UNIVERSITAS SEBELAS MARET
BIOEDUKASI: JURNAL PENDIDIKAN BIOLOGI
https://jurnal.uns.ac.id/bioedukasi
1693-265X (Print) | 2549-0605 (Online)

The Influence Concept Attainment Learning Model on Students Argumentative Skills and Concepts Understanding on *Angiosperm Material*

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Submission : 03/11/2022

Revision : 25/07/2023

Accepted : 26 /08/ 2023

ABSTRACT

Students need their own arguing skills in learning process. Based on the observation, it is known that not all students have the same courage to express their opinions, both verbally and written. This leads to a lack of understanding of the media design content being studied by education participants. The application of the *Concept Attainment* learning model is expected to train students how to construct their own concepts and be able to express them verbally. This study aims to determine the effect of *concept attainment* learning model on students' argumentative skills and concept understanding of angiosperms subject in class X MIPA SMAN 5 Tasikmalaya. This study used a quasi-experimental research method with a research design Nonequivalent Control Group Design. The population in this study were all students of X MIPA SMAN 5 Tasikmalaya of seven classes with a total number of 245 students. The sampling technique used was purposive sampling, with the samples used class X MIPA 3 as the experimental class and X MIPA 5 as the control class with a total number of 72 students. The instruments used in this study consisted of 5 argumentative ability test questions and 10 concept understanding questions. The data analysis technique used in this research is parametric statistical data analysis technique. Data is processed by conducting prerequisite analysis in the form of a normality test, homogeneity test, and hypothesis testing using one way ANOVA test. The results showed that there was a significant effect of the *concept attainment* learning model on students' argumentative skills and concept understanding with a significance value of (0.000). Based on these positive results, it can be used as a reference for educators to use *concept attainment* models that support teaching and learning activities.

Keywords: Concept Achievement Learning Model, Argumentative Skills, Understanding Concepts, Enclosed Seed Plants (Angiosperms)

Introduction

The 2013 Curriculum, which is competency-based, focuses on students' attainment of certain competencies. The 2013 Curriculum encourages students to be active during learning process by forming study groups. With study groups, students are expected to have the ability to argue and understand concepts in each subject. The 2013 Curriculum was adopted and also applied to biology subjects. Biology subject is a subject that is very closely related to everyday life. Such as closed-seed plants (Angiospermae) that can be consumed, for example, coconut, rice, bananas, cassava, papaya and so on. To improve students' argumentative skills and conceptual understanding, Different learning methods are needed, its need to develop learning that leads to the process of acquiring knowledge based on the student's own experience. One form of developing students' knowledge based on their experiences is the *Concept Attainment* learning model.

Concept Attainment learning model is a way of developing conceptual understanding by using inductive reasoning by finding and listing the properties used to distinguish examples and non-examples from various categories (Winarti, Setiawan, & Kusnandar, 2022). So it can be concluded that this *concept attainment* learning model, is a learning model in which the teacher encourages students to develop their understanding of the concept through testing examples and non-examples. Understanding the concept is an important part of the learning process and problem-solving, both in the learning process itself and in the everyday environment (Atmaja, 2021). The ability to understand concepts is a basic skill for developing thinking in solving various problems, students are considered to understand if they were able to conclude the meaning of the learning message by giving opinions during learning process.

Argumentative skills or giving opinions are one of the actions that must be present in student learning activities, student activity in expressing opinions is classified as an oral activity and reflects active students in the classroom learning process (Suarsih, 2018). As conveyed by Rahman et.al., (2022) the courage to express an opinion is a condition that requires a strong will to achieve goals, namely the maturity of logical thinking, creative and critical thinking process based on students' understanding and experience. Through students' argumentative skills, teachers can find out the extent of students' understanding when the learning process takes place at school.

