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An Exploration of Secondary Students' Perception of Blended Learning in Mathematics Learning

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ABSTRACT

This study aims to analyze students' perceptions about the use of blended learning models in understanding mathematics. As blended learning becomes more commonplace, it is important to assess whether students like or dislike the application of blended learning in their studies. The total research subjects were 319 secondary students from 6 different schools in Jakarta. Furthermore, this study used a survey method and the data were analyzed using the Rasch Model (WinSteps). The research instrument was a questionnaire consisting of 21 statements with several indicators, including the delivery of material, understanding of mathematical concepts, easy access, and assignments. Based on the wright maps table on WinSteps, the percentage of male students who like the Blended Learning model in learning mathematics is more than female students. Meanwhile, when viewed in terms of grade, 7th and 8th grade students like the application of blended learning models the most. In addition, this study reveals that students most dislike when it is difficult to access assignments online during the application of blended learning by teachers in learning mathematics. Therefore, to solve mathematical problems, students prefer to have a face-to-face interaction with the teachers to ask if there is something that is not understood yet.

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INTRODUCTION

Blended learning (BL) is a learning model that combines face-to-face and online interaction, referring to the integration of learning delivery methods (Çakır & Bichelmeyer, 2016; Borba et al., 2016; Bidder, Mogindol, & Saibin, 2016; Wai, Lim, & Zinc, 2013). Face to face in BL means that students are active in discussing material so that they will be more cohesive and critical in class (Owston, York, & Murtha, 2013). In addition, the face-to-face learning model allows students to interact more with teachers and classmates. Students enjoy face-to-face learning because they have more time to discuss all the things they do not understand with their teachers (Kharb & Samanta, 2016).

Meanwhile, online learning in BL is used so that students can better understand the material in depth (Owston et al., 2013). Besides, online learning is also used for distance learning so that communication can be carried out and information can be shared flexibly

(Shelley, 2008). Discussions in online learning allow students to exchange their views more comfortably, have plenty of time to read, and understand the purpose of reading and managing critical responses (Blankson & Kyei-Blankson, 2008). However, online learning also makes it difficult for students to communicate. This is due to some mathematical material that can only be conveyed verbally (Kim, Liu, & Bonk, 2005; Wallace, 2003).

BL is efficient learning and can adjust students' needs (Stricker, Weibel, & Wissmath, 2011). In addition, it can increase student motivation to be independent in learning (Faradillah & Hadi, 2020). Thus, they can be active when developing their education compared to technology-based learning (López-pérez, Pérez-lópez, & Rodríguez-ariza, 2011). BL can increase student participation in a way that makes students active in developing their education (Mosca, Ball, Buzza, & Paul, 2010; Vernadakis, Antoniou, Giannousi, Zetou, & Kioumourtzoglou, 2011). Students feel lazy, bored, and other problems in the learning process in class because of monotonous learning (Suliani, 2020). In designing, developing, and providing teaching, teachers must pay attention to students' perceptions because learning that fails to meet student expectations and needs can cause low levels of student involvement and motivation (Horvat, Dobrota, & Krsmanovic, 2015). Their perceptions can influence their decision to understand mathematics material.

Some researchers have discussed students' perceptions of blended learning, such as López-pérez et al., 2011 & Ogden 2015. These studies concluded that (1) e-learning activities support and complement face-to-face classes; (2) the ability and motivation to use blended learning increases; (3) skills or interests to support students' careers increases; and (4) students feel that the BL model makes them more active in asking questions. There is not much research (López-pérez et al., 2011; Ogden, 2015) that addresses students' perceptions of the use of blended learning in mathematics learning. Students' perceptions of mathematics are basic consideration for teachers in the selection of strategies and methods of learning mathematics for students in the class (Siregar, 2017). As BL becomes more commonplace, it is important to assess whether students like or dislike the application of blended learning in their studies. Therefore, this study aims to analyze students' perceptions of the use of BL in learning mathematics.

