

Project Based Learning Tools Development on Alcohol and Ether Materials at Natural Science Faculty State University of Medan

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Abstrak .Project based learning tools development on alcohol and ether materials at Natural Science Faculty State University of Medan .This research has a purpose to develop and review organic chemistry materials of alcohol and ether topics using standard instruments of the National Board of Education Standards (BNSP). This research is a combination of research development and experiment or often referred with as research and development (R & D). This research begins by analyzing 3 syllabuses from 3 colleges. Project based learning tools of development result then reviewed by 3 organic chemistry lecturers and 30 students as sample of respondents in this research. Results of analysis with BNSP standards conducted by three lecturers and students on project based learning tools development on alcohol and ether materials for the feasibility of content with an average of 3.66 %, feasibility of language 3.62 %, feasibility of presentation of 3.56 %, it can be concluded the average obtained from both parties is 3.61 %. It means the project based learning tools development on alcohol and ether materials is valid and does not need revision.

Keywords-development; teaching materials; project-based

I. INTRODUCTION

Self-learning is a process that most determine the success of students in achieving the learning objectives. Independent learning can be done at any time and using self directed learning methods. Self-learning is also a process that is decisive in achieving the learning objectives. However, this process requires resources, one of which is a textbook, which is able to help students understand the learning material [1]. The results showed that the development of teaching materials has given good results in improving learning outcomes of learners. The results of Ramdani (2011) showed that 91.61% of learners considered that the learning module based on Mindjet Manager as an alternative material of organic chemistry learning[2]. Aisyi's research (2013) shows

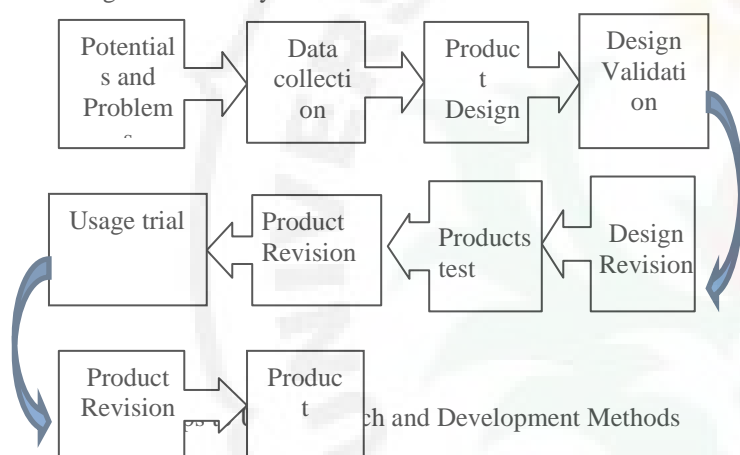
that the use of project-based teaching materials indicate that the use of teaching materials 67.7% of respondents agree that learning support materials as contextually assessed come from the nearest environment and are familiar with everyday life [3]. There are two factors that influence student's independent learning process including in studying organic chemistry, that is external factor and internal factor. External factors such as guiding modules, textbooks, internet access, and academic atmosphere. While the internal factors are learning motivation, perseverance, physical and mental health and ability to learn / learning skills

In Organic Chemistry course there are some subject matter of which is the material of Alcohol and Ether. This material is closely related to daily life but some students say it is very difficult to understand the material. One of the factors of organic chemistry is still less desirable from the point of view of the researcher stated that the organic chemistry book has not given ease of students in studying organic chemicals. Solutions that can be done to facilitate the process of student learning in the course of organic chemistry, among others, by innovating teaching materials that are integrated with the model of scientific learning, among other models of project learning. Project-based learning is an innovative approach to learning, providing emphasis on contextual learning learners through complex and tangible activities [4] This model is also a learning approach that considers the project as a learning infrastructure [5]. Project-based learning is appropriate in organic chemistry learning because organic-based chemistry learning provides students with more collaborative opportunities, students are actively engaged in solving projects independently and collaborating on teams and integrating real and practical problems[6] . The development of project-based materials on alcohol and ether materials at Chemistry Department FMIPA State University

of Medan is one of the efforts to improve the competence of graduates.

