Innovation Of Project-Based Learning Resources For Increase Ability Think Level Tall On Teaching Titration Sour Language

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Abstract. This study aims to determine: 1) Analysis of innovative teaching materials used by universities; 2) Analysis of innovative textbooks in universities for analytical chemistry based on BSNP; 3) The feasibility of project-based innovative learning resources has complied with the eligibility standards of teaching materials based on BSNP criteria; 4) the effect of project-based innovative learning resources in improving higher order thinking skills in acid-base titration teaching, 5) the effect of project-based innovative learning resources in improving student learning outcomes in acid-base titration teaching. The sampling technique is *purposive sampling* . The sample of this research is two classes of chemistry education students. The research instruments are valid and reliable objective tests of learning outcomes, sources of innovative teaching materials, thinking ability assessment questionnaires and BSNP validation questionnaires. The analytical technique used is the *Likert scale technique* and the independent sample t-test test in the SPSS 23 program. Based on the results of the study, conclusions can be drawn, among others: 1) Practicum guiding teaching materials used by universities based on the feasibility standards of teaching materials have values, among others; content feasibility (3.12), language feasibility (3.27), presentation feasibility (3.34) and graphic feasibility (3.37); 2) Project-based innovative learning resource teaching materials used by universities based on the feasibility standards of teaching materials have values, among others; content feasibility (3.7), language feasibility (3.67), presentation feasibility (3.77) and graphic feasibility (3.66) the criteria are eligible to be used; 3) The results of the assessment show the effect of project-based innovative learning resources in the implementation of learning to improve higher-order thinking skills to produce Sig. < (0.00 < 0.05); and 4) The results of the assessment show that the use of project -based innovative learning resources has an effect on improving student learning outcomes on the subject of acid-base titration to produce Sig. < (0.00 < 0.05).

Keywords : innovative learning resources, higher order thinking skills, Study Results, Acid base titration.

1 Introduction

The world of education is currently facing an issue, especially the corona virus pandemic. Learning exercises that are usually done face-to-face suddenly need to be changed to online techniques. Along with the *Covid-19 pandemic* , world changes are undergoing a very rapid

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4.0 industrial revolution, both in the fields of technology, science, psychology, and the transformation of cultural values. This development in the end also demands a transformation of the educational paradigm. Education in the modern era is not enough to only emphasize the achievements of science as a product, but must also emphasize various dimensions of life skills through the use or application of digital technology and the internet. (Jayawardana, HB A, 2020)

Source study is all source like messages , people, materials , tools , techniques , and background used _ student as source for activity study and could increase quality learn it . Source long time learning this used by student University Medan State on eye studying chemical analytic is a book entitled Analytical Chemistry I (Analytical Chemistry base), based on results analysis use BNSP instruments . Source study this efficient used on moment learning stare face , but no for moment this does it online learning .

also known as *project-based learning* , is a contextual learning model because it is expected to change the way students learn independently by increasing higher-order thinking skills, increasing student creativity in work, generating creative ideas, and training critical thinking, in responding to a problem faced in the real world. Project-based learning allows students to design a problem and find a solution on their own. Project-based learning has the advantage of its characteristics, namely helping students make decisions and frameworks, helping students design processes to determine an outcome, train students to be responsible for managing information carried out on a project that is carried out and finally students produce a real product that students produce. which is then presented in class (Marzuki et al., 2017).

Positive results from past analysts regarding the use of venture-based and mixed media creative learning assets by Juliandini G., Manihar, S., and Zainuddin, M (2020) where the consequences of exploration are project-based and visionary and good imaginative learning assets in Anion exam learning can cultivate students' undisputed level reasoning ability while further developing student learning outcomes. From the description introduced, the experts are interested in directing the exploration with the title: "Asset-Based Learning Asset Enhancement to Further Develop Higher Demand Thinking Skills in Performing Acid Base Titrations "

