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The Influence of JIGSAW Learning Model and Discovery Learning on Learning Discipline and Learning Outcomes

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Abstract

This study aims to determine the effect of the jigsaw type collaborative learning model vs discovery learning model and learning discipline on learning outcomes, Message Design courses for students. This study used a quasi-experimental research design with a 2 x 2 factorial design. The data in testing this hypothesis used Descriptive Statistical Analysis and ANOVA (analysis of variance) based on a 2X2 or two-way factorial design. The null hypothesis was tested at a significance level of 5% ($\alpha = 0.05$). Thus the jigsaw type collaborative learning model has advantages over the discovery learning model in achieving learning disciplines on learning outcomes message design course. The interaction between jigsaw type collaborative learning model vs discovery learning model and learning discipline on learning outcomes. Learning outcomes varied between groups of students who were taught using the collective learning model and groups of students who were taught using the exploratory model, different results were obtained. Learning outcomes varied between groups of students with high levels of learning discipline and groups of students with low levels of learning discipline. Therefore, educational institutions are expected to make policies to improve the quality of learning, especially in developing a more student-oriented learning model or better known as student-centered learning. Especially in the message design course.

Keywords: Collaborative Learning, Discovery Learning, Discipline, Learning Outcomes.

Introduction

The global era will guide every country to become a leading country. In this case, taking very sophisticated technology can develop the nations of the world with the birth of globalization into a global village. Competition in the quality of human resources can be improved and advanced through competition with other countries. Jigsaw and discovery learning models have been available since the 1980s. This learning model from time to time develops, especially in line with the development of technology, so that the pedagogics of researchers continue to prioritize collaborative learning models. Focus on collective learning, social engagement, and collaboration. The statement that collaborative study is learning that prioritizes social interaction, intellectual attachment, and shared responsibility (Kırkgöz, 2014). The ability of the lecturer to manage learning better with the efforts and efforts of the lecturer can solve a learning problem in a class. Language lessons are the main lessons in the application of an appropriate learning model. Student learning outcomes are strongly influenced by the model that will be given by the lecturer. To create a learning atmosphere that fosters a sense of fun, curiosity for students (M.-R. A. Chen & Hwang, 2020; Liou & Chang, 2008). To create a learning atmosphere that fosters a sense of fun, curiosity for students. To create a learning atmosphere that fosters a sense of fun, curiosity for students (Kim, 2020).

The application of the jigsaw-type collaborative learning model and the discovery learning model is very easy. through research on cognition, the brain provides many justifications for what we learn regarding the effectiveness of

peer interactions in encouraging active learning. Therefore, lecturers in higher education do not have to worry about falling into uncharted territory. The formation of a bond, active learning, and the expected experience in a study group is a thorough and constant interaction. collaborative jigsaw type and discovery learning methods for teaching beginners or focus on developing student activities, focusing on how it continues to work following good and meaningful work.

This jigsaw-type collaborative learning environment and discovery learning can provide a level in improving the learning methods that are taught better and more actively, the knowledge and skills possessed are further enhanced. Harvey et al., (2018) argue that the teaching that is invited in the collaborative model is an attempt to make a negative impact in the use of a patio, competitive, and isolative for the use of educational activities and mass adjustment. Collaborative

learning today is a model that is widely used by educators following the results of research related to learning models (Bannan-Ritland, 2008; Roschelle, J., & Teasley, 1995).

In this case, the same learning gives students critical thinking in this lesson, giving responsibility for the discussions involved. Research in the 1990s found that 93% of a sample of US lecturers reported using cooperative learning with 81% reporting daily use (M. O. Slavin, 2013)perhaps extend, Phillip Bromberg's creative thinking about the functions of multiplicity, dissociation, and integration in human self structure. We follow how my patient Tanya's capacity for access to her multiplicity played a key role in deepening the negotiation of our relationship as well as in resisting the environmental pull towards over-accommodating, dissociative integrations—identity foreclosures (Erikson, 1980. Meanwhile, in collaborative learning, students can acquire knowledge and skills through teamwork. Based on the results of the research above, the jigsaw learning model and discovery learning are very feasible to be explored, because they are still very applicable in the current situation. In addition, learning discipline must be considered, both in the classroom and in daily meetings between students and teachers, students and education staff, between students and other students in various settings.

One of the characteristics of STEM Education is The term cooperative and collaborative is often indistinguishable, so it is necessary to explain the similarities and differences between cooperative and collaborative. Cooperatives are usually active participation, autonomous participants with the intervention of lecturers, designers, and directors, mediators of materials and assignments are determined by the lecturer, various types of activities involve students to share with students a certain role intensely in small groups. While collaborative, active participation, autonomous learners, facilitators, material guides are arranged according to learning objectives and mutually agreed upon based on the type of activity involving students for various (learning communities) intense students in small and large groups in free form. Activities that take place in community settings are small groups of students who share ideas or focus on solving problems in their assignments (McDonald & Molony, 2004; Moriya et al., 2013). The same thing is also explained by who argues that (Degeng, 1998): "The encouragement of the emergence of discussions of new knowledge to be accepted as it is, joint solutions, not only one correct answer so that it can bring up various types of thought/activity, role-playing, simulation, debate. , and giving explanations to friends".

