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Developing Learning Tools with Case-based Learning and Project-Based Learning for Digital Classroom Management Course

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ABSTRACT

The semester lesson plan is a learning tool used in higher education. The semester lesson plan was designed by applying case-based learning (CBL) and project-based learning (PjBL) models, which aim to achieve the target of course graduates. The digital classroom management course is new in the MBKM curriculum implemented in study programs. Therefore, it requires learning tools to support the implementation of lecture activities. This study aims to develop a semester lesson plan by applying valid and effective case-based learning (CBL) and project-based learning (PjBL) models in the learning activities. This research is development research with the ADDIE model. The subjects in the study were five lecturers and 30 students. The research produced a valid and effective semester lesson plan for digital classroom management courses.

Keywords: Case-based learning, Project-based learning, Semester lesson plan, Class management

INTRODUCTION

The development of science, technology, and art (IPTEKS) in the 21st century is fast and significantly impacts education (Junaidi et al., 2020). Higher education standards (SN-Dikti) follow a changing logarithmic pattern to create educational standards according to world developments. For six years, SN-Dikti underwent three changes. Their latest change is Permendikbud No. 3 in 2020 with *Merdeka Belajar-Kampus Merdeka* (MBKM) policy (Menteri Pendidikan dan Kebudayaan RI, 2020). Changes in the education curriculum were taken to create an academic atmosphere supporting students' potential development within and outside the study program.

Curriculum changes in the chemistry education study program at Universitas Jambi provide space for new courses to support learning achievements and graduate profiles of study programs (Rektor Universitas Jambi, 2018). Graduate profiles provide an overview of the minimum abilities that students must possess after graduation with the criteria of attitude, work skills, knowledge, managerial, and responsibility (Siregar, 2020). Curriculum development and implementation follow an outcome-based education (OBE) approach through three stages. The first stage is the outcome-based curriculum (OBC). One of the outcome-based curriculum (OBC) sub-activities is designing lessons in the form of semester lesson plans. One of the new courses in the development of the MBKM is digital class management in two credits.

Learning tools have a vital role in the success of learning activities (Ayu et al., 2020). Learning tools in lecture activities are semester lesson plans, assessment instruments, learning

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tools, and teaching materials. Learning tools in the form of semester lesson plans for digital classroom management courses need to be developed so that learning activities are planned and measurable. The digital class management course has learning objectives in designing face-to-face classes and digital classes for chemistry learning according to information technology developments.

A subject semester lesson plan is a learning plan to meet graduate learning outcomes in courses for one semester. Semester lesson plan development can be carried out by lecturers independently or in groups according to the field of knowledge in the study program (Junaidi et al., 2020). The lesson plan is designed according to the Indonesian National Qualifications Framework (KKNI) standards with four components: work skills, knowledge scope, method and level of knowledge application, and managerial skills (Siregar, 2020).

Learning activities in semester lesson plans must be designed with a learning model per the learning process's characteristics: interactive, holistic, integrative, scientific, contextual, thematic, effective, collaborative, and student-centered (SN-Dikti, article 11). A semester lesson plan consists of several components: identity, learning outcomes, indicators, learning methods, time, learning experiences, assessment criteria, and references to learning resources (Nurdin, 2017).

Semester lesson plan in digital classroom management courses needs to be developed by researchers so that the course learning process is achieved and measurable. The digital classroom management course is a new general subject in the 2021 MBKM curriculum in the chemistry education study program at Universitas Jambi. Thus, it is hoped that this media development research in the form of semester lesson plans can assist learning in digital classroom management courses with the right learning system.

Learning systems that apply spot-on models and strategies will produce highly competitive graduates. In addition, lecture activities must be designed to accommodate students to explore the knowledge, experience, and attitudes demanded by the working world (Budhi & Fawaida, 2021). The applicable models are case-based learning (CBL) and project-based learning (PjBL).

