The Influence of 'Push-in Pull-out' Learning Model on Students' Learning Outcomes viewed from Academic Capability

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The purpose of this study was to see the effect of the push-in pull-out learning model on student learning outcomes in science subjects in terms of academic competence at *madrasah ibtidaiyah* an inclusive school in Central Java Indonesia including; 1) the effect of critical thinking skills on student learning outcomes, 2) the influence of academic ability on learning outcomes students and 3) whether there is an interaction between the learning model and students' critical thinking skills. Academic competence includes the cognitive domain, psychomotor domain, and affective domain. The object of the research was the student of MI Ma'arif Keji and MI Muhammadiyah Kartasura in grade fifth in the academic year 2020/2021. The research method used was quasi-experimental research with an t-test analysis. By using a significance level of 5% for hypothesis testing, this study found three findings; 1) the push-in pull-out learning model had a significant influence on student's learning outcomes in psychomotor and affective domains, 2) student's academic capability did not influence their learning outcomes, and 3) there is no interaction between push-in pull-out learning model and academic capability.

Keywords: push-in pull-out' learning model, learning outcomes, academic capability, madrasah ibtidaiyah, inclusive school

INTRODUCTION

Current international issues are related to the 21st-century skills such are essential in the educational field (Trilling and Fadel 2009; Arsad, Osman, and Soh 2011; (Kivunja

2015; Griffin and Care 2015; Egan et al. 2017). Those issues one of the issues is learning process becoming a hot education topic that has been widely studied in Indonesia along with changes the developed science and technology have become a stage of the technological revolution wherein human activity is altered in terms of scale, scope, complexity, and transformation from previous experiences (Zubaidah 2016; Supena, Darmuki, and Hariyadi 2021). Learning is direct at mastering knowledge, attitudes, and skills based on inside and outside classroom learning. It is implemented interactively, encouraging, enjoyable, challenging, and stimulating the students to participate actively, and also contributes sufficient space for students' initiatives, creativities, and self-determination under their talents and involves many parties, and is supported by technological developments because the nature of learning is a directive process to achieve goals by doing actions through experiences (Darmuki et al. 2018; Darmuki, Hariyadi, and Hidayati 2019).

Many studies in Indonesia show that the learning process in inclusive school such as madrasas ibtidaiyah still lack students' thinking skills and has many weaknesses is only based on a sense of humanity without developing teacher competence such research by Darma (2015), Muzayanah (2016), (Yusuf 2017). According to zubaidah et al (2018) and Hidayati et al. (2019) a science subject is qualified when the learning process is hard but enjoyable, fosters discovery, provides a successful experience, and equips competent students to make decisions and solve problems both inside and outside of the classroom. This strategy also needs using in inclusive schools as well.

Inclusive schools are educational service systems that include disabled students in regular school by providing educational services based on physical, mental, social, emotional, or intellectual abnormalities or deviations in their students (via curriculum adjustments, learning strategies/methods, assessments, and infrastructure preparation). Inclusive schools must have a basic understanding of students with special needs or children with special needs (Timothy and Agbenyega 2018; Ruairc, Ottesen, and Precey 2013; Miles and Singal 2010). In education, inclusive persons, such as blind people, deaf people, speech impaired people, mentally retarded people, and others, require special services owing to impediments to learning and growth. The faster we learn these characteristics, the more we will be able to overcome challenges with good results through inside and outside classroom learning, particularly in studying topic 5 about ecosystem components.

The purpose of learning on theme five is about the ecosystem in madrasah ibtidaiyah to create students who are adequate to understand the concept of scientific reasoning, capable of implementing the concept learned, capable of relating one concept to another, and capable of overcoming obstacles in daily life. Sutiman, et.al, (2014) argue that theme five is not just an effort to gain knowledge, but also an effort to empower the scientific process skills and internalize it to students. Teachers' perceptions are limited to the output element; as a outcome, theme five examine has missed student-centered. The study aims to force the student in memorize scientific reasoning concepts. When a teacher teaches students how to explore and solve problems, then knowledge be meaningfully generated, and pupils who understand critically will be capable to uncover,

examine and determine of construct ideas. They will be able to answer problems appropriately. Learning theme five is intended to help students learn about themselves and their environment in order to develop life skills (BNSP, 2006), including students' critical thinking abilities and cognitive learning outcomes.

According to research on the 'push-in pull-out' learning approach, it has not been extensively using. Proulx (2004) and Klimoviene, Urboniene, and Barzdziukiene (2006) discovered that integrating scientific method and collaborative critical thinking improves students' debate abilities and fosters the critical thinking student collaborative to increase social skills students' through cooperative learning. Another study by Piawa (2010) is related to creative test assessment and logical analysis in the classroom. Leen et al. (2014) conduct a research on creative learning and logical thinking are being implemented in Singapore education institutions. The research signifies the good students' mastery using with this learning. A study by ŽivkoviĿ (2016) reveals that a certain thinking critical as a learning model are needed to attain fruitfulness in the 21st century. Research by Zubaidah et al. (2018) found that significance of group critical thinking and learning ability that outperforms group investigation learning and Jigsaw learning. In general, the existing studies have not been maximal and specific to theme 5 about ecosystem components. So, it has not been focused on 'push-in pull-out' learning model.

