THE DEVELOPMENT OF CARBOHYDRATE E-MODULE İNTEGRATED BY KKNI TASKS DURING THE COVID-1 PANDEMIC

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Abstract: The transformation of education during the COVID-19 pandemic requires that the elements of education be proficient in using technology according to the online learning system so that it has a positive impact on the demands of the digital era in the future. The research is R & D (Research & Development) oriented with the application of the ADDIE model (Analysis, Design, Development, Implementation, Evaluation) but in this study it only went through three ADDIE stages. E-module development based on syllabus analysis and RPS development refers to KKNI. for biochemistry courses, especially on carbohydrates. E-module validation is assessed by expert validators based on BSNP standards (content feasibility, language eligibility, and presentation). The data collection instrument in this study used a questionnaire which was presented in google form. Based on the validation results of the development of integrated carbohydrate e-module, KKNI tasks during the COVID-19 pandemic with content feasibility, language feasibility, and presentation feasibility scores, respectively 3.61, 3.53, and 3.58 so that the e-module that has been developed is very feasible to use as a learning media. e-module of carbohydrate based KKNI tasks had implemented as a learning media in the future.

Keywords: e-module, carbohydrate, KKNI, COVID-19, learning media

INTRODUCTION

The foundation of education is centered on the curriculum by paying attention to every element of education. Curriculum development continues to take place for refreshment, technological development, pedagogy globally to increase education standards (Rajurkar et al., 2019). The use of technology continues to be developed by curriculum development according to the demands of the 4.0 revolution. which requires high order thinking skills (HOTS) (Subkhan, 2020). The purpose of the development of the KKNI curriculum is to produce graduates who are able to compete in the future in various sectors. Graduates must be able to innovate and be proficient in technology so that the fundamental aspect that must be developed is science, knowledge, skill, and competency (Kemendikbud, 2016). Implementation of the KKNI curriculum at UNIMED by implementing 6 tasks in the form of routine assignments, Critical Book Report (CBR), Critical Journal Report (CJR), Mini Research, Idea Engineering, and projects to strengthen the quality of education (Situmorang et al., 2018).

The use of technology as a learning medium provides a special attraction in the learning process, making it easier for teachers to explain learning material (Chuang, 2014). COVID-19 has an impact on the learning process in education. The transformation of online learning activities is a challenge for the education community such as the ability to use technology (Holme,2020). Learning during a pandemic has led to the multiplication of deep teacher strategies carry out learning activities related to the learning process, learning media, practicum activities, and learning evaluation.

The commitment of teachers is very large in the success of education during a pandemic, so that learning motivation in the use of technology develops rapidly (Dietrich et al., 2020). The transformation of the globalization of education aims to produce graduates who have skills in innovation and digital technology. The skills to create innovation are based on thinking skills to find original ideas. Besides, the use of digital technology as a learning resource to produce learning media with various information found is useful for facilitating learning activities so that they have life and career skills (Puriwat & Tripopsakul, 2020).

The aspect that drives the transformation of education in distance learning is the use of technology (Dulsat & Alvarez, 2020). Technology development as a support for making teaching materials. It is one of the learning resources in the form of a collection of materials used by students in learning activities. Teaching materials are structured in sequence, explain learning competencies, and are useful for independent learning activities. Teaching material innovation is teaching material that suits the needs of students who are flexible from several aspects that are considered such as the suitability of applications in the learning activities used, intellectual, emotional, and spiritual. The material developed in teaching materials must be able to motivate students to encourage students' interests and talents (Sitorus, Sudrajat, & Lestari, 2015). The role of technology in STEM learning is needed to demonstrate learning material so that students are able to produce works in various scientific disciplines, one of which is the robotic application (yksel, Delen & Sen, 2020). One of the interesting and contextual chemical materials, namely carbohydrates, carbohydrates have a broad scope, especially in the metabolic process of carbohydrates and carbohydrates as the main energy source which has an important role in nutritional intake in food (Buyken, 2018). Carbohydrates have high-calorie content, so a diet that is low in carbohydrates is required but produces high energy, so TEE is very suitable for consumption during a diet (Hall, Guo & Speakman, 2019). Based on some research on the development of integrated e-module, KKNI assignments can improve student learning outcomes so that they are able to complete KKNI tasks (Situmorang et al., 2018: Hasibuan, Simorangkir, & Sudrajat, 2020)

One of the teaching materials is the e-module which is completed using technology. Technology-based module development is also called e-moduli. In the development of e-modules based on local wisdom in Kindergarten learning centers in the city of Jambi using the 3D Pageflip Professional application with satisfactory assessment criteria so that they can be distributed to the Jambi area and used by educators and students (Sofyan, Anggereini, & Saaidah, 2019). The development of e-modules as a learning media can support the learning process so that it becomes flexible, efficient, effective, and improves students' understanding of concepts sothat they can solve problems (Uz, Haryono, & Wardani, 2019). The development of modules for laboratory activities in biochemistry learning makes it easier for students to research protein using the NMR Spectroscopy tool. This aims to increase the linkage of scientific methods, laboratory techniques, and skill development in the laboratory related to everyday life (Marsiglia et al., 2020).

