Reading tool helps students to understand, but it is not attractive
11. Answer key is clear.
12. Reference is complete and clear.
13. General comments :
 - a. This module should be put as the second module.
 - b. Glossary is needed.
 - c. The content is enough, but it is not need explanation about 5 kingdoms.
 - d. Guidance of study for students needs to be revised

Module 4 (Evolution of Fungi and Animal)

1. There is no misconception
2. The wideness of the contents appropriate for students.
3. The contents appropriate to the students competencies.
4. The content is up to date.
5. The content is standard for the course
6. The depth of the content appropriates for students.
7. concept and theory was explained holistically

8. The content has a coherent, systematic and logical presentation so it is easy to understand.
9. Illustration, examples and non-examples can help students to understand the contents, but not attractive.
10. Reading tool helps students to understand, but it is not attractive

Comments :

- a. Mapping is needed to add.

Teacher comments on the relevancy of the content of the book with the content at school

Module 1 (History of Theory Evolution)

1. The content is relevant to the content at curricula of school except about religion
2. Competency is relevance.
3. The examples are enough help teachers to teach their students.
4. Picture/diagram/table can be used by teachers to teach these topics.
5. Content is up to date for teachers.
6. Design of module is hard to understand, it need mind mapping.
7. Enrichment needed to be add:
 - a. Idea on delivery methods for evolution
 - b. Attractive learning to deliver evolution
 - c. MUI comments of evolution
 - d. Fossils evolution of human or other creature need to be added.
 - e. How to make replication of fossils.

Module 2 (Mechanism of Evolution)

1. The content is relevant to the content at curricula of school except about religion
2. Competency is relevance.
3. The examples are enough help teachers to teach their students.
4. Picture/diagram/table can be used by teachers to teach these topics.
5. Content is up to date for teachers.
6. Design of module is hard to understand need to add mind mapping.
7. The content is complete.

Comments of students

Module 1(History of Evolution

NO.	explanatory	score
	Completeness of module and language	
1	Description of the content	3
2	General competency	3.5
3	Specific competency	3.5
4	The use of module.	3
5	Characteristic language is used	2.5
6	Variation of paragraph	2.5
7	Term is used	2.5
8	Explanation acronym, and symbol	2
9	Attractive and relevant illustration to enhance understanding	2
10	Lay-out and setting	3
11	Exercise and feedback.	3
12	Resume	2
13	Key answer	3
14	Glossary	3.5

NO.	explanatory	score
15	Reference	3.5
16	Typo	2.5
	average	2.8
	Recentness of the concepts	
17	Explanation of evolution	3
18	Explanation of evolution based on experts and religion	3.5
19	Lamarck theory	3
20	Darwin theory	3.5
21	Evidence of evolution	3.5
22	Evolution view based on religion and Science.	3
	average	3.25
	Appropriateness examples and science	
23	Examples are appropriate	2
24	Fitness examples and content.	2.5
25	The content is up to date	2.5
26	Relevancy examples and non-examples	3
27	Fitness examples and science	2.5
	average	2.5

Comments

Content is really helpful teachers to understand evolution.

Module 2 (Mechanism of Evolution)

NO.	Explanatory	score
	Completeness of module and language	
1	Description of the content	3
2	General competency	3.5
3	Specific competency	3.5
4	The use of module.	2.5
5	Characteristic language is used	2.5
6	Variation of paragraph	2.5
7	Term is used	2,5
8	Explanation acronym, and symbol	2
9	Attractive and relevant illustration to enhance understanding	2
10	Lay-out and setting	2
11	Exercise and feedback.	3
12	Resume	2.5
13	Key answer	3
14	Glossary	3
15	Reference	3.5
16	Typo	3
	Average	2.75
	Recentness of the concepts	
17	Explanation of genetics population	3
18	Explanation of Microevolution	3
19	Explanation of genetic Variation	3
20	Explanation of natural selection and adaptation	3
21	Speciation	3
22	New structure of evolution	3

NO.	Explanatory	score
	average	3
	Appropriateness examples and science	2
24	Examples are appropriate	2.5
25	Fitness examples and content.	2.5
26	The content is up to date	2.5
27	Relevancy examples and non-examples	2.5
28	Fitness examples and science	2.4

Comments

Picture should be made more attractive.