Collaboration is a concept in studying academic problems and is an effort to train a good generation through academic learning to students to create a harmonious social life through the creation of new ideas. Mixed with groups can lead to a two-fold advantage of being the most attractive benefit in

cooperative procedures when compared to groups receiving individual teaching, with the same material covered. Another interesting characteristic of the collaborative grouping model is the position that favors students, so students can take advantage of the direct grouping model to discuss the certain subject matter, referring to relationships within the scope of family life. higher perceived quality of collaboration is associated with increased intercultural competency development. These findings are discussed and related to their implications for the use of group learning activities in international higher education (Arslan, 2013; Erduran et al., 2004).

Talking about the collaboration, it can be about meaningful group work. Seeing life today that humans have a role to work together, in any case, to be able to achieve a goal and the desired hope. The philosophy of personal lifestyle and individual interaction is a collaboration (Santrock, 2017). Based on this philosophy, they develop a sense of responsibility for their every action as individuals, which includes learning to appreciate the contributions and input of their colleagues. In the context of learning or learning, Panitz defines collaborative learning as a series of processes that help people interact simultaneously to achieve certain goals or develop more specific end products. Apart from this opinion, The idea of cooperative learning was added by Swain (Begley & Tan, 2001) who explained that one of the most important and effective things in collaborative learning is the creation of a learning atmosphere that fosters students' ability to explore together each subject between students of the same age and between students and lecturers through social interaction. Students work Significantly harder for and learn more from the cooperative learning component than from the lecture component and the traditional method (Ahmad et al., 2020; Ross, 2012) which explains that one of the most important and effective things in collaborative learning is the creation of a learning atmosphere that fosters students' ability to explore together each subject between students of the same age and between students and lecturers through social interaction. students work significantly harder for and learn more from the cooperative learning component than from the lecture component and the traditional method (Button et al., 2021; Mark & Id-Deen, 2020) which explains that one of the most important and effective things in collaborative learning is the creation of a learning atmosphere that fosters students' ability to explore together each subject between students of the same age and between students and lecturers through social interaction. students work significantly harder for and learn more from the cooperative learning component than from the lecture component and the traditional method (Cardow & Smith, 2015)which retains its popular and academic cult status. Through the identification of the familiar (vampires and Buffy.

Collaboration is learning that requires a combination of work ethic in students' efforts to strive together to gain insights, ideas, goals or produce a product, and is entirely

based on student experiments, not clear or comprehensive descriptions by educators (Dyrbye et al., 2009)clinical rotation factors, workload, demographics and personal life events relate to student burnout. Methods: All medical students (n = 3080. Collaborative learning is a learning approach that involves many students joining together in groups to identify discrepancies in individual abilities and thinking (Chang & Benson, 2020). The success of collaborative learning in various contexts is a challenge not only for the dominant economic model society, but also for the dominant learning and education model (Araya & Peters, 2010). Students benefit from the general support provided by the group and are willing to learn from one another, except when faced with unequal contributions from group members to collaborative learning (Agran, M., Hughes, C., Thoma, C. A., & Scott, 2016). The convergence of interaction and positive, shared regulation in social interactions can serve a meaningful function for the advancement of collaborative learning (Siregar et al., 2020) meaningful and informative. The selection of Islamic video making as a project task of the PAI was motivated by the importance of utilizing advances in technology, information and communication (ICT. This is also in line with the results of research (Hollen et al., 2007) which states that collaborative testing improves student behavior and attitudes. Collaborative learning is proven to provide positive learning outcomes for students (Brott et al., 2016). except when faced with the unequal contributions of group members to collaborative learning (Agran, M., Hughes, C., Thoma, C. A., & Scott, 2016; Araya & Peters, 2010). Collaborative learning is proven to provide positive learning outcomes for students (Raphael et al., 2012; Schniedewind & Salend, 1987). This is also in line with the results of research (Chang & Benson, 2020; Rahayu et al., 2018; Wheeler & Pannell, 1973) which states that collaborative testing improves student behavior and attitudes. Collaborative learning is proven to provide positive learning outcomes for students (Anindita & Satoto, 2017). This is also in line with the results of research (Brott et al., 2016)which states that collaborative testing improves student behavior and attitudes. Collaborative learning is proven to provide positive learning outcomes for students (Chaeruman, 2019).

