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# Improvement of Six Competency Skills through the Development of Flipped-Case Project in Era of Education 4.0

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## Abstract

The lack of research development on 21st-century learning models that can improve the six competency skills of Geography Education students at Universitas Lambung Mangkurat Indonesia and its integration in wetland environment management became the background for developing the Flipped-Case Project Model. This model results from the development of case methods and team-based projects, one of the efforts to improve six competency skills in learning innovation. This development consists of five stages: analysis, design, development, implementation, and evaluation. The results of this study showed that the novelty of the development of this model was seen in the learning syntax, including group formation, determining the topic of wetland management, mini-research, case finding by students, group discussion, presentation of reports, presentation of results, mini lecturers, and evaluation in the form of feedback. The Flipped-Case Project model has been declared feasible and effective for improving six competency skills as a learning model in the study of wetland environment management at the Geography Education Study Program, Universitas Lambung Mangkurat. The implications of this research as an alternative geography learning model that can improve students' six competency skills in the 4.0 education era. In addition, as a guide for further research to be implemented in other courses in higher education.

**Keywords:** Six Competency Skills, Flipped-Case Project Model, Wetlands, Education 4.0

## 1. Introduction

The era of education 4.0 is an era of the development of science and technology that is advancing rapidly in the field of education. The development of science and technology will align with the increasing quality of education in the higher education (Muzana et al., 2021). This poses a big challenge for universities in Indonesia in improving student competencies to enter a new era of education. Lecturers must produce graduates with competencies by education 4.0 through innovative and technological learning. Personalization of education 4.0 can be seen from the learning process in which lecturers have complete flexibility as their learning designers in achieving learning goals. It can be concluded that the role of lecturers is more complex than in the previous era, which is shown by the way lecturers respond to the increasing needs of student competence, accompanied by faster technological

developments and social construction changes. Therefore, (Fariza Khalid et al., 2016; Tican & Deniz, 2019) utilizes learning innovations.

Students in the 4.0 education era also face challenges in a complex and systematic way. In addition, students must be able to compete in the learning process to achieve goals (All et al., 2021; Li et al., 2021; Tapingkae et al., 2020). To survive in the 4.0 education era, students must have soft skills competencies and be developed according to their potential. The partnership framework of 21st Century Skills formulates it as "The 4C Skills," namely Critical Thinking, Communication, Collaboration, and Creativity (Ennis, 2019). As development progresses, it turns out that competencies must be possessed not only limited to 4C skills but also increased to Six Competency Skills: Critical Thinking, Collaboration, Creative Thinking, Character Education, Citizenship, and Communication (Anekwe, 2020).

But the problems faced in the learning process are encountered by most lecturers. These problems include the lack of student activity in participating in asking questions, discussing, and answering questions, the low ability of students to communicate to explain and argue both orally and in writing, and the low ability to solve problems in teamwork. Several research findings show that students in Indonesia cannot engage in critical thinking and higher order thinking (Mahanal et al., 2018). This problem can result in students being unable to fulfill the six competency skills that must be possessed in the 4.0 education era. So, lecturers must take advantage of learning technology currently developing rapidly through learning models.

The learning model is the most important component in the learning process (Budi et al., 2020). Applying the suitable model can improve student skills in the 4.0 education era. So, the development of learning models is necessary to adjust the need for the quality of student skills to the needs of today's world of work. So, it is essential to develop a learning model based on case learning methods and team-based projects so that students have six competency skills in the 21st century. Case methods and team-based project learning are one of the learning methods that refers to the 7<sup>th</sup> Key Performance Indicators (KPI), where the percentage (50%) of the final score weight must be based on the quality of class discussion participation (case method) and project-based learning final presentation. This learning is discussion-based participatory learning to solve cases or problems. The benefits of this case method can develop a holistic way of thinking, the correlation between concepts, and relationships between disciplines (Kim et al., 2006). For this reason, applying this case method and a team-based project can improve 6C skills, which are the learning objectives in the 4.0 education era.

