

EduCM (Education Case Method) Application for Students' Skill in Designing Case Method Assignments

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Abstract. This research focuses on developing an artificial intelligence-based application called EduCM, which is designed to provide education to students on how to develop Skill in Designing Case Method Assignments. The research location is in the PPKn Department, Faculty of Social Sciences, Medan State University, with the research sample being students from the Civic Education Department or Jurusan PPKn, Faculty of Social Sciences, Universitas Negeri Medan. The research method is ADDIE model. The data collection tools used were observation sheets, questionnaire sheets, and test sheets. Data analysis uses several kinds, ranging from the Likert scale measurement scale, the Guttman scale, and also uses Miles and Hubermann data analysis to analyze observation data. The orientation of the results will focus on the influence of EduCM to assist students in developing lecture assignments in this mini-research based on the case method. Initial and final skills will show significant development, and students will feel comfortable operating EduCM..

Keywords: *Case Method, Artificial Intelligence, Application.*

1 Introduction

The demands of the times continue to change and lead the world of education to move dynamically and innovatively to respond to these changes. The impact of these changes has a significant impact so that it presents a phenomenon called the demographic bonus and Indonesia is currently entering the demographic bonus or dividend demographic phase. (Ariteja, 2017). This phase certainly has a good impact as well as a bad impact. However, if you look at the negative impact, in particular, it will have an impact on the global competition map that will become increasingly uncontrollable, where people who are more future-oriented will benefit more. Meanwhile, those who are passive and find it difficult to adapt or innovate will fall into the abyss of adversity. This is where the major role of the world of education or

especially universities is to be able to adaptively respond to the expectations of the "Demographic Bonus" in order to produce graduates who are superior, intelligent, critical, productive, and of good character.

One of the important tasks of universities in responding to the demographic bonus situation is to improve the quality and relevance of higher education (Kementerian Pendidikan dan Kebudayaan, 2021). This task is clearly a shared responsibility by all elements within the university. However, the roles of lecturers and students are two vital actors that need to be paramount to support the achievement of these targets. So that the "Gold Standard" target set for every PTN (State Universities) can be realized.

One of the targets in the gold standard target given by the Direktorat Jenderal Pendidikan Tinggi Kementerian Pendidikan dan Kebudayaan to all PTNs is to produce graduates who are superior and critical in solving a problem. However, it must be admitted that this is not an easy and simple matter to be realized, due to the fact that our universities are still difficult to compete globally because the best position so far has been achieved by Gajah Mada University which only sits in the 254th position in the world, far below the Massachusetts Institute of Technology originating from the United States (Ihsan, 2021). One of the indicators that influence the ranking is academic reputation and the reputation of graduates, which contribute a total of 50% to the quality assessment of a university. This fact cannot be separated from the critical thinking ability of the majority of PTN students in Indonesia which still needs to be improved.

In the pedagogic context, critical thinking ability is one of the elements of cognitive quality which is characterized by "a person's ability to analyze all problems and generate an idea to solve the problem" (Karyana, 2010). This ability or skill is very important to support the academic reputation and reputation of graduates who are superior and critical and competitive. As explained by Zare, P. & Othman, M in (Cahyono, 2018) that in the 21st century, the skills that are recognized so that the consequences of success and high success are critical thinking skills. This is also the basis for all PTNs in Indonesia to support and realize the gold standard target in facing the demographic bonus phase. Including in this case, the State University of Medan (UNIMED) which also has a discourse on developing critical thinking skills for UNIMED students through the Case Method program which is integrated into various compulsory tasks for UNIMED students in various subjects or known as term 6 core tasks consisting of routine tasks, critical book review/CBR tasks, critical journal review/CJR, Mini Research, Idea Engineering, and Projects.

The UNIMED policy mentioned above will also be automatically integrated into the order of learning methods at the UNIMED Faculty of Social Sciences (including in this case the PPKn Department of the UNIMED Faculty of Social Sciences). On Tuesday, November 29, 2021, a Case Method program dissemination activity at the UNIMED Faculty of Social Sciences was held which was attended by all representatives of the UNIMED Faculty of Social Sciences (FIS UNIMED) lecturers, including myself (Abdinur Batubara). as one of the representatives of PPKn FIS UNIMED lecturers.