Some of the collaborative models above are focused on the Jigsaw Procedure (JP) model. Jigsaw Proscedure (JP) was first developed by Elliot Aronson (1975), Jigsaw Proscedure (JP) II (Slavin, 1995), and Jigsaw Proscedure (JP) III (Mann et al., 2015) according to (Hawkins et al., 2007). Jigsaw Process (JP) means Jigsaw (JP) in English and some people call it a puzzle, which is a puzzle that arranges picture objects. The Jigsaw Procedure (JP) model is a research model that offers equal learning opportunities to all students and also offers students the ability to be involved in this process. students in the jigsaw group were more successful than students in the non-jigsaw group (Doymus, 2008). Jigsaw type collaborative learning

is an effective teaching technique to challenge students' misconceptions (Tarhan et al., 2013).

In addition to looking at the level of students in completing the article after looking at the Jigsaw Learning Model (JP), it also looks at how students do their assignments. This paradigm offers an incentive for every student to review the basic elements of their teaching materials to become an expert. By using the Jigsaw Technique (JP) model, it is hoped that students can practice more broadly. One of the most adaptable methodologies for cooperatives is the Jigsaw Protocol (JP). One of the most powerful teamwork approaches is the Jigsaw Protocol (JP). The Jigsaw Technique (JP) curriculum model is an educational model that is intended to offer fair and reasonable opportunities for all students to be involved in the learning process (Basak & Yildiz, 2014). The Jigsaw Practice (JP) is a kind of collective way to teach students how to make fun of English (Kırkgöz, 2014). The Jigsaw method improves students' academic achievement (Button et al., 2021). The study also revealed that gender had no effect on academic achievement. This is in line with the results of research (Tarhan et al., 2013) which states that the Jigsaw technique can improve student achievement even though it is different in culture. The jigsaw model can also generate greater profits compared to other methods (Genç, 2016; Ramsay & Richards, 1997)nonidentified children will exhibit more positive attitudes toward cooperative learning methods than their more academically able peers; (b which states that the Jigsaw technique can improve student achievement even though it is different in culture. The jigsaw model can also generate greater profits compared to other methods (Ramsay & Richards, 1997)nonidentified children will exhibit more positive attitudes toward cooperative learning methods than their more academically able peers; (bwhich states that the Jigsaw technique can improve student achievement even though it is different in culture. The jigsaw model can also generate greater profits compared to other methods (Genç, 2016).

The beginning of the Jigsaw Protocol (JP) is the presentation of the theme that will be discussed by the lecturer. Lecturers must enter material and question students about the subject to meet new learning practices. the jigsaw method affects individual learning in groups (Liao et al., 2019). Professors often divide the origin group according to the concept under study into several different sections. After each group is created, the instructor offers the material to each group. Analysis of the information obtained from the instructor is also the responsibility of the team members. Subsequent sessions were mostly similar to the initial set. Research using the jigsaw technique is very effective in learning (Tarhan et al., 2013). The shape-matching procedure is then used by two greedy algorithms to construct an apictorial puzzle, especially in the case of a jigsaw (Altman, 1989). jigsaw visual analysis system to support sensemaking activities, especially in learning

(Baken et al., 2020). Jigsaw learning is more effective for character building and student achievement (Doymus, 2008).

Panels are created, they are given the opportunity to discuss the topics that the lecturers offer them, with panel discussions. After the debate was over, they returned to the original party. Let them know when they get back to the original party. The experience gained from the panel discussions reflects this activity. In Jigsaw Technique (JP) students work in their own class and a specialist class twice. This guide is needed to train him and his teammates for the next test, which will be measured separately by a questionnaire. The results of this quiz determine the score each participant receives. The score their party received. Jigsaw provides multiple coordinated views of document entities with particular emphasis on visually illustrated connections between entities across different documents (Chang & Benson, 2020; Clapper, 2015)along with a description of how these two important learning theories may be applied to improve simulation-based instruction. Findings. When learning new material or skills, learners sometimes need to be assisted with moving through the disequilibrium process that can occur when the new information contrasts with their existing frames of reference or ways of knowing. Cooperative-based learning and the zone of proximal development (ZPD. The jigsaw method can also improve the quality of experimental learning (Baken et al., 2020). Student activities in the form of exploration in learning are felt to be easier to use the jisaw method so as to increase student learning achievement (Yoruk, 2016). Collaborative learning steps, unlike the Jigsaw (JP) form of practice; (1) Student groups consisting of 5-6 members are divided into various classes each. (2) Students are given subject matter which is divided into several different sub-chapters in the form of documents. (3) Each community member must read and review the assigned sub-chapter. (4) Members of other organizations who have researched the same sub-chapter continue to discuss this in expert groups. (5) Each Member of the Expert Group will be responsible again for introducing his partner to the original group. (6) Students are asked to fill out student questionnaires at home school meetings and debates.

