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Abstract. Information and communication technologies have become a very powerful means of student engagement in an online learning environment. Google Classroom is an easy-to-use educational application that enables teachers to extend their student learning online. With Google Classroom, teachers can create classes, post assignment, grade and send feedback, and see students' works in real-time. This study aims to investigate the students' perspectives on their engagement in online learning in Google Classroom. An ethnographic case study was employed to explore and observe student activities in a virtual class in Google Classroom. Questionnaire survey and semi-structured interviews were conducted to understand students' perceptions of online learning through Google Classroom. The results showed that Google Classroom has good potential to support students' learning. Students could access the learning resources provided by the teacher at anytime and anywhere. They were also able to construct their knowledge by actively participating in an online discussion forum, and the instructional practices can be performed efficiently. Some challenges that arise included the limited availability of devices, technical issues, and the low level of familiarity of Google Classroom's features, the readiness of students to study independently online. Although challenges arise, the teacher enabled to deal with the issues well.

1. Introduction

The impacts of the fourth industrial revolution on the educational world in Indonesia are getting higher from day to day. This can be seen from the many educational innovations that utilize technology to support teaching and learning activities. Schools as the forefront of the field of education are required to be able to prepare more skilled and competent learners of 21st-century skills, known as 4C: critical thinking and problem solving, creative thinking and innovation, communication, and collaboration [1]. With these skills, the students are expected to be able to face the challenges of the industrial revolution 4.0.

Besides the schools, the teachers also play an important role in preparing the students to be technology literate, so that ongoing teaching and learning activities can adapt to the development of science and technology. The presence of technology helps the teachers in evaluating the learning outcomes, as in the OECD report [2] which states that "...technology can amplify great teaching practice, but great technology cannot replace poor teaching", therefore "... it takes educators time and effort to learn how to use technology in education while staying firmly focused on student learning" (p.17). The teachers need to work hard to integrate the technology in their teaching and learning activities because the students' learning process remains a top priority. In the context of mathematics learning, the role of the teacher is not only helping the students to construct their knowledge but also

encouraging them to be actively involved in practicing their high-level cognitive skills [3]-[4]. It is important for the teachers to have a good understanding of technology in order to facilitate the students in supporting their learning process [5]. Thus, the teachers are expected to be able to design a learning program that is information-rich and relevant to the mathematical activities in school.

2. Google Classroom as a Learning Space

Google Classroom is a free web service developed by Google to support teaching and learning in the classroom to be more productive and meaningful [6]. Using Google Classroom, the teachers can provide online assignments, increase collaboration among their fellow teachers, their students and among the students, and foster communication with the students at all times. The teachers can create virtual classes, distribute assignments, send feedback, and see everything within one media. The flexibility and many features offered by Google Classroom make this application considered practical to support learning activities [7].

The technology like Google Classroom can make the students become more receptive to the learning materials. Baskerville [8] states that the application of technology in the classroom must provide opportunities for the students to make their learning experiences more meaningful, for example exploring information from digital media to get new ideas and build knowledge. The teachers, in this case, need to use an appropriate learning strategy in order to create an interesting and effective learning atmosphere. The interactions and discussions between the teachers and students and/or among the students can no longer be held just at school but can also be online anywhere and anytime.

3. The Context of the Study and Method

An ethnographic approach was employed in this current study. This study observed how the students used Google Classroom as a learning space. The ethnographic approach is considered appropriate because it has an "intimate nature" [9], where the researcher is directly involved in the field for some times and interacts directly with the research subjects at the observation site. Such an approach allows the researcher to explore aspects of the phenomenon of students' learning process. Ethnographic research also offers a variety of procedures that provide convenience and flexibility to be applied in the education field [10].

A total of 35 seventh grade students from a junior secondary school in Semarang city were involved in this study. The selection of participants was performed using purposeful sampling technique [11] by which the selection of research participants was in the school where the co-author was currently working at. The data collection techniques were carried out using observation participants, students' interviews, documents and online posting. The data that had been collected were then managed collectively using NVivo software. Qualitative content analysis was used as a descriptive approach to identify codes and then finding the themes. Trustworthiness check was also carried out by referring to the interpretation and the extent to which the researcher accurately described the viewpoints, thoughts, feelings, intentions, and experiences of the research participants [12].