In conclusion, through the above program, UNIMED through the Vice Chancellor 1 launched the Case Method program which must be integrated into various course assignments. Which through the dissemination of the Case Method program at FIS UNIMED, the UNIMED Vice Chancellor 1 program was completed with the explanation and purpose that Case Method was present as one of UNIMED's priority programs to respond to the gold standard target of the Directorate General of Higher Education, Ministry of Education and Culture (Ditjen Dikti Kemdikbud) and also UNIMED's efforts to realize one of the Main Performance Indicators (KPI) of Higher Education, namely realizing the criteria for learning methods based on Case Method for the sake of creating collaborative and participatory classes. So, through the Case Method dissemination program, it is hoped that all lecturers in the FIS UNIMED environment are able to foster and educate students to be able to develop scientific works or lecture assignments that are case-oriented.

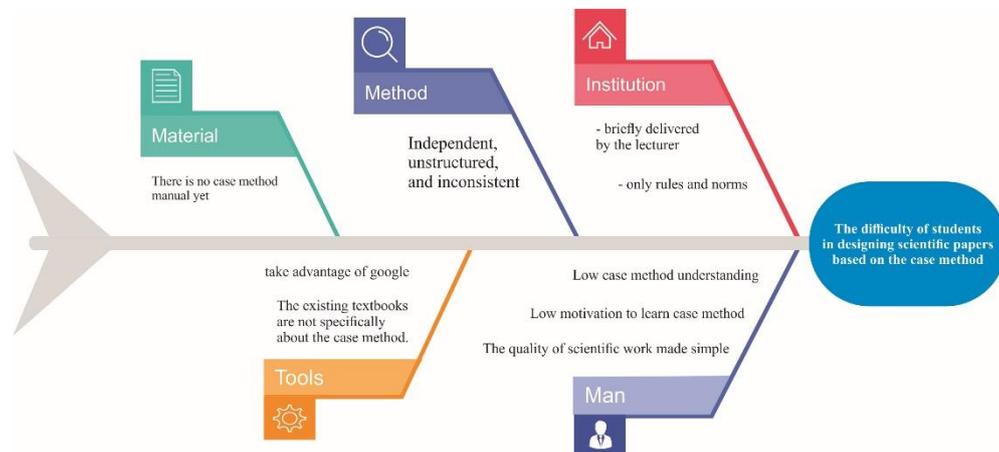


Fig. 1. Fishbone Identification of Research Issues.

Based on the situation above, our research team plans to present a smart application called EduCM or Artificial Intelligence-based Education Case Method in the UNIMED FIS environment as an alternative innovation that provides online assistance to students to understand what Case Method is integrated into assignments. student lecture assignments, how to design Case Method based lecture assignments, and what is the urgency of the importance of the ability to develop Case Method based scientific papers to equip them with competence to meet the demands of the world of work and government demands for the ability of students and alumni to be able to collaborate and participate.

Some of the problem formulations raised in this research are as follows, How is the EduCM design with the Artificial Intelligence model in an effort to develop the ability of FIS UNIMED students to design lecture assignments based on the Case Method; What are the test results on the implementation of EduCM as an Artificial Intelligence model system designed to effectively develop the ability to develop case method-based FIS UNIMED student assignments; How is the collaboration and participation skills of FIS UNIMED students

developed through the EduCM program as an effort to support one realization of the UNIMED KPI and the Gold Standard target of the Directorate General of Higher Education, Ministry of Education and Culture.

The feasibility of EduCM as an alternative assistance for students in developing their abilities in designing lecture assignments based on the Case Method, will be tested using the ADDIE (Analyze Design, Development, Implementation, and Evaluation) method, which is a method to see the development of the feasibility of the EduCM program or application as a web-based application. -view the artificial intelligence model that can effectively help or educate students in developing their coursework based on Case Method.

2 Method

This research focuses on the development and implementation of an application designed by utilizing a simple sophisticated artificial intelligence system. The application is called EduCM as explained in the theoretical review of the previous chapter. Therefore, the research method used in this study is the Research & development (R&D) research model by utilizing the Analyze Design, Development, Implementation, and Evaluation (ADDIE) model to "see the extent to which the development of the usability of applications designed as learning tools" (Purnamasari, 2019).

