
EDUCATORS' PERCEPTION OF BLENDED LEARNING MODELS ON MATHEMATICS LEARNING

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ABSTRACT

The main objective of this research is to analyze and compare educators' perceptions of the application of the BL model in mathematics learning. The stages of research carried out in this study began with the manufacture of questionnaires both for educators and students. Next, the researchers asked one of the lecturers and mathematics teachers to validate it. Based on the results of the validation conducted, the questionnaire was declared to be appropriate to be used by correcting a selection of words so it would not have a double meaning. In the next stage, researchers distributed the questionnaire to educators in schools and universities in several provinces in Indonesia. After obtaining the data, researchers analyzed the data using WinStep. The results of the questionnaire showed that there was one statement that was agreed by educators regarding the assignment of the assignment with the BL model that students felt they needed more time to complete the assignment online when dealing with graphs/diagrams/tables / other on mathematical material.

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INTRODUCTION

Blended Learning (BL) is one of the models in teaching and learning activities that teach face to face and online learning so that BL can facilitate interaction between teachers and students (Borba et al., 2016; Çakır & Bichelmeyer, 2016; Horvat, Dobrota, Krsmanovic, & Cudanov, 2015; Kharb & Samanta, 2016; Ndlovu & Mostert, 2018; Philipsen, Tondeur, Pareja Roblin, Vanslambrouck, & Zhu, 2019; Prasad, Maag, Redestowicz, & Hoe, 2018). Face-to-face learning alone can provide students with experience and opportunities to explore and reflect ideas from previous concepts and provide feedback and interaction between teachers and students (Borba et al., 2016). Online authentic resources appeal to both students and professors due to certain characteristics: demonstrativeness; the structured and laconic character of the theoretical material or lesson content; familiar and user-friendly interface; the simplicity of the usage; up-to-date authentic content allowing the necessary or required skills development; and independent or individual learning (Arkhipova, Belova, Gavrikova, Lyulyaeva, & Shapiro, 2018). Whereas online learning can provide communicative skills and are attractive to students and teachers because of certain characteristics such as familiar and user-friendly interfaces; the simplicity of use; the latest authentic content that enables the development of the necessary skills; and independent learning (Arkhipova et al., 2018).

Several previous studies have analyzed the perceptions experienced by teachers, such as perceptions of internet usage and mobile devices (Bauk, 2015; Borba et al., 2016). The online learning environment, it has allowed the expansion of blended increasingly popular so that it can make effective learning and increase interaction between students (Hung & Chou, 2015; Philipsen et al., 2019). The use of technology is also still considered when developing BL, such as mobile learning. While face-to-face learning at BL is carried out independently carried out either through audio, video, online discussions, quizzes, assignments, emails, and direct chat so that the BL model is flexible, improves the skills and ways of learning of each different individual (Bidder, Mogindol, & Saibin, 2016; Elyakim, Reyhav, Offir, & McHaney, 2019; Wai & Seng, 2015). Some research related to BL (Çakır & Bichelmeyer, 2016; Kharb & Samanta, 2016; Ndlovu & Mostert, 2018; Philipsen et al., 2019). According to the researches above showed that analysis results showed that the examined teacher characteristics and teaching practices do not have any impact on student achievement. In summary, though, the results demonstrated that students developed collaboration skills,

sharing, and production of information and knowledge, which is an experience related to any subject or learning area. The results indicate that a TPD for OBL should be designed and developed in such a way that teachers are supported throughout the entire professional development process. Majority of the students responded that BLM increased their interest in the subject, encouraged them in developing independent learning skills. They experienced better understanding of the subject and higher level of interaction with the teacher during face-to-face sessions. Most of the faculty members agreed that BL motivated students to do self-study, helped them in developing higher cognitive skills and enhances learning.

There are several studies related to BL such as measuring teacher quality on student achievement in secondary schools with a standards-based curriculum, analyzing teacher perceptions about the use of a modular object-oriented dynamic learning environment, the importance of online and BL strategies, and teacher professional development (TPD) on how to teach online or BL (Çakır & Bichelmeyer, 2016; Kharb & Samanta, 2016; Ndlovu & Mostert, 2018; Philipsen et al., 2019). However, there are no studies that have examined the perceptions of teachers with BL on the delivery of mathematical material yet. In implementing learning, one of the important roles of the teacher is to identify material that is relevant to the learning objectives to be achieved.

