Dynamic Geometry Software Based Modules: Difficulty Aspects of Studying Geometry at University Level

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Abstract
The purpose of this study is to ensure that geometry is the most difficult subject to understand, aspects of the difficulty of learning geometry for students, and suggestions for reducing difficulties. This study uses an exploratory mixed methods design. Students of mathematics education teacher candidates in semesters 3-7 as research subjects were selected by purposive sampling. Data collection techniques using questionnaires, interviews, and the value of learning outcomes for the last 4 years. The results showed that geometry is the most difficult subject, the external learning difficulties factor is dominated by the aspects of the material and learning methods. In addition, references, media, and online learning are also discussed factors. Meanwhile, students' learning difficulties internally from the aspect of motivation and intelligence. One solution suggested to educators is to take advantage of the collaboration of DGS with the Geometry module in learning in dealing with learning difficulties.

Abstrak
Tujuan penelitian ini adalah untuk memastikan bahwa geometri merupakan matakuliah yang paling sulit dipahami, aspek kesulitan belajar geometri pada mahasiswa dan saran untuk mengurangi kesulitan. Penelitian ini menggunakan Eksploratory mixed methods design. Mahasiswa calon guru pendidikan matematika semester 3-7 sebagai subjek penelitian dipilih dengan teknik purposive sampling. Teknik pengumpulan data menggunakan teknik angket, wawancara dan nilai hasil belajar selama 4 tahun terakhir. Hasil penelitian menunjukkan bahwa geometri merupakan matakuliah paling sulit, faktor kesulitan belajar secara eksternal didominasi dari aspek materi dan metode pembelajaran. Selain itu, referensi atau bahan ajar, media dan pembelajaran secara daring juga menjadi factor yang dibahas. Sedangkan kesulitan belajar mahasiswa secara internal dari aspek motivasi dan intelegensi atau kemampuan keruangan. Salah satu solusi yang disarankan kepada pendidik adalah memanfaatkan DGS yang dikolaborasikan dengan Modul Geometri dalam pembelajaran untuk menangani masalah kesulitan belajar.

Keywords: *DGS; Modules; Learning Difficulties; Geometry.*

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INTRODUCTION

In everyday life, humans have made mathematics a knowledge either consciously or not. Amazingly, Mathematics has been applied in other sciences such as arts, medicine, economics, engineering, taxation, astronomy, and so on. Formally, mathematics has been studied since the elementary school level. Mathematics has also been studied informally since the earliest stages of a person's life begins. Mathematics is used as a way of thinking, organizing logical proofs, and communicating through the learning and teaching process (Ganal & Guiab, 2014). In line with this, (Satriawan, & Wutsqa, 2013) states that mathematics has become a lesson about settings, patterns, paradigms, relationships, and worldviews. So, Mathematics is a science that is consciously or not already attached to the self and human life. Mathematics has a very broad scope. Therefore, several branches of mathematics can be studied. One of the branches of mathematics is geometry.

Geometry comes from two words, namely geo which means earth and metron which means measurement (Henle, 1969). Geometry is one of the materials that is generally applied in everyday life (Yeni, 2011). Geometry learning simply starts from basic education from concrete to abstract, from intuitive to analytical, from exploration to mastery over a long time, and from the simplest to the most advanced stages. One of the abstract branches of mathematics is geometry. Furthermore, (Nur'aini et al, 2017) revealed that Geometry is the study of points, lines, planes, and spaces as well as their properties, measurements, and relationships with one another. Meanwhile (Aden, 2011; Endang & Istikomah & Mohamad, 2013) stated that geometry is one of the fields in mathematics that is very difficult and weak for school students to absorb because geometry learning emphasizes mastery of written evidence deductive skills.