This research was conducted in the Department of Pancasila and Citizenship Education, Faculty of Social Sciences, State University of Medan (FIS UNIMED). This location was chosen as the initial space to test the success rate of EduCM application development to students. So that later, it can be used as a recommendation to develop a wider research location on a university or even national scale. The population in this study were all students in the PPKn FIS UNIMED environment. And the samples used later are 1 class each in the 2nd semester of the class of 2021.

The variables of this study consisted of the independent variable (X) and the dependent variable (Y) as described briefly below. The independent variable in this study is EduCM as an artificial intelligence application. This independent variable will later become a stimulus that will affect the dependent variable. The dependent variable is the ability of students to design lecture assignments based on the case method. This dependent variable will be influenced by the independent variable, namely the EduCM Application. The data collection tools used in this study were observation, questionnaires, and tests.

The data analysis technique used will be adjusted to the required data and the data collected. First, for expert response data, the data that needs to be analyzed is the validity of the EduCM application. As for measuring the validity of the EduCM application as a stimulus to educate students in developing case-based lecture assignments, the Likert scale measurement scale is used. The category used is a Likert scale range from a score of 1 to a score of 5. The student response questionnaire data will be analyzed using the Guttman scale measurement scale. The Guttman scale is designed with a focus on 2 statements, namely Yes or No, in which the answer Yes will get a score of 1 and No will get a score of 0. This affirmation is a form of certainty for the responses from students to the quality of the EduCM application product. Meanwhile, for data analysis on the effectiveness of the EduCM application, it is based on data from the collected technical tests. Then used the technique of calculating the minimum

completeness criteria (KKM). Where the KKM here is in the range of at least 75%. Finally, to analyze the observational data on the quality of scientific work developed by students based on the case method. Then the miles & huberman technique is used, through the process of data reduction, data display, and conclusion drawing or verification (Nasution , 199). The stages of this research use the R&B design of the ADDIE model, so the stages of the research are as follows:

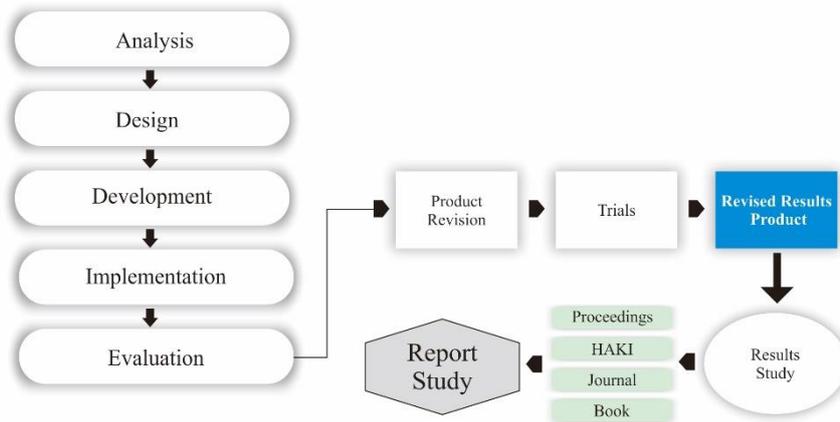


Fig. 2. The flow of the R&B research stages of the ADDIE Model was adapted from (Purnamasari, 2019)

The stages in this study were designed and modified from the original source of the ADDIE method. The point of this research is to try to test a product that was developed called EduCM.

3 Results and Discussion

The first step for the research team was to make initial observations about how good the initial understanding of students from the PPKn FIS UNIMED class of 2022 or new students was with insights about case method-based scientific papers. The results show the following:

Table 1. Rubric Result of Initial Observation of Case Method Understanding of PPKn FIS UNIMED Students.