In the design of learning process established in Indonesia have not required students' talents along with inventiveness. Learning focuses on knowledge and comprehension, with the application, analysis, synthesis, and assessment playing a minor role. The teacher should be able to inspire students' critical thinking on theme 5's ecosystem components. Gokhale (1995) said that teaching are step to participating with students to gain intelligence, create understanding, find clarity, be critical, and provide justification. So, it can be said that teaching is a method of self-education. The learning system for theme five has mostly contained lectures and exercises to answer questions quickly without understanding the concept in depth. It causes pupils to be less skilled in developing their thinking skills in problem-solving and applying knowledge taught. The primary cause of kids' incompetence in critical thinking is the instruction that does not enhance their reasoning skills. The capacity to think critically is not the primary purpose of learning implementation. Nonetheless, it shows a significant role in improving individual quality.

The application of a learning representations that can develop students' thinking abilities, particularly creative and critically thinking abilities, is the explanation to their critical thinking problems. The learning model used is 'push-in pull-out' learning. According to Guo (2017), this learning model is an innovation in learning theme five about ecosystem components. It has useful, critical, and collaborative constructivist personalities that complement one another. The useful aspect of the 'push-in pull-out' learning approach demands students to manage a hypothesis and test making, to manipulate things, solve issues, have a discussion, undertake research, find solutions, articulate ideas, ask questions, and reflect. This learning model character can develop pupils' critical and creative thinking abilities. It also boosts pupils' scientific potential

mastery. The collaborative nature allows students to collaborate, learn from one another, and discuss in groups. As a result, they can equalize learning outcomes and narrow the academic success gap between children with high and low academic performance.

Theoritical Review

Push-In Pull-Out' Learning Model

Inclusive education has emerged as a global education priority as sustainable development efforts seek to provide inclusive and non discriminatory quality education and offer everlasting learning opportunities for all. A study in Myanmar by Tonegawa (2022) revealed that inclusive education is still very limited and carried out in stages. Some of the challenges of inclusiveness in Myanmar are the ineffectiveness of communication between regular and special schools and insufficient communication between student with special needs and normal student. Research by Osaman Aktan (2021) in Turkey found that there are issues such as teacher professional deficiencies, insufficient support services, collaboration among partners, crowded classes, unqualified schools in terms of physical support, a lack of expert support, and leaving all engagement to teachers during interventions. According to Pakistani research, there is a link between orientation and accessibility training in the special education curriculum and social adjustment issues in visually impaired children (Malik et al., 2018).

The problem for teachers in managing learning in inclusive classrooms in elementary schools in Indonesia is how to develop an effective learning model that can meet all the needs of students with diverse characteristics through six factors learning experience, motivation, psychomotor, social skills, talents, and interests, as well as general teaching competencies (Rasmitadila et.al. 2021). Concerning the model of learning, the push-in and pull-out learning model is a prototypical that develops 21st-century skills that refer to the curriculum that will be required in the future. This learning model improves students' critically, constructively, collaboratively, creatively, and systematicly thinking abilities based on future needs. It is collaborative learning between inside and outside classroom learning to help students to study (Morin 2020; Nes, Demo, & Ianes, 2018; Watt & Richards, 2016, Marston, 1996; Laffitte, 2012; Kasey, 2016).

Developing a management model for 'push-in pull-out' learning in inclusive MI which is integrated in a system of planning, organizing, implementing, and controlling means how it is implemented through identification of learning objectives, instructional analysis of learning, identifying initial behavior/students characteristics, formulating learning objectives, developing benchmarks, developing teaching strategies, designing and implementing formative evaluations, and conducting teaching revisions (Dick, Carey, &James, 2014). Identifying learning objectives means conducting instructional analysis directed at developing knowledge, attitudes, and competencies. Teachers need to be trained about the stages of inclusive learning procedures that need to be passed.

The 'push-in pull-out' learning has uniqueness which science is constructed by the students who work actively in collaborative groups. The perspectives of collaborative in socioculturalism and constructivism actually emphasize on the importance of students' activeness in learning process. Both perspectives agree that individuals' knowledge is

form through the process of initiation and active inculturation through social interaction. Constructivist-collaborativei learning, cognitive imbalance, Zone Proximal Development (ZPD), scaffolding conception (schemas), assimilation, and accommodation are all included.

The 'push-in pull-out learning model involves a teacher providing direct experiences for students to drive students to be able to see and know the environment directly to increase students' understanding and intelligence. Moreover, students can obtain direct experience through observation, and answer questions about what they have seen, heard, and experienced. Furthermore, students can gain information through conversation, question-answer, or explanations about the objects visited. It raises pupils' environmental awareness and promotes collaboration. Conversation and discussion activities have the potential to close the achievement gap between average academic students and students with special needs under the "push-in pull-out learning paradigm. To execute this learning style, teachers must regard the classroom as a learning society. Not only acquiring fact, but students are also developing inquiry abilities such as explaining, characterizing, predicting, and managing natural things and occurrences.

The 'pull-out' model is generally carried out at a predetermined time. Inclusive pupils in normal classes continue to study without receiving specialized treatment. They require specific tutors at the same time as they are having difficulty. The 'pull-out' learning model requires careful processing of facilities, infrastructure, and teacher's willingness. In-depth data collection is carried out before this model implemented. In regular class, there is no guarantee in providing personal services for inclusive students. But, they gain knowledge without any difference. The existence of 'pull-out' learning model can overcome the weaknesses of regular classroom learning model and inclusive students to understand and obtain lessons. This learning model is usually used for every inclusive student who requires understanding based on his needs. It requires special space, tools, media, and time allotment. So, it has to be scheduled for its implementation.