According to van Hiele's theory, what is needed to understand geometry is the cognitive development of students. In addition, geometry has the characteristics of higher-order thinking and students need a lot of experience in lower-level thinking or stages before learning the concepts of formal geometry. According to Van Hiele's theory, a person going through five stages of thinking development in learning geometry (Crowley, 1987). The five stages are: introduction (visualization), analysis (analysis), informal deduction, deduction (deduction) and last stage is accuracy (rigor) (Burger & Shaughnessy, 1986). Students experience with proper teaching, will pass through these five stages. This means that students will not be able to reach one stage of thinking without passing the previous stage (Safrina et al., 2014)

Therefore, to study geometry, one must have a deep understanding. As said (Ma'rufi et al., 2018) Geometry is a science in the branch of mathematics that is about the size, location, and shape of an object/object, and in learning geometry, students need a mature concept so that students can complete geometry-related problems. Furthermore (Alghadari et al., 2020) stated that geometry is part of learning mathematics that requires mastery of concepts in stages and interrelated. This is by following the objectives of learning geometry at the university. The purpose of learning geometry at the university is for students to master mathematical concepts and mindsets needed to carry out learning in primary and secondary education as well as for further studies. From some of the opinions above, it can be concluded that geometry is a part of mathematics whose existence is very

useful for human life, either directly or indirectly. Learning difficulties are a condition marked by the presence of certain obstacles to achieve learning outcomes. The barriers in question can be psychological, sociological, or physiological in learning in general. Learning difficulties are one of the external factors for students that result in low student achievement, so students find it difficult to do learning effectively (Hasibuan, 2018). So, this condition can cause students not to learn well. Students who have high cognitive abilities sometimes have difficulty in learning which is influenced by factors within themselves (Internal). In line with that, (Clements & Sarama, 2011) states that Learning difficulties are conditions in which children with average or above average abilities, but fail to learn. This is because there are obstacles in the process of perception, conceptualization, language, memory, concentration of attention, self-control, sensori-motor, and integration functions. Learning difficulties can be defined as a gap between the potential possessed by students and the achievements achieved in completing academic tasks (Syahrir et al., 2013). Learning difficulties in students can have an impact on various things, especially academic achievement. The conclusion is learning difficulties can be classified into two groups, namely: developmental learning difficulties which include attention, memory, motor and perception disorders, language and thinking, and learning difficulties. Academic learning includes reading, writing, and arithmetic difficulties (Ayuningrum et al., 2019).

Difficulty in learning geometry is a state in the learning process which is marked by the emergence of various obstacles when learning geometry. The difficulty in learning geometry experienced by students is when they are asked to solve geometric problems related to proof (Novita et al., 2018). These difficulties are shown by students through the mistakes they make when working on problems related to three-dimensional geometry. These difficulties then impact the mastery of the geometry material itself as well as on other concepts in mathematics (e.g., analytic geometry of space and advanced calculus). Two conditions cause students to have difficulty understanding geometry material (Isharyadi & Arios 2018). First, the internal conditions of everyone are different, and this also distinguishes the level of student understanding of geometry material. Internal conditions such as physical condition and level of intellectual ability greatly affect the learning process of geometry. Second, external conditions such as lecturers' teaching methods and ownership of reference books on geometry material, also affect the level of student understanding of the material. Broadly speaking, there are five indicators of difficulty in learning geometry namely: Number Fact, Arithmetics, Information, Language, and Visual-Spatial Skill Error (Purnomo & Machromah, 2017).

These difficulties affect problem-solving and can lead to failure in solving problems. Even if you are not careful in understanding geometric concepts, students will find it difficult to advance to the next level. Therefore, we need solutions or alternatives to overcome learning difficulties as early as possible. To overcome student learning difficulties, various methods are needed according to the difficulties themselves.