Based on the discussion above, the purpose of this study is to obtain information about the perception of mathematics teachers towards BL models in the delivery of learning materials, to optimize learning activities for the better, and facilitate the characteristics and independence of student learning. Various researchers related to the application of *BL* have been widely used by researchers, but not many have analyzed the perceptions of teachers with *BL* on the delivery of material. Whereas teacher perceptions are also needed to help, improve, and develop BL itself. Therefore, there is a need for teacher perceptions with BL of the delivery of material.

METHOD

The research method is a survey method with a qualitative approach. So that researchers will give questionnaires to school and university educators in Jakarta, Lampung, Tangerang, South Tangerang, and Riau. Furthermore, researchers will use the Rasch model to analyze the person and items in the questionnaire that has been collected. Rasch modelling is used for questionnaire data analysis. Using Rasch modelling can overcome the problem of

data intolerance by accommodating logit transformations by applying logarithms to the odds ratio of raw data (Sari, Sekarwana, Hinduan, & Sumintono, 2016). The instrument used in the form of a questionnaire educators' perceptions of BL in mathematics learning that has been validated and declared eligible for use by the validator. The aspects seen in BL in mathematics are divided into four, namely classroom tasks, web aided, strategies, and assessment (Setyaningrum, 2018). The details of the number of subjects in each province are set out in the table 1 below, where the educators came from 18 schools and universities (public and private).

Table 1. The Total of Subjects in Each Province

The Province (code)	The number of schools or universities	The number of subjects
Lampung (A)	1	2
Banten (B)	2	7
DKI Jakarta (C)	8	10
Riau (D)	2	2
Jawa Timur (E)	2	4
Maluku Utara (F)	1	1
Jawa Barat (G)	1	1

RESULT AND DISCUSSION

This research went through several processes or stages before analyzing the results of the educators' perception of the questionnaire towards BL. The first step carried out by the researchers was to validate a questionnaire about the educators' perceptions of BL. This questionnaire is a combination of several previous research questionnaires (Bidder et al., 2016; Ciabocchi, Ginsberg, & Picciano, 2016; Ginns & Ellis, 2007, 2009; Precel, Eshet-Alkalai, & Alberton, 2009) about teacher perceptions of BL. The validation process was carried out by several experts, namely lecturers and teachers. Both validators stated that the questionnaire was appropriate for use with several language-related revisions. The second stage is making a questionnaire with Google Form and asking some prospective subjects, "Have you ever applied BL when teaching mathematics?". Educators who said that ever applying BL was the subject of this study. The third stage is analyzing. The analysis process is carried out using WinSteps table variable maps, which aims to see item difficulties based on gender and regional teaching educators (provinces). The following table maps variables by gender and provinces.

Table 2. The Percentage of BL Rate Like Based on Gender and Provinces

The Rate of BL Like	Gender (%)		Provinces (%)						
	Men	Women	A	B	C	D	E	F	G
Like	3.7	11.1	0	3.7	7.4	3.7	0	0	0
Medium	14.8	59.3	3.7	14.8	25.9	0	11.1	3.7	0
Don't Really Like	0	11.1	3.7	11.1	3.7	3.7	3.7	0	3.7