The stages for implementing the 'pull-out' model include: 1. Preparation. It is a stage of providing facilities and infrastructure in forms of tools, media, classes, and teachers. 2. Implementation. The teacher communicates with special co-teacher. Both of them has to communicate actively about the implementation of 'pull-out' model when inclusive students needs learning assistance. It is conducted every Tuesday, Wednesday and Thursday. 3. Evaluation. In the end of assistance process for the inclusive students, it is evaluated. The results of it are submitted to the classroom teacher to be followed up. 4. The follow-up action. The classroom teacher and co-teacher communicate about the inclusive students' learning achievement. From the results, inclusion is stated as a basis for continuous mentoring.

Using control theory (Glasser, 1992) the management of 'push-in pull-out' learning at Madrasah Ibtidaiyah has the primary goal of teaching students and improving their lives. For instructors, excellent learning management may serve as a guide in the teaching and learning process, ensuring that the goals of inclusive learning are met.

It will also be able to evaluate students in a disciplined new way. One way that can be done is to establish cooperation between Madrasah Ibtidaiyah (MI) and Islamic boarding schools. This collaboration between MI and Islamic boarding schools can be useful in providing effective learning programs that involve collaboration, control, teacher learning commitment, and supervision of learning effectiveness (Raharjo et.al., 2017) (Renato Opperti and Jayne Brady, 2011; Yan and Meng Deng 2019). Pesantren (Islamic boarding school) is a community-based Islamic educational institution founded to address the educational requirements of its members. It will exist as long as it can fulfill the requirements of its people. Despite their disparities, it is envisaged that the partnership of public schools and Islamic boarding schools would contribute to the growth of Indonesia's educational system. The originality and uniqueness of Islamic boarding schools are part of the country's cultural past, as is education's capacity to produce moral national leaders in response to globalization's demand for exceptional human resources. Pesantren is one of many non-formal education institutions in Indonesia that has effectively education learning (Raharjo, Fakhruddin, and Sutarto 2017; Wibowo and Prihatin 2020; Wibowo et al. 2020).

Beyer (1995) defines human resource development as an intellectual and disciplined critical thinking process capable of conceptualizing, implementing, analyzing, synthesizing, and evaluating messages generated through observation, experience, reflection, reasoning, or communication as a reference about what to believe and what action to take. Bers (2005) thesis founded on correct and fair perceptions, assumption analysis, biased arguments, and logical interpretations (Fascione, 2020). Jenicek (2006) and Owu-Ewie (2010) distribute higher order thinking within four categories: decision making, creative thinking, problem solving, and critical thinking. Reasoning includes basic thinking, creative thinking can be related to critical thinking are to test, relate, and evaluate all aspects of problems, focus on part of problems, gather and arrange information, validate and analyse knowledge, remember and analyse knowledge, determine reasonable answer, draw valid conclusions, have analytical and reflexive characteristics (Ennis, 2011).

According to Piawa (2010), critical thinking involves the capacity to make observations, be curious, ask the questions, seek needed sources, place beliefs, assumptions, and views to test and utilize facts, identify and characterize obstacles, evaluate the validness of explanations and arguments, develop sound judgments and solutions, and understand logical concepts in particular. The ability to formulate students' critical thinking concepts in understanding problems, choosing important information to solve, understanding presumption, formulating and selecting relevant hypotheses, representation valid conclusions, and determining the hypotheses of validity related to the ability to develop analytical characteristics of students (Klimoviene et al., 2006). Knowledge is the most important elemental the thinking process, according to critical thinking and students should use certain skills when practicing critical thinking.

Think critical is a method of thinking that is planned and constructed. It follows a logical progression based on previously known facts. Focus, logic, interpretations, situation, clarity, and overview are the six components of critical thinking (Ennis, 2011).

Critical thinking begins with how to respond to a problem, and the conclusion of the arguments presented reveals the problem's focus. Students are required to respond with underlying and logical reasons. As same with Ennis, Prayitno, Subanji, and Muksar (2014) add that the thinking ability construct is as follows: 1) creating problems that are graded on students' ability to create a query that leads to analysis 2) Argumentation, which can be assessed by students' ability to formulate ideas and identify differences and comparisons among various aspects of the simulated task. 3) Making deductions to assess students' ability to make logical deductions and interpret data appropriately. 4) The effectiveness of induction can be measured primarily by students' ability to analyze data, generalize, and draw appropriate conclusions. 5) The ability of students to evaluate facts to find alternative solutions can be used to assess evaluation. 6) Students' ability to determine and take action can be measured based on their ability to determine a way out and choose feasible alternatives.

Although the perspectives of many experts differ, they have similarities in terms of properly gathering, assessing, and applying information. Students require critical thinking abilities to make life decisions (Lange 2000; Leen et al. 2014). The key to achieving critical thinking is to restructure ideas as a result of properly analyzing and evaluating them. When the reasons given are appropriate and sufficient, When terms are used in the argument, there must be clarity so that there are no problems in drawing any conclusions. It reviews, checks, or re-examines what has been develop, decided, attentions, studied, and concluded. Even though the opinions of several experts are different, it has similarities in the conditions of gathering, to evaluate, and using material effectively to decide their life.