Score Interval	Category	Percentage
90-100	Very good	0%
70-89	Well	4.76%
50-69	Not enough	79.37%
0-49	Bad	15.87%

Based on the data above, it can be concluded that there are still 79.37% or 100 students from the total sample, 126 students majoring in PPKn FIS UNIMED who are still in the category of lacking in understanding what the Case Method is and how to design case-based coursework. Meanwhile, 15.87% were even in the Bad category, and only 4.76% were in the Good category, while 0% was in the very good category. Some of the main indications of a lack of understanding of the student case method are the lack of special educational programs to

educate them about the case method, the existing educational programs are still less attractive and up-to-date, and the low motivation of students to learn about the case method.

From the initial observation data, the research team took the next step to immediately draw up a field plan in an effort to provide case method education that was fresher and more solutional and up-to-date. The education is through the EduCM application or case method education that relies on simple artificial intelligence features, a questbot model or an intelligence system that can answer structured questions from users. The application is designed by utilizing the PHP programming language, Mysql database system, and CSS Web design as well as several other applications such as CorelDraw for web graphic design and also sublime text for initial editing on localhost. Here are some screenshots of the educm web display:

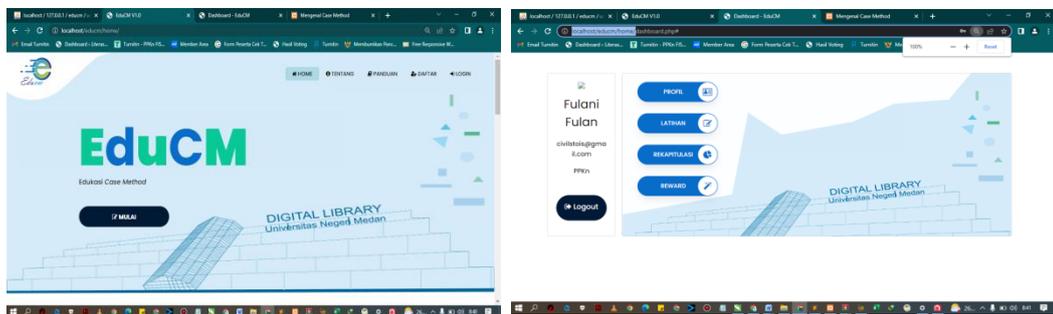


Fig. 3. Image of EduCM Application Home Page and Dashboard

Some of the main menus in the EduCM application include the home page, about, register, login, and start/start education (main feature). Here the most important thing to explain is the main features or educational features of the case method. This feature is an online tutorial room for students to learn firsthand how the process of making a scientific work is like a mini research based on the case method. This feature is also supported by a simple artificial intelligence system, namely Ai-Quesbot or an intelligence system that is able to read user questions in a structured manner, and answer well. In addition, these main features are also supported by a data collection process such as user data when operating the main features, then data on the recapitulation of the results of their tutorial performance which can be seen on the recapitulation page on the user's dashboard.sorted by rank. Some of the appearance of the application when run as follows:

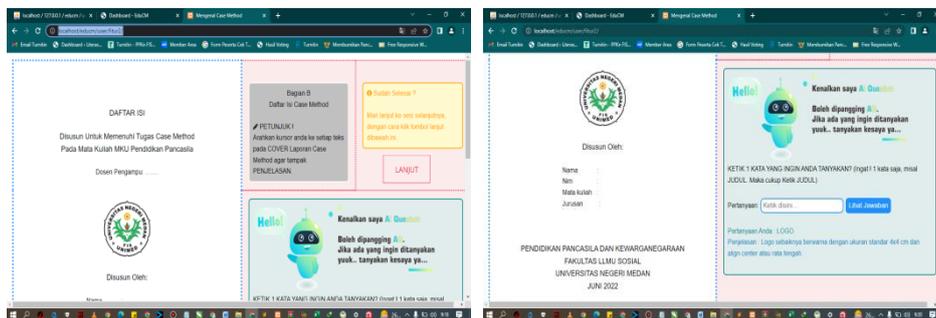


Fig. 4. The main features of the EduCM application appear

Then the following can also be shown some documentation when students take part in the case method educational field activity which was carried out on September 5, 2022 in the PPKn lab:



Fig. 5. Screenshots of Students Using the EduCM application

Case method education activities take place with an application introduction system and then directly used by users or students. The data obtained are first, the level of user mastery in operating the EduCM application. The following is a recapitulation of data from expert assessment observations about the quality of the EduCM application:

Table 2. Rubric of Expert Validation Observations Against EduCM.

