

Students' Perceptions of the Implementation of Blended Learning in English for Mathematics

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Abstract

Covid-19 Pandemic forces all schools and universities to be familiar with blended learning. It is such an advantage for universities that have already implemented blended learning in their teaching and learning processes. The full implementation of blended learning raises various perceptions from both lecturers and students. This study employed a descriptive qualitative research design to investigate the students' perceptions of the implementation-of-blended learning in English for Mathematics. This study involved six student participants who willingly participated and provided deep data about the implementation of blended learning in English for Mathematics. To gather the data, the researchers interviewed the participants at the end of the semester. The interview was conducted in a Focus Group Discussion (FGD) session. In analyzing the data, the interview results were translated, transcribed, and coded by using thematic analysis. It is found that most students have positive perceptions about the implementation of blended learning in their teaching and learning processes. The participants stated that the implementation of blended learning in their class facilitates students to deepen their understanding of the materials, blended learning promotes independent learning, and blended learning promotes student engagement through various online instructional media.

Keywords: blended learning, English for Mathematics, perceptions

Introduction

The Covid-19 pandemic is a health crisis that firstly happened in Wuhan, at the end of 2019. This sudden phenomenon spreads widely all around the world and causes health crisis, economic crisis, education crisis, and other crisis in almost all aspects



of life. The education crisis happened because the schools are closed in order to control the spread of Covid-19 viruses. The phenomenon of school and universities closure changes the teaching and learning processes in all schools and universities into online ones. At the beginning of the Covid-19 pandemic, the full implementation of online learning was a great challenge for both lecturers and students. Both lecturers and students are not accustomed to online learning even though some universities have implemented online learning.

On the other hand, some universities have partially implemented online learning. They provide the students with a Learning Management System that can be accessed by lecturers and students. The Learning Management is usually Moodle-based, a Modular Object-Oriented Dynamic Learning Environment. This learning management system is designed for lecturers and students to facilitate them in their teaching and learning activities. This learning management system uses an integrated, well-set, and safe system to create a personalized online learning environment. This learning management system has many features such as assignments, video conferences, chats, choices, database, forum, glossary, lesson, quiz, SCORM, survey, wiki, file, folder, IMS Content Packages, Label, Page, and URL. The features provided on the Learning Management System enable lecturers and students to have great experiences of teaching and learning processes.

With the rapid spread of technology, lecturers and students become more familiar with online learning, a learning that can be done via the internet without face-to-face interaction (Hockly, 2015). In the beginning, the online learning was only conducted by schools or universities which have supporting facilities. Nowadays, online learning becomes more popular in all educational fields from the lower level to the higher ones. Online learning has been implemented in all subject areas in many schools and universities in the world. English is one of the subjects that uses online learning as its medium in its teaching and learning processes. There are some reasons why online English learning is beneficial for EFL learners. First, online English learning facilitates the students with an authentic learning environment where they can find authentic materials and communicate with native speakers. Second, online learning makes learning more student-centered. Third, online learning promotes higher-order thinking skills. In addition, it increases students' motivation since it enables the learners to work creatively and collaboratively with others (Aydin & Universitesi, 2000; Daneshdoust & Hagh, 2012; Mohammadi et al., 2011; Mutambik, 2018).

The benefits of online learning will be greater if it is combined with other components of learning; commonly, it is known as blended learning. During the Covid-19 pandemic era, where the lessons are all delivered online, blended learning appears as one great option to accommodate the learning activities in the higher education context. Blended learning can mix the traditional classroom setting and online learning. The face-to-face interaction which is usually done offline or meeting directly in the classroom is transformed into virtual meeting via applications for video conferencing such as Zoom, Google Meet, and the likes. Meanwhile, the online learning is done through the Learning Management System (LMS) by sharing learning materials as well as learning activities. In this case, the lecturer shares the materials such as recorded Power-Point Presentation, URL link, and some articles related to the materials discussed on the Learning Management System before the scheduled class, then conducts the class discussion at the



scheduled time by using other media such as WhatsApp, Google Meet, Quizizz, Mentimeter, Padlet, Coogle, etc. to conduct the group or class discussions.