Based on the results of field observations made during the Introduction to School Field II Internship (PLP II) activity from October 1 to October 29, 2021; which took place at SMA Negeri 5 Tasikmalaya, it shows that the face-to-face learning process is still limited. In addition, based on the results of interviews with the Biology teacher at SMA Negeri 5 Tasikmalaya on January 15 2022, Limited Face-to-Face Learning (LFFL) often did not fully cover the material, so students often do not fully understand the content being taught. The material to be discussed is closed-seed plants (Angiosperms). The reason for the selection of closed-seeded plants (angiosperms) in class X MIPA SMA Negeri 5 Tasikmalaya Academic Year 2021/2022 is due to the lack of students argumentative skills and concepts understanding in closed seed plant (angiosperms) subject. This is due to the lack of awareness and experience in the field that they get during Limited Face-to-Face Learning (LFFL). Especially in terms of differences between monocotyledonous and dicotyledonous plants.

The *concept attainment* learning model is considered suitable for overcoming the problem of students' lack of argumentative skills and concept understanding. This learning model is designed to help students develop and strengthen their concepts and understanding of learning materials so that when students have understood the concepts in learning materials, they are expected to be able to express their opinions confidently.

Method

This research is a quasi-experimental study. The population in this study were all X MIPA classes of SMAN 5 Tasikmalaya consisting of 7 classes with a total number of 245 students. The sampling technique used was purposive sampling. The research sample used 2 classes with a total number of 72 students, X MIPA 3 consisted of 36 students as the experimental class and X MIPA 5 consisted of 36 students as the control class. The data analysis technique in this study used parametric statistical data analysis techniques. According to Sugiyono (2018) "Parametric statistics are used to test population parameters through statistics, or testing population size through sample data.". Parametric statistics are statistics that consider the type of data distribution, whether the data is normally distributed or not (Jamco & Balami, 2022). In other words, the data to be analyzed using parametric statistics must meet the assumption of normality. The data is processed by conducting analysis prerequisite tests in the form of a normality test, homogeneity test, while the hypothesis test uses One Way Anova test. The research design used is a *non-equivalent control group design*. The dependent variable in this study is students' argumentative skills and conceptual understanding while the independent variable is *the concept attainment learning model*. The learning process is conducted by using the *concept attainment* model.

The data collection technique used was a test of students' argumentative skills and conceptual understanding that was given to both experimental and control classes. The research instrument used was an argumentative skills test consisting of 6 questions and a concept understanding test with 15 questions related to angiosperm material. Data processing techniques to determine the improvement of argumentative skills and concept understanding between pre and post-learning are carried out by calculating N-gain. The data analysis technique used One Way Anova test. Previously, the data normality test was carried out using the Kolmogorov-Smirnov test and homogeneity test using the Levene test. All data analysis was carried out with SPSS software version 24 for Windows, to see a comparison of pretest-posttest values using N-gain with Microsoft Excel 2013 tool.

Results and Discussion

This research was conducted to determine the effect of the *concept attainment* learning model on students' argumentative skills and conceptual understanding of angiosperm material. Based on the research results and prerequisite test analysis, the population data is normally distributed and has a homogeneous variance. Overall the results of the analysis prerequisite test are presented in Table 1 and Table 2.

Table 1 Data Normality Test of Argumentative Skills and Concepts Understanding (Kolmogorov-Smirnov Test)

		Normality					
	Test Class	Kolmogorov- Smirnov [a]			Shapiro- Wilk		
		Statistics	df	Sig.	Statistics	df	Sig.
Student Argumentative Skills	Experiment Pretest	.132	36	046	.745	36	.101
	Posttest Experiment	.110	36	.163	.751	36	.274
	Pretest Control	.141	36	054	.726	36	0.082
	Posttest control	.113	36	.179	.738	36	.073
Student Concept Understanding Skills	Experiment Pretest	.144	36	058	.950	36	.104
	Posttest Experiment	.124	36	.178	.965	36	.297
	Pretest Control	.157	36	.064	.936	36	.097
	Posttest control	.124	36	.193	.946	36	083

The results of the analysis of the argumentative skills test and students' concept understanding in Table 1 obtained a significant value> 0.05. From this value, it can be concluded that H_0 is accepted, which means that the pretest and posttest data on students' argumentative skills and conceptual understanding are all normally distributed.

