Exploration and Validation of Lecturer Competency Models in Case Method Based Learning and Project Based Learning

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Abstract. This study aims to explore and validate the lecturer competency model framework in managing case-based learning and project-based learning. After the lecturer competency model in case-based learning and project-based learning has been validated, it will then be applied as an effort to increase lecturer competence in carrying out this learning. Exploration and validation was carried out using the Delphi method which explored panelists' agreement on a set of competency indicators developed by researchers based on lecturer generic competencies from various literatures. The instrument used is a list of statements containing a list of competency indicators which include four domains, namely planning or preparation for learning, learning environment, instruction in learning, professional responsibility. The panelists in this study consisted of 5 case method and project based learning experts who were determined based on their experience, research and scientific publications, 10 subject lecturers who usually organize case method and project based learning, and 15 students who often receive learning case method and project based learning. Then the panelists gave an assessment of the list of competencies provided. The research results for this competency model narrow down to 3 aspects namely HR Readiness, Learning Process, Assignment and Evaluation of Learning Outcomes. The total number of valid items is 50 with reliability based on the results of calculations using the Alpha formula, it is obtained that $r\_11 = 0.919$

Keywords: Problem Based Learning, Case Method, Basic Education Courses

1 Introduction

The levels that students must achieve are just the beginning of the academic problems. Particularly during the Covid 19 pandemic, which necessitated that lecturers and students conduct their studies remotely, many new issues have emerged. The preparation of imaginative, cutting-edge, and relevant learning materials and media is undoubtedly a challenge for educational lecturers [1]. As the driving force behind education, lecturers must create teaching methods and media that help students achieve these objectives.

Implementing a case method learning model and project-based learning that is supported by higher-order thinking skills, which are accommodated through Bloom's taxonomy level 4 to 6, namely the ability to analyze and synthesize, evaluate, and create, is one of the solutions offered to address this challenge [2]. Case method-based and project-based learning online semester learning designs have important points in the preparation of case-based online

learning designs and project-based learning, which include paying attention to graduate learning outcomes, so that learning is designed according to graduate learning outcomes and responds to the needs of the industrial world, among others by paying attention to the national qualification curriculum standards.

Learning activities that support the development of the ability to analyze and evaluate the learning design are undoubtedly necessary. Therefore, a key component of the case method and project-based learning is the application of appropriate learning activities. Therefore, the lecturers must conduct learning activities that are in line with the size of the course's learning load. This case method and project-based learning model also aims to mentor students in a cooperative project that integrates different curriculum subjects (materials), gives them the chance to independently explore content (materials), and conducts experiments.

As case method-based learning and project-based learning are implemented, it is hoped that they will not only be successful but also be able to maintain or even raise the standard of learning itself. To produce graduates who are critical, intelligent, open, productive, and have noble character in order to satisfy the demands of various stakeholders is a difficult task for lecturers. Because of this, competency is a non-negotiable requirement if you want to enhance learning, which is indicated by a rise in the learning outcomes attained by students. Furthermore, state that the qualifications and teaching style of lecturers greatly affect student learning abilities. This opinion is in line with [4] which states that lecturer competence in organizing and designing learning is an important factor in the learning system.

Ad person in carrying out his professional duties is required to have and master competencies that contain knowledge and understanding, skills and correct behavior. Therefore, lecturers should possess a certain set of knowledge, skills, and behaviors in order to perform their duties as teachers, educators, mentors, and directors. Furthermore Danim [5]) mentions four competencies that a lecturer must have. First, pedagogic competence which includes the ability to create learning systems and materials; Second, personality competence in the form of attitudes and actions during the teaching and learning process; Third, social competence which includes the ability to interact and communicate; Fourth, professional competence that looks at the extent to which the lecture material is mastered.

Lecturers, when carrying out new approaches in learning, must be recognized that many feel uncertainty about the role they are carrying out. Even more so when so far the learning model that is carried out almost every day is the conventional model in the classroom in a face-to-face atmosphere without any media so that student learning activities and their activity can be directly monitored. This is certainly a difficult thing to do in learning.