There are several suggested efforts to overcome learning difficulties including the use of ICT, textbooks, applying various appropriate learning methods and strategies, developing teaching materials/modules, and the role of the teacher. Integrating TIK in the learning process. In addition, the teacher's role is to be able to identify student difficulties so that they

can create a learning process that can overcome learning difficulties (Retnawati, H. Harlinwibowo, J & Sulytianingsih, 2017). The use of computers in learning geometry needs to be done. With computers, abstract and difficult geometric concepts will become more concrete and clearer. Moreover, the use of ICT in learning will make students motivated learning (Abdussakir, 2013). The results of research conducted by (Nur, 2017) show that the use of Kolb-Knisley teaching materials assisted by Geogebra can increase Higher Order Thinking Skills and student appreciation of mathematics. Use teaching materials that were integrated with the DGL Model and the Self Explanation strategy (Ma'arif, 2016) . Using the DGS Cabri II Plus allows students to make diagrams in verifying the problem well, determining valid allegations, and justify statements on written evidence (Maarif, S; Wahyudin; Noto, M, S; Hidayat, W.; & Mulyono, 2018). Then, students can participate in geometric exploration activities using the DGS Cabri 2+ which provides opportunities to investigation alternative evidence related to geometry.

This study aims to ascertain by investigating that geometry is the most difficult subject to understand. Aspects of students' difficulties in learning geometry were also carried out in this study and suggestions for reducing difficulties were also discussed.

METHOD

This research method uses Mixed Methods with Exploratory Designs. Exploratory Design is a method that starts from the qualitative stage which is then continued to the quantitative stage (Greene, J. C., Caracelli, V.J., & Graham, 1989). The research design is based on statement that exploration is necessary for one of several reasons: measures or instruments are not available, variables are not known, or there is no guidance framework or theory. Because this research design begins with a qualitative approach, this research design is suitable for uncovering phenomena (Creswell, J. W, Plano Clark, V..L, Gutmann, M., & Hanson, 2003; Creswell, 2008). To reveal the phenomenon, this research uses a case study approach. This research approach was chosen because the case study is a research approach that focuses on a phenomenon, variable, or group of variables, things, or cases that occur in the context of a specified or limited time, place, or place to gain an understanding of the overall phenomenon being studied (Merriam, 2009; Stake, 1995; Yin, 2002).

Qualitative data includes open and closed information using questionnaires distributed using Google Forms and interviews with lecturers who are experts in the geometry course. Quantitative data is obtained from the final semester grades in the last four years. Student candidates for mathematics education in semesters 3 to 7 as research subjects were selected by purposive sampling. Researchers have conducted an Online Survey of 74 students who have taken Geometry courses. They consist of 45.9% in the seventh semester, 17.6% in the third semester, and 36.5% in the fifth semester. To find out, in general, the subjects and materials that are the most difficult to understand, the factors that cause learning difficulties to occur, and what solutions are taken to reduce learning difficulties, especially geometry courses, the researchers gave a questionnaire through Google Form. After that, open and closed interviews with students represented by 6 students and interviews with lecturers. The questions in the questionnaire, the researchers compiled based on direct information from the research subjects and influential lec-

turers, which were then validated by experts. Finally, the collection of final Geometry scores from students in the form of KHS (Study Results Card) and lecturers (In the form of a verified UAS score recap) to support the data obtained from the appointment and interviews. Data was analyzed visually and in depth and using Microsoft Excel.

RESULT AND DISCUSSION

Result

This research resulted in an explanation of the answers to the research objectives, namely: 1) knowing and describing the most difficult subjects for students to understand and the causes of the courses being difficult to understand, 2) suggestions for overcoming difficulties based on previous theoretical studies.

Based on the results of an online survey, the most difficult subject for students to understand is Geometry. Students are asked to openly and privately express related subjects which are the most difficult to understand, obtained subjects are Geometry (33.8%), Calculus (23%), Geometry of plane and space analytes (13.8%), MNA (9.7%), Real Analysis (6.8%), Linear Program (2.8%), and Complex analysis, Advanced calculus, Statistical data analysis (1.4%), and other subjects (2.8%).