### *1.1. Case Method*

The case method is a learning model that uses case studies from the real world in the community. This learning model uses engaging learning scenarios as a means of learning activities. With case solving, students can explore, find, and solve problems from cases through group discussions in class. Learning that uses real cases and is equipped with appropriate learning syntax will help students to answer problems so that they are more creative to develop critical thinking competencies (critical thinking) or higher-order thinking skills (HOTS) (Nuswawati et al., 2017).

The case method is an alternative to teaching and learning activities with a pattern of application in case studies of problems related to lecture material sourced from the organization's internal or external environment. With the emergence of issues and problems in case studies, it is a place for students to put themselves as decision makers of the problems found so that students not only know or understand the problems that have been discussed but also think about finding solutions to these problems. With the application of this case method, participatory learning based on problem-solving discussions will improve critical thinking skills to solve problems, communicate actively, collaborate, and innovate.

### *1.2. Team-Based Project*

Team-based project is a combination of project-based learning and team-based learning models. Project-based learning involves problem-based learning procedures requiring identification, analysis, and solutions. Meanwhile,

Team-based learning is evidence-based collaborative learning designed to provide a way for students to solve problems they face in their environment (real life).

Team-based project learning seeks students to think critically through projects given by educators (teachers or lecturers) (Mutakinati et al., 2018; Wu & Wu, 2020). This learning provides opportunities for students to build critical thinking skills, communication, knowledge, and learning outcomes that are important to improve the quality of education and long-term learning through group discussion activities (Marzuki & Basariah, 2017; Yustina et al., 2020).

This method will involve students actively through projects and discussion groups in developing their 6C abilities to solve problems related to real life, such as the problems encountered by students in the wetland environment. There are still many obstacles and issues that need to be criticized by students so that their potential can be developed optimally. For this reason, students must be able to explore their abilities in solving and providing solutions to these wetland environmental problems through courses such as Wetland Environmental Management, Regional Planning and Development, Rural and Urban Geography, and other related courses to environmental themes/discussions of wetlands.

Previous research found that conventional methods only emphasize declarative knowledge, while contemporary learning methods emphasize intellectual skills such as problem-solving. This causes differences in the learning outcomes that depend on the learning approach, and the assessment process carried out (Anderson, 2013). This case method and team-based project are better than conventional learning methods (Mentari & Laily, 2016) and positively affect student learning achievement (Anas, 2021). In line with this, it is stated that the development of teaching materials with this case method can improve student collaboration capabilities in synergy in understanding, analyzing, and finding solutions to problems outlined in cases with real situations and conditions (Anas, 2019). This case learning method is a forum for educators to integrate fundamental knowledge and practice in improving problem-solving skills (Schoeman et al., 2009). This research is different from previous research because this research will be able to produce a case method development model and a team-based project based on a wetland environment, namely the Flipped Case Model. The results of this study can fill in the gaps in information related to learning models based on case methods and team-based projects for the wetland environment as learning materials.

This research is fundamental to do to produce a Flipped-Case Project Model learning model as a case method and team-based project development with the topic of the wetland environment to improve Six Competency Skills (6C) skills in Era of Education 4.0 for students in the Geography Education Study Program, Universitas Lambung Mangkurat.

## **2. Method**

This research method uses ADDIE. The development model used is the ADDIE model, which consists of five stages consisting of 1) the analysis stage, which is the stage to find out the learning problems and the needs of the learning model; 2) the design stage, to design a learning model that is ready to be validated; 3) the development stage, consisting of validation test activities by learning model experts as many as two experts; 4) the implementation stage, including the learning model trial phase in the wetland environmental management course, involving 31 students and two lecturers in the geography education study program; and 5) evaluation stage, is the last stage in which the model evaluation stage becomes the final product. The procedure for developing a learning model using the ADDIE model is presented in a flow chart (Figure 1).