METHOD

The research method used was a survey where it can make a large contribution based on samples and knowledge derived from statistics (Stern, Bilgen, & Dillman, 2014). This research instrument was developed from a number of previous instruments that were adapted to mathematics learning and language structure. This instrument was validated by two validators, including lecturers and teachers, where it had gone through a revision process and was declared eligible for testing by both validators. The total subjects in this study were 319 students consisting of junior and senior high school students.

TABLE 1. Constructs and Items of Questionnaire

CONSTRUCT	ITEM NO.	TOTAL
Presentation of material	1, 2, 3, 4, 5, 6	6
Understanding the material	7, 8, 9, 10, 11	5
Access facilities	12, 13, 14, 15, 16	5
Assignments collection	17, 18, 19, 20, 21	5

The indicators on this research instrument were divided into four, including presentation of material, understanding the material, access facilities, and assignments. Data tabulated in Ms. Excel software was then converted and analyzed with the Rasch assisting model of WinSteps software (Linacre, 2011). Rasch analysis is a statistical technique that is usually used to analyze test data and Likert survey data to construct and evaluate problems

(Edwards & Alcock, 2010). In this study, researchers categorized the subject's demographic data into two parts, namely gender and grade.

RESULTS AND DISCUSSION

The analysis in this study was seen from two aspects, gender, and grade. The data obtained were analyzed using the Rasch Model to determine student responses based on distributed questionnaires. The Rasch Model Analysis was a formal test for the scale results introduced by Georg Rasch (Hidayah, Lah, & Tasir, 2018). It provided an opportunity to test how far the response of the scale that closed the pattern needed in the measurement (Tennant & Conaghan, 2007), which aimed to see item difficulties based on gender and class.