Blended learning has been defined in various ways from the aspects of goals and components until the modes used to deliver the learning materials. Blended learning is a simple and complex process (Zhonggen, 2015). Blended learning is simple because it is a mixture of physical classroom activities and learning activities using online technologies. Then it becomes complicated related to the vast definition of “blended” itself - what components or aspects that are blended. In general, blended learning involves three components, namely (a) learning activities, (b) students, and (c) instructors. Furthermore, there are four dimensions of blended learning, i.e. space (face-to-face/virtual), time (synchronous/asynchronous), sensual richness (high, all senses/low, text-only), and humanness (high human, no machine/low human, high machine) (Bryan & Volchenkova, 2016). The aspects which are blended can essentially vary based on the learning goals, like pedagogical richness, access to knowledge, social interaction, personal agency, cost-effectiveness, and ease of revision (Zhonggen, 2015).

Blended learning or hybrid learning is characterized as a combination of digital content and face-to-face classes, cooperative learning, critical thinking, reflective thinking, reusable learning object, flexible, time-saving, and cost-effective (Shivam & Singh, 2015). It is also described as a learning environment that combines teaching methods, delivery methods, media formats, or a mixture of those components (Shivam & Singh, 2015). In addition, it is the combination of different instructional methods, i.e. face-to-face interaction and computer-mediated instruction or online learning (Nurmasitah et al., 2019). To put it briefly, blended learning is not simply defined as combining virtual and physical learning, but it is integrated learning involving various hybrid factors, including learners, brain acquisition mechanism, learning affective factors (motivation, satisfaction, discouragement, and frustration), learning environments (online, face-to-face, workplace), and teachers.

Blended learning promotes some advantages when applied to the classroom. Since it involves three different types of learning, namely face-to-face learning, online learning, and self-paced learning, it can create a wide range of learning opportunities rather than the use of a single medium to deliver the learning materials (Shivam & Singh, 2015). There are various advantages of blended learning, such as it increases the opportunities for collaboration at a distance, increases flexibility and interaction, enhances learning, and improves the ability to be virtual citizens (“Модель Электронной Библиотеки Для Поддержки Системы «Blended Learning» в Новосибирском Государственном Университете,” 2016). Besides, blended learning also enables students to develop projects and time management skills, integrates appropriate technology and how to manage it effectively for the courses, encourages students to have personal, relevant, and engaging course experiences, supports the provision of resources and information for the students, engages and motivates students through collaboration and interactivity, and develops a stronger sense of community compared to either conventional class or fully-online courses (Shivam & Singh, 2015). They also mention some characteristics of blended learning, such as: (1) it provides more opportunities for learners to interact socially and negotiate meaning, (2) learners have enough time and feedback, (3) learners are guided to attend mindfully to the learning process,



and (4) it can create an atmosphere with ideal stress or anxiety level for the learners to work.

Many studies have been conducted regarding students' perceptions of blended learning in mastering English for Specific Purposes (ESP). A study shows that most students get satisfied and enthusiastic to have blended learning in their ESP course with an equal mix of face-to-face and online learning (Mulyadi et al., 2019). This mixed-mode enables students to find some educational resources from internet websites, e-books, and online learning platforms. Besides, the students prefer blended learning because of the flexibility of accessing the classes as well as the materials anywhere and anytime, the utilization of technology in ESP classes, the flexibility of the schedule, and the convenience of not attending the class frequently. Another study also shows that the implementation of blended learning received positive responses in some aspects, like the practicality of sharing learning materials, independent learning, and saving time and costs in the learning process (Nurmasitah et al., 2019). The integration of face-to-face and online classes is proven productive as the students are actively engaged in the learning process and they are able to do a self-evaluation of their knowledge any time without any pressure from their classmates and without feeling intimidated.