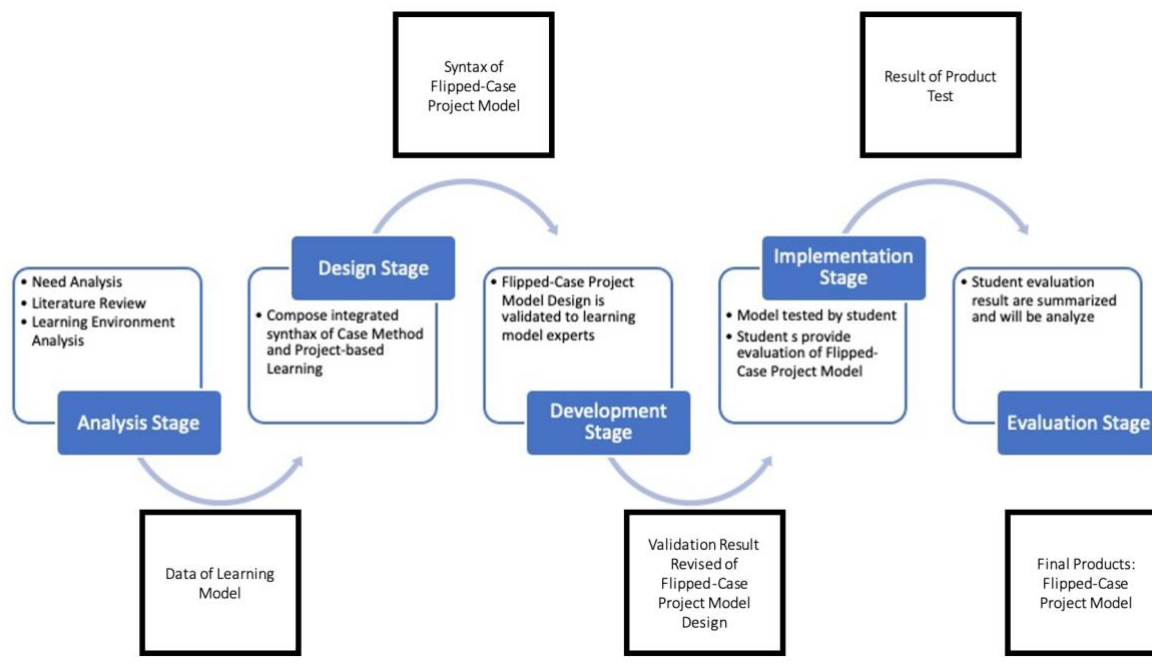


Figure 1: Flowchart of Model Development Procedure

### 3. Results and Discussion

#### 3.1. Analysis Stage

This stage is the initial stage in reviewing the goals of education development in Indonesian universities, namely 1) improving the quality of learning and the relevance of higher education; 2) improving the quality of lecturers and education staff; and 3) the realization of quality management of the Director General of higher education (Direktorat Jenderal Pendidikan Tinggi, 2021). Universities are expected to manifest these three goals by increasing the capacity and quality of the education process and management they are responsible for.

The achievement of targets can be measured through the Main Performance Indicators of State Universities (IKU-PTN), including first, the quality of graduates is calculated based on decent work and students gain experience outside the campus; second, the quality of lecturers is measured through the activities of lecturers outside the campus, teaching practitioners on campus, and the work of lecturers is used by the community and gets international recognition. Third, the quality of the curriculum has sub-indicators such as study programs in collaboration with world-class partners, collaborative and participatory classes, and international standard study programs. The three leading indicators, IKU-PTN, are broken down into eight KPI-PTN. Regarding learning, this is found in the 7<sup>th</sup> IKU-PTN: collaborative and participatory classes.

The development referred to in this research elaborates case methods and team-based projects into new learning models. The development of this model can be used as a learning model that can produce competent students and meet the challenges of 21st-century education in the form of six competency skills. The 6C skills in question are Critical Thinking, Collaboration, Creative Thinking, Character Education, Citizenship, and Communication to support 21st-century learning.