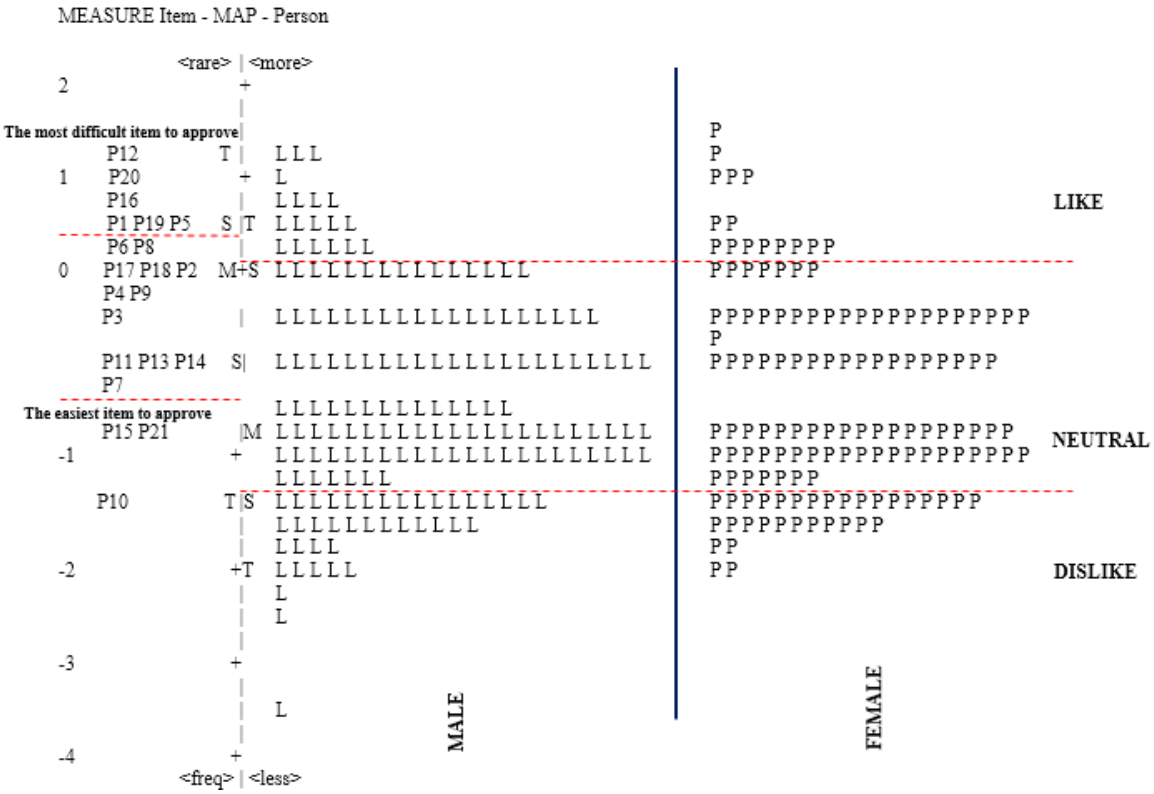

Figure 1. The Wright Maps of Students' Perceptions Based on Gender

Based on the results of Wright Maps on WinSteps, male students prefer the application of BL in mathematics learning compared to female students, which is 19 (5.96%) and 15 (4.70%), respectively. These results are consistent with previous research in the process of BL, that males liked the Blended Learning component more than females (Koohang, 2004). Female students have more difficulty when studying online than male students because of a higher level of confidence possessed by male students. Koohang (2004) stated that the lower confidence level might create barriers that limited the opportunities for female students in achieving a positive academic learning experience. Besides, female students had less computer knowledge and fewer computing experiences than male students (Beyer, 2006; Dunaway, 2013; He & Lee, 2009) since they learned and practiced less in using internet technology. Next, the researchers discuss the topic according to the grade to see which class likes blended learning in mathematics.