Table 2. Data Homogeneity Test of Argumentative Skills and Concepts Understanding (*Leven Test*)

Variance Homogeneity Test					
		Levene Statistics	df1	df2	Sig.
Student Argumentative Skills	Based on Means	.649	3	147	.654
	Based on Median	.752	3	139	.516
	Based on Median and with adjusted df	.764	3	136,932	.627
	Based on trimmed average	.628	3	128	.578
Student Concepts Understanding Skills	Based on Means	.747	3	155	.761
	Based on Median	.782	3	143	.623
	Based on Median and with adjusted df	.773	3	152,822	.726
	Based on trimmed average	.751	3	138	.629

Based on Table 2, the homogeneity test of students' argumentative skills and conceptual understanding skills data was tested using Levene's test. The results of the data homogeneity test analysis can be concluded that the data being taken has a homogeneous variance. While the One Way Anova test is used to test the research hypothesis. The complete hypothesis test is presented in Table 3.

Table 3. Hypothesis Test of Argumentative Skills and Concepts Understanding Skills (*One-way* ANOVA Test)

One Way ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Argumentative Skills	Between Groups	9046838	3	3015613	26,266	.000
	In Groups	16532486	144	114,809		
	Total	25579324	147			
Concept Understanding Skills	Between Groups	5777673	3	1925,891	32,071	.000
	In Groups	8407.215	140	60,052		
	Total	14184.889	143			

Based on Table 3. The results of calculations using One Way Anova test on students' argumentative skills and conceptual understanding skills obtained a significance value of 0.000. The significance value is <0.05, so it can be concluded that H0 is rejected and Ha is accepted which means that there is an effect of *concept attainment* learning model on the argumentative skills and concept understanding of students in class X MIPA SMAN 5 Tasikmalaya.

Furthermore, the hypothesis testing data is smaller than 0.05, so it can be concluded that in this study H0 is rejected. It means the concept *attainment* learning model has an influence on students' argumentative skills and concept understanding of Angiospermae material in class X MIPA SMAN 5 Tasikmalaya. In line with previous research, according to Putri (2017) the *concept attainment* learning model is able to improve students' argumentative skills and conceptual understanding. This happens because students are more active in building their knowledge, in the learning process students are invited to actively discuss to understand the concept of the material being studied with several questions from the teacher to help students build their knowledge. Syaspasbandah, et.al (2018) also said that learning media that use the *Concept Attainment* model can be said to be effectively used in learning processes and able to increase students' interest in learning.

In the experimental class, students were tested with description questions and learning model that was used was concept achievement method. There are several advantages in using the concept achievement learning model, such as the teacher is able to directly deliver information that will provide an overview of the topic taught to students so that students will have parameters for achieving learning objectives. The other advantages are to train students' concept achievement, connect with existing frameworks, and produce a deeper understanding of the material, concept achievement improves students' understanding of concepts and argumentative skills. In line with the research Mustika & Sutriana (2018) the *concept attainment* learning model is a learning model that focuses on concept formation and encourages students to find certain concepts through studying problems, formulating, and testing hypotheses so that students are confident with the concepts they find.

The obstacles found by researchers during learning process in experimental classes that use *concept attainment* learning model is that teachers need a long time to conditioning students to be able to work in groups or individually in summarizing concepts. The success rate of learning is determined by the presentation of the data presented by the teacher. At the beginning meeting, the class was excited because new students felt that they had learned to use *concept attaintment* learning model. This can be seen in the comparison diagram as an interpretation of the argumentative skills and concepts understanding skills of students in experimental class and control class during Pretest-Posttest are presented in Figure 1.