Critical thinking starts with evaluating evidence, assumptions, and logic that underlies other people's statements to reach a deep understanding (Retno et al., 2018). Problem solving also requires creative thinking skills as an effort made by lecturers and students in the learning (Heong et al., 2020). A diverse learning environment is important in learning management, especially regarding communication between lecturers and students. Communication skills play a very important role because communication culture as a bridge for interaction

between lecturers and students in conveying information must be reasonable and clear in the learning process (Roksa et al., 2017). The existence of communication with proper articulation in the learning process also influences creativity and critical thinking skills in the learning (Budi et al., 2020; Epçaçan, 2019). Education 4.0, or 21st-century education, also requires student skills in collaboration between individuals and groups. Collaboration between students and lecturers is an important element in learning to solve the difficulties of the problems discussed. The findings of previous studies also state that the challenges teachers and students encounter during classroom learning can be solved by collaborating to find the right solution (Mutohhari et al., 2021).

### 3.2. Design Stage

Based on the needs analysis results, it is necessary to design a learning model to improve six competency skills for Geography Education Study Program students. At the design stage, it is necessary to study literature that supports the design of the learning model concept resulting from the elaboration of the case method and team-based project. The idea of resulting learning model aims to improve the soft skills possessed by students in the form of six competency skills. The Flipped-Case Project model was developed based on the case method and team-based project elaboration (figure 2). The case method and team-based project syntax were elaborated and modified according to the needs and characteristics of students in studying contextual wetland management.



Figure 2: Syntax Design of the Flipped-Case Project Model

### 3.3. Development Stage

Based on the assessment given by the validators, the average value of the validation results on aspects of the Flipped-Case Project model is 95%. These results were obtained based on four factors, including parts of the syntax, social system, reaction principle, and instructional impact and accompaniment. Based on the test results on the four aspects (Figure 3), the highest score on the syntax aspect of the model reached 97%, and the instructional impact aspect had a low score of 90%. The validators give suggestions to use sentences that are easier to understand. Other recommendations regarding aspects of instructional impact are to be more concrete so that it is easy to achieve learning objectives. Revisions have been made according to suggestions from experts so that it is hoped that there will be no sentence ambiguity in the syntax of the Flipped-Case Project model.

### 3.4. Implementation Stage

This trial stage is carried out on all students who take the wetland environment management course in class A1 of the Geography Education Study Program, Universitas Lambung Mangkurat, Banjarmasin. The implementation of the Flipped-Case Project Model is by the learning syntax, in which their activities consist of nine learning steps of the Flipped-Case Project Model (Figure 2). So the learning activity of this Flipped-Case Project Model (Figure 4) begins with the formation of six groups that have determined the location of wetland environment management in the South Kalimantan region, including 1) peat swamp on A. Yani Street Km 16, Banjar Regency; 2) the Barito River in Banjarmasin; 3) Riam Kanan Reservoir in Banjar Regency; 4) Rice fields in Marabahan, Barito Kuala Regency; 5) Estuary in Barito Kuala Regency, and 6) Ex-mining pond in Martapura Area. The six locations are determined because the area can represent the wetlands in South Kalimantan. Before they did case finding in each of these locations, the lecturer provided an understanding of concepts related to wetland environment management in South Kalimantan.

After the lecturer explains the concept of wetland environment management in class, students can go directly to the field to find wetland environment management problems. Students must be more sensitive and critical in finding problems (cases) of wetlands in their respective locations. After the lecturer explains the concept of wetland environment management in class, students can go directly to the field to find wetland environment management problems. Students must be more sensitive and critical in finding problems (cases) of wetlands in their respective locations. After the lecturer explains the concept of wetland environment management in class, students can go directly to the field to find wetland environment management problems. Students must be more sensitive and critical in finding problems (cases) of wetlands in their respective locations.