The size of the Jigsaw Technique collaborative research model according to is; (1) The student community consists of 4 people, (2) Different materials and assignments are given to each team member, (3) A new group (expert group) consists of participants from different teams for the same task; (4) After the conversation in the expert community, each member returns to his original community and discusses the chapters they have learned with group members. (5) The findings of the debate were discussed by each expert team, (6) Discussion, and, (7) Fermeture (Doymus, 2008; Genç, 2016). Learning models are distinguished from learning techniques, which arise because students themselves cannot arrange learning content in its final form. Bruner argues that discovery learning can

be defined as learning that occurs in the absence of subjects, but needs to be managed by students. Bruner claims that children have an active role in the educational process. Bruner uses a discovery learning system, which organizes content in its final form (Murtono et al., 2020). The learning paradigm for knowledge development or experimentation is often characterized as an intuitive method, to draw conclusions. It is a methodology for understanding ideas, interpretations, and relationships (Caspersen et al., 2017). Discovery occurs when people are interested, especially where conceptual mechanisms are used to explore certain ideas and values. Discovery is done by observation, description, calculation, prediction, detection and information. This method is considered a logical method according to (Rivera-Pérez et al., 2021) although the exploration itself is a conceptual phase of the ideas and values of cultural assimilation.

In this third word, exploratory learning emphasizes the development of significance or fundamental principles that have not been understood. Discovery Learning methodology as a learning technique includes the principle of investigation (request) and the same problem solving method. The Discovery Learning model has the same definition and theory of problem solving (demand) studies as the learner approach. The difference between exploration and inquiry learning is that the exploration difficulty faced by students is a form of difficulty that has been designed, while the inquiry challenge is not changed. To translate the results into topics through the testing process. Meanwhile, it varies from experimental learning to problem solving. More focus is given to problem solving skills in the problem solving model.

Learning in Discovery Learning is evidenced by the concept that the resulting element or material is not created in its final state, but students are motivated to determine what they want to know, accompanied by a search for knowledge and then the structure or creation of what they know. And they see it in its final form. Discovery learning is also beneficial for students so that discovery, learning, and engagement; add and maintain knowledge and technology; and involve students in their professional lives (Plagens, 2011). Discovery learning can also motivate students to improve their learning outcomes and learning achievement (Young & La, 2020). In addition, discovery learning is able to uncover and solve problems for students (Santrock, 2017). The discovery model can affect several aspects of learning (J. Chen & Lin, 2020). The learning aspect is felt to be increasing when using the discovery learning model compared to using the conventional model (Ismail & Al Allaq, 2019; R. E. Slavin, 1980).

Defining an invention is a conceptual process according to (Sullivan, 2013)habitats and ecosystems. Led by an international collaboration of representatives from companies, financial institutions, governments and non-governmental organizations (NGOs, where students will follow a concept or

idea. This mental procedure includes: observation, processing, understanding, description, statement making, clarification, measurement, conclusion drawing etc. Therefore, Discovery Learning is an internship that involves students in mental activities by sharing views, speaking, reading and trying on their own, so that they can learn on their own. The Discovery Learning model is a form of teaching based on student learning activities; this method is just a guide for instructors and pushers who guide students to find ideas, claims, methods, algorithms, etc. The Discovery Learning model provides benefits for problem solving for students who want to learn actively and productively (Button et al., 2021). This is in line with the opinion (Johnson & Johnson, 2009; Wattanawongwan et al., 2021) which states that the discovery learning model can solve problems that exist in schools. This model is also very effectively applied to basic education that hones students' curiosity abilities (Giorgi et al., 2017). The Discovery Learning model focuses on how students find problems and how students are graded (Clapper, 2015)along with a description of how these two important learning theories may be applied to improve simulation-based instruction. Findings. When learning new material or skills, learners sometimes need to be assisted with moving through the disequilibrium process that can occur when the new information contrasts with their existing frames of reference or ways of knowing. Cooperative-based learning and the zone of proximal development (ZPD. This learning model is felt to be very suitable for development in learning, sharpening curiosity and being creative in finding problems (Caraher M, Dixon P, Lang T, 1999). The discovery model is also more effective than the guided model (Singer & Pease, 1978). This is reinforced by research (Singer & Pease, 1976) which previously stated that the discovery model was very effective in learning. The Discovery Learning model is also very effective for students and has an important role in the listening process (Marsden, 1989)but there are problems in using this as a basis for modeling the process of listening as one of parsing. Not only are there unresolved issues in modeling listeners' abilities to accommodate a multiplicity of musical styles, including novel styles, but also problems occur in modeling the recognition of recurrent patterns in a suitably flexible way. Discovery and learning are found to have a crucial role in the listening process, and so should be at the heart of a listening model. Learning models from other domains of cognitive science offer a potential basis for such models. This is illustrated through a model, based on Thagard and Holyoak's PI ("Processes of Induction".