2. Method

This research is a development research with ADDIE development model (*Analysis, Design, Development, Implement, Evaluation*). This research is a quantitative research with the aim of developing learning resources to see the improvement of learning outcomes using test instruments and to see students' learning motivation using non-test instruments. The research will be conducted at the Department of Chemistry Education, Faculty of Mathematics and Natural Sciences (FMIPA) of Medan State University in the 2020/2021 academic year. The population in this study were all lecturers of chemistry at the State University of Medan and all students of chemistry education at the State University of Medan. The sample in this study were three UNIMED chemistry lecturers as validators, material experts and media experts who were selected by purposive sampling and the samples in this study were two classes of chemistry education students who were taken by *purposive sampling*, to measure learning achievement before being given treatment. In the experimental class, students are taught to use innovative project-based learning resources while in the control class to use a practicum guide. The research design can be seen in table 3. 1 below:

Table 3. 1 Table design Study Use Source Study Innovative Based on Project 3

Group	Pre-test	Treatment	Post-test
Experiment Class	T1 _	X_A	T2 _
Control Class	T1 _	-	T2 _

Source: Sugiono, 2014

Information :

X_A =Learning using project-based innovative learning resources
T_1 = Initial test (*Pre-test*)
T_2 = Final test (*Post-test*)

The type of research used in this research is the research and development method (*Research and Development*) . Research and development methods or in English *Research and Development* are research methods used to produce certain products, and test the effectiveness of products (Sugiono, 2014).

The research to be conducted is experimental. The research involved two classes of chemistry education students. Before learning begins, students are given an objective test in the form of a multiple choice test to determine the students' initial abilities (*pre-test)* . Then after the end of the learning process students are given an objective test to determine changes in student learning outcomes (*post-test*). The control class uses a practicum guide used by students, while the experimental class uses developed learning resources.

3. Results and discussion

The exploration used is Innovative Work research (Research and Development) where the results of this test are project-based showing materials for teaching Titration Acid Base . This study aims to decide: (1) testing the requirements for creative performance materials used in universities (2) investigating imaginative course readings that have been available in logic colleges according to BSNP, (3) the use of learning assets in the light of consistency with the principles of principle. displaying material in accordance with BSNP regulations, (4) the impact of developing imaginative learning assets to increase higher reasoning abilities in the acquisition of corrosive base titrations, (5) the impact of developing business-based learning assets in further development of student learning outcomes in corrosive base titration education , (6) students' reactions to project-based creative learning assets.

4. Conclusion

Source learning that has used by student University The land of Medan in eye studying chemical analytic is book entitled Analytical Chemistry I (Analytical Chemistry base), based on results analysis use BNSP instruments . one _ Theory in eye studying this is titration sour language . On Theory this there is a number of a must practice done , while learning conducted online . So required something innovation source study based project for increase

results study student on Theory that . One of the learning models that can increase Skills experimentation student is a learning model based project . Tests used _ is study Creation Innovative (Research and Development) where results from study this is based project showing _ ingredient for teaching Acid Base . Study conducted with To do innovation titration teaching materials sour language , standardized teaching materials by expert validator use questionnaire eligibility taken _ by purposive sampling.

Results study show that (1). Analysis source study student on Theory titration sour language obtained the average rating appropriateness contents of 3.14 ; _ appropriateness language 2.89; appropriateness presentation 2.76; and appropriateness graph 2.72. (2). Part coordinated learning _ to in asset learning creative is showing Theory as module electronics , group small project titration language corrosive , recording learning , and recording completed functional _ direct by para scientist . (3). Test normalization asset learning imaginative based on effort by material master validator get score typical 3 ,68 ; qualification language 3.40; depth material 3.44; and 3.76 positions and design media situation arrived at the point middle 3.54. Remember evaluation this , an evolved item be in a class really possible and no need overhauled . (4). Ability more reasoning _ tall on class test try get score typical 85.45 _ whereas class control get score typical 79.49. (5). results study class exploratory obtained normal value is 0.71 _ on classification high , while class control get normal value is 0.50 in class medium . (6). Reaction student after use asset learning based Duty creative generally very good .

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