The CBL model is most widely used in university lecture activities. This learning model is a learning paradigm closely related to the problem-based learning (PBL) model with a constructivist learning approach. The learning approach is associated with contextual problems or events to be resolved during learning activities (Syarafina et al., 2017). The PBL model can be combined with cognitive conflict learning strategies to familiarize students with problem-solving through three stages: expressing initial conceptions, creating conceptual conflicts, and seeking cognitive accommodation (Asmiyunda et al., 2021). Learning by applying the CBL model provides opportunities for students to analyze content and find solutions.

The PjBL model supports, facilitates, and enhances the learning process through projects as learning activities (Tamim & Grant, 2013). The learning atmosphere from applying the PjBL model can attract learning interest and motivation and allows for collaboration between students in completing projects. The PjBL model application can be adapted to educators' learning needs and demands, such as teaching concepts, expanding knowledge, strengthening knowledge, or according to student needs. PjBL wants students to solve real problems, be active in learning, choose essential things during the project, and clearly show that students are learning key concepts and skills (Jamilla & Lazulva, 2020).

This study aims to develop semester lesson plans for digital classroom management courses using case-based learning (CBL) and project-based learning (PjBL) models. CBL model is a learning model that implements a scientific approach with the learning stages of observing, asking, collecting data, analyzing and communicating (Asmiyunda et al., 2018). The application of the learning model aims to train and hone students' cognitive abilities and skills

in solving problems through cases and projects. This research was carried out to complement learning tools in the learning curriculum of study programs.

METHODS

This research is development research with the ADDIE model through five stages: analysis, design, development, implementation, and evaluation (Branch, 2009). Details of the stages of development with the ADDIE model are presented in Table 1.

Table 1. Stages of Developing Semester Lesson Plans with the ADDIE Model

Stage	Description	Target Result
1. Analysis	Analyze learning problems according to students' learning needs to find out the learning achievements of the course.	Students' Learning Needs Learning Achievements
2. Design	Design and determine indicators, assessment instruments, and learning methods based on the analysis results.	Learning Indicator Assessment Instrument Learning Methods Students' Assignment
3. Development	Develop learning media and materials supporting the designed learning methods or strategies.	Learning Material Learning Media
4. Implementation	Implement the results of design and development in learning activities to get student responses.	Learning Implementation
5. Evaluation	Conduct evaluation activities to increase the efficiency and effectiveness of the student learning process to meet graduate learning outcomes.	Learning process and outcome evaluation

Development research was carried out with five lecturers and 30 chemistry education students at Jambi University as research subjects. The object of this research is the developed semester lesson plan for digital classroom management courses. Data were collected in this study using product validation questionnaires and student activity assessment sheets. Validation questionnaire data were analyzed using the Aiken V formula, and student activity was analyzed using the following percentage calculations:

$$V = \frac{\sum(r - I_o)}{n(c-1)} \qquad \text{and} \qquad P = \frac{f}{N} x100\%$$

In the V Aiken formula to calculate validity, V is the Aiken value, r is the number given by the validator, Io is the lowest validity rating score in this assessment 1, c is the highest validity rating score (5 for this study), and n is the number of validators (5 validators for this study). The results of the Aiken V assessment decision are that the value ≤0.4 is categorized as invalid, 0.4<V≤ 0.8 is valid, and the value >0.8 is highly valid (Retnawati, 2016). On the other hand, in the percentage formula for determining activity, P is the percentage of assessment, f is the score obtained, and N is the maximum score. The decision results use value intervals of 81%-100% (very high), 61-80% (high), 41%-60% (moderate), 21%-40% (low), and 0%-20% (low very) (Gitnita et al., 2018).

RESULTS AND DISCUSSION

Results

Analysis Stage Results

Semester lesson plan development is carried out for digital classroom management courses. This course is new to the chemistry education study program at Jambi University after the development of the MBKM curriculum. The development of the semester lesson plan ensures that learning takes place according to graduate profiles and learning outcomes in digital classroom management courses.

The digital classroom management course is compulsory in general or general basic courses with two credits for third-semester students. Reference to learning activities carried out in tertiary institutions uses the CBL model and the PjBL model approaches. This learning model is based on the learning characteristics of students who can learn independently and think creatively and critically. The application of the PjBL model can increase the activity and quality of learning carried out in tertiary institutions (Nelson & Tarigan, 2022). The ability to think creatively refers to the concept of mental activity that can connect continuously so that the correct thinking association is formed with five criteria: fluency, flexibility, originality, elaboration, and evaluation (Utami, 2009).