The Discovery Learning model is undergraduate schooling which is defined as continuous learning behavior when the end of the lesson is not given to students. Discovery learning follows the same ideals of inquiry and problem solving as learning methods. Discovery research emphasizes the discovery of previously discovered theories or values. in these three words

have little big difference. Compared to analysis, the student's exploration problem is a kind of dilemma posed by the professor. There are: 1) studying and solving problems in the field of information teaching, 2) integrating it, and generalizing it; 3) student-centric. The Discovery Learning model is very suitable for students who have high motivation in learning (Jamieson, 1970, 1971; Zamroni et al., 2020). Discovery Learning is also believed to be an effective method for learning motor skills, anticipation, and cognitive (Dixon, 1973). In addition, discovery learning is very suitable for students who want to seek knowledge through a very comprehensive digital experience with learning (Pretorius, 2018). Students who use the discovery model are very significant in achieving good and directed learning outcomes (McLeod & Adams, 1979). Students have greater ownership of the knowledge because they discover the knowledge (Mukherjee, 2000). In addition, discovery learning is very suitable for students who want to seek knowledge through a very comprehensive digital experience with learning (Pretorius, 2018). Students who use the discovery model are very significant in achieving good and directed learning outcomes (McLeod & Adams, 1979). Students have greater ownership of the knowledge because they discover the knowledge (Mukherjee, 2015). In addition, discovery learning is very suitable for students who want to seek knowledge through a very comprehensive digital experience with learning (Pretorius, 2018). Students who use the discovery model are very significant in achieving good and directed learning outcomes. Students have greater ownership of the knowledge because they discover the knowledge.

Discovery learning has advantages; (1) Information is durable and easy to remember; (2) The discovery effect had a greater effect on the transition than the other results; (3) In general, students' thinking and honest thinking skills improve learning. Deep Exploration (Peterson et al., 2019). The benefits for discovery learning are: (1) Students are involved in learning when they think and use the final result ability; (2) Students always understand the instructional material, and they really want to know it. There is something long remembered that is learned in this way; (3) It gives a feeling of satisfaction to find yourself. This inner pleasure inspires you to explore more to increase your interest in learning; (4) Students who study information using a discovery approach will move their skills in different ways more effectively; (5) In this way students are prepared to study on their own. Rachman (Tu u., 2004) Discipline is about enforcing one's rules. Meanwhile for every student the concept of learning discipline is very important, educational goals will be more easily achieved if students are more disciplined in the teaching and learning process (Zamroni et al., 2019). Discipline is an element of life that must be expressed in society (Haryuni, 2013). Discipline is an effort to monitor oneself and the mental attitude of individuals or communities in maintaining loyalty and compliance with laws

and regulations based on motivation and understanding that is felt from the heart (Ritonga & J., 2016).

Flippo's previous research in discipline is an effort to plan someone's behavior in the future by using laws and rewards (Hadiwinarto, 2014; Sumarni, 2018). Discipline is an attitude of respect, respect, loyalty and obedience to the applicable rules, whether written or not, and if they violate their duties and authority, they do not avoid the sanctions given to them (Haryuni, 2013). James Drever (psychological side) discipline is the ability to control behavior that comes from within a person in accordance with things that have been controlled from outside or set standards, someone's actions that appear and are able to adjust to predetermined rules. Ohn Macquarrie (ethical aspect) discipline is the willingness and action of a person in obeying all the rules that have been regulated with a specific purpose. Pratt Falrshiif (sociological side) disciplines are people who can direct their behavior and actions based on certain standards or behavioral limits that are accepted in their respective groups or social environment. Wikipedia discipline is a feeling of loyalty and obedience to the principles that are considered as obligations.

Discipline is a tool used by managers to communicate with the workforce so that they are willing to change a behavior as well as an effort to increase one's awareness and willingness to obey all regulations (Adams, 2014). Discipline is a management activity to reinforce organizational guidelines (Koentjoro, 1996). Character education is a discipline that develops with a deliberate effort to optimize students' ethical behavior (Berkowitz, 2011). Discipline is important for the following reasons: 1) Discipline that arises because of self-awareness, 2) Without good discipline, the campus and classroom atmosphere becomes less conducive to learning activities, 3) Parents always hope that on campus students can become individuals who are orderly, organized and disciplined, 4) Discipline is a way for students to be successful in learning and later when they work (Tu'"u., 2004). Maman Rachman (Tu"u., 2004) explains the importance of discipline for students as follows: 1) Provide support for the creation of behavior that does not deviate. 2) Helping students understand and adapt to environmental demands. 3) How to solve the demands that students want to show to their environment. 4) To regulate the balance of individual desires with other individuals. 5) Keep students away from doing things that are prohibited by the campus. 6) Encourage students to do good and right things. 7) Students learn to live with good, positive and beneficial habits for them and their environment. Good habits that cause peace of mind and environment. Parker (2006: 144) explains the importance of discipline to; 1) keep children awake and safe, 2) teach children to think about others including their parents, 3) provide a predictable and therefore safe environment for them to be there 4) help children develop constructive independence , 5) clarify the difference between acceptable and unacceptable

behavior, 6) show that every action has a consequence, 7) help children easily deal with various groups.