To find out more about the reasons or aspects that make difficult for students to understand the material, the researchers conducted interviews with six students. Two students from semesters Three, five, and seven. The same results were obtained from survey data with interviews. In the aspect of reference or teaching materials used (48%), then followed by materials (20%) and learning models (16%) and other aspects. Students expressed that they wanted complete teaching materials, minimal errors, lots of

practice questions, no gaps between material and questions, language that is easy to digest, can be integrated with ICT, and easily accessible so that teaching materials help students understand the material and in the end learning difficulties can be overcome. Apart from that, the aspect of students' abilities in the field of geometry also deserves attention. Based on researcher interviews with Geometry lecturers, students' spatial abilities are still low and this is acknowledged by students. The results of online surveys and interviews on student learning difficulties are reinforced by the geometry scores of students for the past 4 years (2017/2018 – 2020/2021), as follows:
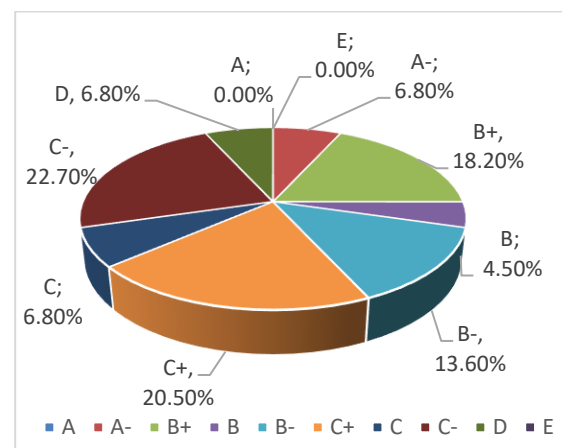

Figure 1. Percentage of Student Geometry Scores for the last 4 years

Discussion

Learning difficulties are also caused by two factors: external and internal factors. As revealed by (Novita et al., 2018) that student learning difficulties are influenced by several internal and external factors. Internal factors as the cause of learning difficulties are factors of interest, talent, and intelligence. While external factors come from aspects of the use of materials, lecturers' teaching methods in which the delivery of material without adjusting students' abilities, references, and so on. Psy-

chologically, it turns out that learning difficulties are also influenced by congenital factors, during pregnancy, and after childbirth. As (Harwell, 2000) explains the factors of learning difficulties in the form of 1) heredity/congenital factors, 2) disorders during pregnancy, childbirth or prematurely, 3) the condition of the fetus that does not receive enough oxygen or nutrients, and or the mother who smokes, drugs, or drinking alcohol during pregnancy, 4) Post-natal trauma, such as very high fever, head trauma, or drowning, 5) Recurrent ear infections in infancy and toddlerhood. Children with learning difficulties usually have a weak immune system, 6) Early childhood is often associated with aluminum, arsenic, mercury/mercury, and other neurotoxins. More deeply (Kirk, S.A, & Gallagher, 1986) states that learning difficulties are caused by factors: 1) Brain Dysfunction, 2) Genetics, 3) Environment & Malnutrition, and 4) Biochemical Factors. From several expert opinions, it can be concluded that learning difficulties can be influenced by various aspects and factors, both physical and psychological. So, the handling must be adjusted.

According to (Erma suryani, 2010) there are three characteristics of learning difficulties, including 1) Internal Disorders, Internal disturbances in question are children who have attention disorders, so their perceptual abilities are hampered. Perceptual abilities that are hampered include visual perception (the process of understanding the object seen), auditory perception (the process of understanding the object that is heard), and tactile-kinesthetic perception (the process of understanding the object that is touched and moved); 2) The gap between potential and achievement, meaning that children have normal intelligence/ intelligence potential, some even have above-average abilities. However, they have low academic achievement. As such, they can be

said to have a marked gap between their potential and the achievements they display. This gap usually occurs in specific academic learning abilities, namely the ability to read (dyslexia), write (dysgraphia), or count (dyscalculia); 3) Absence of Physical and/or Mental Disorders. Children who have learning difficulties are children who do not have physical and/or mental disorders, such as Mental Retardation, Slow learning, and Learning Problems (Leaner Learner).