4. Results and Discussion

Some potential and challenges related to the use of Google Classroom have been identified during the study. This section outlines these potential and challenges of the integration of Google Classroom into teaching and learning mathematics.

4.1. The potentials of Google Classroom as a blended learning support tool

The implementation of Google Classroom-based learning received diverse responses from the students. Most of the students were feeling happy with this learning activity. Several potentials for learning mathematics using Google Classroom based on students' perspectives have been identified.

4.1.1. Learning math without any space and time constraints. In this study, the teacher provided online learning material in Google Classroom, in the form of video and document formats. The teacher also

provided some contextual mathematics problems for the students so that they can practice independently at home. Some students commented that blended learning benefited them.

> *I am very happy* [learning with Google Classroom] *because even though school is off, I can still study together* [with my friends] *online* (Anggun, Grade 7)
>
> *Online learning* [using Google classroom] *is fun because the material can be learned at home or anywhere* (Dwi, Grade 7).
>
> *Online learning* [using Google classroom] *is very fun and very helpful for me, it can be performed anywhere, for example at home or at school* (Winda, Grade 7).

These voices show that the students perceive a positive attitude towards the use of Google Classroom since it provides opportunities for students to learn at anytime, anywhere either in the school or outside the school. The subject material is also accessible for students so that they can learn it at home, school or anyplace.

4.1.2. Constructing student knowledge through active participation in online discussions. In online learning, the teacher invited the students to actively participate in the discussion forums. The teacher gave contextual mathematics problems that were linking the mathematical concepts with real-world problems. Figure 1 shows an excerpt of the online discussions in Google Classroom.

Agung : a. x = 65^o
b. y = 120^o
c. c = 70^o
Teacher : ok … thank you for your opinion, Agung. We look forward to hearing other friends' opinions. Agung, could you please give further explanation about your answers?
Rasyid : a. 18
b. 108 degrees
c. 72 degrees
Explanation:
4x = 72
x = ?
y = ?
c = ?
4x = 72
x = 72/4 =18 degrees
y+72 =180
y =180-72
y =108 degrees
y+c =180
y+72 =180
y =180-72
y =108 degrees
Because angle c and angle 4x coincide then angle c=angle 4x
angle c=4:18
angle c=72 degrees

Figure 1. Excerpt of online discussion in Google Classroom

In the discussion, Agung only presented the result of his answer without giving a clear explanation of how to get mathematics solutions. While Rasyid provided a detail explanation of how to find a mathematical solution of the given problem. This discussion is an example of what is Abidin, Mathrani and Hunter [13] called social knowledge construction, where student knowledge is built through ongoing conversations between teacher-student and student-student. Rasyid directly included the step of mathematical solutions in his response after the teacher previously asked Agung to give a complete

explanation of his answer. Such discussion received positive appreciation from a number of students, including Revanda who gave his comments:

> *I gained a new experience while studying mathematics online. Learning mathematics online is more fun. We can interact/discuss with our classmates. We can also interact with our class teachers* [online] (Revanda, Grade 7).

Revanda shared his new experience in online discussions that made learning mathematics more fun and interactive.

4.2. The challenges of Google Classroom as a blended learning support tool

4.2.1. Limited availability of technology and technical issues

Students at the school participant were from lower-middle socio-economic status families. Although all parents of the students had internet-enabled mobile devices like laptops and smartphones, only a few students (15 students) had their own smartphones. For the purposes of independent learning at home, students were not actually restricted to using a mobile phone, but they were more likely to choose a mobile phone. Students who did not have a mobile phone, they borrowed a mobile phone from their parents or siblings. Consequently, the students did not get an immediate notification when the teacher posted his posts. Two students extend their comments.

> *I sometimes do not take part in online learning because my parents/siblings do not tell me the notification* (Dwi, Grade 7)

> *Daddy's mobile phone is usually brought to work, I can borrow* [for online learning] *afterwards.* (Amalia, Grade 7)

Dwi's comment indicates that he could not get the latest information updates posted by the teacher because he was not aware of the notification. Meanwhile, Amalia's comment shows that she could only borrow a mobile phone when his father was at home. This is like what was felt by the teacher that students' responses to online assignments were quite slow because they were not aware of the notification and the factor of ownership of mobile phones.