Although many studies have been discussing students' perceptions of blended learning in mastering ESP, a few of which discuss blended learning in English for Mathematics classes, especially those which are conducted in Indonesian contexts and use the qualitative method. A case study was conducted to investigate teachers' techniques in teaching English at Mathematics Department showed that the techniques used by the teachers are Translation Literary Passage, Reading Aloud, Question and Answer Exercise, Teacher's Silence, Peer Correction, and Authentic Materials (Nursa'adah, 2016). Using English for teaching Mathematics has its own challenges because Mathematical English has its own vocabulary and teachers' technique plays an important role in conveying the materials to the student. Teachers still face difficulties to make sure that students really understand the materials. In addition, it is essential to encourage students to learn English for Mathematical Purposes (EMP) because students do not come from English department, so EMP is far more difficult compared to General English in many aspects, including vocabulary, writing, reading, etc. (MOET, 2008). Therefore, this study is aimed to explore the students' perceptions of the implementation of blended learning in English for Mathematics.

Method

This study employed a qualitative research method to investigate the students' perceptions of the implementation of blended learning in English for Mathematics. Creswell (2007) pointed out that the qualitative research method is aimed to gain a deeper understanding of certain phenomena through participants' feelings, thoughts, and emotions in making meaning on the phenomena. Further, he added that the findings of qualitative research could not be generalized, instead, they could provide in-depth perspectives about the phenomenon being studied. Specifically, this study employed descriptive qualitative research design aiming to investigate students' perceptions of the implementation of blended learning in English for Mathematics. Previous studies have been conducted by using mostly quantitative approach (Bijeikienė et al., 2011; Khoii & Arabsarhangi, 2015; Liu et al., 2002; Mohammad,



2013; Tai & Yang, 2015). In comparison to the previous studies, this study was conducted by using a descriptive qualitative research design to investigate the students' voices on the implementation of blended learning in English for Mathematics class.

Six student participants who attended English for Mathematics in English Language Education Department of a state university were involved in this study. The considerations in selecting the participants were based on their willingness to participate in this study and time availability. To gather the data, the researchers interviewed the participants at the end of the semester. The interview was conducted in a Focus Group Discussion (FGD) session to gain a deeper understanding of the students' voices and the phenomenon being studied (Creswell, 2007). A semi-structured interview by using a set of interview questions guideline asking about students' viewpoints of the implementation of blended learning in English for mathematics class was used to gather the data.

To collect the data, an informed consent form was distributed to the students who were willing to participate in this study. An FGD session with the participants was conducted upon arrangement by using a teleconference platform. In order to get rich data and reveal the meaning of the phenomenon, the FGD was conducted in Bahasa Indonesia. To analyze the data, the FGD session was recorded, translated, and transcribed. Thematic analysis was used to analyze the transcripts to obtain important points about the data and to represent the meaning of the phenomenon (Braun and Clarke, 2006).

In conducting this study, some ethical considerations were taken into account. First, an informed consent form was distributed to the student participants who have agreed to participate in this study. The informed consent form briefly provides general and basic information about the study, such as the purpose of the study, the risk and potential benefits, the confidentiality, and the nature of participation. Second, the participants' identity would remain confidential. The participants' names and institutional affiliations are disclosed to protect them from any potential harms caused by the participation in this study.

Findings and discussion

The findings and discussion are respectively based on the data gathered from the interview and some previous studies about blended learning in mastering English for Specific Purposes (ESP). The previous studies show satisfying results as well as students' enthusiasm to experience blended learning in their ESP course with an equal mix of face-to-face and online learning (Mulyadi et al., 2019). In addition, students give positive responses toward blended learning because of the practicality of sharing learning materials, the chance to have independent learning, and the efficiency of time and costs in the learning process (Nurmasitah et al., 2019). After reviewing and analyzing the previous studies, this study also shows positive perceptions about the implementation of blended learning. However, this study focuses more on the implementation of blended learning in English for Mathematics which is rarely discussed. The interview results show that students have positive perceptions about the implementation of blended learning in English for Mathematics. The interview results are presented in three themes as follows; blended learning facilitates students to deepen their understanding of the materials,



blended learning promotes independent learning, and blended learning enables students to experience various kinds of online instructional media.

