

Improving Student Learning Using Case-Based Method in Hybrid Learning of Basic Pharmaceutical Chemistry Practicum

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ABSTRACT

The COVID-19 pandemic has caused universities to adjust the state of education on campus without reducing learning outcomes. In this case, Hybrid learning was developed, which combines offline and online learning and practicum. The method used in developing this learning is the Case-Based Method, in which a total of 30 students, as subjects in this study, evaluated students' understanding using pretest and posttest. This assessment was conducted to see the success of the case-based method and the challenges of this method. An increase in students' understanding was obtained using pretest and posttest assessments. The average pretest value per class is 60, and after using the case-based learning method, the class posttest score increases to an average of 84.

Keywords: Case-Based Method, Hybrid, Practicum, Basic Pharmaceutical Chemistry

1. INTRODUCTION

The Indonesian government mandated a regional quarantine at the start of the crisis to prevent the spread of the SARS-COV2. In this case, teaching and learning activities switched to online. Teaching practices and learning activities in universities must adapt to new conditions due to the COVID-19 pandemic. Lecturers are required to use and develop Hybrid learning, efficient lessons in pharmacy. Therefore, the course must adjust the Learning Outcome and learning method so that students can accept it. Hybrid learning uses online and offline systems. Lessons must be designed to be interesting because, during a pandemic, much stress is happening to students [1].

The basic pharmaceutical chemistry practicum is a core topic in the curriculum structure. It is an introductory level course. This course's learning outcomes relate to fundamental knowledge of pharmaceutical chemistry before attending the qualitative and quantitative analysis lectures. As a response to the COVID-19 pandemic, the practicum was designed to hybrid online and offline modules.

A Case-Based Method is used to bring out learning innovation. Outcome-Based Assessment is used to evaluate learning. Attitudes, values, talents, knowledge,

responsibilities, including hard work, are all examples of learning outcomes.

Case-Based Learning focuses on developing classes with small groups [2]. Case-Based Learning focuses on developing classes focusing on how the problem is solved with more preparation. This learning strategy focuses on students as the center of Learning. This method develops group collaboration, is case-oriented with realistic and specific situations.

Students focus on cases resulting in independent, scientific Learning and develop critical thinking, clinical problem solving, and integrate theory with practice, small groups [3]. Lecturers can use various methods to integrate mimicked cases into the classroom, including guided problem solving, case seminars, role plays, and patient care models [4]. This study aimed to see the effectiveness of case-based learning methods, observe learning constraints, and update semester learning plans to adapt learning during the pandemic.

2. METHODS

2.1. Research Subject

A total of 30 students, as subjects in this study. Students are divided into five groups and given cases to discuss.

2.2. Hybrid Practicum

This practicum is carried out utilizing a hybrid learning strategy that combines online and offline learning. Some students are assigned to undertake practicum on campus and record the practicum activities. The captured video is then shared with students participating in the online practicum through Google Drive. Students see the video via Zoom when the practicum begins. Following that, the teacher will present a case for discussion.

2.3. Case-Based Method

The stages of developing learning using a case-based method model are 1. Classifying terms in cases. 2. Identifying problems, 3. brainstorming, 4. Determining Learning Objectives. 5. Setting learning objectives, 6. Gathering information, and 7. Evaluating results. Pretest and posttest evaluations are performed to determine the knowledge of learning using a case-based approach.

3. RESULTS AND DISCUSSION

This study was carried out in 2 weeks; the first week introduces students to more critical skills in seeing cases. Since the pandemic, lectures have used the Old Semester Learning Plan from 2017, which still uses offline practicum. Learning outcomes are still using the old curriculum achievements. It also does not include assessing the rubric of assignments, either individual or group assignments. Learning outcomes are still focused on the level of “remembering” in the higher-order thinking category. The Case-Based Method was chosen because it is more suitable for this course which emphasizes learning the causal relationship between the chemical basis and its relationship with pharmacy.

In this study, an analysis was also performed Outcome-Based Assessment. This method is to find out the specific contribution of the method used. This assessment helps to understand the effects and benefits of the methods used. This assessment helps understand the effects and benefits of the methods used, increases accountability, and increases data-driven efficiency [5]. The case-based method is a learning method using small groups to solve problems [6]. It can be used to solve a range of problems. In the practicum, the case is discussed. It enables lecturers to adjust the learning approach to the requirements and goals of their students [7]. It can accelerate a comprehensive understanding. This assessment method ensures that courses are given so that students can carry out direct roles by what is happening in the world. The outcome-based assessment focuses on the education results [8].

Before the pandemic, this practicum is a direct practical lesson system in the laboratory. Students are given practical work procedures, then students observe and carry out these procedures and discuss them with the lecturer. In 2020 the COVID-19 pandemic occurred. The practicum was replaced the online system with students

being given learning videos similar to those obtained on YouTube. Learning during the pandemic was a challenge because complete online practicums did not provide practical understanding to students.