Cognitive Learning Theory. Learning theory views that basically everyone in behaving and doing everything is always influenced by developmental behavior and understanding of himself. A person has beliefs, ideas and principles that are chosen for his own benefit. Social Learning Theory. This theory explains the influence of strengthening from outside the student's environment, and cognitive activities from within the student combined with the basic philosophy of humanistic learning theory, namely humanizing humans to student learning abilities through "modeling" or imitating the behavior of others. Humanistic learning theory. Humanistic learning theory explains that learning is a process in which students develop distinctive personal abilities in reacting to the surrounding environment. In other words, the student develops the best abilities in himself. Constructivist Learning Theory. Constructivist learning theory defines learning as a process of constructing knowledge through one's internal processes and interactions with others. Thus, learning outcomes will be influenced by one's competence and intellectual structure. Learning outcomes are also influenced by thinking maturity, previous knowledge, and other factors such as self-concept and self-confidence in the learning process. Based on the explanation of the learning theory above,

Learning outcomes are the abilities, skills, and attitudes of a person in completing a thing. The results of a learning (ability, skill, and attitude) can be realized if learning occurs. Both individuals and teams, want a job to be done properly and correctly in order to get good results from the work. This success will be seen from the understanding, knowledge or skills possessed by individuals or teams (Santrock, 2017). The use of Jigsaw technique also has an effect on increasing learning achievement, especially in mathematics (Quieng et al., 2015). Jigsaw was developed to support students in gathering big ideas effectively and revealing meaning constructions in knowledge structures such as graphs of design thinking (Ghabanchi & Behrooznia, 2014). Jigsaw Method can also improve students' social, cognitive, and psychomotor learning. students' limited practical abilities, their minimal teaching abilities, and their problematic social relationships have an impact on students' use of Jigsaw learning (Doymus, 2008). Jigsaw models. first developed by Elliot Aronson (1975), Jigsaw II (Slavin, 1995), and Jigsaw III (Kagan: 1990). Jigsaw means Jigsaw in English and some people call it a puzzle, which is a puzzle that arranges picture objects. The Jigsaw model is a research model that offers equal learning opportunities to all students and also offers students the ability to be involved in this process.

The level of students' readiness in completing the article after seeing the Jigsaw Model, also saw the way students did their assignments. This paradigm offers an incentive for every student to review the basic elements of their teaching

materials to become an expert. By using the Jigsaw model) it is expected that students can practice more broadly. One of the most adaptable methodologies for cooperatives is Jigsaw. Jigsaw-based cooperative learning strategies with Google+ to support cooperative learning through social networking services can strengthen the effect of reading, provide a better learning environment and good learning outcomes as well concluded that jigsaw-based learning can improve vocabulary skills and the development of student learning outcomes (Yu & Huang, 2019). Students use the Jigsaw method with satisfactory learning outcomes (Johnson & Johnson, 2009; Onwuegbuzie et al., 2009).

Method

The design of this study was carried out in a quasi-experimental pretest-posttest non-equivalent control group design (Arikunto, 2019; Creswel, 2009; Sugiyono, 2013) with a 2X2 factorial version. The design of this study with consideration of the focus of attention in the independent variable (independent) is a model in jigsaw and discovery learning collaborative learning and also takes into account the moderator variable which is estimated to influence learning outcomes, namely learning discipline. There are 3 (three) variables in this study as follows: The learning outcome variable can be said to be the dependent dependent variable (Y), the learning model variable is the independent variable (X1) which consists of two categories, namely: collaborative jigsaw type (A1) and discovery learning (A2). The learning discipline variable (X2) as a moderator variable is two categories, namely: high learning discipline (B1), and low learning discipline (B2).

As for in this case the steps used are as follows: The first thing to do is to observe a destination which is to see the condition of the place, and find out what is already available. The second determines the population. The population of this study were all fourth semester students spread over two classes totaling 70 students. Third, conducting a homogeneity pre-test for students to be able to find 2, namely the experimental class (independent) or the control class (dependent). Fourth, determine the experimental class and control class. carry out lesson study (plan) activities in the experimental class learning planning. Then carry out the teaching and learning process with jigsaw-type collaborative learning in the experimental class. Jigsaw Type Collaborative Illustration in Experiment Class. Discovery learning in the control class. Analyze the results that have been obtained. Conduct discussions based on the analysis obtained. Finally draw conclusions from the research that has been done.

Data collection is described as follows: first, all activities are documented with the aim of obtaining the number of students to be studied. Second Questionnaire. In this study, the questionnaire used was in the form of a Likert scale which was in the form of a statement. Respondents' opinions have been arranged in answer categories which put a check mark in the space or column provided to choose the answer: 1 = Never, (TP), 2 = Rarely (JS), 3 = Rarely (J), 4 = Often (SR), 5 = often (SS) or choose an alternative answer: S : Always, SR : Often, KD : Sometimes, TP : Never. The third is observing the implementation of jigsaw type collaborative learning and learning discipline. The fourth is the observation of the implementation of the jigsaw type collaborative learning and learning discipline. Carrying out the Pre Test was carried out in the experimental group and the control group. The post test was carried out in the experimental group after the jigsaw type collaborative learning model was treated. The post test was carried out in the control group after the discovery learning model was treated.