Blended learning facilitates students to deepen their understanding of the materials

The results of the in-depth interviews with six students of Mathematics department show that blended learning can help them understand the materials given by the lecturer in easier ways. Students can learn basic vocabulary about English for Mathematics and practice using specific terms as well as language expressions in their micro-teaching. Participant 2 stated:

“I think that learning English through blended learning is more understandable. The lecturer gives explanation about the materials, like *Powers, Roots, Logarithm, Plane Geometry, Trigonometry*, and so on, by using different techniques and media, such as voice notes, video conferences using google meet, and presentation in the forms of Powerpoint slides. The lecturer doesn't only send the written materials but also delivers the oral explanation via voice notes in WhatsApp or video conference using Google Meet. It helps me a lot to understand the lesson.” (Participant 3)

Providing various means of learning can blend the four dimensions of blended learning, namely space (combining face-to-face and virtual interaction), time (combining synchronous and asynchronous learning), sensual richness (various types of inputs varied from texts, voices/audios, or videos) and humanness (the involvement of machine and human in the learning process)(Bryan & Volchenkova, 2016). Students may find it difficult to deal with the lesson if they only get the written materials in the forms of PowerPoint slides, Ms. Word, PDF, and the likes, without any further explanation about the contents. During the Covid-19 pandemic, in which the classes were conducted online, the synchronous interaction using video conferences, like Google Meet, Zoom, etc, is the replacement of the face-to-face interaction. Besides, the lecturer also employs voice notes in WhatsApp to conduct the discussion about the learning materials. The students may ask questions or tell their difficulties in learning. WhatsApp has some beneficial features, including, texts, calls, videos, audios/voice notes, documents, and pictures, to support the implementation of blended learning. Using WhatsApp as the means of learning promotes some benefits, such as it facilitates students to increase their motivation to learn English (involving four language skills- listening, speaking, reading, and writing), it helps overcome student's fear of applying the language through the discussion and sharing information, it builds student's confidence in their abilities, and it enables students to learn from their friends' mistakes (Ayuningtyas, 2018; Nuraeni & Nurmalia, 2020).

Blended learning enables teachers to deliver learning materials using different modes, methods, and techniques with the integration of technology in the learning process(Nurmasitah et al., 2019). By this means, students can get an explanation about the materials directly from the lecturers. Besides, there is a two-way interaction between the students and the lecturers. The students can ask the lecturers if they find any difficulties with the lesson materials. In addition, blended learning facilitates students to have a deeper understanding of the learning materials



because, with the combination of the learning modes as well as methods and techniques, it enables students to learn more comprehensively.

Based on the interview result, it shows that the students find it easier to understand the lesson with the multimodes used by the lecturer. The materials shared by the lecturer in the form of documents, PDFs, powerpoints, voice notes, recorded videos, as well as links of the materials, can support the students either to prepare for the synchronous meeting or to re-learn and review the materials after getting the explanation from the lecturers in the virtual meeting. This is in line with the characteristics of blended learning i.e. flexible, reusable learning objects, critical thinking and reflective thinking (Shivam & Singh, 2015).

“In my opinion, the focus of online learning in English for Mathematics class is not only reading and writing, but also speaking. By using voice notes in Whatsapp, we can also practice listening and speaking.” (Participant 3)

Blended learning can support the students in developing their English competencies, including listening, reading, writing, and speaking. Blended learning promotes the sensual richness (high, all senses/low, text-only) (Bryan & Volchenkova, 2016). By giving various learning inputs, it can facilitate the students to learn integrated language skills. In addition, blended learning gives opportunities for students to sharpen their understanding.

“I think that blended learning is quite effective because the documented learning materials can help the students learn more comprehensively before and after the class.”(participant 5)

From the interview result, it can be seen that students still need more time to study the learning materials. The explanation from the lecturers through the virtual meeting via video conferences is not adequate to gain understanding about the lesson. They need to learn deeper and continue to sharpen their understanding and build their knowledge about the topics being discussed. In blended learning, the synchronous interaction is supported by asynchronous learning in which the lecturers send the materials to the students in order that they can learn freely by themselves. The students can access and download the materials to be learned independently. From this activity, they are guided to attend mindfully to the learning process and it can create an atmosphere with ideal stress or anxiety levels as there is less distraction from their friends (Shivam & Singh, 2015).