This uncertainty can be minimized by clarifying the role of the lecturer and the competencies needed to carry out the new role. Lecturer competencies in participating in learning vary, but which competencies are most relevant to the case method-based learning model and project-based learning need to be explored and validated. [3] states that in any learning the lecturer must still be able to increase student activity in their learning activities. With a validated competency model, lecturers will have a clear picture of what competencies must be developed to participate optimally in case method based learning and project based learning which are applied unconditionally, especially in the work from home era. Without exploration and validation, the compiled model will become general information which will create variants of the model implementation. Without validated competency attributes, competence is only interpreted as something that dictates.

From year to year research on learning has always developed with changes in the object studied. Starting from testing the effect, testing the effectiveness, developing teaching materials, to developing the learning model itself. Further studies on learning and which have

never been carried out, especially at Unimed, are research that measures the competence of lecturers in courses based on the case method and project base learning based on a validated competency model framework.

2 Research Methods

The descriptive method is used because this research is a problem-solving study that seeks to explore and validate lecturer competencies in implementing case-based learning and project-based learning based on literature studies and lecturer competency criteria. based on the goal of the study, which was to develop a model of lecturer competency in putting project-based learning and case method-based learning into practice. The validation process was then carried out by learning specialists to obtain consensus on the researcher's competency model. Consequently, the Delphi method is used in this research strategy. According to Rum [2], the Delphi method can be used in educational research, particularly when looking at topics like curriculum planning, educational modeling, and human resource management.

The key steps for the Delphi process are (a) initial actions, including conducting a literature review and defining research questions, must be carried out. Research questions should flow from the literature and determine whether Delphi is an appropriate research method. (b) Eligibility criteria should be developed as well as a recruiting action plan. After the criteria and plans are planned, the participants should be invited to participate. Participants must be introduced to the Delphi process by inviting them to participate. (c) develop a Delphi Round 1 questionnaire with a basic domain based on the literature. A pilot study should be carried out to improve the content and face validity of the instrument. (d) Distribute questionnaires to the participants with explicit instructions which are then analyzed for the responses obtained to develop the next round. (e) Distribute questionnaires to the participants with explicit instructions which are then analyzed for the responses obtained to develop the next round. (f) Repeating the analysis, summarizing, and developing the questionnaire until a consensus has been reached. (g) Develop and provide final report to participants.

The research was conducted at Medan State University. Subjects in this study were determined by *purposive sampling*, adjusted for inclusion criteria. Subject selection criteria consist of (a) expert lecturers are selected based on their level of expertise in the field of case methods and project based learning, research and scientific work produced, experience in class administration; (b) course lecturers; and (c) students are selected based on their experience in participating in case method based and project based learning classes. The number of lecturers and students who were involved were 5 case method and project based learning experts at Unimed, 10 lecturers who organized case method and project based learning and 15 students so that the number for each round was 30 people.

2.1 Technique Collection Data

Collection data on study this conducted through questionnaire that was used at the same time as research instrument. Through questionnaire, researcher serve statements where the panel was asked to clearly assess whether the statement is a statement the urgent in formulation competence lecturer in learning case method and project based learning. The series of statements in the instrument are in the form of a lecturer competency framework

along the indicators in learning case method and project based learning come from literature and previous research findings.

Data collection in the first round of Delphi, questionnaires were given to the Delphi panel to find a lecturer competency framework model in case method learning and project based learning. Panels were asked to tick all statements deemed important. Furthermore, if there are suggestions or other input, the panel can add competency components and indicators that are not yet available in the list. After all the first round of questionnaires were completed, the researcher then summarized the important competency frameworks to be included in the next Delphi round. The competency framework went into a second round of Delphi after the entire panel declared the item important. Likewise if there is a competency framework added by the panel in the first round.