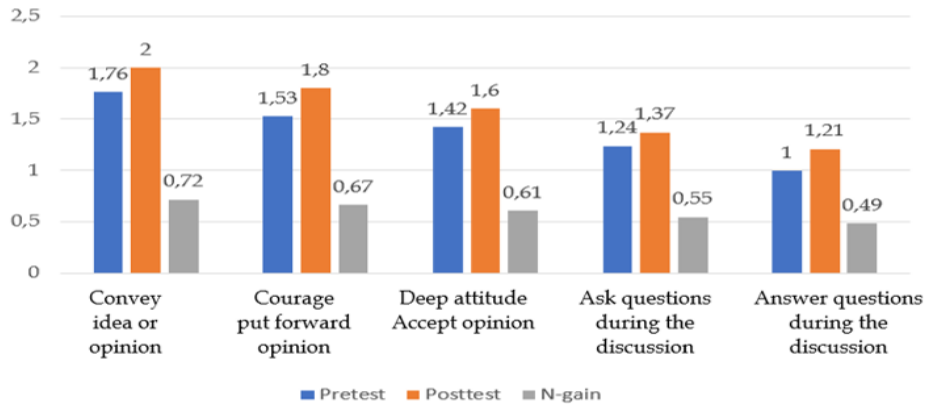

Figure 1. Diagram of Comparison of Pretest-Posttest Scores and N-Gain Argumentative Skills of Experimental Class

Based on Figure 1, it can be seen that the highest average pretest score on the indicator of presenting ideas or opinions is an average of 1.76 and the lowest pretest score on the indicator of answering questions during discussion is 1. The highest average post-test score on the indicator of presenting ideas or opinions was 2 and the lowest post-test score on the indicator of answering questions during discussion was 0.49. The highest N-gain score obtained by the

indicator of presenting ideas or opinions is 0.72 indicating that the students' opinions are good, with the ability to express opinions, students will grow to be critical individuals in giving their opinions and always confident. According to Amin (2016) argumentative skills are responses given by a communicant to a communicator who has previously asked questions. As stated by Fatimah (2016) presenting ideas or opinions, is a logical ability that can train students to think critically and have the courage to speak in public, especially in front of the class.

While the lowest N-gain score on the indicator of answering questions during discussion is 0.49. The low score obtained is caused by some students who still have a better idea of asking questions than answering questions because they fear being wrong in answering them, so this indicator obtained the lowest score compared to other indicators. Ginanjar et.al., (2019) by developing the ability to answer questions, children can easily express themselves, children dare to speak in public, and train children to think critically. So, on all indicators of argumentative skills, students overall gained an increase in the high category according to the N-gain categories.

Students in control classes are given pretest questions by the teacher by distributing questions that have been printed, students fill in pretest questions based on the text on the question paper by referring to *concept attainment* learning models. This can be seen in a comparative diagram of the argumentative skills of control class students during Pretest-Posttest as presented in Figure 2.

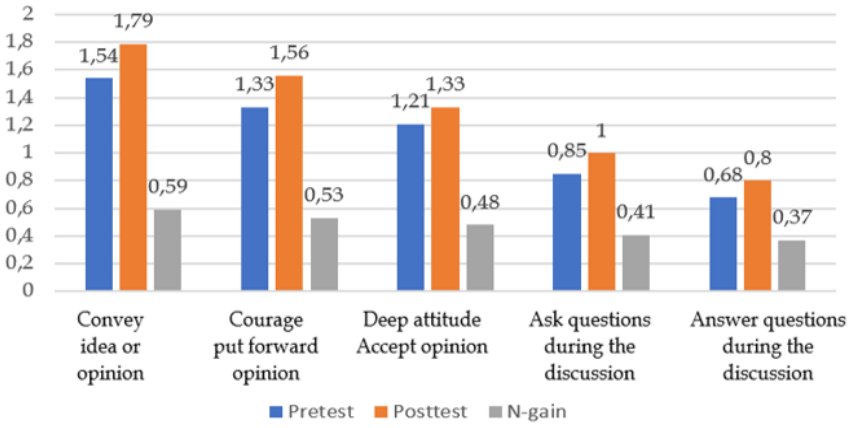

Figure 2. Pretest-Posttest Score Comparison Diagram and Control Class Argumentative Skills N-Gain

Based on Figure 2, it can be seen that the highest average pretest score is on the indicator of presenting ideas or opinions with an average of 1.54 and the lowest pretest score is the indicator of answering questions during the discussion, with an average of 0.68. The highest post-test average score is the indicator of presenting ideas or opinions with a value of 1.79 and the lowest post-test score is the indicator of answering questions during discussion with a value of 0.8. The highest N-gain score is achieved by the indicator of presenting ideas or opinions at the rate of 0.59, thus indicating that students are able to convey their ideas or opinions during learning process at school on closed-seed plant sub-materials. (Angiosperms). As stated by Muna et.al., (2019) expressing opinions is the most basic stage in speaking, where children who are used to expressing their opinions will grow into children who dare to express opinions in public, such as schools and organizations.