The research instruments in this study were in the form of questionnaires and tests. The test will be given at the time of pretest and posttest. Before the instrument is used, the validity and reliability of the instrument is first tested so that it can be known whether the instrument is suitable to be used to measure the variables studied. Pretest is given to students with the aim of equating students' perceptions and prior knowledge. After doing the pretest, then the homogeneity test is then carried out. Next, a posttest will be carried out to find out how much the results of the treatment in the control class and experimental class in table 1.

From the results of SPSS output, the test instrument used is reliable. This can be seen from the Cronbach's Alpha value of 0.892 which shows that the instrument package of the test items is very reliable. In the analysis, one of the requirements is carried out to detect the data obtained can meet the requirements for analysis through testing using analytical techniques that are planned according to the research objectives. The basic assumptions that must be met before the data are analyzed using the ANOVA analysis technique are; 1) the distribution of the data is normal, and 2) the data is homogeneous.

Normality test can be conceptualized on the basis of Kolmogorov Smimov's normality is that it can be compared in the distribution of data (which will be tested for normality) with the standard normal distribution. The standard norm distribution is data that has been transformed into a Z-score form and will be assumed to be in normal form. The application of the Kolmogorov Smimov test is that if the significance is 0.05, that is, there are two data to be tested and have differences where one has a significant characteristic with the standard

Table 1: Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.892	0.891	7

normal data, which means this data indicates that it is not normal. The homogeneity assumption test is also a test of differences between two groups, only the difference is not the average value but the variance of the group. Testing the requirements of this analysis will use the SPSS computer aid program.

To test the hypothesis, Statistical Analysis: Descriptive, paired-sample-test and ANOVA (analysis of variance) based on a 2X2 or two-way factorial design were used. Anova or analysis of variance is classified as a comparative analysis of more than two variables or more than two averages. The goal is to compare more than two averages. To see the difference in the mean of two groups, as well as to see the effectiveness of the treatment on the sample, the t-test can be used, but to test the difference in the mean of three or more samples, the F-test is used. In addition to being more efficient, the use of the F-test can be used to determine the interaction between the variables of concern. ANOVA analysis technique with the help of the SPSS program with a significance level of = 0.05. The decision criteria if the sign value> 0.05 then H_0 is accepted and if the sign value is <0.05 then H_0 is rejected.

Findings

Prerequisite test is used to detect data that has been obtained whether it meets the requirements for analysis using analytical techniques that are planned in accordance with the research objectives. The basic assumptions that must be met before the data is analyzed using the ANOVA analysis technique are: 1) the distribution of the data is normal, and 2) the data is homogeneous. The normality test is used to find out about the normal or abnormality obtained by the data. In this study normality testing using the Kolmogorov-Smirnov test, while the results of the normality analysis of the data can be seen in Table 2.

Based on the data in table 2, it shows that the sig value of the variables is greater than the sig (alpha) value of 0.05, this indicates that all data variables are normally distributed. Homogeneity test will be used in testing the variance between the two groups. The assumption of homogeneity is known by comparing the probability value of sig, which has been determined to be 0.05. The assumption is that if the probability of sig is greater than the probability level = 0.05 (sig. > 0.05), then the data is from a homogeneous population and vice versa. The results of the data homogeneity test in this study can be seen in table 3.

Table 2: Normality Test Results

Variable	sig value.	Sig level. A	Conclusion
X1	0.64	0.05	Normal
X2	1.85	0.05	Normal
Y	2.00	0.05	Normal

Based on table 3.2, it can be concluded that the two variables X to Y have sig values. The greater the probability value of sig. (0.05), this indicates that the variable is homogeneous. The data presented below are the results of the fourth semester student test of the Education Technology Study Program, Faculty of Teacher Training and Education, University of Muhammadiyah Sidenreng Rappang in the Message Design course. The data in question came from the experimental group and the control group. As for the differences in learning outcomes using a jigsaw type collaborative learning model with those taught using a discovery learning model.

Based on the processed data of SPSS version 25.00 for windows, it shows that there are differences in using the jigsaw type collaborative learning model and to be taught using the discovery learning model. The description of what makes the difference between the two is using a jigsaw type collaborative learning model with those taught using a discovery learning model, described in table 4.

In testing the first hypothesis, it shows that there is a significant difference between student learning outcomes using the jigsaw learning model and those taught using the discovery model. In testing the second hypothesis, it shows that there is a significant difference between the learning outcomes of students who have a high level of discipline and a low level of discipline. The difference is clearly visible from the experimental class and the control class as stated in the F test table below, which distinguishes between high discipline and low discipline students. In testing the third hypothesis, it shows that there is a significant interaction between the jigsaw type collaborative learning model and the discovery learning model and learning discipline on learning outcomes.