During the second round of the Delphi method, the panels gave an assessment based on a Likkert scale of 1-4 depending on whether or not the competence was important to be used in the case learning method and project based learning. Large value determines the importance or not of these competencies.
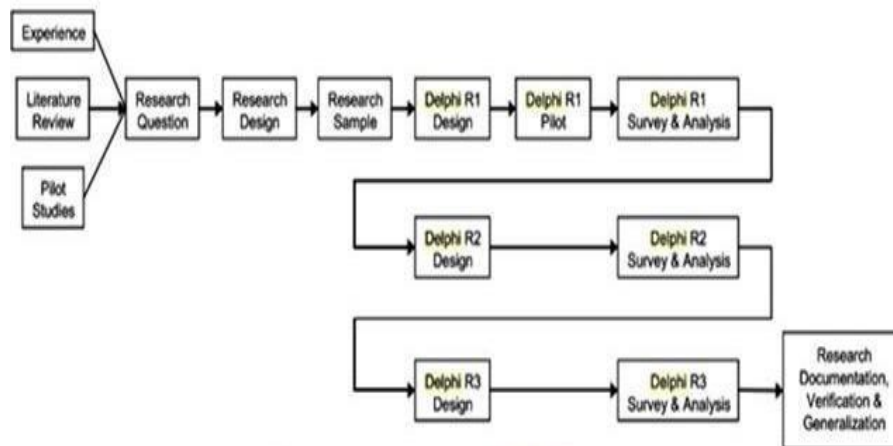

Fig. 1. Design Method *Delphi* Three Rone [6].

2.2 Data analysis

Based on the opinion of Rum [2] after all respondents gave answers to the existing questions, the next stage was statistical analysis of the results of the respondents' answers to see convergence or consensus. Consensus or convergence of opinion is the end result of the Delphi Method, to see whether existing instruments are important to develop. The existing instruments have converged or a consensus has been reached from the informants who consider it important to develop using statistical analysis [2].

The first measure of convergence or consensus assessment is when the answers or judgments from all sources have a standard deviation of <1.5. The Standard Deviation formula is as follows:

$$s = \sqrt{\frac{\sum(x_i - \bar{x})^2}{n-1}} \text{ atau } \sqrt{\frac{\sum x_i^2 - \frac{(\sum x_i)^2}{n}}{n-1}}$$

The second measure of convergence or consensus assessment is when the answers or ratings from all sources have an Interquartile Range < 2.5. The formula is IR = Q3 –Q1, where Q3 is the Upper Quartile and Q1 is the Lower Quartile. The Upper Quartile formula is

$$Q_1 = \frac{x_{\left(\frac{n-1}{4}\right)} + x_{\left(\frac{n+3}{4}\right)}}{2}$$

$$Q_2 = x_{\left(\frac{2(n+1)}{4}\right)}$$

$$Q_3 = \frac{x_{\left(\frac{3n+1}{4}\right)} + x_{\left(\frac{3n+5}{4}\right)}}{2}$$

The evaluation to state the convergence or consensus of all instruments is when the standard deviation is < 1.5 and the interquartile range is < 2.5. If neither the standard deviation nor the interquartile range is < 1.5 and < 2.5 then these components are declared non-convergent or not agreed upon (consensus) potential as a lecturer competency framework in case method learning and project based learning. After conducting an evaluation which states that the instrument is convergent or it is agreed (consensus) that the instrument is important and has the potential to be developed, the next step is to rank it with the highest average value for each convergent instrument.

3 Results and Discussion

The aim of the research is to validate the lecturer competency model in conducting project based learning and case method based learning. This competency validation was carried out using the Delphi method, in which the researcher designed a lecturer competency model design in carrying out project-based and case method-based learning, after which he gave the design to several lecturers who are experts in project base learning and case method learning based on research and journals that have been produced. by the lecturer concerned.

This competency model will be weighed and assessed by a team of experts who have been determined and are expected to provide suggestions and input to enrich and deepen and validate the competency models proposed by researchers.

This validation process is carried out in three rounds, until the competency model proposed is actually approved by the validator team.