Case-Based Method learning is carried out for two weeks; the first week, students are introduced to Case-Based Method learning, namely by being given a case. Students then identify complicated terminology or words, then identify problems in the form of questions from cases that can arise—troubleshooting and solving simultaneously. Students are directed to make schemes in terminology identification, problem identification, problem-solving, and students are directed to formulate Learning Objectives (LO). Focus can be in the form of student desires to know a problem, learning objectives that must be known, and information sought in books and journals.

Lecturers provide feedback, assessment process, and explain what is lacking in the formulation of Learning Outcomes (LO). Students study independently for one week, looking for journals, learning videos, and scientific articles. The following week continued with a discussion of Learning Outcomes, and students were directed to conclude.

In the second week, students are also directed to solve cases using videos. Instructors should consider three factors when using video as an educational tool: managing the video's cognitive load, increasing student engagement with the video, and facilitating active learning [9]. Here are the cases are given in the first and second week

First Week of Practicum Cases: Amal is a research pharmacist at the National Nuclear Energy Agency (BATAN), and his research team will analyze the physicochemical properties of H_2SO_4 . Together with his friends, he concluded that H_2SO_4 is very dangerous. Amal then obtained a bibliography of the essential guidebook at the Faculty of Pharmacy, Universitas Andalas. In the guidebook, the charity looks at the physical and chemical properties. It also analyzes the boiling point and solubility; solve the above case?

Second Week Practicum Cases: Tenria Maudia reads the periodic table of the Elements in the Laboratory. She is still confused about questions from his lecturers, such as What are Groups of the periodic table? Who is The genius of Mendeleev's periodic table? How History of Periodic Table? Solving the periodic table's puzzle, how did Mendeleev change the periodic table?. The Periodic Table of Elements has existed since the ancient Greeks divided the elements into four categories. At the Industrial Revolution, intense research on the Elements was started by Mendeleev, a talented chemist. The Periodic Table of Elements was initially compiled based on chemical properties, but the challenge is which

element or compound should be included. Solve the above problem?

Table 1. Score pre-test and post-test

	Min	Max	Average
Posttest	60	100	84
Pretest	20	90	60

In the second week of testing the pretest and post-test of understanding and effectiveness of using Case-Based Method, the result of case 2 can be seen in (Figure 1). There is an increase in the score on the post-test of students as much as 24 points where during the pretest, the average value is 60 and after using learning Case-Based Method becomes a class average of 84 (Table 1).

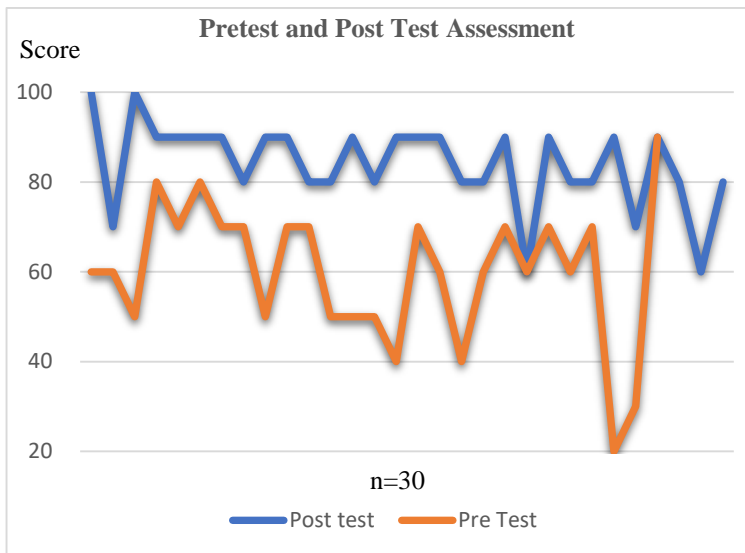


Figure 1. Comparison of pretest and posttest scores

There was an increase in the student's minimum score after the post-test, which was 60, and the highest score was 100. This increase in score was predicted to be due to using the case-based method because students were more active in discussions and sharpened their mindset.

The case-based help students improve their soft skills by critical thinking and solving problems. This method requires analyzing foreign words. The small group system helps students to speak in public. Many Students work collaboratively with other members and train leadership in solving cases. The cases given are cases that often occur daily. This study still has shortcomings with the number of students analyzed as many as 30 people. The analysis time is limited due to the midterm exam.

The challenge in case-based method learning is that students are still limited in using good literature such as international articles and textbooks. Many students are

solving cases by reading the information in blogs and articles on the internet without knowing whether the information is valid.

4. CONCLUSION

There is an increase in student understanding with pretest and posttest assessments. The average pretest value per class is 60, and after using the case-based learning method, the class posttest value increases to an average of 84. However, one challenge students experience is that they tend to cite a lot of inaccurate bibliographies while solving problems.

AUTHORS' CONTRIBUTIONS

The author contributed equally to this study. P.P.P designed research, wrote articles and collected data. F.I and R.A design learning plan and determine Learning Outcomes (LO).

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