In explaining the supporting theory of collaborative learning, the author examines several theories that are related to the theory of educational psychology. The supporting theory of collaborative learning presented in this study is

Table 3: Homogeneity Test

Influence Model	sig value.	Sig level. α	Conclusion
X1 Against Y	0.369	0.05	Homogeneous
X2 Against Y	0.137	0.05	Homogeneous

Source: SPSS version 25.00 program analysis results for windows

Table 4 Between-Subjects Factors

		N
Learning Discipline	1.00	5
	2.00	65
Discovery Vs Jiksaw	1.00	35
	2.00	35

Information:
A1 : Discovery Learning   B1: Low learning discipline
A2 : Jigsaw Learning   B2: High Learning Discipline

Vygotsky's sociocultural theory (Garrels & Arvidsson, 2018; Langford, 2005). Learning that is mediated in the context of experiences with peers is a significant contribution given by Vygotsky through a sociocultural view of social constructivist epistemology. Learning from a sociocultural perspective is a term that underlies the existence of individuals in a social environment where interaction is a learning process. Another benefit of collaborative learning is that collaborative learning pedagogical techniques can improve achievement gaps (Morales, 2008; Stowe, 2017). Changes in representation are also indispensable for collaborative work because shared understanding or shared knowledge can only be achieved by partial convergence of the knowledge structures of the collaborating subjects (Mol & Birkinshaw, 2014; Silva & Sousa, 2018). Effective interaction requires collaboration between group members and requires active participation and productive work (Berkowitz, 2011; Greenier, 2020). There are three problems studied in collaborative learning, namely (1) students' reluctance to ask what they don't know because of the lesson structure and negative psychological effects; (2) difficulty in making assignments challenging enough for students to do mutual consultation, because of teachers' inadequate experience in academic inquiry and expertise in their disciplines; and (3) linking their learning from observation and reflection to their own teaching (Leppink et al., 2014). If the three problems are solved, the collaborative concept will be easy and make learning more fun (Adams, 2014; Bertelli et al., 2018). Vygotsky (Langford, 2005); lays the foundation for the collaborative learning paradigm by claiming that working with more capable people has something to do with personal development. Vygotsky focuses on individuals who are deeply rooted in the context of collaborative learning and makes the following. Interactions in collaborative situations are more often group-related than individual tasks (Garrels & Arvidsson, 2018). If the three problems are solved, the collaborative concept will be easy and make learning more fun (Chan, S. C. H., Wan, C. L. J., & Ko, 2019; Scharff, 2004). Vygotsky (Langford, 2005; Santrock, 2017); lays the foundation for the collaborative learning paradigm by claiming that working with more capable people has something to do with personal development. Vygotsky focuses on individuals who are deeply rooted in the context of collaborative learning and makes the following. Interactions in collaborative situations are more often group-related than individual tasks (Lameras et al., 2012; Roschelle, J., & Teasley, 1995) If the three problems are solved, the collaborative concept will be easy and make learning more fun (Kim & McDonough, 2011). Vygotsky (Langford, 2005); lays the foundation for the collaborative learning paradigm by claiming that working with more capable people has something to do with personal development. Vygotsky focuses on individuals who are deeply rooted in the context of collaborative learning

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Conclusion

There are differences in learning outcomes between groups of students who are taught using the jigsaw-type collaborative learning model and groups of students who are taught using the discovery learning model. There are differences in learning outcomes between groups of students who have high learning discipline and groups of students who have low learning discipline. There is an interaction between the jigsaw-type collaborative learning model vs discovery learning model and learning discipline on the learning outcomes of fourth-semester students of the educational technology study program, faculty of teacher training and education at the University of Muhammadiyah Sidenreng Rappang. The relationship between the learning model and the discovery and learning model encourages students' understanding of lessons at the psychomotor level, where students' findings achieve the ability to adapt to the knowledge learned.

Based on the results of research on the interaction between the jigsaw type collaborative learning model and the discovery learning model with high learning disciplines and low learning disciplines for student learning outcomes, educational institutions are expected to make policies to improve the quality of learning, especially in developing learning models that are more centered on students or better known as student-centered learning, students learn by doing (learning by doing). Especially for fourth-semester students of the educational technology study program, it is recommended to use the jigsaw learning model, this is follows the characteristics and learning needs of students, as well as the current learning situation. The results of this study indicate that the learning model can affect student learning outcomes. Researchers, lecturers, and learning designers need to think that learning models can affect learning outcomes. The combination of learning models and the relationship with individual characteristics can be explored more deeply for further research. Generalizing the

results of this research to other universities is a bit difficult because this research was only conducted at one university, therefore further research needs to be carried out by involving several different universities with different conditions. The combination of learning models and the relationship with individual characteristics can be explored more deeply for further research. Generalizing the results of this research to other universities is a bit difficult because this research was only conducted at one university, therefore further research needs to be carried out by involving several different universities with different conditions. The combination of learning models and the relationship with individual characteristics can be explored more deeply for further research. Generalizing the results of this research to other universities is a bit difficult because this research was only conducted at one university, therefore further research needs to be carried out by involving several different universities with different conditions.

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