While the lowest N-gain score on the indicator of answering questions during discussion is 0.37. The low score obtained is because not all students have the ability to answer questions properly. This shows that the ability of student and the quality of student's language is different. According to Nurkholifah & Wiyani (2020), answering questions during discussions

is one of language skills possessed by children, and the ability to answer questions is very important to develop in their early life. Because answering questions is a way to respond to other people and train children's language skills, especially spoken language.

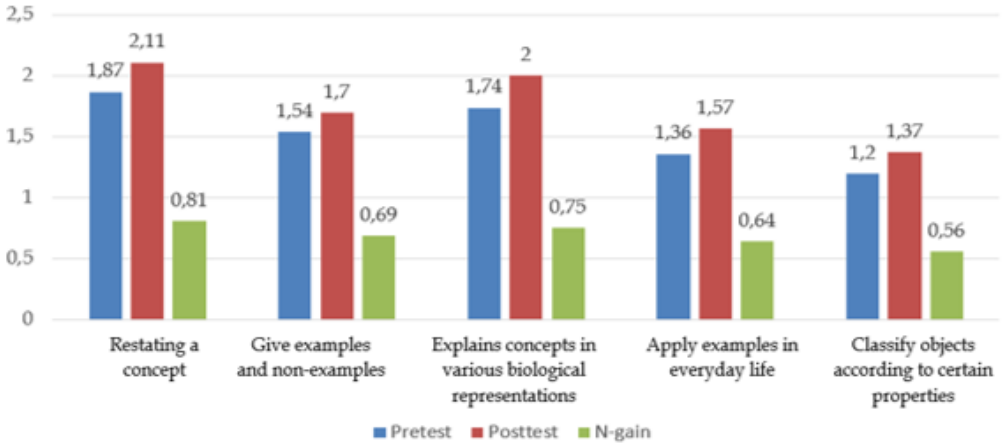

Figure 3 Diagram of Comparison of Pretest-Posttest Values and N-Gain Concept Understanding Skills in Experiment Class

Based on Figure 3, it can be seen that the highest average pretest score is found in indicators of restatement of a concept with an average of 1.87 and the lowest pretest score is in indicators of classifying objects according to certain properties, with a score of 1.2. Meanwhile, the highest post-test average score found in the indicator restatement of the concept was 2.11 and the lowest post-test score found in the indicator of classifying objects according to certain characteristics with the score 1.37. The highest N-gain score obtained by the indicator restatement the concept of 0.81 indicates that students restate good concepts, the ability to restate concepts will make students easier to restate the concepts they have learned. Based Virgana (2016) states that concepts are internal representations of a group of stimuli, concepts cannot be observed, and concepts must be inferred from behaviour. What is meant by Istikomah & Jana (2017) is the ability to restate concept is the student's ability to restate the concept that has been given to him.

The lowest N-gain score on the indicator of classifying objects according to certain characteristics is 0.56. The low score obtained is because there are still students who are confused when classifying objects according to certain characteristics. As stated by Nuraina & Rohantizani (2023) the argument that students have not met the indicators of classifying objects according to certain characteristics is marked by the presence of students who are still confused about classifying objects according to certain characteristics. Therefore, all indicators of students' concept understanding as a whole have increased with a high category in accordance with the N-gain category. Students in control classes are given pretest questions by the teacher by distributing questions that have been printed, students fill in pretest questions based on the contents of the questions stated on the question paper, referring to the *concept attainment* learning model. This can be seen in the comparison diagram of the control class students' understanding of the concept during the Pretest-Posttest presented in Figure 4.

