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Maximizing Online Collaboration Tools in Enhancing Student Engagement: A Qualitative Study

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Abstract*— This study examined how Online Collaboration Tools are utilized by Junior High School teachers synchronously and asynchronously. Moreover, the challenges and the coping strategies employed have been explored. A semi-structured interview was employed for data gathering. Interview transcripts constituted the collected qualitative data. The qualitative data were analyzed in three major stages: open-coding, axial coding, and selective coding. The thorough analysis of the data resulted in five major themes that represent the findings of the study: 1) teacher's understanding of OCTs, 2) uses of OCTs synchronously and asynchronously, 3) student-related challenges, 4) teacher-related challenges, and 5) coping strategies. Results reveal that teachers employ OCTs in their instruction to improve student engagement. These tools are mainly employed as they allow students and teachers to collaborate, communicate, and discuss online. Problems arise commonly due to technological concerns, time management, and reduced student participation. Teachers and educational institutions observe means to mitigate the challenges by engaging more in understanding OCTs and improving technicalities.

Index Terms*— Online Collaboration Tools, Online Distance Learning, Pandemic, Student Engagement

I. INTRODUCTION

Online Collaboration Tools are facilitating instruments that the teachers integrate to improve classes that are conducted online – synchronously and asynchronously. These educational tools assist both teachers and students in accomplishing collaborative tasks such as communicating, brainstorming, creating files, uploading documents, editing videos, and more. Because of the recent pandemic, educational institutions have shifted their instruction from face-to-face to Online Distance Learning (ODL), Modular, or Blended Learning. It has become essential that students and teachers discover methods to effectively collaborate online (Everette, 2015). According to Gordonas (2018), when applied in teaching, Online Collaboration tools may stimulate the students and improve their enthusiasm and appreciation of lessons in the virtual classroom. The effectiveness of these tools relies on the teachers' strategies and methods with the content, outcomes, and process in mind. This idea is also supported by the study conducted by Humes (2015), who discovered supports that improve group functioning and academic achievement.

Other elements may contribute to the success of online instruction. The study by Martin et al. (2018) asserts that the objectives of engagement strategies, assisted by Online Collaboration Tools, are to promote more engaging learning activities. These activities include group collaboration, student-led performances and conferences, and exchanges of information and reflections. The results of a study conducted by Parker (2015) revealed that students consider compelling lecture videos, engaging discussion boards, clear course expectations and organized course designs, well-supported technology, and practical assignments as essential ways to promote engagement and learning. Along with the prior-mentioned elements, communication performs a crucial role in improving the online learning experience through peer-to-peer and student-to-instructor exchanges (Roddy et al., 2017). As revealed by the same study, the teacher's ability to effectively interact with the students, manage technology, and present and evaluate content displays a vital position in online environments. Dhawan (2020) strongly suggests that teachers should utilize technology that can assist in designing amenable programs for students' better comprehension; educational institutions, on the other hand, should establish flexibility in their systems in order to ensure the development of problem-solving, critical thinking, and adaptability skills among the students. Despite the studies above, the effectiveness of Online Collaboration Tools as instruments to enhance student engagement during Online Distance Learning still needs to be explored.

This study aims to contribute to the present research in the context of utilizing Online Collaboration Tools amidst the COVID-19 pandemic. It is unknown when the educational setup will return to normal, so there is a need to improve the strategies employed by the teachers and educational institutions and mitigate the challenges teachers and learners encounter when these tools are used. This study aims to explore the advantages of using Online Collaboration Tools in online classes and determine strategies for alleviating possible challenges. The study, therefore, will benefit learning institutions, teachers, and learners who are all involved in the educational process. After the introduction,

the paper will discuss the study's theoretical framework, present the methodology, and reveal and discuss the study's results.

This paper focuses on Online Collaboration Tools and Student Engagement. Specifically, it seeks to answer the following questions:

1. How do JHS teachers integrate Online Collaboration Tools in teaching their respective subjects synchronously and asynchronously?
2. What challenges do JHS teachers encounter in employing Online Collaboration Tools?