Before determining a solution to overcome learning difficulties, a teacher should try to identify learning difficulties experienced by students first. This effort is called a diagnosis which aims to determine the type of student learning difficulties. In making a diagnosis, certain procedures or steps are needed that are oriented to finding the types of learning difficulties experienced by students. This procedure is called diagnostic. Many diagnostic procedures can be taken, one of which is the Weener & Senf (1982) procedure which is quoted (Wardani, 1991) that is : 1) Conducting class observations to see student deviant behavior when participating in learning; 2) Checking the eyesight and hearing of students, especially those suspected of having learning difficulties; 3) Interviewing parents or guardians to find out which families are causing learning difficulties; 4) Provide diagnostic tests in certain skill areas to determine the nature of learning difficulties experienced by students; 5) Provide intelligence ability (IQ) tests, especially to students who are suspected of having learning difficulties.

Based on the description of the procedure above, in general, it can be done easily by educators. For the most likely student levels, numbers 1 and 4. After carrying out the above procedure, educators are expected to make alternative solutions to learning difficulties by 1) analyz-

ing the results of the diagnosis, 2) identifying and determining certain skill areas, 3) compiling improvement programs, and 4) implementing improvement programs. In a study (Wijaya et al., 2019) it was found that educators have not carried out in-depth diagnoses of difficulties in students' mathematics learning. Educators do not focus on students' thinking processes but focus on mathematical topics and non-mathematical problems. Educators also do not differentiate between diagnosis, evaluation, and predictive tests. Educators diagnose students' learning difficulties through students' responses to tests not to the learning process. For this reason, the skills and competencies of educators are needed, especially to be able to diagnose student learning difficulties, especially students' thinking process difficulties.

In this study, solutions to overcome or reduce difficulties will be discussed, one of which is the use of Dynamic Geometry Software (Geogebra)-based Modules. As will be described as follows:

Learning media using computers can be a choice used by teachers in the teaching and learning process. Computer-based learning media has many advantages including being able to provide interesting and dynamic visual effects, animations, and sounds. With an attractive visual appearance, students will be more happy and interested in learning the competencies presented (Chipangura & Aldridge, 2019; Yulianti et al., 2017). Currently, one of the most familiar computer-based mathematics learning media is the Dynamic Geometry Software (DGS) application. For concepts related to geometry and measurement, DGS is an effective and flexible tool for mathematicians, such as telescopes or microscopes for scientists, to make discoveries and test theorems (Özçakir & Cakiroglu, 2019) DGS can

provide an invaluable learning environment for school geometry. The most important characteristic of DGS for traditional environments is that objects, drawn or constructed, can be moved and resized interactively (Özçakir & Cakiroglu, 2019). In other words, students can manipulate geometric shapes and can observe changes in real-time measurements with DGS. Geogebra is one type of DGS developed by Markus Hohenwarter after Geometer's Sketchpad (GSP) and is used as a learning tool that is widely used in geometry learning in schools. Like GSP, Geogebra is a type of DGS in the form of an application that can be installed on various computers. This application was developed specifically to facilitate the dynamic visualization of geometric concepts (Jelatu et al., 2018). The convenience of this application is the availability of Indonesian in all its features and can be downloaded for free.

DGS in the form of Geogebra can help teachers when teaching two-dimensional and three-dimensional geometry. Several researchers have shown the effect of computer-based learning with DGS in the form of both GSP and Geogebra. Researchers (E. Istikomah, 2019; Endang & Istikomah & Mohamad, 2013) have conducted previous research which found that the use of GSP can help students improve understanding of mathematical concepts and the use of GSP in learning is positively correlated with student learning outcomes. Furthermore, the use of GeoGebra found that Geogebra is useful mathematics learning media for student learning and can develop their understanding of geometry because students can explore, guess, build, and define geometric relationships when interacting with Geogebra. (Isman, 2016) revealed that there are three uses of GeoGebra in mathematics learning, namely mathematics learning media, tools for making

mathematics teaching materials, and tools for solving math problems. Overall, the results of the study found that students in the DGS-supported group (Geogebra) performed better than students in the physically manipulative-supported group.