II. RESEARCH METHODS

This research was conducted in Chemistry Department, State University of Medan on April 2015. Population in this research include (1) State University of Medan's chemistry lecturer, (2) All students of the fourth semester of chemistry UNIMED. Samples were taken randomly (random sampling or probability sampling) by drawing 3 organic chemistry lecturers at State University of Medan, taking purposively at least 20% of total IV semester students majoring in chemistry State University of Medan, with category getting A / B value on organic chemistry.



This research is a combination of research development and experiment or often referred with as research and development (R & D). Research development includes the preparation of chemistry teaching materials for universities in alcohol and ether. The data collection procedure is carried out with the following stages:

1. Syllabus analysis from 3 universities
2. Preparation of the syllabus that has been analyzed as a reference for the preparation of teaching materials
3. Selection of University Organic Chemistry textbooks for 8 books with different authors of Alcohol and Ether materials
4. Contents preparation of teaching materials results analysis
5. Preparation of draft teaching materials based on the table of contents of textbook analysis results.
6. Review drafted teaching materials by Unimed Chemistry Lecturer
7. Review of teaching materials by students of the fourth semester
8. Revision of teaching materials according to the results of riview and advice of lecturers and students.
9. then a fourth semester student who studies Alcohol - Eter material

Data analysis technique performed is a qualitative data analysis to be analyzed using descriptive analysis percentage using the formula:

$$P\% = \frac{\sum q}{\sum r} \times 100\%$$

Description:

P % The percentage score obtained, in this case is the percentage of standard research component of the book according to BSNP.

$\sum q$ Number with the sign (✓) on the questionnaire of the assessment of alcohol-ether materials.

$\sum r$ The total number of concepts in the assessment's questionnaire of alcohol-ether materials

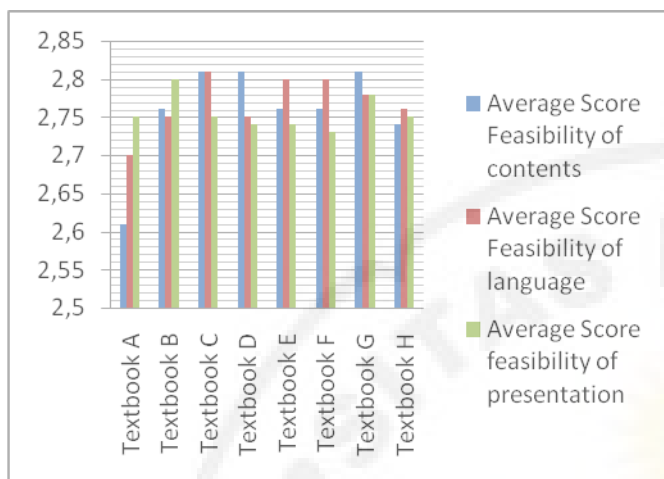
IV. III.RESULT AND DISCUSSION

A. Syllabus Analysis And Organic Chemistry Textbook

The syllabus of Organic Chemistry which is used as the analysis material is syllabus from Universitas Pendidikan Indonesia (UPI), State University of Medan (Unimed) and Andalas University (Unand). From the results of the analysis of the three syllabuses prepared Comprehensive competence standards and basic competencies and become a new syllabus. The teaching materials in syllabus prepared for alcohol material are as follows: Common structures and formulas of alcohol compounds, for example alcohol compounds, classification of alcohols, chemical properties of alcohols, physical properties of alcohols, alcohol reactions, acidity and alkalinity of alcohols, alcohol manufacture, benefits of alcohol, phenol, thiols. The teaching materials composed of ether materials are as follows: general ether structures and formulas, ether's nomenclature, physical properties of ether, etheric reactions, ether preparation, benefits of ether, epoxides, special ethers (cyclic).