METHOD

Research Design

This study is a type of quasi-experimental research. This study only used a non-equivalent posttest. This was done due to limited errors and the researchers' use of a natural environment, and randomization was not possible for ethical or practical reasons (Krishnan, 2019). There were two groups in this model: control and experimental. Traditional methods of learning, such as varying lectures, were used by the control group. The experimental group used 'push-in pull-out' learning. This research was conducted for 6 months by paying attention to the lesson plan prepared by the teacher and validated by the MI's supervisor. To ensure students learn with the expected lesson plans, the researcher looks at the teacher's lesson plans and takes a theme about the ecosystem in science subjects. The researcher ensures by push-in and pull-out outside the classroom with collaboration during *pesantren* leathat the classroom teacher who provides the material by participating in classroom learning hours. Both groups received a post-test as a result of their relationship (Sugiyono, 2012). The primary data was then processed and analyzed to see if the 'push-in pull-out' learning model affected students' academic ability.

The procedures of study included the phase of arrangement, planning, implementation, observation, evaluation, analysis, and follow-up. The learning instruments were created

during the planning phase. Using a collaborative-constructivist teachings model need entailing developing research proposals, learning tools in the form of a syllabus, and lesson plans. Finally, it created research instruments in the form of data collection instruments.

The implementation phase involved administering treatment to the research subject. In this step, the researchers collected as much information as they could from the research subject. This stage included the development of a research proposal, research instruments (syllabuses and lesson plans), and the implementation of teaching and learning activities in both the control and experimental groups. The learning process was observed by researchers and research assistance who monitored the syntax implementation of 'push-in pull-out' learning model using observation sheets. Moreover, a posttest was carried out after the theme of thematic learning about ecosystems is completed in fifth grade.

The data collection phase was followed by the data analysis phase. The SPSS program version 16 was used to analyze the data. This procedure was followed until the report was completed.

Participant

This study's population consisted of all fifth-grade students from inclusive Islamic schools in Central Java; there are only four inclusive madrasas in Central Java, one each in the regencies of Semarang, Sukoharjo, Kebumen, and Banyumas. The samples takes two madrasah inclusion were taken from the population which represented it, so the conclusions could be drawn from it (Sukmadinata, 2005). The samples of study were two classes from MI Ma'arif Keji in Semarang regency and MI Muhammadiyah Kartasura in Sukoharjo Regency. MI Ma'arif Keji (1A) organized a force of 36 students as the experimental group. MI Muhammadiyah Kartasura (1B) served as the control group, which included 38 students. This study's subjects were chosen using a random sampling technique.

Data Collection

This study used checklists, tests, documentation, and observation to determine if the instructor as a whole follows the grammar of learning the subject matter for regular students and special needs. Pre- and post-test data, as well as rubrics, were used to compare student outcomes across the push-in and pull-out learning models in the cognitive, psychomotor, and affective domains. The test method was a systematic procedure in which the person being tested was given a set of response stimuli that could be represented numerically. As a data collection instrument, the test consists of a series of questions or exercises designed to assess individuals' or groups' knowledge, intelligence, abilities, and talents (Budiyono, 2017). The test was developed to assess pupils' critical thinking abilities. It was written in the style of an essay.

The documentation approach was used to collect data in the form of notes and to analyze school papers relating to the study purpose, such as lesson plans, the profile of madrasah ibtidaiyah, instructors, and students. The test results were gathered as a

reference to resolve the equity of pupils' beginning ability in the population.

The observation technique is used to closely examine the exercises by observing directly the target of inquiry (Budiyono, 2017). The observation sheets were applied to examine the syntax fulfilling of 'push-in pull-out' learning model which was applied in the classes being observed. The researcher employed observation, interview, and rubric criteria to prevent study bias. The object of observation is the entire teaching and learning process includes teachers, students, and class conditions, especially when learning theme five about ecosystems is given to students in Grade Five.

Data Analysis

Descriptive analysis and inferential statistical analysis were used to analyze the data in this study. The descriptive statistical analysis was utilized to link the data collected, namely the students' critical thinking abilities in MI Ma'arif Keji and MI Muhammadiyah Kartasura. The hypothesis was evaluated using inferential statistical analysis. In this study, the hypothesis was tested using a two sample t-test that was independent at a significance level (α) = 0,050 using SPSS version 16. A preparatory test was completed before the t-test. It was a normalcy and homogeneity test. The Kolmogorov Smirnov test was employed to determine normalcy. The Levene's test was utilized in the homogeneity test. H0 was rejected when the probability significance (*Sig.*) > α (0,05). In contrast, when the probability significance (*Sig.*) < α (0,05), H_0 was accepted (Budiyono, 2017).

Validation of Data Accuracy

An essay test was used to assess intellectual thinking skills in this study. To examine the quality of questions, the instrument that will be used to gather data must first be validated. The instrument's probability test was performed in various steps, including the validity and reliability tests. Before using it to collect data, the instruments were checked for validity and reliability to assess the quality of the things in question, which was the instrument's accuracy in measuring something (Sugiyono, 2012). The instruments were considered valid if they could be used to measure something. The purpose of the validity test was to ensure that the instrument accurately reflected the science subject provided during the learning process. Internal or external validity is assigned to it.

The measurement of content that was supposed to be measured is the focus of content validity. In other words, the test comprised a sample that was representative of the behavioral domain being examined. It might be managed by determining the concepts to be verified in the topic, assembling a grid of the material to be tested, developing test questions based on the grid and an answer key with the assessment rubrics, and re-examining the questions, answer key, and assessment rubrics before printing. (Budiyono, 2017).