Several studies have tested the effectiveness of DGS in improving students' mathematical abilities and the results are consistent. The use of DGS especially GeoGebra has been used in mathematics learning around the world, because it can create a dynamic learning environment (Nurzhanov et al., 2021). Furthermore, the use of DGS can help educators in the future by considering sample size, the ratio of students using computers, and education level (Dadang Juandi et al., 2021). The use of DGS has a positive effect on students' mathematical communication and skills (D Juandi & Priatna, 2018; Nopiyani et al., 2016; Tamur et al., 2020). Furthermore, in research (Setyawan et al., 2018) it was found that DGS has helped teachers to understand mathematical concepts and demonstrated their mathematical understanding skills in front of the class. In addition, DGS can be used flexibly both in class and at home. Researchers have also researched with the results that GeoGebra-based learning can increase students' self-efficacy and self-regulation and students' mathematical communication skills through GeoGebra are better than the control class (Zetriuslita; Nofriyandi; & Istikomah, 2021; Zetriuslita et al., 2021). However, (D Juandi et al., 2021) in their study found that the use of GeoGebra was more effective when the sample was less than or equal to 30 people and a sufficient number of computers allowed students to use it individually in the classroom. It aims to achieve a higher level of effectiveness. To make it easier for users (Hohenwarter & Hohenwarter, 2002) has

described in detail the elements of Geogebra in his book entitled "Introduction to Geogebra", intending to be used by people who deserve to be crowded. Users can explore at the link www.geogebra.org.

The module is one part of the teaching materials that can be used by teachers in learning. The module can also be interpreted as a book written with the aim that students can learn independently without the help of educators (Prastowo, 2012). There are four meanings of the module (Mardati, 2017) namely: 1) a unit of material specifically designed so that students learn independently; 2) is a complete learning program, arranged systematically, referring to clear and structured learning objectives; 3) contains learning objectives, directions and activities to achieve goals and evaluation of the achievement of learning objectives; 4) Module is a learning tool or infrastructure that contains materials, methods, limitations, and how to evaluate. In detail (Istikomah, E & Herlina, S., 2019) explains the characteristics of the module, including specifically formulated lesson objectives, students can study independently, opening opportunities for students to progress continuously according to their respective abilities and providing opportunities for students to be active so that the module can also generate student learning motivation. From some of the definitions above, it can be concluded that the module is a teaching material with all forms of material (written or unwritten) that is used to assist teachers or instructors in carrying out the learning process and assist students in learning independently to achieve learning objectives.

Characteristics of a good module according to (Sungkono, 2003) can be arranged with certain principles such as 1) The principles of goal-oriented learning design (objective model); 2) The principle of independent learning; 3) The principle

of continuous learning progress (continuous progress); 4) Structuring the material in a complete and complete (self-contained) modular manner; 5) The principle of cross-referencing between modules in subjects; 6) Self-study assessment of learning progress (self-evaluation). Furthermore (Daryanto, 2013) suggests that to produce a module that can increase learning motivation, module development must have the following characteristics: 1) Self Instruction (The module must contain learning objectives and materials, material according to the atmosphere, tasks, and environment of students. includes examples and exercises. Simple and communicative language. There are summaries, assessment instruments, feedback, and references); 2) Self Contained (A Self-Contained Module is a module that contains all learning materials. The purpose of this Self Contained is to provide opportunities for students to study learning materials thoroughly; 3) Stand Alone (Modules can stand alone meaningfully by using this module, no teaching materials are needed/ other media); 4) Adaptive (Modules are presented according to the development of science and technology. Modules should have high adaptability to science and technology); 5) User Friendly (Modules should be structured in such a way that they seem familiar to the users. Every information and instructions presented are helpful for the users). From the above opinion, there is one principle and one very interesting character to discuss, namely the principle of self-contained and adaptive character. This means that a module must contain a complete and complete modular arrangement of materials and the module is designed according to ICT developments. To make the principled and characteristic module, the researcher wants to design a geometry module that is equipped with ICT-assisted student worksheets later.

