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Flipped-Differentiated Learning (FDL) as an Innovative Learning Model to Improve Learning Outcomes

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ABSTRACT

The Flipped-Differentiated Learning (FDL) model is an innovative approach that combines the concepts of Flipped Classroom and Differentiated Instruction to enhance student learning outcomes. This model allows students to access materials before class, while class activities are focused on problem-solving and deeper interactions. The purpose of this research is to examine the effectiveness of the FDL model in improving student learning outcomes compared to conventional learning models. The research method used is an experiment with a pretest-posttest control group design. The results of the study indicate that the implementation of FDL significantly improves student learning outcomes, particularly in conceptual understanding and active engagement in learning. The implications of this research suggest that FDL can be an effective solution in more flexible learning that meets the individual needs of students.

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1. INTRODUCTION

21st-century education demands a more flexible and adaptive learning model to meet students' needs. The Flipped Classroom has become a popular approach because it allows students to access material before class, enabling class time to be used for discussions and more interactive activities. However, this model has not fully accommodated the differences in learning styles and levels of understanding among students. Therefore, the integration of Differentiated Instruction in the Flipped Classroom forms the Flipped-Differentiated Learning (FDL) model, which aims to provide a more personalized learning experience for each student.

The main objective of this research is to analyze the effectiveness of the FDL model in improving student learning outcomes compared to conventional learning models. By integrating technology-based learning and instructional differentiation, it is hoped that FDL can have a positive impact on learning outcomes and student engagement in the learning process.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

1. Flipped Classroom

   The Flipped Classroom is a learning model where students study the material independently before class meetings, allowing class time to be used for discussions, problem-solving, and collaborative learning (Bergmann & Sams, 2012). This model has been proven to enhance conceptual understanding and student engagement in learning.

2. Differentiated Instruction

   Differentiated Instruction is a teaching strategy that adjusts the content, process, and products of learning to meet the needs, interests, and learning styles of students (Tomlinson, 2001). This model allows each student to have a learning experience that is appropriate for their level of understanding.

3. Flipped-Differentiated Learning (FDL)

   The FDL model combines the principles of Flipped Classroom and Differentiated Instruction, allowing for differentiation in content, process, and assessment of learning. Thus, students not only gain access to materials before class but also receive an approach tailored to their individual needs during face-to-face sessions.

4. Hypothesis Development

   Based on the literature review above, the hypothesis proposed in this study is: H1: The Flipped-Differentiated Learning (FDL) model is more effective in improving student learning outcomes compared to the conventional learning model.

5. Main Components in FDL
   a. Pre-Class Learning
      1) Students are provided with materials in the form of videos, articles, or interactive modules before the class session.
      2) Learning is conducted independently with flexibility in time and place.
   b. In-Class Engagement
      1) Class time is used for discussions, problem-solving, experiments, or project-based activities.
      2) The teacher acts as a facilitator and provides guidance according to the individual needs of the students.
   c. Differentiated Instruction
      1) The teacher applies teaching strategies that are suitable for the abilities and learning styles of the students.
      2) Various methods such as project-based learning, group work, and individual assignments are implemented to enhance the effectiveness of learning.
   d. Continuous Assessment and Feedback
      1) Evaluation is conducted formatively to assess student progress.
      2) Teachers provide constructive feedback to help students achieve a deeper understanding.

6. Advantages of Flipped-Differentiated Learning
   a. Increases Student Participation
      Students are more active in learning because they have understood the basic material before the class session.
   b. Adjusts to Students' Learning Pace
      Students who need more time can review the material, while students who understand more quickly can move on to the next challenge.
   c. Optimizing Face-to-Face Time
      Direct interaction in class is more meaningful because it is used to discuss more complex concepts and improve understanding through discussion and practice.
   d. Increasing Motivation and Learning Independence
      Students are accustomed to learning independently, improving critical thinking and problem-solving skills.
   e. Utilizing Technology Effectively
      The use of videos, simulations, and online learning platforms enrich the learning experience.

7. Implementation of Flipped-Differentiated Learning in Learning to implement the FDL model effectively, the following steps can be followed:
   a. Preparation of Appropriate Materials
      Teachers prepare learning content in various formats to suit student preferences.
   b. Using Digital Platforms
      Utilizing Learning Management Systems (LMS) such as Google Classroom, Moodle, or Edmodo to distribute materials.
   c. Analyzing Student Needs
      Teachers conduct initial assessments to understand students' learning styles and levels of understanding.
   d. Activating Discussion and Practice Sessions in Class
      Providing activities that are oriented towards problem solving, discussion, and collaboration.

e. Continuous Evaluation
Using various assessment methods to continuously assess student development.

3. RESEARCH METHODE

1. Research Design
This study uses an experimental method with a pretest-posttest control group design. The research sample consists of two groups: an experimental group using the FDL model and a control group using a conventional learning model.
2. Population and Sample
The research population was high school students at a school in Indonesia. The research sample was selected using a purposive sampling technique, with a total of 60 students divided into two groups.
3. Research Instruments
The research instruments consisted of learning outcome tests (pretest and posttest), student engagement questionnaires, and interviews with teachers and students to evaluate the effectiveness of the FDL model implementation.
4. Data Analysis Techniques
The data were analyzed using an independent t-test to compare learning outcomes between the experimental and control groups, as well as descriptive analysis to evaluate the level of student engagement in learning.

4. RESEARCH RESULTS

The results of the study showed that there was a significant difference between the learning outcomes of students who used the FDL model compared to students who studied using the conventional model. The average posttest score of the experimental group was higher than the control group ($p < 0.05$). In addition, the student engagement questionnaire showed that students who studied with the FDL model were more active in discussions, had a better understanding of concepts, and felt more confident in doing assignments.

The results of interviews with teachers also showed that FDL helped them manage more heterogeneous classes by providing a more individual approach to student needs. Thus, this study confirms that the FDL model can be an effective solution in improving student learning outcomes and engagement that Flipped-Differentiated Learning (FDL) as an innovative learning model can:

1. Improve Learning Outcomes:
   a. Students who study with the FDL model show a significant increase in learning outcomes compared to conventional methods.
   b. The average test score of students in the experimental group is higher than the control group.
2. Engagement and Motivation:
   a. The FDL model increases student engagement in learning because they can learn at their own pace and style.
   b. Students are more motivated because they have access to the material before class and receive more intensive guidance in class.
3. Improved Concept Understanding:
   a. With differentiated learning, students receive support according to their needs (e.g., additional assignments for students who are quicker to grasp the material, and extra help for students who are having difficulty).

5. CONCLUSION

The Flipped-Differentiated Learning (FDL) model has been proven effective in improving student learning outcomes and their engagement in learning. By combining the advantages of Flipped Classroom and Differentiated Instruction, this model provides a more personalized and adaptive learning experience to students' needs. The implications of this study indicate that the implementation of the FDL model can be an innovative strategy in education, especially in supporting more flexible and technology-based learning.

Suggestions for further research

Further studies are needed on the implementation of the FDL model in various subjects and different levels of education to test its effectiveness more broadly.

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