Construct validity refers to instrument validation based on concept indicators in abstract learning materials. It requires an indicator that helps to ensure that measuring instruments were prepared under the concept.

The indicators of measuring were used to evaluate the concept's construction. When the measuring instrument was appropriate for measuring indicators, it was also appropriate for measuring material concepts, it was possible to draw the conclusion (Sukmadinata, 2005). Expert judgment was used in this study to assess the construct validity of the measure.

External validity was determined by comparing the instrument's existing criteria to empirical facts observed in the field (Sugiyono, 2012). It was carried out by administering a try-out test to a population sample. The validity might be assessed by utilizing Pearson's product-moment correlation technique to connect the overall students' scores in one item (X) with the total scores acquired by all students (Y).

The value of r_{xy} was then employed in the t-test calculation. Because the responders in testing the instrument were the study's samples, the t-test was applied. Generalization was required in the population so that it could be deemed to represent all of the population's characteristics (Budiyono, 2017).

The distribution (t- table) for the significance level (α) = 0,05 and the degree of freedom (dk= N-2) was then examined. A test judgment was reached as a result of the comparison. When the value of the $t_{count} < t_{table}$ was not a valid component or item. Although it was tested frequently, the component was declared valid when the value of $t_{count} > t_{table}$ (Arikunto, 2018). When test questions provided the same answers on multiple occasions, they were considered dependable. The Cronbach Alpha coefficient was used to assess the dependability of test and questionnaire instruments. Cronbach alpha 0.745 was obtained using SPSS 16 statistical test results on the reliability test, suggesting that the instrument is suitable for use because the recommended Cronbach alpha value is more than 0.6 (Cronbach, 1951)(Chan & Idris, 2017).

FINDINGS

The Research Results

The goal of this study was to see how the 'push-in pull-out' learning strategy affected students' critical thinking ability. In the control group, 38 students adopted this learning approach (class 1B). The experimental group (class 1A) of 36 students used lectures and presentations. When the number of samples in each group differs and the variances of the two data sets differ, an uneven (independent) variance t-test is required. (Sugiyono 2010: 2017) (Sujarweni 2014). The determination of class 1B as the experimental group and class 1A as the control group was carried out by using cluster random sampling that had previously been verified for balance on the unified population of *madrasah ibtidaiyah* at Central Java in academic year 2020/2021. Both groups' critical thinking skills (post-test) results were compared. It could be viewed whether there was an influence of 'push-in pull-out" learning model on critical thinking abilities of students.

Data on students' critical thinking abilities while studying ecosystem components in topic 5 was obtained from the results of the essay in the post-test who checked by teachers. It explained how to gain knowledge by using deductive and inductive reasoning. The essay involve of 6 items about the aspects of critical thinking. According

to (Fascione, 2020), Interpretation, analysis, inference, appraisal, experimentation, and self-regulation were all incorporated. Table 1 shows the distribution findings of students' critical thinking skills using the 'push-in pull-out' learning model in the experimental group and a variety of lecture methods in the control group.

Table 1
The distribution of critical thinking ability

Interval Score	Frequency of Control Group	Frequency of Experimental Group
31-40	6	0
41-50	6	3
51-60	10	6
61-70	8	6
71-80	4	15
81-90	4	6
91-100	0	3
Total	36	38

* score intervals are made based on the results of students' scores with an interval range of ten

Table 1 showed the frequency of one by one of interval score in both groups. The control group had the highest frequency in the score range of 51 to 60, with a total frequency of 10. The experimental group's highest frequency was in the range of 71 to 80, with a total frequency of 15. The statistics demonstrated that the experimental group's critical thinking capacity was greater than that of the control group. Table 2 provides a summary of the outcomes of the student's critical thinking ability.

Table 2
The results of students' critical thinking

Statistical Results	Control Group	Experimental Group
Mean	63,88	76,31
Standard Deviation	12,13	8,87
Variance	147,164	78,731
Minimum	35	47
Maximum	85	92
Median	63,50	77,15
N	36	38

Table 2 revealed that the experimental group's average critical thinking skill was higher than the control group's. The average score of the control group was 64,92. The experimental group's average score was 76,84. The data was more heterogeneous when the standard deviation was larger. Conversely, when the standard deviation was getting smaller, the data was still homogeny. The control group's standard deviation was 12.13. The standard deviation for the experimental group was 8.87. The variance in the control group was 147,164, while the variance in the experimental group was 78,731. This condition demonstrated that the standard deviation and variance of the control group were greater than those of the experimental group. In other words, the control group had a higher level of diversity (variability) (Budiyono, 2017). The experimental group's maximum and minimum scores, as well as the median score, were higher than the

control groups. According to the data, the experimental group's students outperformed the control group on the critical thinking test. Table 2 reveals that the experimental group that utilized the 'push-in pull-out' learning model had a higher average critical thinking ability score than the control group that used the lecture and presenting method. Table 3 shows the comparability of average results for each facet of critical thinking capability in both groups.

Table 3
The average value comparison of each aspect in critical thinking ability

Group	Interpretation	Analysis	Evaluation	Inference	Explanation	Self- Regulation
Experimental group 84,210		84,210	76,315	73,684	86,842	60,526
Control group	91,666	47,222	69,444	63,888	61,111	55,555

The experimental group outperforms the control group in five categories, as demonstrated in Table 3: analysis, inference, evaluation, explanation, and identification. The control group fared better in one component of critical thinking, namely interpretation.