The digital classroom management course description is that students can understand, implement, and design classroom management through face-to-face and digital classroom management in chemistry learning according to information technology developments. Following the course descriptions and students' learning characteristics, graduate learning achievements (GLA) are determined according to learning outcomes in courses in the chemistry education study program. Graduate learning achievements consist of attitudes, knowledge, general skills, and special skills and will be implemented into course learning achievements (CLA). Learning achievements in digital classroom management courses are presented in Table 2.

Table 2. Learning Achievements of Digital Classroom Management Course

Graduate Learning Achievements	Course Learning Achievements
Attitude: 1. Fear God and show a religious attitude. 2. Collaborate and have social sensitivity and concern for society and the environment. 3. Demonstrate a responsible attitude towards work in the field of expertise independently. Knowledge: 1. Integrate chemistry concepts, chemical pedagogic knowledge, curriculum, methodology, media, evaluation, classroom management, and ICT in chemistry learning (technological pedagogical and content knowledge). 2. Understand the basics of the scientific method and academic integration in research and scientific work. General skills: 1. Apply logical, critical, systematic, and innovative thinking in the context of developing or implementing science and technology that pays attention to and applies humanities values under their field of expertise.	1. Demonstrate a responsible attitude towards work in the field of expertise independently. 2. Integrate chemistry concepts, chemical pedagogic knowledge, curriculum, methodology, media, evaluation, classroom management, and ICT in chemistry learning (technological pedagogical and content knowledge). 3. Apply logical, critical, systematic, and

Graduate Learning Achievements	Course Learning Achievements
2. Examine the implications of the development or implementation of science and technology that pays attention to and applies the values of the humanities under their expertise based on scientific principles, procedures, and ethics to produce solutions, ideas, designs, or art criticism. Special skills: 1. Identify problems and determine alternative solutions based on theory and research findings, design them, and implement them in chemistry education research. 2. Apply digital competence in chemistry learning and relevant daily life.	innovative thinking in the context of developing or implementing science and technology that pays attention to and applies humanities values under their field of expertise. 4. Design digital classroom management in chemistry learning.

Design Stage Results

The analysis results of student characteristics and learning outcomes are used as a basis for determining learning indicators formulated into sub-course learning achievements (sub-CLA). Sub-CLA is the final capability planned at each stage of learning based on CLA to fulfill GLA (Junaidi et al., 2020). The next step after formulating the sub-CLA is to determine the assessment criteria and develop assessment instruments to measure the success of the learning process. The developed assessment instrument assesses students' attitudes, knowledge, and skills. The development of the assessment instrument will be adapted to the GLA and PjBL models in the course. The learning design is presented in Table 3.

Table 3. Learning Design in the Digital Classroom Management Course

Sub-CLA	Learning Model Implementation
1. Students can explain the basic concepts of classroom management. 2. Students can differentiate approaches in classroom management. 3. Students can put forward the learning environment management and class arrangements. 4. Students can explain procedures and management plans for chemistry learning classes. 5. Students can implement online learning models and methods with a digital class management design for chemistry learning. 6. Students can design digital classroom management. 7. Students can present digital classroom management designs in chemistry learning.	Case-Based Learning: 1. Students explore lecture material or cases in life or literature in the form of research results. 2. Students discuss with other students to get a solution to the specified case. 3. Students and lecturers discuss the resolution of cases as discussions result in reports or article reviews. 4. Students present reports or article reviews to get feedback from other students. Project-Based Learning: 1. Students choose one or two topics related to lecture material. 2. Students make a digital classroom management plan according to the lecturer's instructions. 3. Students and lecturers evaluate project results to get more effective results.

Development Stage Results

This stage is carried out by developing media and teaching materials used in the learning process. The media and teaching materials were developed using the CBL and PjBL models. The media used is a learning management system (LMS) provided by Jambi University. This LMS is used to provide assignments and assessments during lecture activities. Lecture activities are carried out in a blended learning manner with a combination of face-to-face classes and virtual meetings through Zoom.