The main components that need to be available in a good module according to (Daryanto, 2013; Sungkono, 2003) are course review, introduction, learning activities, exercises, practice answer signs, summaries, formative tests, and formative test answer keys. So, a good module fulfills the eight components above and researchers will add Student Worksheets (LKM) and instructions for using ICT (Geogebra) for the geometry material in the module with the aim that students understand geometry material in-depth, and the module becomes more adaptive according to student suggestions and powerful lecturer during the interview. Later this module will be assessed from 4 aspects, namely, aspects of content (Content), Language (Language), Concept (Construct), and Graphics (Graphic). Then (Muhtadi et al., 2017; Saadati et al., 2014) explained that interactive mathematics learning modules and media are products developed with advances in information technology, to improve students' skills, and enable them to study productively. The hope is that students can improve their skills and be productive so that learning difficulties can be overcome.

The advantage of learning using modules according to (Istikomah, E & Herlina, S., 2020) is that students can study individually and study independently without guidance from the lecturer so that they can manage their own study time and the lecturer is only a facilitator. While the drawback is that students learn monotonously, less than optimal in developing their creativity. To minimize the shortcomings of this module, it is hoped that researchers will be able to design interactive and adaptive modules on an ongoing basis by considering the concepts, language, constructs, graphics, and characteristics of good modules that have been described in this paper. To further

refine this module into a recognized product, the researcher plans to apply for IPR.

The efforts or solutions offered are expected to overcome or minimize learning difficulties. (Pangesti & Retnowati, 2017) suggests that the limited quality of teaching materials is thought to be the main factor causing difficulties in learning geometry, especially teaching materials that contain enrichment materials such as modules. This means that the module can be used as an alternative to reduce student learning difficulties. Then (Owon, 2017) observing this, it is necessary to develop teaching materials that can help students learn and understand the material. The existence of teaching materials is important because lecturers and students tend to depend on the teaching materials they have. In line with that, (Gazali, 2016) explains that one of the benefits of using teaching materials is that it can increase the effectiveness of learning and improve the quality of learning. By increasing the effectiveness of learning is expected to reduce or overcome learning difficulties. Lastly, Aunurahman (Isharyadi & Ario, 2018) reveals that during the learning process, learning problems are often related to learning materials (materials) and learning resources.

CONCLUSIONS

Learning difficulties are a very crucial component in his learning in geometry at the university level. Difficulty in learning geometry is a condition in the learning process which is marked by the emergence of various obstacles (both physical and psychological) so that the handling must be adjusted. The module is one of the teaching materials as well as a learning tool that can minimize learning difficulties. It will be better if the module has collaborated with ICT. The results of data collection through questionnaires, interviews, and scores obtained, students have difficulty learning to understand basic geometry material. This is evidenced by the average geometry value for four consecutive years is the value of A 0.00%), B+ (18.2%), B (4.5%), B- (13.6%), C+ (20, 5%), C (6.8%), C- (22.7%), D (6.8%) and E (0.0%). Learning difficulties are caused by material that is difficult to understand, students' perceptions of the material, learning strategies that are not by following student needs, lack of references, incomplete material content, lack of practice questions in reference books, and low special ability. It is hoped that further research will discuss spatial abilities and the development of teaching materials according to student needs because in this study it is not discussed. Based on several literature studies, the use of ICT such as Dynamic Geometry Software is considered appropriate as a tool to reduce student difficulties in learning geometry. GeoGebra is one type of DGS that can be used in learning. GeoGebra is very effective in helping both teachers and students. To make it easier for educators, researchers suggest combining DGS (GeoGebra) with Geometry learning modules, so that DGS and Modules become unified learning tools and materials.

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