The number of interpretations in the control group was 91,666. With a value of 84,210, it was higher than the experimental group. The value of the analytical aspect in the control group was 47,222. It was much lower than the experimental group's score of 84,210. The assessment component had a value of 69,444 in the control group and 76,315 in the experimental group. The inference aspect in the control group was likewise lower than in the experimental group, with a value of 63,888 in the control group and a value of 73,684 in the experimental group. The explanatory aspect for the control group was 61,111, which was lower than the experimental group's score of 86,842. The self-regulation aspect of the control group was 55,555, which was lower than the experimental group's value of 60,526. The experimental group's highest level of critical thinking was the explanation, while the control group's highest level was interpretation. The experimental group's lowest critical thinking aspect was self-regulation, while the control group's lowest critical thinking element was analysis. Based on average differences in critical thinking ability between experimental and control groups, the analysis aspect was 36,988, the explanation aspect was 25,731, the inference aspect was 9,796, the evaluation aspect was 6,871, the interpretation aspect was 7,456, and the self-regulation aspect was 4,971.

Normality Test

Testing assumptions were to be statistically tested as a prerequisite for analyzing different treatments using the t-test. T-test analysis requires two prior tests: normality and homogeneity. The first condition for test data required that it be normally distributed. The normality test was meant to establish if the control and experimental groups were recruited from a normally distributed population. The sample was taken from a normally distributed population, according to H_0. According to H_1, the sample did not occur from a regularly distributed population. The Kolmogorov-Smirnov test with = 0,050 was used to assess the normality of students' critical thinking ability in both groups. It used SPSS version 16 program. When the value of Sig. from the normalcy test

was more than the value of Sig. in which the value of α is 0,050 (Sig. >0,050), H_0 was accepted. The data might be regarded to be regularly distributed. Table 4 shows the results of the normality test.

Table 4
Results of normality test in students' critical thinking ability

Group	Kolmogorov Smirnov	KS_{Table}	N	Sig	Result	
					Description	Decision
Control	0,107	0,227	36	0,809	Sig > 0,05	Normal
Experimental	0,077	0,221	38	0,455	Sig > 0,05	Normal

Table 4 indicated that sig. > 0,05, implying that H_0 was approved. It was determined that the data in the control and experimental groups were regularly distributed.

Homogeneity Test

The second prerequisite before performing the t-test was that the data be distributed equally. The homogeneity test was developed to determine if the variation between the control and experimental groups was homogeneous or heterogeneous. When the data was homogenous, the variance between the experimental and control groups was the same. The homogeneity test of the ability to think critically was performed using Levene's test with = 0,05 and the SPSS program version 16. When the significance value was more than 0.05 (*sig*>0,05), the variance between the two groups was said to be homogenous. It was deemed to be heterogeneous when the significance value was less than 0.05 (*sig*<0,05). According to H_0, each group had the same variance (homogeneous). According to H_1, each group did not have the same variance. The findings of the homogeneity test on students' critical thinking abilities are shown in Table 5.

Table 5
Results of homogeneity test in students' critical thinking ability

Homogeneity Test	N	df1	df2	F_{count}	F_{table}	Sig	Test Decision of H_o
Critical Thinking Ability	74	1	72	3,891	3,974	0,083	Accepted

In Table 5, the value of F_{count} was 3,883, while the value of the $F_{table(0,05)(1)(72)}$ was 3,974. The calculation results indicated that $F_{count}<F_{table(0,05)(1)(72)}$ and the significance value for the homogeneity test were more than 0.05 It meant that H_0 had been accepted. As a result, the critical thinking ability scores in both groups were similar. The prerequisite for hypothesis testing for the findings of students' critical thinking skills had been reached. It belonged to a population with a regularly distributed variance. As a result, parametric hypothesis testing using the t-test could be performed.

Hypothesis Testing

Hypotheses were assessed in this study using the t-test in the SPSS program version 16. The two-sample t-test was made to analyze whether two sets of data (variables) were comparable or dissimilar (Sugiyono, 2010). The findings of the preconditioning test revealed that the critical thinking test data was normal and uniform. In other words, the

conditions for conducting the t-test had been met. The criteria used in making hypothesis decision was the significance level (α) = 0,05. H_0 was rejected when the significance probability (*sig*) < α (0,05). It meant that when the significance probability (*sig*) > 0,05, H_0 was accepted. In this study, H_0 was stated there was no difference in students' critical thinking abilities while employing the 'push-in pull-out' learning model v.s lecturing with the presenting method. H_1 was stated that on students' critical thinking ability, there was a difference between the implementation of the 'push-in pull-out' learning model and lecturing with the presentation method. The findings of the t-test examination of the influence of the 'push-in pull-out' learning model on students' critical thinking abilities are shown in Table 6.