Category	Predicate
Programming language	Very good
Web Structure	Well
Web Graphics	Very good
Functionality	Well
Ease of Access	Well
Protection System	Enough
Security System	Enough

From the observation data above, it can be concluded that the EduCM application received good appreciation and assessment from website media experts, namely Mr. Deni Suprihadi, ST, M.Kom. attention is on programming languages and web graphics which he considers very good. And in terms of web structure, web functionality, and ease of web access are considered good. Meanwhile, what needs to be improved and become the developer's evaluation in this case the author is the components of the protection system and security system that are still sufficient. Indications of the functioning of the web can be seen from the flow and process of accumulation of the web at each process of data running well, starting from the registration process, login, menus, Ai-Questbot process, and also process recapitulation. The EduCM application is also indicated to be user friendly according to experts, because the process and appearance are very easy to understand and neatly arranged. This convenience is also very helpful for writers and application developers so that many are interested in wanting to operate the application. Students majoring in Civics are also highly interested in taking part in operating the EduCM application.

In addition to expert validation data, there is also percentage result data from the recapitulation of tutorial scores achieved by all users in using the EduCM application, the following data are:

Table 3. Percentage of Students' Case Method Understanding Values After Using EduCM.

Predicate	Percentage
Very good	55.56%
Well	19.05%
Enough	25.40%
Bad	0%

After using EduCM, students majoring in Civics have valuable experience in learning what the case method is and how to design lecture assignments or scientific papers based on the case method. As many as 55.56% of students or 70 people who have a very good percentage of results. Very good score in the range of 90-100, with an indication of correctly filling out all the questions applied during the evaluation session, completing the entire tutorial process in EduCM, and being able to process the EduCM application without any errors. The stimulus given in the EduCM application to help 70 students achieve a value range of 90-100 is the feature view of systematic examples of case-based task reports, then a question and answer feature with the artificial intelligence system Ai-Questbot, as well as a variety of clear and concrete instructions that are on each button and the steps for working on tutorials carried out in EduCM. Even in EduCM, it is easier for users to understand what the Case Method looks like, where there is a participant identification feature or a feature that invites the user to analyze the case method content that requires observations to identify participants. As explained by (Dermawan, 2014). That one thing that really needs to be considered in working on the case method is the identification of participants.

The key to the success of EduCM as a Case Method educational application for students is the principle of easy access, clarity of material, attractive graphics, and application creativity that presents Ai-Questbot. Especially with the Ai-Questbot feature, meaning that the EduCM application is like a human being that can directly help users in solving their confusion or questions when operating EduCM in tutorial sessions. This is in line with what was conveyed by Kusumadewi AI, namely Artificial Intelligence or Artificial Intelligence is one part of computer science that makes machines (computers) able to do work like and as well as humans do (Rahayu, Mukrodin, & Hariyono, 2019).

The Ai-Questbot system is a simple artificial intelligence system that utilizes 4 AI systems, namely process control, association memory, prediction system, and data clustering. This system ensures the convenience of developers and writers to assist them in conveying information that has been prepared regarding how to compile case method-based scientific papers into the EduCM application so that users can easily understand and use and benefit from the functions and objectives of EduCM. This system is in line with that described by (Widarma & Rahayu, 2017) that "a subclass of computer software that utilizes the direct capabilities of a computer to perform a task the user wants it to do".

4 Conclusion

This study has the main goal of educating students to be able to develop case-based scientific papers through online tutorials in an application called EduCM. The process is quite easy, the user registers an account, then logs in, then follows the instructions in the user dashboard until the final stage is recapitulation of values and rewards. This research was carried out by utilizing the development of an EduCM application based on an artificial intelligence system. Artificial intelligence was developed using 4 AI systems, namely process control, association memory, prediction system, and data clustering. And from these 4 processes, an AI system called Ai-Questbot was created which can help users to get answers to their structured questions.

The results showed that there were many changes from the initial data obtained with the final data after the EduCM application was operated by students. The impact is, their understanding of the case method increases, then students feel the experience of learning tutorials on developing assignments or scientific papers based on the case method online, and students know and can measure their abilities about the case method.

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