• Textbook Review Results

The analysis was conducted on eight textbooks used in universities conducted by fourth semester students majoring in Chemistry Unimed with total of 30 respondents. Feasibility analysis of chemistry books content adjusted with instrument from BSNP with score 1-4 with component of assessment as follows: feasibility of content, feasibility of language and feasibility of presentation



Inset .1 Graph Students Analysis Results Against 8

Textbooks

Based on the results of the graph obtained, the F-book gets the highest average score compared to the other book for the content feasibility component, the C text book gets the highest score for language eligibility and in book B gets the highest score for presentation feasibility compared to other textbooks

B. Integrated Components in the Module

In the Alcohol and Ether module consists of basic competence (KD), learning indicator, concept map, the detailed material, examples of problems and solving at the end of submateri, a Selip topic is containing a special review made with the aim of linking material information with more complex in everyday life, the module contains the Project Tasks that must be done by Student, with the expectation that by doing student will more master the material of Alcohol and Ether, Summary in the End of the Module, Evaluation consisting of questions that have been adapted to Indicator learning, Glossary, Bibliography and Key answers.

Each of the sub subjects is organized in accordance with the students' development and the demands of the Competency Standards in the Organic Chemistry syllabus followed by the integration of learning innovation through instructional media in the form of animated video, practicum video and contained in the module. Learning model that can be integrated into the module, among others, such as scientific learning model (PBL, PjBL, Inquiry). The developed modules are equipped with examples of problems, assignments and solutions of each question. Procurement of instructional media on teaching materials is expected to help students in learning modules and help them to learn independently, is the most decisive process in achieving learning objectives. While the learning model is used for students more active and more motivated in understanding learning. In the final stages of development is prepared about the evaluation that can measure student's competence to the material.

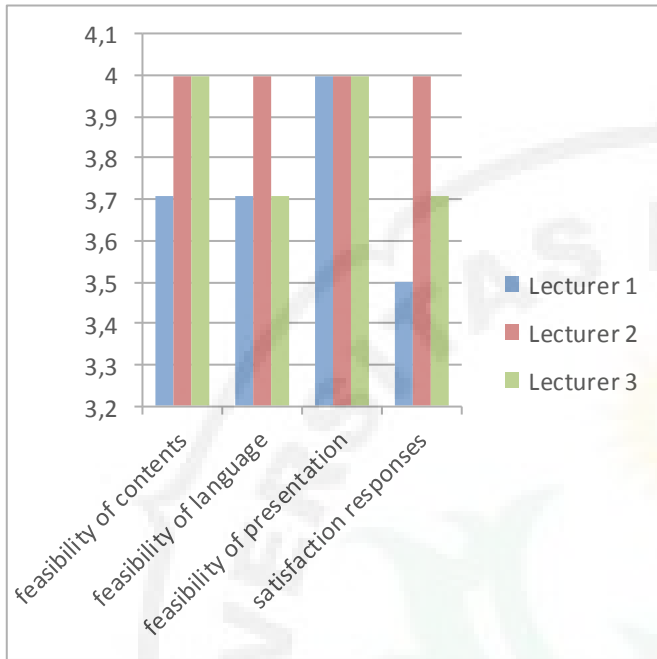
C. Standardization and Assessment of Modules by Organic Chemistry's Lecturers

From the analysis of the assessment conducted by three lecturers of Organic Chemistry FMIPA UNIMED Chemical Department of the materials based on the project of alcohol and ether. Where for the content feasibility of obtaining the results 3.71 %, for the language feasibility of obtaining the value of 3.71 %, for the feasibility of the presentation obtained a value of 3, 00 %. Each description of the assessment is calculated on average of the values of the three assessment teams which then at the end of the study are calculated on average of all descriptions so as to know the final value of the module

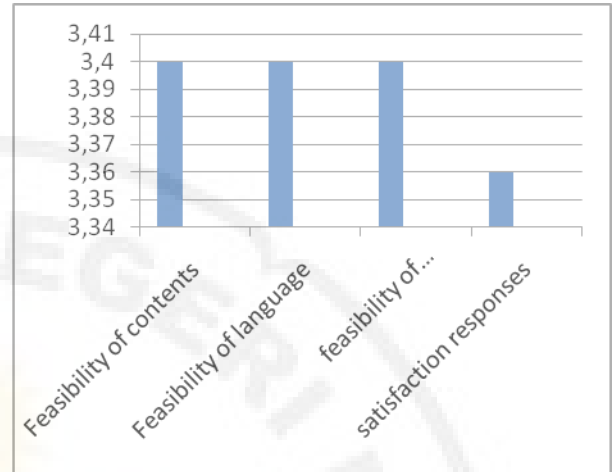
Table.1 Average score gain and percentage of assessment result of Organic Chemistry lecturer