Table 6
T-test result about the influence of 'push-in pull-out' learning model on critical thinking ability

Variable	N	df	t_{count}	t_{table}	Sig	Description	Test Decision of H_o
Critcal thinking ability	74	72	4,243	1,993	0,00	Sig > 0,01	Rejected

Table 6 showed the test results in which the significance value was less than 0,05 (0,00< 0,05). Based on these findings, it was possible to infer that H_0, which indicated that there was no significant difference in students' critical thinking skills between the implementation of the 'push-in pull-out' learning model and the lecturing approach, was rejected. H_1 was accepted, stating that the implementation of the 'push-in pull-out' learning model and the lecturing approach resulted in a considerable difference in students' critical thinking abilities. The 'push-in pull-out' learning paradigm was determined to have a substantial influence on student's critical thinking abilities because the significance value was less than 0.01. (0,00001).

DISCUSSION

The t-test data analysis revealed that the 'push-in pull-out' learning style influenced students' critical thinking abilities. It showed by the *sig.* value was 0,00 (*sig* < 0,05), the value of t_{count} was 4,845, and the value of t_{table} was 1,993, so t_{count} > t_{table}. The average critical thinking skills scores of students in the experimental group were better than those in the control group. There was a significant difference. The experimental group's average score was 76,84. The average score for the control group was 64,92. The findings of this statistical test were analyzed because students were needed to formulate questions, formulate hypotheses, and test tentative explanations through group discussion and experimentation in the 'push-in pull-out' learning model. It resulted in a learning experience that required pupils to think critically about the learning materials. The ability to describe challenges has a significant impact on the ability to develop interim solutions before applying concepts from textbooks to students. The teachers stimulates this process in children through perception, question and response, debate, and basic experiments. Finally, it becomes a habit to teach pupils critical thinking skills to improve their academic talents. The teacher stimulates this process in children through perception, question and answer, debate, and basic experiments. Finally, it becomes a habit to teach students critical thinking skills to enhance their academic aptitude. This is in line with Kaddoura (2011), Fascione (2020), and Srikote (2013) who

state that there is a disparity in critical thinking skills in the areas of analysis, evaluation, drawing conclusions, deduction, and induction between classes conducted in learning-based learning and learning. Traditional methods for developing activity in building concepts and solving problems in learning materials include interpretation, analysis, inference, evaluation, explanation, and self-identity.

Although not all students were able to fully participate in the learning process due to differences in academic ability, the learning process ran smoothly and effectively, allowing the learning objectives of theme five regarding ecosystem components to be met. The 'push-in pull-out learning approach' was a synthesis of constructivism and collaborative perspectives that complemented one another. Students were obliged to develop their knowledge under constructivism, whereas collaborative stressed social practice and collaborative groups. According to Srikote (2013), students are needed to be engaged in creating concepts and addressing issues in the learning materials during the learning process.

Base on research finding obtained fact that not every students could be implicate taking part in the educational process, because they had various academic abilities. To increase critical thinking for both typical and special needs children, the instructor employs a push-in pull-out learning technique by modifying the curriculum, learning, and evaluation. The goal is to impact good students' critical thinking skills so that they can attain good academic abilities, as well as normal kids and students with special needs, based on their talents both inside and outside the classroom. According to Darmuki et al. (2019) (2019) Students in collaborative learning must be able to communicate with others, have a strong desire to teach their classmates, and capitalize on their interactions in collaborative groups taking part in the educational process. Teacher carried out learning stages which encouraged students to construct their own knowledge in an interactive and enjoyable environment in the material of theme 5 about ecosystem components. It had been carried out well by the teacher.

The experimental group's implementation of this learning model began with organizing learning. At this point, students were divided into teams of five members with varying academic abilities. It was designed to make the scaffolding process easier by using peer tutorials. This scaffolding approach intends to enable high-academic students to assist low-academic students in developing concepts or knowledge. It could minimize the students' gap in thinking ability. The second stage involved looking into students' initial perceptions of environmental pollution through the lens of theme 5 about ecosystem components. The teacher assisted pupils in exploring their initial concepts by asking questions about the phenomenon. After observing outside the classroom, students were more concerned with recognizing and clarifying their perceptions/ideas. The purpose of disclosing students' initial notions was to encourage conceptual modifications congruent with constructivist ideals, allowing students to build new concepts that were more scientific than their earlier concepts. During the assimilation and adaptation processes, students developed the concepts. The transformation to new knowledge was the assimilation process. Individually, he changed his knowledge base to respond to a new

This stage was designed to encourage students to express their initial ideas or concepts

about the learning material, enabling students to build critical thinking abilities in the area of interpretation. This was the student's ability to categorize situations or phenomena in order for them to be adequately understood. It was consistent with Piaget's constructivist learning theory, which proposed that students formed systems of meaning and grasped facts via their experiences and interactions with learning sources and partners (Piaget, 1976). The average interpretation difference between the experimental and control groups was 7,456. The control group had an average value of 91,666. It was better than the experimental group's 43,210. It happened because the teacher started the experimental group off with a material presentation before starting the exercise. It encouraged children to follow directions effortlessly. It was compared to a control group that initially practiced the inquiry technique.

The following stage involved implanting cognitive conflicts in pupils' minds in order to induce cognitive imbalances. During this stage, students displayed slides in the form of action photos outside the classroom with material from theme 5 about ecosystem components. The teacher's responsibility was to help pupils describe their thoughts by asking refuting questions. As a result of cognitive difficulties, students would be challenged to learn. Students were unhappy with the occurrences they observed until they found the appropriate answers to balance their cognition. At this stage, students were able to acquire critical thinking abilities in the areas of analysis and explanation. When students evaluated concepts and investigated problem causes, they demonstrated their ability to analyze. The average difference in this characteristic between the two groups was 36,988. In the experimental group, the average value of the analytical aspect was 84,210. It was higher than the 47,222 in the control group. It occurred because the experimental group's constructivist method was superior to the control group, which only acquired materials from the teacher. When students presented and explained their opinions to discover the best solution to the difficulties given, the explanation component could be seen. This factor differed by an average of 25,731 in both groups. The experimental group's average value was 86,842. It was higher than control group which was only 61,111. It occurred because the experimental group was given more opportunities and time to voice students' thoughts than the control group.