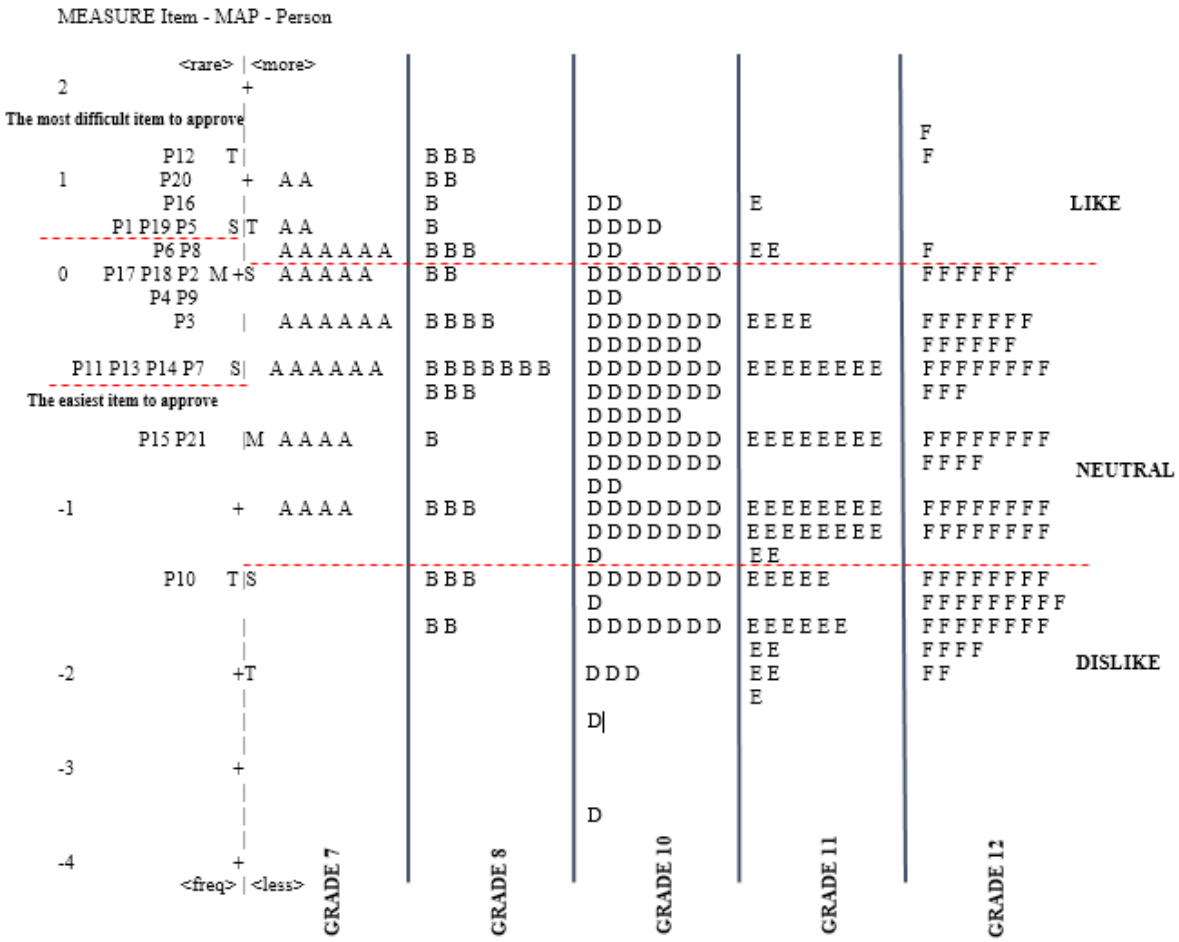

Figure 2. The Wright Maps of Students' Perceptions Based on Grade

The Wright Maps on WinSteps show that 7th and 8th grade students like the application of BL in mathematics learning more than other grades, which is 10 (3.13%). Meanwhile, 31 (9,72%) of 12th grade students do not like the application of BL in mathematics learning.

In 7th grade, students feel some new things compared to the previous school level, including the situation, environment, and study habits. Therefore, they are better able to follow the rules when learning (Nuramaliah, 2002). Furthermore, new friends influence their study habits so that they are more profound in learning and doing the tasks given by the teachers well. BL is likely a new learning model in learning mathematics for them so that they are more motivated in understanding mathematics.

The perception of senior high school students about blended learning is unsatisfactory. They think that face-to-face discussion is essential because the teachers can provide reinforcement, confirmation, and students struggle when they build their knowledge from online activities (Bagus & Sudria, 2015). Teachers can provide direct justification to avoid misunderstanding of students' concepts. Besides, students can ask questions directly when they have a problem. The reason for students' preference which is reflected in the questionnaire on BL in mathematics learning in this research can be determined based on Figure 3 below.

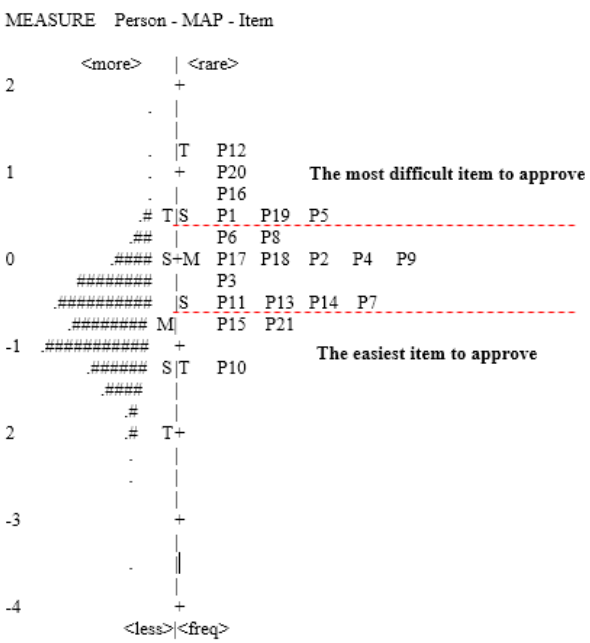

Figure 3. Item Distribution Map

Figure 3 shows the subject's score and the relative difficulty of the material presentation items on the Rasch calibrated scale. The left side of the plot shows the participant's response. The right side shows the item difficulty faced by the students, were the highest level of participation with the most difficult items are placed at the top. Then, participants who show the lowest participation with the easiest items are placed at the bottom of the plot (Lamb, Annetta, & Meldrum, 2011).