II. METHODOLOGY

Research Design

The study utilized the qualitative research design that observes the basic qualitative research approach as the researcher aims to comprehend "the meaning a phenomenon has for those involved" (Merriam, 2009). The research design intends "to understand how people make sense of their lives and experiences."

A basic Qualitative Study is focused on:

a. how people interpret their experiences;
b. how they construct their worlds; and
c. what meanings are attributed to their experiences.

Specifically, this study will explore the experiences of selected Junior High School teachers in employing Online Collaboration Tools in teaching their respective subjects online. Understanding their experiences involves determining the relevance of OCTs in education, how they integrate OCTs into their instruction, the challenges experienced, and the coping strategies employed to mitigate or eliminate the recognized challenges.

Participants and Sampling

The study participants were determined through purposeful sampling, "selecting information-rich cases for study in depth" (Patton, 1990). There were four criteria that the researcher based on in selecting the participants; each should be: (a) a Junior High School teacher, (b) teaching for at least two years, (c) engaged in Online Distance Learning (ODL) as the medium of instruction, and (d) conducting synchronous and asynchronous classes online. A formal letter of invitation was given to several teachers who qualified based on the given criteria. Three teachers have given their consent to participate in the study. Each participant had been assured that the data that were collected from them would be treated with strict confidentiality. Also, each participant was given respective codes – Participant 1, Participant 2, and Participant 3.

Data Collection Technique and Procedure

An in-depth interview was the exclusive data collection technique utilized by the researcher. In particular, a semi-structured interview was conducted. A verbal questionnaire was prepared with the specific research questions in utmost consideration. Each participant was interviewed via Zoom Meeting since face-to-face meetings are still prohibited due to the Enhanced Community Quarantine directives in both the participants' and researcher's locality. The interview was done twice per participant until data saturation was achieved. The researcher prepared a transcription of all the interviews for data analysis.

Data Analysis

The qualitative data obtained through interviews were analyzed in three stages: open-coding, axial coding, and selective coding (Creswell, 2007; Merriam & Tisdell, 2017). Each interview transcript per participant was read multiple times. During the initial readings and reviews of the interview transcripts, the researcher employed open coding by highlighting significant statements and writing comments on the document's margin. This step is followed by the assignment of codes to the pieces of data obtained; consequently, Axial Coding, "the process of classifying or grouping your initial codes" (Corbin & Strauss, 2007 in Merriam, 2009, p. 180) was employed. The researcher came up with four categories after the said step.

The initial categories have undergone selective coding to determine the final list of categories. The researcher ultimately reached three categories considering the criteria for determining the following categories: Conceptual congruence, Exclusivity, Responsiveness, Exhaustiveness, and Sensitivity.

Trustworthiness

Guba and Lincoln (1985) recommended four criteria for establishing the trustworthiness of a qualitative study: credibility or truth of the findings, transferability, applicability of the findings in other contexts, dependability, consistency and replicability of findings, and confirmability, absence of the researcher's bias in the determination of findings. The trustworthiness of the present study is established through considerable time spent conducting the interview of the study participants. The interviews were conducted several times until data saturation was reached.

III. RESULTS AND DISCUSSION

Results

Integration of Online Collaboration Tools in teaching synchronously and asynchronously

Two final themes were determined under the first specific research question after a thorough analysis of the interview transcripts. These themes were (1) Teachers' understanding of Online Collaboration Tools (OCT) and (2) Uses of OCT during online synchronous and asynchronous classes. The corresponding themes are presented in the table below.

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Table 1. Integration of OCTs in teaching synchronously and asynchronously

Themes
Teacher's Understanding of Online Collaboration Tools
Uses of OCT during Online Synchronous and Asynchronous Classes

Theme 1: Teachers' understanding of Online Collaboration Tools (OCT)

The theme Teachers' understanding of Online Collaboration Tools (OCT) was drawn from the study's results. According to the participants, OCTs are used mainly for collaboration and improving Student Engagement. OCTs were used before the shift of educational modality from face-to-face to Online Distance Learning; however, it was used more extensively after the shift. The teachers utilize these tools to conduct synchronous and asynchronous classes. To illustrate, the extracts from the interview transcripts are presented.