The following step was the concepts' formation for collaborative learning. It was built in a constructivist approach, using assimilation and accommodation processes. Students were required to do inquiry activities such as developing and carrying out experiments, as well as engaging in group discussions, throughout this period. During the discussion and experiment, students were asked to develop questions and hypotheses and test preliminary responses. According to Gokhale (1995) tudents received a free basis for critical thinking through collaborative groups and depended on one another during debates to voice their perspectives, make decisions, and solve issues. The ability to think critically was determined by one's comprehension, belief, maturity level, and experience.

Students employed critical thinking to concentrate on the learning process rather than acquiring knowledge about phenomena. Critical thinking allows students to be more creative by helping them to discover and apply new information in real-life circumstances. After learning to think critically, they were more thoughtful and creative.

Students were taught how to organize existing data as part of the problem-solving process. It allowed students to strengthen their critical thinking skills in the interpretation element. Students learned how to test facts, develop logical linkages, and formulate hypotheses during the hypothesis formation process. It was capable of strengthening their analytical and critical thinking abilities. Testing preliminary responses taught pupils how to connect events, assemble data, analyze data, and form conclusions. Assembling events and compiling data helped students develop critical thinking skills in the areas of explanation and evaluation. Learning model in the control group is carried out using a push-in learning model only. They have to be able to explain and evaluate assertions with strong opinions. The average rating difference between the two groups was 6,871. The average value for the experimental group was 76,315. It was more than 69,444 in the control group. It happened because the 'push-in pull-out' learning paradigm was based on a problem or phenomenon that prompted students to evaluate a credible assertion from an experimental report. According to Fascione (2020) stated students were able to generate opinions after undertaking tests that they devised themselves. As a result, problem-based learning has the potential to help pupils enhance their capacity to assess problem-solving solutions.

After gathering data, the next step was to reach inferences. In both groups, the average difference in inference was 9,796. The average value for the experimental group was 73,684. It was more than 63,888 in the control group. Because students in the experimental group framed questions, suggested hypotheses and organized and completed activities on their own, they could evaluate evidence, answer hypotheses, and draw conclusions using inductive or deductive reasoning. It was in conformity with the Bers (2005) and (Beyer, 1995) statement that Students' critical thinking ability can be achieved by recognizing and acquiring the elements required to draw meaningful conclusions, solve assumptions, recognize important information, and reduce the impact of data, statements, concepts, evidence, determinations, beliefs, points of view, explanations, and so on.

The outcomes of the collaborative groupwork discussions and experiments were then presented to the class. Class presentations were designed to allow teachers to monitor students' concept acquisition, improve it, and strengthen students' concepts obtained during group discussions, allowing them to gain knowledge. Students would know which material had been grasped. For instance, the instructor served as a facilitator while training students in self-regulation skills. The average difference in self-regulation between the two groups was 4,503. The average value of the self-regulation aspect in the control group was 55,555. It was lower than the experimental group, which had 60,526.

Further stage was an individual quiz which was carried out towards the conclusion of the learning process. The quiz of one basic competence was given to the students in form of essay test. This phase has proven how well students understood the material. The final stage was team recognition for active collaborative groups with an improvement score (both individual score and group score). The purpose of awarding recognition or rewards was to demonstrate to students that learning success was possible if they worked hard and performed better than before.

The 'push-in pull-out' learning model's implementation might train students' thinking abilities components, particularly creative thinking ability. According to Guo (2017), the 'push-in pull-out' learning model contained initial conceptions (schemata), assimilation, facilities, cognitive imbalance, and scaffolding, which enabled students to obtain construct theories or information by debating or working in collaborative groups, thereby training students' critical thinking skills.

This study found that implementing a 'push-in pull-out' learning model in learning theme 5 about ecosystem components increased critical thinking skills in students. This study was consistent with the findings of Klimoviene et al. (2006) and (ŽivkoviL, 2016) research which revealed that through collaborative constructivist learning, students' critical thinking skills increased. Gokhale (1995) performed another study that corroborated this study, stating that collaborative critical thinking learning might increase students' learning outcomes, including thinking skills.

CONCLUSION AND RECOMMENDATION

Based on the findings and interpretation of the research, the author draws three conclusions, namely; 1) the push-in pull-out learning model has a significant effect on student learning outcomes in the psychomotor and affective domains, 2) students' academic abilities have no effect on their learning outcomes, and 3) there is no interaction between the push-in pull-out learning model and academic ability at *Madrasah Ibtidaiyah* in academic year 2020/2021.

The following suggestions base on this research are namely; 1) the push-in and pull-out learning model can be applied to inclusive schools, particularly Madrasah Ibtidaiyah, and 2) when using the push-in and pull-out learning model, teachers must modify the curriculum and material learning for children with special needs, and 3) the push-in pull-out learning model can collaborate with other educational institutions, such as *pesantren* or Islamic boarding schools

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