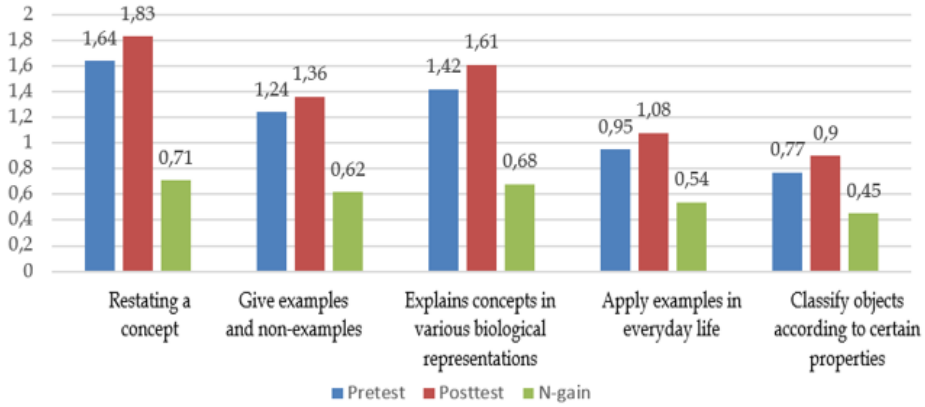

Figure 4. Diagram of Comparison of Pretest-Posttest Values for Students Concept Understanding and N-Gains Control Class

Based on Figure 4, it can be seen that the highest average pretest score is an indicator of restating a concept by obtaining an average of 1.64 and the lowest pretest score is an indicator of classifying objects according to certain properties, with an average of 0.77. The highest posttest average score on the indicator restating the concept was 1.84 and the lowest posttest score on the indicator classifying objects according to certain properties was 0.9. The highest N-gain score obtained by indicator restating with numbers of 0.71 indicates that students restate good concepts, which states that students are able to express or explain again the concepts they have acquired, in the sense that students do not just know or memorize the sequence of previous activities without knowing the meaning (Magdalena et.al, 2020).

The lowest N-gain score on the indicator of classifying objects according to certain characteristics is 0.45. This is because there are still some students who are still confused when classifying objects according to certain characteristics. As stated by Haryani (2022) states that students can determine the classification of an object's name according to the properties that have been acquired. As been Ruswana (2019) stated if students meet the indicators of classifying objects according to certain properties based on their concepts in angiosperms, this indicates that students are able to classify angiosperms based on their criteria and characteristics. Therefore, it can be concluded that the difference in average pretest, posttest and N-gain scores on students' argumentative skills and concept understanding in experimental class has a higher value than the control class. The higher average score in experimental class indicates the influence of *concept attainment* learning model on students' argumentative skills and conceptual understanding in closed seed plants (angiosperms) sub-material.

Based on Dewi et.al., (2021) the teaching and learning process can be optimized if teachers could improve students' argumentative skills and concept understanding so that learning objectives can be properly achieved. The *concept attainment* learning model is a method where the teacher provides examples and non-example images that have not been labelled, about the material being studied. The aim of this learning model is to encourage students to compare the characteristics of images so that it will stimulate students to be skilful in giving opinions and facilitate students' concept understanding from broader topics to topics that are easier to understand.

It can be seen that although the use of *concept attainment* learning models in experimental classes has an influence on argumentative skills and concept understanding, the difference between the posttest average scores in control classes was not very high. This happens because the *concept attainment* learning model has some weaknesses, it takes quite a

long time to conditioning the students and the success rate depends on the learning model used by teacher in delivering the material. In line with Sumartini (2017) states that the weaknesses of *concept attainment* learning models are that teachers need more time to conditioning students to work in groups or individually in summarizing concepts and the success rate of learning is determined by the data presentation presented by teachers.

Conclusion

According to the problem formulations, hypothesis, and the results of data analysis, it can be concluded as follows:

1) *Concept attainment* learning model influences students' argumentative skills on Angiospermae material in class X MIPA SMAN 5 Tasikmalaya.
2) *Concept attainment* learning model influences students' understanding of the living Angiospermae concept for students in class X MIPA SMAN 5 Tasikmalaya.
3) *Concept attainment* learning model influences students' argumentative skills and concept understanding of Angiosperm material in class X MIPA SMAN 5 Tasikmalaya.

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