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METHOD

The development of an integrated carbohydrate e-module is the KKNI task during the Covid-19 pandemic using R & D research (Research and development). One of the R & D models is ADDIE (Analysis, Design, Development, Implementation, Evaluation). In this study, only three ADDIE stages were carried out, namely Analysis, Design, and Development (Sugiyono, 2014).

This research is based on previous research (Munthe, Silaban, & Muchtar, 2019), the development of the e-module carbohydrate integrated with the KKNI tasks during the Covid-19 pandemic with stages namely analysis (analysis biochemical book analysis and analysis biochemical syllabus), design (designing research in accordance with the application of the KKNI curriculum and regulating the presentation of e- interesting module) and development (developing the carbohydrate e-module in accordance with the KKNI competence presented using a flipping book, validation e-module with expert validators, revise e-modules according to suggestions from expert validators so that e-modules are suitable for use in biochemistry courses. The sample of this study consisted of 3 expert validators who had experience and had participated in KKNI learning. The data collection instrument used a questionnaire based on BSNP standards which were published in the google form based on content feasibility, language eligibility, and presentation feasibility.

RESULTS AND DISCUSSION

The research use three procedure to developed the carbohydrate e-module integrated by KKNI task during the Covid-19 pandemic. The result from the stages are :

Analysis Stage

Based on the results of the syllabus analysis referring to the KKNI assignment, the carbohydrate e-module was developed in Table 1.

Table 1. Description of E-Module Based on KKNI Assignment

No	**Sub-discussion on Carbohydrate**	**Description KKNI assignment**
1	Classification of Carbohydrates	Knowing the increased knowledge about the structure of carbohydrate classification with (Routine Task)
2	Classification and Metabolism of Carbohydrates	Having the ability to select textbooks for review of carbohydrate classification and carbohydrate metabolism processes so that they understand the concept of matter and compare books (CBR)
3	Functions and Effects of Consuming Carbohydrates	Conduct journal analysis related to the function of carbohydrates in the body and the impact of excess and lack of carbohydrates (CJR)
4	Test of carbohydrates and sources of carbohydrates	Identify sources of carbohydrates and classify them based on the tests conducted (Mini Research)

Based on the results of the analysis of sub-learning outcomes which are integrated with KKNI tasks on carbohydrate material, there are 4 KKNI tasks that are applied, namely routine assignments, CBR, CJR, and Mini Research. 2 KKNI assignments that have not been published in the e-module, namely the Idea and Project Engineering assignments because this assignment is given to other biochemical materials.

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Design Stage

The next stage is design, at this stage the e-module design is carried out in accordance with the sub-learning outcomes in the syllabus and an interesting presentation. The following is an integrated carbohydrate emodule for the KKNI assignment that has been designed and uses the developed flipping book in **Fig.1**

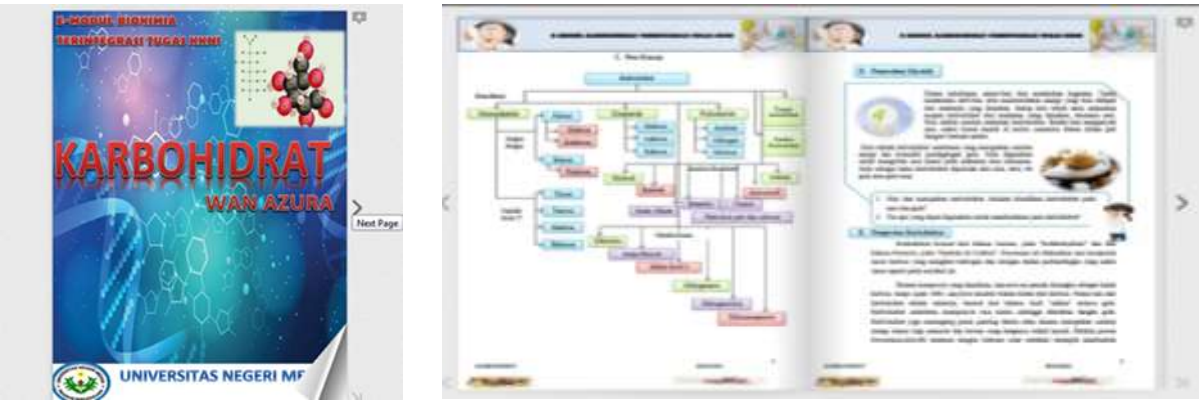

Fig. 1 Design of e-module

The design concept in this study with a problem solving model, students are presented with problems related to carbohydrate material, so that this stimulates the thinking skills of students in solving problems. The presentation of KKNI assignments on e-modules because this development aims to make it easier for students to complete KKNI assignments so that they have competence when they graduate. In e-, the module also has apperception, pictures, tables, summaries, indexes, and glossaries to make it easier to find keywords in e- module.