The analysis shows a statement that the most disliked subject about the application of BL in understanding mathematics is P12. The statement said that the subject has problems when accessing assignments through online learning. Problems experienced by students include the unavailability of internet facilities in some places and the inadequate skill of computer operation (Chandrawati, 2010). Meanwhile, the most preferred item when studying mathematics using BL is P10. Students like learning with BL because they can ask the teachers directly when they do not understand. This statement is similar to the findings found by Ogden (2015) where students felt that the teaching approach enabled them to ask more questions in class. Furthermore, in online learning, students have difficulty when interacting (Utami, Cahyono, 2020), causing them to prefer to interact face to face.

Based on this analysis, students have no difficulty when accessing assignments through online learning. In BL, they like learning mathematics in a face-to-face learning method because they can ask questions directly to their teachers when they do not understand. The details of the summary of the statistical instrument are presented in Table 2 below.

TABLE 2. The Summary of Statistical Instrument: Reliability of Person and Item

	Mean	Separation	Reliability	Cronbach's α
Person	0.04	1.44	0.67	0.50
Item	0.13	6.81	0.98	

As shown in Table 2, the coefficient of Cronbach α has a score of 0.50. It shows that it has excellent reliability. The reliability score for the item obtained according to Table 2 is 0.98. This score shows that the instrument has excellent reliability (α > 0.94) (Sumintono &

Widhiarso in Perdana, 2018). The reliability score for the person obtained according to Table 2 is 0.67. This score shows that the person has good enough reliability ($0.67 \leq \alpha \geq 80$) (Sumintono & Widhiarso in Perdana, 2018). The score of separation for the item obtained is 6.81 (rounded up to 7). This score shows that respondents only consist of seven groups.

CONCLUSION

The analysis shows that male students like the Blended Learning model in learning mathematics more than female students with a percentage of 5.96%. Meanwhile, when viewed in terms of grade, 7th and 8th grade students most like the application of blended learning models with a percentage of 3.13 %. In addition, it is found that students most dislike when it is difficult to access assignments online during the application of blended learning in learning mathematics. Therefore, to solve mathematical problems, students prefer to have a face-to-face interaction with the teachers to ask if there is something that is not understood yet.

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Persepsi Siswa terhadap Penggunaan Model Blended Learning dalam Pembelajaran Matematika

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ABSTRAK

Penelitian ini bertujuan untuk menganalisis persespsi siswa tentang penerapan model blended learning dalam memahami matematika. Karena blended learning sudah umum digunakan, penting untuk menilai apakah siswa menyukai atau tidak terhadap penerapan blended learning pada pembelajaran mereka. Total subjek penelitian adalah 319 siswa sekolah menengah yang berasal dari 6 sekolah berbeda di Jakarta. Penelitian ini menggunakan Rasch Model (WinSteps). Instrumen penelitian menggunakan angket yang terdiri dari 21 pernyataan dengan beberapa indikator yaitu penyampaian materi, pemahaman konsep matematika, kemudahan akses, dan penugasan. Berdasarkan wright maps pada WinSteps, persentase siswa laki-laki yang menyukai model blended learning lebih besar dari siswa perempuan. Sedangkan, jika dilihat berdasarkan kelas, siswa kelas 7 dan siswa kelas 8 paling menyukai penerapan model blended learning. Selain itu, penelitian ini menemukan bahwa saat penerapan blended leaning siswa paling tidak suka ketika kesulitan mengakses tugas online dalam pembelajaran matematika. Oleh karena itu, untuk menyelesaikan masalah matematika, siswa lebih memilih tatap muka dengan guru karena dapat bertanya secara langsung jika ada sesuatu yang belum dipahami.

Kata Kunci: Blended Learning, Persepsi, Pembelajaran Matematika.

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