Besides the limited availability of devices, the main challenge that was conveyed by most of the students was the Internet issue, as stated by two students as follows:

> *A bad signal at home and sometimes the internet data package runs out* (Abhinaya, Grade 7)

> *The internet signal is intermittent, so it takes a long time to open* [Google Classroom] (Gita, Grade 7)

Poor internet connection made students difficult to access Google Classroom. The limited internet data packages were also an obstacle to the implementation of online learning. This finding aligns with a study conducted by Abidin et al. [13] that the limited infrastructure and technology affect students' attitudes in learning mathematics with technology.

4.2.2. Low level of familiarity with Google Classroom features

In February 2019, the teacher conducted a trial of mathematics teaching practices using Google Classroom. Students were introduced to the features of Google Classroom. The Google Classroom's features of computer mode and mobile application mode are different. This made students difficult to

send their assignment results back. During the classroom observations, many students did not upload their assignment result to Google Classroom. The researcher tried to confirm this issue by approaching a number of students who had not submitted their assignment by asking, "Did you find any difficulty when sending the assignment back?" The students responded that they did not send their assignment results due to internet connection issues and they were not familiar with the mobile version of Google Classroom features. Some students also suggested that assignments could be completed at school. The following is the students' comments.

> *Do the assignment in school is better than at home because you can do everything* (Winda, Grade 7).

> *It is better to do the assignment at school. If it is done at home there must be a student who does not understand* [how to send it] *and the* [internet] *connection is unstable* (Revanda, Grade 7)

These findings have become input for the researchers. In the next encounters, the teacher conducted his instructional practices in a computer laboratory to facilitate students to more engage with Google Classroom.

4.2.3. Low level of student's readiness to engage in the online learning

Blended learning activities at the secondary school level are indeed still very few [14-15]. Students who involved in this study also said that the blended learning model was such a new experience for them. Almost all teaching and learning activities that they followed use conventional teaching deliveries. At the beginning of the study, only a few students engaged in responding and commenting on the teacher's posts on Google Classroom. One student opined:

> *I rarely go online because I prefer online learning to be conducted at school ... if there is someone who can't work* [the assignment]*, it can be discussed together in the class* (Rizal, Grade 7)

Rizal's comment indicates that not all students are ready for learning independently at home. Rizal preferred the discussion to be held in the class. In this regard, classical meetings are still a mainstay for students. In this study, the teacher had accommodated student expectations by changing the design of the teaching and learning process, that is the face-to-face teaching deliveries were conducted to give a confirmation regarding the given materials, to invite students to participate in the discussion section in finding mathematics solutions together, and to emphasize materials that were considered difficult for the students. Some teaching and learning activities were also held in a computer laboratory to accommodate students who did not have mobile phones, so they can be online at school using the desktop computer. The teacher in this matter has done what was expressed by Lin et al. [14] that is facilitating active learning and interaction between students and teachers in a blended learning environment.

5. Conclusion

This study has explored students' experience in using Google Classroom as mathematics learning space. The results of the study revealed that there are some potentials and challenges in the use of Google Classroom for supporting blended learning. The positive potentials are students can access learning resources anytime and anywhere. With Google Classroom, students enable to increase their participation in the discussion forum hosted by the teacher. The online discussion forum can be used to facilitate the students to construct their knowledge in understanding the mathematical concepts. The teacher's role is very essential in the discussion process because the teacher acts as a mediator to

facilitate good discussions so that each student stays focused on the given topic and keep the online discussion alive.

This positive potential does not come without a challenge that must be faced during the implementation of this Google Classroom. Some challenges that arise include the limited availability of equipment and technical obstacles. Also, limited the Internet connection, and the Internet data packages are other challenges that face during the online learning process. The students are not familiar with the features in Google Classroom, consequently, they face difficulty to operate it. Some students are also still not ready with the online learning model. Assistance and guidance are still needed during the learning process. The solution provided is that the teacher checks continuously on face-to-face to ensure that students have understood the subject matter when it is being discussed.

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