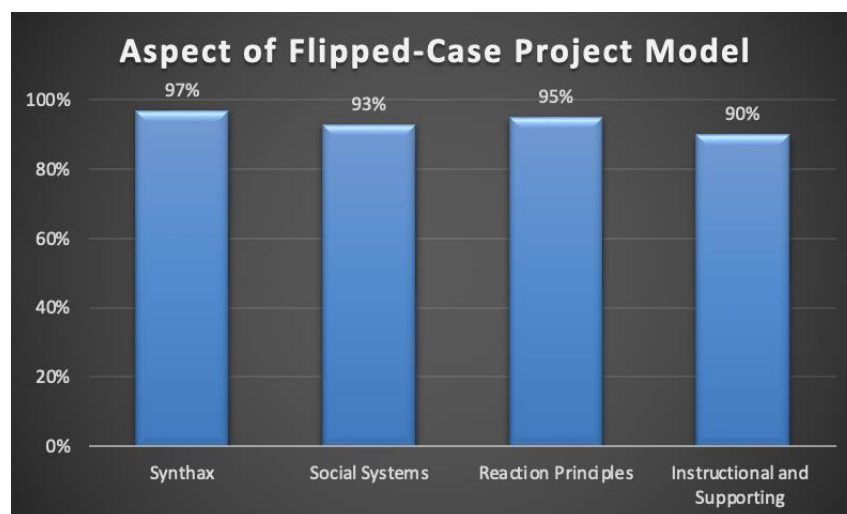


Figure 3: Flipped-Case Project Model Validation Results

In addition, they must explore data and information in the field related to theories and literature reviews of wetland environment management so that later they can propose appropriate designs, ideas, ideas, and solutions to solve case studies of wetland management. The results of this mini-research project must be written on a worksheet and discussed among group members. The discussion results can be used as the basis for making group reports and presenting the final product as a case report on wetland environment management in South Kalimantan. The lecturer's role as a facilitator is to direct and guide students in this learning process. In addition, lecturers provide feedback to students related to wetland environment management to see students' competence in critical and creative thinking.



Figure 4: Learning Activities with the Flipped-Case Project Model

Several Flipped-Case Project Model product tests were conducted for students and lecturers at this implementation stage. The test phase of this product is as follows.

#### 1. Practical Test of Flipped-Case Project Model by Lecturer

The results of this Flipped-Case Project Model product were also tested on users, namely two lecturers in the Geography Education Study Program related to the practicality of the model, namely a lecturer in charge of a geography teaching planning course and a geography learning strategy course. Based on the results of the practical test of the Flipped-Case Project Model, it was found that the average value was 94.16%, which means this model is functional and user-friendly in the application of learning by lecturers (Figure 5).

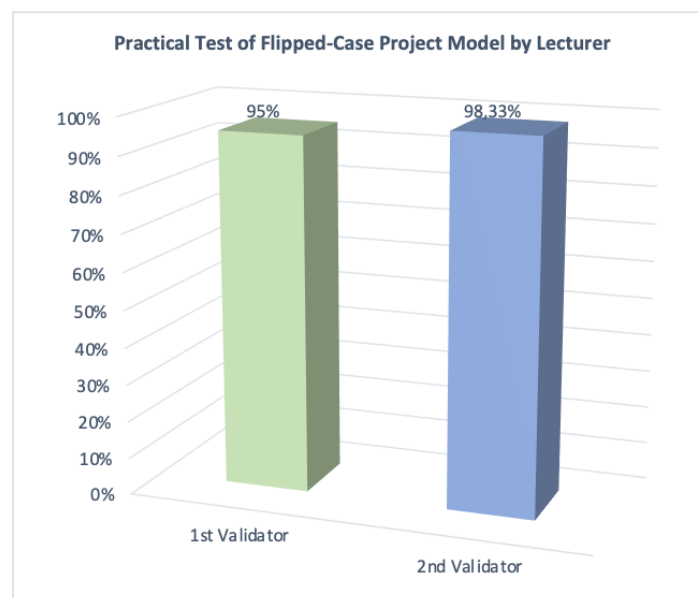


Figure 5: Practical Test Results of the Flipped-Case Project Model

#### 2. Flipped-Case Project Model Practical Test by Students

At this implementation stage, the Flipped-Case Project Model was also tested on 6th-semester students who took the wetland environment management course in the geography education study program as many as 31 students. The results of the practical test of the Flipped-Case Project Model for students have obtained an average of 94.98%.