Aspect of assessment	Lecturer I	Lecturer II	Lecturer III	Average	Categories
Feasibility of contents	3.71	4	4	3.9	Valid and do not need revision
Feasibility of language	3.71	4	3.71	3.8	Valid and do not need revision
feasibility of presentation	3	4	4	3.66	Valid and do not need revision
satisfaction responses	90 %	100 %	100 %	96.67 %	very satisfying

With the same instrument result of assessment from Chemistry Department student of 4th Semester, which has been through learning of Organic Chemistry I and certainly have passed the material of alcohol and ether with number of respondents as much as 30 people got average value 3.44 %. In terms of feasibility of content obtained score 3.44 %, feasibility of language score of 3.44 % and in terms of feasibility of presentation scored 3.44 %. This means that the Student gives a positive opinion on the development result module and means that study module of Alcohol and Eter has been made valid and does not need revision.



Inset.2 Obtaining the results of reviews by lecturers



Inset 3. Obtaining Result's Standardization from Student

Elements Rating	Component Assessed	Respondents' opinions on innovative modules		Average (%)
		P (%)	Q(%)	
Feasibility of contents	Material coverage	4	3,34	3,67
	Material accuracy	4	3,47	3,73
	Material Upgrade	4	3,44	3,72
	Contains productivity insights	3.66	3,52	3,59
	Stimulate curiosity	4	3,53	3,76
	Develop life skills	4	3,35	3,67
	Developing Insights Indonesia	3.66	3,43	3,54
Average		3.90	3.44	3.66
Feasibility of language	In accordance with the development of learners	4	3,30	3,65
	Communicative	4	3,50	3,75
	Dialogic and interactive	3,33	3,60	3,46
	Straightforward	4	3,42	3,71
	Coherence and mindset demands	4	3,47	3,73
	Compatibility with correct Indonesian rules	4	3,30	3,65
	Use of terms and symbols	3,33	3,50	3,41
Average		3.80	3.44	3.62
feasibility of presentation	Presentation techniques	3.66	3.48	3.57
	Supporting material presentation	3.66	3.38	3.57
	Presentation of learning	3.66	3.43	3.54
Average		3.66	3.44	3.56
Total Average		3.78	3.44	3.61

Based on table 2 above, the results obtained for the feasibility of content with an average of 3.66 %, feasibility of language 3.62 %, feasibility of presentation of 3.56 %, it can be concluded the average obtained from both parties is 3.61 %. By looking at the analysis criteria of the average value of project-based teaching materials, the average value in the interval value of 3.24-4.00 % means the module is valid and does not need revision. And if you look at the average value of the results of project-based assessment of materials that have been made by researchers that is at a value of 3.61, it can be concluded that Alcohol and Ether-based projects that have been developed according to the standards of curriculum from the University

especially Organic Chemistry is valid and do need revision

D. Perception of Respondents' Satisfaction Against Development Results

Phase perception of materials satisfaction that has been standardized by student respondents and expert lecturers is done in line with the standardization of teaching materials that have been developed, to know whether or not the teaching materials developed to be used as reference of organic chemistry learning on alcohol and ether materials to the students. The perception of student satisfaction on project-based teaching materials on alcohol and ether material was 88,71% and perception of lecturer's satisfaction on project-

based teaching materials on alcohol and ether material 96,67%

V. IV CONCLUSION

The average results of the assessment of project-based materials that have been drawn up by lecturers and students obtained by 3.61 %, it can be concluded that the alcohol-based materials and ether-based projects that have been developed according to curriculum standards of the University specifically Organic Chemistry is valid and no need revision (2) Alcohol and Ether based project development modules consist of sub subjects arranged in accordance with University curriculum requirements integrated learning innovation through instructional media in the form of animated video, practice video and contained in module with scientific learning model. (3) Overall respondents also agree that the development result module will be very helpful and excellent as a learning resource on alcohol and ether materials with 96.67% satisfaction percentage by lecturers and 88.71% by students.

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