Development Stage

The last stage in the development of e-modules in this research is the development stage which is validated by expert validators who refer to BSNP standards. Based on the aspects of content feasibility, language feasibility, and presentation.

Table 2. Results of Expert Validation on carbohydrate e-module integrated by KKNI tasks during the COVID-19 pandemic

Aspect	N	$\bar{X}$
Content eligibility	3.61	Very valid
Language eligibility	3.53	Very valid
Serving feasibility	3.58	Very valid

Based on the results of expert validation based on the aspect of content feasibility with a score of 3.61 which is categorized as very feasible, the feasibility of presenting with a score of 3.53 is categorized as very feasible, and the feasibility of presenting 3.58 is categorized as very feasible. Based on the results of the development of books carried out by expert validators, there are several suggestions for book improvements, namely that each image is included with its source, adding more material relevance to everyday life so that it is contextual, providing reinforcement for certain concepts as the advantage of e-modules so the it is suitable for use as a learning resource during the Covid-Pandemic

DISCUSSIONS

Based on the results of research on the integrated e-module development of KKNI tasks during the COVID-19 pandemic, it is very suitable to be used as a learning resource. Previous research related to module developers was also carried out as a learning medium. One of the learning media used is a module, development of interactive multimedia used in chemistry learning. The use of this module motivates students with confidence in doing exam questions to improve student learning outcomes on electrochemical material (Lee & Osman, 2012). The development of teaching materials in the form of e-modules developed based on discovery learning to support the biomolecular learning process on protein material is by BSNP and SNPT standards so that it can be used as a learning resource (Munthe, Silaban, & Muchtar, 2019). Besides, the development of project-based e-modules on biomolecular enzymes is implemented according to the KKNI curriculum which has been validated and according to standards so that the implementation of e-modules can increase student motivation and competence (Hasibuan, Simorangkir, & Sudrajat, 2020). Development of chemical e-modules to make it easier for students to carry out practicum activities on chemistry materials for class XI integrated simple practicum with BSNP standards. The purpose of making e-modules is so that practicum activities are more efficient, interesting, and meaningful and can be applied in the era of revolution 4.0 (Harefa, Sanga, & Purba, 2019). The chemistry learning process requires supporting media for learning activities by utilizing technology, so the development of e-modules in the chemistry learning process is needed. The feasibility of e-modules is according to the standard because it has a characteristic learning animation video that attracts students to read and watch videos to improve students' literacy skills (Irwansyah et al., 2017). The development of interactive chemical e-module on hydrolysis material was developed using the R & D method, feasible to be used as a learning resource during a pandemic (Mazidah, Erna, & Anwar, 2020). In practicum activities, modules are also needed, one of which is the development of modules for determining the 3D structure of an inorganic compound, so that lecturers can easily teach the crystal structure of a compound so that it helps students enjoy the learning process (Brannob et al., 2020). Regarding the development of modules given to students so that they have competence in learning. Module development is carried out with a pedagogical approach to chromatography learning, through surveys, interviews, and personal interactions. The developed module can be used for students and industry practitioners in a sustainable manner (Xie et al., 2020). Interactive module development to face the challenges of using technology-based learning media, so that an interactive e-module in the form of a Chemistry Magazine on chemistry was developed using the kvisoft-flipbook maker application (Linda et al., 2018. Based on these advantages STEM graduates can compete globally so that learning media is needed in the form of PLANTEC-based laboratory modules (Phytochemical Laboratory activities for Integrative Thinking and Enhanced Competencies) on science materials to produce graduates who have integrative technical skills and cognitive competencies with logical thinking, have expertise in certain fields, science communication, and team collaboration (Busta & Russo, 2020).

CONCLUSIONS

The transformation of education during the COVID-19 pandemic requires that the elements of education be proficient in using technology according to the online learning system so that it has a positive impact on the demands of the digital era in the future. In this study only through three stages of ADDIE. E-module development based on syllabus analysis and RPS development refers to KKNI. For biochemistry courses, especially on carbohydrates. E-module validation is assessed by expert validators based on BSNP standards (content feasibility, language eligibility, and presentation respectively 3.61, 3.53, and 3.58). The data collection instrument in this study used a questionnaire which was presented in the google form.

ACKNOWLEDGEMENTS

Thanks to all staffs of the Postgraduate School and FMIPA Universitas Negeri Medan for the suggestions so that the paper can be published

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