The learning steps in this Flipped-Case Project Model consist of nine components, including understanding the lecturer's instructions, understanding the instructions on the observation sheet, understanding the problem, understanding the lecturer's explanation, understanding the wetland environment management material, problem-solving ability, solving problems in the form of tests, conducting discussions, and presentation skills (Figure 6).

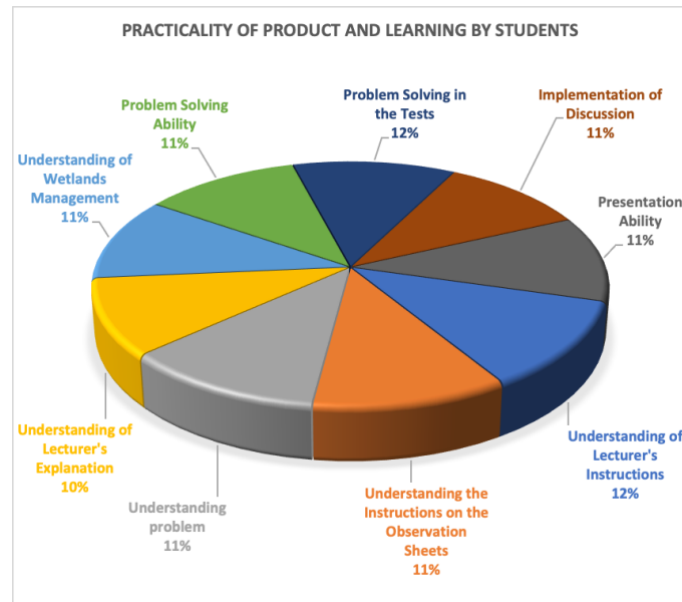


Figure 6: The Practical Test Results of the Flipped-Case Project Model by Students

### 3. Flipped-Case Project Model Effectiveness Test

In the Flipped-Case Project Model trial, it is also necessary to test the implementation of the model by two observers when the lecturer implements this model in the classroom. The two observers assessed the implementation of the Flipped-Case Project Model in the learning process. The results of the Flipped-Case Project Model implementation test found that the Flipped-Case Project Model had been implemented according to the components of this model in learning. The features observed in the implementation of this model include 1) student orientation in problem situations; 2) student organization for learning; 3) problem solving individually or in groups; 4) presentation of works; 5) analysis and evaluation; 6) the implementation of the social system; 7) the implementation of the reaction principle, and 8) implementation of the learning support system.

At the implementation stage, the Flipped-Case Project Model went through several test stages, so it can be concluded that it is practical and feasible to be used as a learning model to improve the six competency skills of students of the Geography Education Study Program, Universitas Lambung Mangkurat (Figure 7).

#### 3.5. Evaluation Stage

This trial stage is carried out on all students taking the wetland environment management course at the Geography Education Study Program, Universitas Lambung Mangkurat. The evaluation stage is the final stage of developing the Flipped-Case Project Model learning model. This stage produces a new learning model product that has undergone several tests at the implementation stage. The final product of this development research is a Flipped-Case Project Model. This model can be used as a geography learning model to improve students' 6C competencies.