The advantages of blended learning are training independence and increasing motivation and critical thinking skills (Sari, 2021). Apart from LMS and Zoom, lecture activities also utilize Google as learning media in the form of YouTube, Google Classroom, and Google Drive. Students can access lecture materials via LMS or Google Drive provided by lecturers.

In addition to learning media, there are teaching materials that lecturers must provide to support the learning process. The teaching materials used are course dictates and reference sources in national and international journals. The purpose of using articles from various journals is as a comparison material for students to solve problems in learning and add to students' insights regarding research results in the same field.

Implementation Stage Results

The semester lesson plan design is implemented in digital classroom management courses for third-semester students in the chemistry education study program at Jambi University in the 2022/2023 academic year. The learning process for digital classroom management courses uses a blended learning method combining online and offline learning. Learning is carried out by applying the CBL model through case studies on research results published in national journals. This is done to train students' analytical skills on a case and compare it with real cases found in class (Garvey et al., 2000).

The CBL model is also applied to the PjBL model through the project of making a simple learning management system (LMS) by students. This project was designed by students as material for implementing all material in digital classroom management courses. Learning with PjBL creates a balance between learning needs and constructivism strategies that help solve cases through a project (Tamim & Grant, 2013).

With two credits, the digital classroom management course is designed with lecture material in basic class management concepts, class management principles and strategies, class management approaches, class management and setting, and simple digital class designs. The assessment criteria include attitude assessment with student activity criteria, knowledge assessment with assignment and quiz criteria, general skills assessment with presentation ability criteria, and special skills assessment with project assessment. Furthermore, the semester lesson plan design is tested for validity and effectiveness in learning. The results of the validity test are presented in Table 4.

Table 4. Semester Learning Plan Validity Test Results

	Assessed Aspect	V	Category
1.	The semester lesson plan design conforms to the KKNI format with the components of semester lesson plan identity, learning achievements, brief course descriptions, learning materials, course matrices, and sources, tools, and learning materials.	0.708	Fairly Valid
2.	The complete semester lesson plan identity contains the course name, course code, course group, course weight, and supporting lecturers.	0.833	Valid

	Assessed Aspect	V	Category
3.	Graduate learning achievements (GLA) from KKNI include attitudes, knowledge, general skills, and special skills specified in the SN-Dikti.	0.625	Fairly Valid
4.	Brief course descriptions are precise and systematic.	0.625	Fairly Valid
5.	Appropriate and systematic learning materials.	0.625	Fairly Valid
6.	Learning activities follow learning achievements.	0.833	Valid
7.	The main points and sub-topics are clear and systematic.	0.833	Valid
8.	Learning indicators in course learning achievements (CLA) and sub-CLA describe learning details clearly and precisely.	0.625	Fairly Valid
9.	The learning model corresponds to the material, CLA, and sub-CLA.	0.833	Valid
10.	The time allocation used follows the course weights.	0.833	Valid
11.	Assessment and assessment instruments are clear and measurable.	0.833	Valid
12.	Teaching tools and materials are suitable for achieving CLA and sub-CLA.	0.625	Valid
	Average	0.736	Fairly Valid

Based on the assessment of student activity, graduate learning achievement (GLA) in the digital class management course with a success percentage of 84% in the very high category. Assessment of student activities aims to determine the effectiveness of the developed semester lesson plan by implementing the CBL model and the PjBL model into learning activities. Student activity during the learning process can be assessed by students' activeness in expressing their thoughts and ideas during discussions and presenting the results of ideas and projects designed during the learning process (Budhi & Fawaida, 2021).

Evaluation Stage Results

Assessment of the learning process using the developed semester lesson plan was carried out for eight meetings. Lecture activities were carried out per the developed semester lesson plan. The learning process applied the CBL model and the PjBL model, with the final assessment being a student project to create a simple learning management system (LMS) for learning activities at school. Obstacles found during the learning process were the inconsistency of the attitude assessment process by the subject lecturers due to the limitations of the lecturers in observing all student behavior and reactions during learning activities. One display of the students' learning management system (LMS) project is presented in Figure 1.