Blended learning promotes independent learning

Blended learning combines traditional learning and online learning. In this case, online learning can be synchronous and asynchronous. There are four dimensions of blended learning, i.e. space (face-to-face/virtual), time (synchronous/asynchronous), sensual richness (high, all senses/low, text-only), and humanness (high human, no machine/low human, high machine) (Bryan & Volchenkova, 2016). Blended learning can be conducted using many kinds of



learning media such as voice recorder, videos, mobile phones, Learning Management Systems, etc. The implementation of blended learning in English for Mathematics class was conducted by combining some features and classroom instructions; for example by sharing the recorded materials about vocabulary and terms of Solid and Space Geometry, Logic and Set, Probability and Statistics and also Calculus before the scheduled class by using the University's LMS. The combination of online educational content with the best features and classroom instruction therefore enables students to experience student-centered learning which forms students to become independent learners.

“During the implementation of blended learning in this pandemic era, students are asked to learn the Mathematics terms and vocabulary about English for Mathematics such as Solid and Space Geometry, Logic and Set, Probability and Statistics and also Calculus independently. Students need to employ themselves to learn the materials before the teacher explains those materials to them. After we learn the materials usually we have a class discussion and question and answer session by using chat/forum feature provided by the University's LMS, Whatsapp and also Mentimeter.” (Participant 5)

During the implementation of blended learning, teachers share the materials using various online media, ask the students to learn the materials, and conduct both group and class discussions. In this case, students have a great opportunity to collaborate with their classmates to do peer group interaction or to exchange ideas and express opinions. In the English for Mathematics class, the lecturer usually gives the opportunity to the students to ask questions related to the terms and vocabulary about Mathematics. On the other hand, the students always express their opinions about Mathematics concepts that sometimes make them confused because they do not know the English terms of some complicated Mathematics materials such as Calculus and Trigonometry. This collaboration stimulates students to become more critical and more knowledgeable. The increasing collaboration is one of blended learning advantages (“Модель Электронной Библиотеки Для Поддержки Системы «Blended Learning» в Новосибирском Государственном Университете,” 2016). It is stated that there are various advantages of blended learning, such as that it increases the opportunities for collaboration at a distance, increases flexibility and interaction, enhances learning, and improves the ability to be virtual citizens (“Модель Электронной Библиотеки Для Поддержки Системы «Blended Learning» в Новосибирском Государственном Университете,” 2016). Besides, students can also access some offline as well as online resources such as accessing e-library and educational blogs, learning through videos and audios, YouTube, and also webinar. Students can also have greater opportunities to create their own projects such as creating videos and maintaining their own educational blogs.

“During the implementation of blended learning in this pandemic era, I always try to understand the materials by looking up some terms and vocabulary related to Mathematics in the dictionary, reading and listening to the shared materials, and accessing both online and offline references in order to understand some unfamiliar Mathematics terms and vocabulary. I also try to always participate in the teaching and learning processes by asking questions



related to some complicated topics such as Trigonometry and Calculus. I also share my opinions while the lecturer opens a sharing and discussion session” (Participant 4)

From the interview results above, it can be seen that the implementation of online learning has formed students to become more independent learners. They always try to learn by themselves using their own way and give greater engagement. They also have greater and better access to infrastructure and anytime and anywhere learning. Students become more reflective, they can monitor their own learning which results in the improvement of their understanding. It means that blended learning has successfully made students become more aware of their own learning. The explanation of the interview results refers to blended learning characteristics, such as (1) it provides more opportunities for learners to interact socially and negotiate meaning, (2) learners have enough time and feedback, (3) learners are guided to attend mindfully to the learning process, and (4) it can create an atmosphere with ideal stress or anxiety level for the learners to work (Shivam & Singh, 2015).