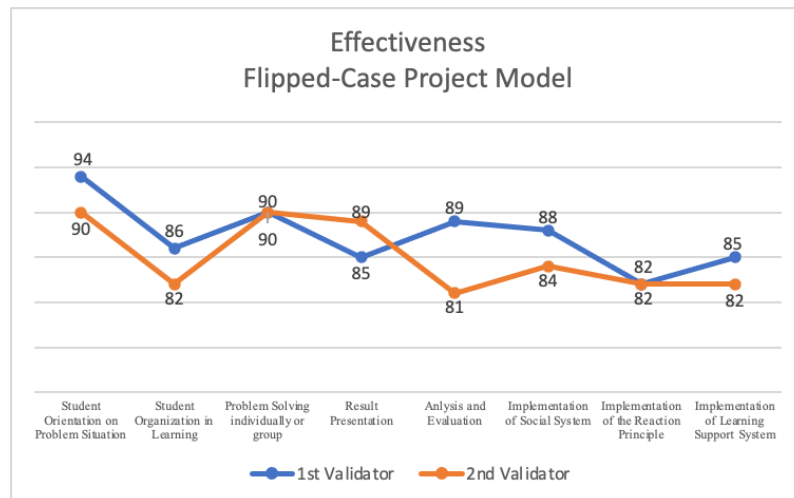


Figure 7: Results of the Flipped-Case Project Model Effectiveness Test

The Flipped-Case Project Model results from developing case methods and team-based projects based on projects and cases solved in groups. The existence of the Flipped-Case Project Model is expected to improve student skills in the 4.0 education era, namely six competency skills. This is in line with the 21st-century skills-based curriculum as stated in the Main Performance Indicators of Higher Education which aims to prepare student competencies including critical thinking, collaboration, creative thinking, character education, citizenship, and communication. These skills focus on 21st-century global education in preparing students to face the challenges of the 21st century and the real-world (Anekwe, 2020; Takeda, 2016).

The novelty in the Flipped-Case Project learning model lies in the learning syntax. The learning syntax of this model must include critical thinking, collaboration, creative thinking, character education, citizenship, and communication skills in the geography learning process, especially in the wetland environment management course. This can be seen from the activities of students who first identified cases with the theme of contextual wetland environment management in South Kalimantan. Activities outside the field integrated with this model are fun learning activities with direct experience in the field (Bamberger & Tal, 2007; Takeuchi & Sugimoto, 2006). Students conduct group discussions about the results of case findings in the field. This group discussion activity can develop students' mindsets and skills (Rijal et al., 2021). The role of the lecturer in the Flipped-Case Project model is as a facilitator of learning activities, not as a provider of cases to be solved by students. The transformation from conventional teacher-centered learning to student-centered learning that emphasizes problem-solving, creative thinking, critical thinking, communication, and collaboration can improve the 21st-century competency-based learning (Mutohhari et al., 2021).

The Flipped-Case Project's effectiveness This model positively impacts geography students in the learning process as they can identify problems around them directly, solve problems and make concrete problem solutions, work together, and communicate effectively. With this provision, students have solid mental activity, can reason, make the right decisions, generate creative ideas, collaborate, and communicate effectively with others (Belland et al., 2009; Zubaidah et al., 2020).

#### 4. Conclusion

The development of learning models refers to case methods and team-based projects as learning methods on the Main Performance Indicators of Higher Education in Indonesia. Research on this model's development goes through five research and development stages. The first is an analysis that includes primary considerations related to a strong background for developing learning models. The fundamental concern is the importance of a learning model that can form students with six competency skills in 21st-century education. Second, a design plan in the form of a prototype Flipped-Case Project Model. Third, at this stage, validation activities are carried out by learning model experts to assess the feasibility of the Flipped-Case Project Model. The validation test results

showed that the Flipped-Case Project Model was declared feasible. However, I still need to do minor revisions based on suggestions from the experts on this learning model. Fourth is the implementation stage, where at this stage, the Flipped-Case Project Model must be tested, including practicality tests by students and lecturers and model effectiveness tests. The results of the three tests show that the Flipped-Case Project Model can be applied well to each learning syntax and is declared effective as a geography learning model. Fifth, this stage is the final stage of developing this learning model, which produces the Flipped-Case Project Model. The implications of this research as an alternative geography learning model that can improve students' six competency skills in the 4.0 education era. In addition, as a guide for further research to be implemented in other courses in higher education.

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