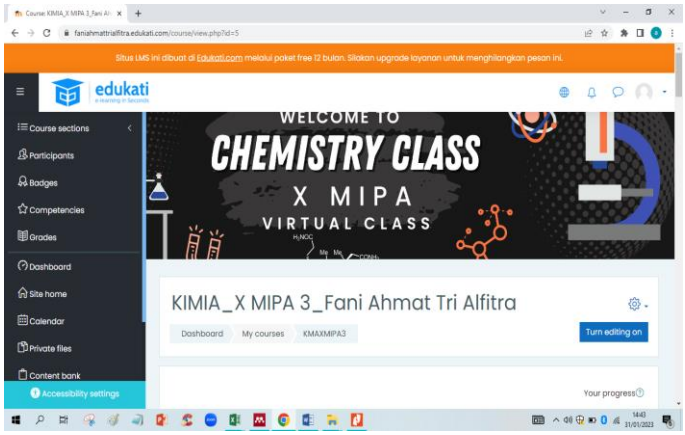

Figure 1. Display of Students' Learning Management System Project

The results of the final assessment of learning activities using the semester lesson plan for digital classroom management obtained an average of 84 with a high category for the assessment components of attitudes, knowledge, general skills, and special skills. Thirty students took part in the final assessment. The results of the assessment of learning activities are presented in Table 5.

Table 5. Learning Achievement Assessment Results

Component	Average Score	Category
Attitude	75.5	High
Knowledge	84.8	Very high
General Skills	82.1	Very high
Special Skills	93.6	Very high
Average	84.0	Very high

Discussion

The research aims to produce learning tools as lesson plans for digital class management courses. This course focuses on class management and design classes using digital-based chemistry learning. Digital-based learning makes it easy for lecturers and students to develop models, innovations, and evaluations of learning with digital media (Aziz, 2019).

Development research uses the ADDIE model with five stages: analysis, design, development, implementation, and evaluation (Branch, 2009). The research showed good enough results to produce semester lesson plans for digital classroom management courses. Each stage in the ADDIE development model will produce outputs revised according to the validator's inputs.

The results of the analysis stage explain the need to develop semester lesson plans in digital classroom management courses using the CBL and PjBL models. The learning model selection is adjusted to the guidelines for preparing a higher-education curriculum (Junaidi et al., 2020). Furthermore, graduate and course learning achievements are formulated for this course. This formulation measures the success of implementing learning in digital class management courses. Measurement of learning success includes the components of attitudes, knowledge, and skills (Putra et al., 2022).

The results of the design and development stages are carried out by determining and developing learning indicators, instruments, learning strategies, student assignments, and learning materials and media. This activity resulted in a learning design in the form of a sub-CLA and implementation of the CBL and PjBL models. The learning is designed to meet the graduate achievements set for 4.0-era learning (Nusantara, 2018). The feasibility of a product includes three aspects of assessment, namely aspects of language, media and material taking into account the assessment and suggestions from the validator (Citra et al., 2021).

From the implementation and evaluation stages, a valid semester lesson plan for digital classroom management courses was obtained with an average of 0.736 in all aspects of the components assessed in the fairly valid category. At the same time, student activity assessment shows a response of 84% in the very high category. The final evaluation stage is in the form of student project assignments with an average score of 84 for the components of attitudes, knowledge, general skills, and special skills in the very high category for the use and implementation of the developed digital classroom management lesson plan. The limitation of this research is developing learning tools in the form of lesson plans for one course. In the future, developing and testing the effectiveness of other learning tools, such as assessment instruments, learning media, and teaching materials, is necessary.

CONCLUSION

Based on the research and data processing results, it can be concluded that the semester lesson plan for digital classroom management courses is successfully developed by fulfilling graduate learning achievements for students. The developed semester lesson plan was declared valid with an Aiken score of 0.736 in the fairly valid category. The developed semester lesson plan was stated to be effectively used in learning activities following the student activity assessment while participating in learning activities with a percentage of 84% in the very high category. As a follow-up research effort, it is expected to develop teaching materials under the developed semester lesson plans to support lecture activities to make them more effective.

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