Module 3 (Evolution of Prokaryote, Protista and Plant)

a.

No.	explanatory	score
	Completeness of module and language	
1	Description of the content	2.5
2	General competency	2.5
3	Specific competency	3
4	The use of module.	3
5	Characteristic language is used	3
6	Variation of paragraph	3
7	Term is used	2.5
8	Explanation acronym, and symbol	2
9	Attractive and relevant illustration to enhance understanding	2
10	Lay-out and setting	2.5
11	Exercise and feedback.	3
12	Resume	3

No.	explanatory	score
13	Key answer	3
14	Glossary	3
15	Reference	3.5
16	Typo	3
	average	3
	Recentness of the concepts	
17	Evolution of Prokaryote	3.5
18	Phylogeny of Prokaryote	3
19	Protista (Eukaryote)	3.5
20	Plant evolution	3.5
21	The original evolution of Vascular plant	3.5
22	Evolution of vascular plant	3
	average	3.33
	Appropriateness examples and science	
21	Examples are appropriate	3
22	Fitness examples and content.	3
23	The content is up to date	2.5
24	Relevancy examples and non-examples	2.5
25	Fitness examples and science	2.5
	average	2.7

Comments:

1. Add resume for each explanation.
Illustration or picture for Evolution of Prokaryote is needed to add.

Module 4 (Evolution of Fungi and Animal)

NO.	explanatory	score
	Description of the content	
1	General competency	2,5
2	Specific competency	3
3	The use of module.	3
4	Characteristic language is used	3
5	Variation of paragraph	3
6	Term is used	3
7	Explanation acronym, and symbol	3
8	Attractive and relevant illustration to enhance understanding	2,5
9	Lay-out and setting	3
10	Exercise and feedback.	2,5
11	Resume	2,5
12	Key answer	2,5
13	Glossary	3
14	Reference	3,5
15	Typo	3,5
16	Description of the content	3
	average	2,9
	Recentness of the concepts	
17	The origin of Fungi	2,5
18	Phylogenetic relation between Fungi and animal	3,5
19	The origin of animals.	3
20	Evolution of Invertebrate	3

NO.	explanatory	score
	average	3
	Appropriateness examples and science	
21	Examples are appropriate	3
22	Fitness examples and content.	3
23	The content is up to date	3
24	Relevancy examples and non-examples	2
25	Fitness examples and science	3
	average	2,8

Comments:

Illustration for evolution of fungi needs to be added.

Discussion

1. *Content*

1. The content is too wide, but it is not depth, so it is hard to understand (based on experts, lecturer, and teachers)
2. There are misconception in module 2, 3 and 4.
3. Contents in module 3 and 4 are not relevant to the curricula of school.

2. *Recentness*

The content in module 1, 2, 3, and 4 are up to date (based on comments of lecturer and teacher), but only module 1, 2, and 3 are up to date based on experts.

3. *Austrasia, examples, non-examples*

Based on experts, illustration, examples and non-examples is relevant but it cannot help reader to understand. However, based on lecturer it helps reader but it is not attractive. Based on students, it is relevant, help them to understand and can be used for teaching.

Based on experts and lecturer, reader tools help to understand the modules but it is not attractive.

Based on expert comments, the content is less appropriate to the competency; however, based on lecturer and teachers, the content is appropriate to the competency.

Instructional design of the module

Based on teacher and expert comments, not all presentation of module is systematic. It does not help them to understand module. So, teachers suggest adding mind mapping concept. However, the lecturers said it is systematic, logic.

4. Reference

There is a different view from experts and lecturer on the reference used in the modules. Experts comment that reference is not appropriate; on the other hand lecturer comment is one.

The average score of students to evaluate the recentness of the content is 3.14, the appropriateness examples to the sciences is 2.74, and completeness of module and language is 2.84.

Conclusion

This research concludes that:

1. The module has to be revised related to
 - a. Synthesis and modern evolution
 - b. The process of organism evolution, genetic variation, classification of kingdom
 - c. Misconception in module 1, 2, 3, and 4.
2. It needs to add real example for module 2 Dan 3
3. It needs adding how to deliver evolution at class, to be more attractive
4. It needs to consider teacher competency
5. It needs to improve an attractive reader tools

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