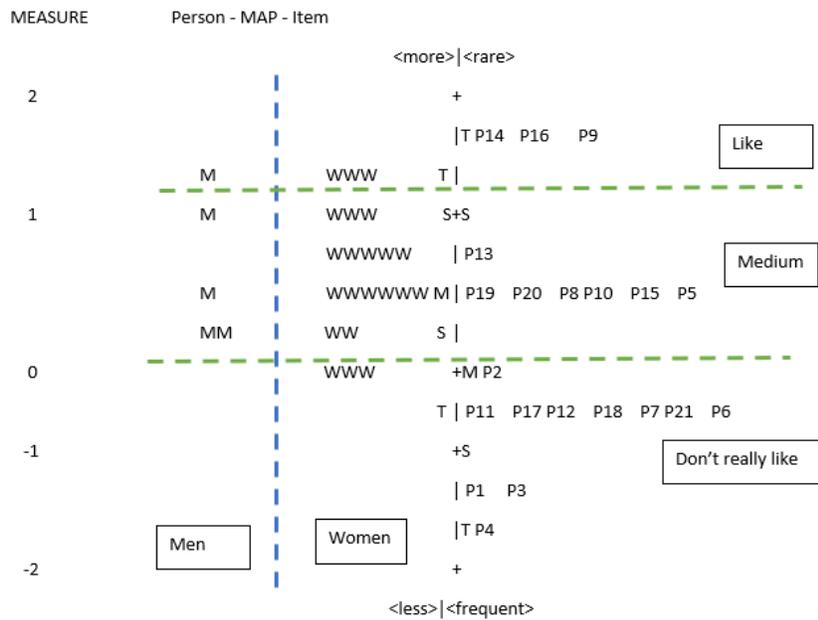


Figure 1. Variable Maps Based on Gender

Figure 1 and table 2 reveal that there are percentages of men and women who like the application of BL in math subjects by 3.7% and 11.1%, respectively. Three statements are disapproved, namely (1) I feel that giving mathematics material in BL is more effective than traditional learning, (2) writing math equations often cannot be read on online assignments, and (3) students feel they need more time to complete online assignments when dealing with graphs/diagrams/tables/other mathematical material. Students do not have conceptual knowledge because there are still many educators in mathematics using traditional (conventional) methods (Panjaitan, 2016). While in the "don't really like" category, there are only three women included in the category and there are ten statements that are agreed, one of which is students can read anywhere and at any time to re-understand mathematical material if the educator provides online teaching material. As revealed by several studies that technology in online media can make it easier for students to understand learning material (Adams, Sumintono, Mohamed, & Noor, 2018; Cheok, Wong, Ayub, & Mahmud, 2017; Hassan Ja'ashan, 2015).

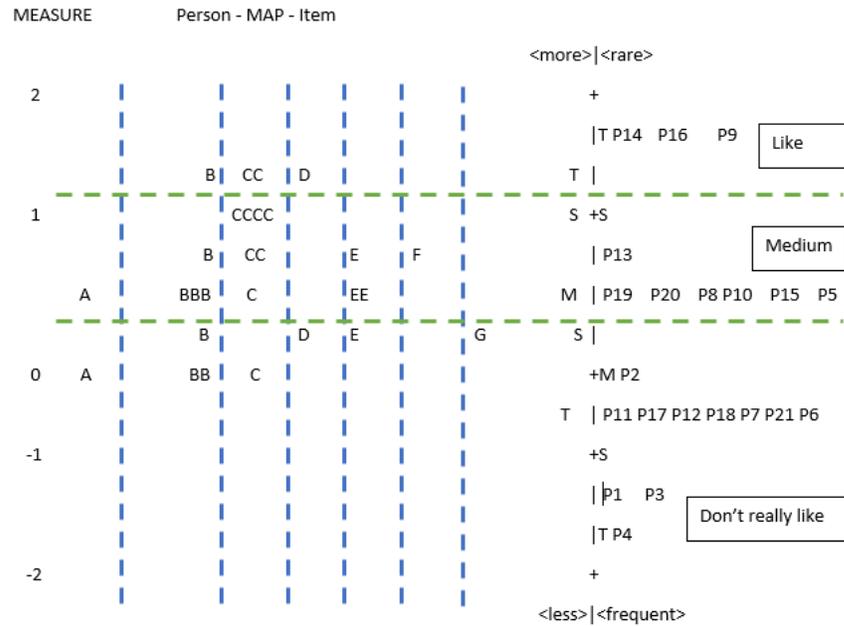


Figure 2. Variable Maps Based on The Provinces

On the other hand, figure 2 and table 2 show that only subjects from the provinces B, C, and D liked BL in teaching mathematics, the percentage is 3.7%, 7.4%, and 3.7%, respectively. While the subject that falls in the "don't really like" category for mathematics is province B, which is 11.1%. Whereas women and respondents from province C are mostly liked BL.

CONCLUSION

The results of the analysis using Winsteps showed that men and women were included in the medium category in the application of BL in mathematics in terms of gender. While in terms of provinces, province C has educators who like BL the most and province B, which has the most educators who don't really like BL. This research is still limited to a small number of subjects. Bcause there are still very few educators who apply BL in learning mathematics.

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