3.1 Expert Verification and Validation

The competency model is validated by 5 experts who have certain criteria from both academics and practitioners in order to obtain the actual competency model . From interviews with some of these experts, input/comments related to this research were obtained. These inputs include research aspect sentences , adding and reducing the number of descriptors , data processing, and so on.

3.2 Expert Description

The description of the experts in this study can be seen below:

Table 1. List of Experts

No	Expert	Experience in Project Base Learning and Case Method	Profession	Education
1	Expert 1	22 years	Lecturer	S3
2	Expert 2	12 years old	Lecturer	S3
3	Expert 3	7 years	Lecturer	S2
4	Expert 4	12 years old	Lecturer	S2
5	Expert 5	7 years	Lecturer	S2

3.3 Delpi Round I results

After the experts provide an assessment of this research variable, the results can be tabulated as follows. The lecturer competency model variables in case-based and team-based project learning consist of three aspects, namely aspects of readiness of human resources, learning processes, and assignments and evaluation of learning outcomes. With a total of 68 statement items.

3.4 Delpi Round II results

At this stage the questionnaire was openly distributed to the project base learning and case method learning organizers, namely 25 people consisting of 10 lecturers and 15 students who carried out Project base learning and case method lectures. The number of questionnaires distributed was 68 competency model indicator items and all of them could be retrieved.

From the results of the verification and validation of respondents, namely 10 lecturers and 15 students who are attending lectures based on project base learning and case methods, it can be concluded that from the three aspects of learning which consist of 68 competency indicators there is a reduction in some of these indicators, namely in the aspect of readiness of human resources and technology as many as 5 items.

In the second aspect, namely the learning process, there is a reduction in competency indicators on 5 items. While in the aspect of assignment and evaluation of learning outcomes there is no reduction in competency indicators. Thus, from 68 indicators of lecturer competence in project base learning and case method learning, there was a reduction of 10 indicators so that the number of lecturer competency indicators in project base learning and case method learning in the second round became 58 competency indicators.

3.5 Delphi Round 3 Results

At this stage the questionnaire was openly distributed to the organizers to be validated by 5 experts who had certain criteria both from the academic field, practical in order to obtain the

actual competency model. The number of questionnaires distributed was 5 8 competency model indicator items and all of them could be retrieved . After the experts gave an assessment of the research variables, 50 agreed items were obtained so that the results can be tabulated in the following table .

Table 2. Lecturer Competency Models in Case Method and Team Based Project Learning

No	Statement
1	Mastering project base learning theory and case method
2	Understanding case studies
3	Instruct students to utilize open learning resources to help with assignments
4	Plan the cases to be studied
5	Mastering the communication aspects of learning
6	Displays professional characteristics as a teacher
7	Skilled in designing activities in accordance with learning outcomes
8	Effective in building the independent learning of students
9	Accustomed to conducting scientific research and development
10	Able to utilize case-based open learning resources
	Form groups in class
11	Mastering the course material being taught
12	Using text, audio, visual or video as a support for learning activities
13	Have a planned and structured teaching program in project base and case method learning
14	Mastering a variety of project base learning learning strategies and case methods
15	Asking trigger questions when starting learning
16	Give full responsibility to students for the resulting project
17	Actively involve students in problem solving
18	Make students aware of the importance of scientific stages in problem solving
19	Have the motivation to conduct learning
20	Developing a HOTS-based teaching philosophy
21	Able to liven up the class atmosphere
22	Understand the latest developments in the teaching materials presented
23	Conveying topics and learning objectives clearly before entering the core material
24	Develop planning, preparation and presentation of products that will be produced by students
25	Instruct clearly how to participate in learning
26	Translate theoretical concepts into the real world
27	Influence students to be tolerant of deficiencies and the development of other people's ideas
28	Answer immediately if there are students who ask
29	Listen and care about students
30	Able to carry out effective leadership in the classroom
31	Skilled in managing student learning problems
32	Have a strategy for fixing ethical issues
33	Able to avoid academic stress
34	Understand the various learning styles of students
35	Ensure students know the procedure for making a project
36	Make an agreement with students about the project collection schedule
37	Develop cognitive abilities through active learning strategies
38	Actively monitor the progress of student projects
39	Directing students to involve other parties in project work