“During the implementation of blended learning in this pandemic era, I always read the module not only at the scheduled time but also at the time when I feel I need to learn English in order to understand the material better and deeper because English for Mathematics is sometimes complicated. I need to learn and relearn the Mathematics terms in order not to misunderstand the Mathematics concepts. I’m happy since I can access the materials before the class and I have the opportunity to learn the materials in my spare time.” (Participant 2)

It can be seen that the implementation of blended learning encourages the students to be more responsible with their own learning because they can monitor their own progress; therefore, they can enhance their understanding. It also means that blended learning provides the students with the flexibility of learning, in which they can learn according to their pace and time. The results of the interview with the participants may refer to the characteristics of blended learning which combine digital content and face-to-face classes, cooperative learning, critical thinking, reflective thinking, reusable learning object, as well as flexible, time-saving, and cost-effective learning (Shivam & Singh, 2015).

Blended learning promotes student engagement through various online instructional media

Based on the results of the interview with 6 student participants from English for Mathematics class about the implementation of blended learning, they were all in agreement that blended learning promotes student engagement through various kinds of online instructional media. Participant 6, for example, reported:

“I feel challenged and happy because the lecturer gave us many kinds of online activities by using various instructional media. The lecturer recorded herself explaining the materials, and gave us some exercises by using many websites. She used Kahoot, Padlet, and of course the university LMS. The websites, videos, and applications are interesting and help me a lot in understanding difficult vocabulary about arithmetic operations, logic and set, and calculus.



The online quizzes about vocabulary are exciting. I just love doing quizzes about vocabulary.” (Participant 6)

In addition to the statements from participant 6, participant 3 also shared similar interests from various online instructional media for explaining the materials and assigning tasks. He explained that he learned many technological tools from the class activities that he could use to do his micro-teaching.

“When I had to do micro-teaching for Mathematics lesson, meeting 14 and 15, I used the technological tools introduced by the lecturer in this class. I think I know many technological tools for teaching Mathematics from the class activities. It helped me a lot when I did my micro-teaching. That’s why I’m so excited to join the activities the lecturer designed. Well, it’s because she used various kinds of technological tools.” (Participant 3)

Participant 5 stated that she had a similar experience in utilizing various online instructional media during the implementation of blended learning.

“I like the video and game-based exercises in this class. Before the pandemic, the class activities were limited to physical games and oral presentations given by the teacher. I myself feel I prefer watching videos and doing many kinds of online quizzes. They help me a lot in understanding and using difficult words related to mathematics, such as statistics, geometry, trigonometry, and logarithm. The online quizzes helped me to understand the difficult words. As a pre-service math teacher, I need to understand mathematics vocabulary in English.” (Participant 5)

The results of the interview with the participants may refer to the strengths of blended learning that blended learning provides rich and more personalized learning experiences for the students (Burkholder & Holland, 2020; Shivam & Singh, 2015). Further, he added that blended learning accommodates a variety of learning styles through instructional media used in its implementation. Based on the interview excerpts aforementioned, the participants claimed that they experienced the use of various online instructional media that increase their learning motivation, help them understand difficult mathematics vocabulary, enrich their skills in using web-based technological tools to support their micro-teaching, and cater to their individual learning style. In addition, the results were aligned with studies on blended learning for general English adult classes (Shivam & Singh, 2015; Whittaker, 1976). In the light of their studies, the implementation of blended learning provides personalized learning experiences through the utilization of various instructional media. Various online instructional media accommodates students’ learning styles and provides students with opportunities to set the pace of their own learning.



Conclusion

From the discussion above, it can be concluded that the participants have a positive perception towards the implementation of blended learning in English for Mathematics. The participants stated that the implementation of blended learning in their class facilitates students to deepen their understanding of the materials, blended learning promotes independent learning, and blended learning promotes student engagement through various kinds of learning media. Those positive impacts give great influences on the teaching and learning processes in English for Mathematics class. Therefore, ESP teachers are encouraged to implement blended learning in their classes. There will be various kinds of combinations in implementing blended learning as well as the percentages of synchronous and asynchronous learning during the implementation. It is not important how much the combination of each feature is used in blended learning but the most important is combining online delivery with the best feature of the classroom and live instruction that can facilitate students' learning. Further study can replicate this study by having greater participants with different subjects of ESP.

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