40	Conduct tests and assessments at the beginning or end of learning
41	Monitor directly the involvement of students in project work
42	Projects that are done lead to increased learning outcomes
43	Asking questions that stimulate students' critical thinking
44	Measuring the achievement of the resulting project
45	Explain the products/bills that students will work on as a result of learning products
46	Develop authentic assessments that emphasize the ability to design, implement, invent and deliver products to others
47	Reflect on the problems students encounter during learning
48	Provide an accountable assessment for all group and individual work
49	Provide an assessment of the quality of responses during class discussions
50	Give comments on the results of student assignments

3.6 Validity and Reliability Test

Based on the analysis of the formula above, it can be concluded that if the results of r_{count} < r_{table}, then the item is said to be valid, and vice versa if the results of r_{count} > r_{table}, it is said that the item is invalid. while the number of valid statement items is 50 items.

3.7 Reliability Test Results

To interpret the reliability of the question item, the item is consulted in the r product moment table with the criteria r_{count} > r_{table} for the real level α = 0.05, the item is declared reliable and vice versa if r_{count} < r_{table} for the real level α = 0.05 then the question item is declared unreliable. Based on the results of calculations using the Alpha formula, it is found that r_{11} = 0.919. It is known that r_{11}(0.919) > r_{table}(0.339) then this variable is reliable. After being compared with the correlation index, it is included in the very high reliability category.

4 Conclusion

In general, the project base learning and case method learning that has been carried out at Medan State University has been going according to the plan based on the student satisfaction instrument. The majority of the question items were answered positively by students with an average above satisfied and very satisfied in the implementation of project base learning and case method learning. There are several things that the students hope for, there are several things that are found from the satisfaction instrument, namely:

First, in the readiness aspect of human resources it was found that, the majority of lecturers and students were very ready to use project base learning and case method learning, so that project base learning and case method learning had become the new normality in conducting lectures at Medan State University.

Second, in the aspects of the learning process of project base learning and case methods lecturers teach in a structured manner in project base learning and case method learning. In addition, lecturers have also been able to utilize learning resources and media as a strategy in project base learning and case method learning.

Third, the assignment and evaluation of learning outcomes, it was found that the assignment of 6 assignments had been adjusted in project base and case method learning, then the lecturer had reflected as an independent lecturer evaluation to improve learning project base and case method based on the results of lecturer and student reflections as well as permanent lecturers giving tests to measure competency achievement or course objectives carried out using project base and case method learning.

Some notes that need attention and improvement for future learning are the need for support services for project base learning and case method learning and the existence of a forum for submitting student complaints regarding project base learning and case method learning. Opportunities to be able to gain access to learning resources from digital libraries also need to be improved so that students can easily find additional materials in learning.

References

[1]   Abbasi, AS, & Mir, GM. 2012. Impact of Teacher's Ability, Student's Work Ethics and Institutional Environment on Student Performance of the University of Gujrat . Middle-East Journals of Sientific research, 12(4), 572-579. On line

[2]   Rum, A., Ireland., & Ratni, H. 2018. Module Method Delphi. Bandung: University Padjadjaran.

[3]   Fullan, M. 2001. The New Meaning of Educational Change (3rd). New York: Teachers College Press.

[4]   Ganyaupfu, EM 2013. Factors Influencing Academic Achievement in Quantitative Courses among Business Students of Private Higher Education institutions, 4(15), 57-66 . On line

[5]   Murti, Rudiantoro Widoyo and Prasetio, Arif Partono. 2018. Competency Influence Lecturer on Academic Achievement of Students of the Faculty of Economics and Business Telkom University . Journal Study Education. On line.

[6]   Skulmoski, GJ, Hartman, FT, & Krahn, J. 2007. The Delphi Method For Graduates Research. Journals of Information Technology education, 6, 1-21.