Extract 1:

> Participant 1: These are tools that can help to easily communicate and to share work. These help in working with pair or groupmates using online tools such as Zoom etc. We have been using these tools even before the pandemic. We used tools like Google docs, Google drive, google classroom, and etc. (cf. Appendix C, Lines 24-25, 30-31)
>
> Participant 2: Online Collaboration Tools are applications and approaches used by teachers and learners to work together on tasks. [We started using OCTs in] 2019, before the pandemic. Our school allows us to use Learning Management Systems like Edmodo, iTunesU, and Seesaw. (cf. Appendix C, Lines 177-178, 183-184)
>
> Participant 3: Online collaboration tools are technological tools with a combination of internet and educational online platforms used in online learning and interaction. They are very helpful these days especially when conducting classes in the distance learning modality. These tools keep interaction and motivation among the learners. It has been used as an educational alternative during pandemic. (cf. Appendix C, Lines 311-314, 319)

The results show that the three participants have the same idea of OCTs being effective instruments that can be integrated with education to support collaboration between students and teachers and improve student engagement. It was also revealed that the teachers already know what OCTs are and how they can be utilized in educational instructions even before ODL has become the primary modality due to the pandemic.

Theme 2: Uses of OCT during online synchronous and asynchronous classes

It is revealed that synchronously, the teachers prefer to use tools that enable them to communicate in real time with the students with presentation sharing, video, and microphone functions. Synchronously, on the other hand, teachers tend to make use of tools that allow the teachers to post announcements, files, and tasks and enable the students to work on tasks collaboratively. This concept is emphasized in the extracts below:

Extract 2:

> Participant 1: Right now, we use Google Meet, Google Sheets, and Google Drive. [I use it] Specifically because these tools are user-friendly. It is difficult to monitor the students these days, so it will be challenging to know if they do know how to use the tools, I would like them to use. These tools I mentioned on the other hand are easy to use. I am confident that my students will find it easy to be productive using these tools. With the features available, I know that the students can freely and easily guide themselves. (cf. Appendix C, Lines 36, 41-46)
>
> I use Telegram, messenger, and Facebook [for asynchronous classes]. I use them because of my students' preference and their features. My students are in senior high school and most of the time they are always online on Facebook. It is easier to communicate to them what are needed, easy to post announcements. I know that they will be able to read the information right away. The good thing is students re-share the information with their friends or classmates in their own group chats. (cf. Appendix C, Lines 50, 54-59)
>
> Telegram particularly assists me in various functions in teaching such as its video features where teacher can post or upload videos easily. It can also edit photos etc. We are in a digital age and all the students love exploring different tools that they may use in their studies. (cf. Appendix C, Lines 64-67)
>
> Participant 2: [I use] Canvas, Google Slides, Google Docs, Kahoot, Jamboard, Nearpod, Mentimeter, etc. to initiate collaboration between learners. These tools promote positive engagement in classes. (cf. Appendix C, Lines 189-90,194-195)
>
> [For synchronous classes, I use] Canvas, Google docs, Google Drive, Google Forms Because the teachers and students can easily upload and download the needed files with the help of these collaborative tools. Also, the students may interact with each other and share ideas in the process of completing tasks. (cf. Appendix C, Lines 201, 2015-207)
>
> The students are encouraged to take charge of their own knowledge-acquisition and directly apply what they learned from synchronous class in a more independent student-facilitated environment. These online collaboration tools enhance engagement during online classes since the interaction is real-time and it also avoids isolation because the communication is open throughout

classes. (cf. Appendix C, Lines 213-217)

Participant 3: [I use] Zoom, Peardeck, google slides. Those are the applications required by the school. (cf. Appendix C, Lines 324, 328)

[For synchronous sessions,] I use Moodle, it is a learning platform. I also use YouTube, online journals, and new articles. I use these tools so that the students can still do their tasks together even when there is no scheduled meeting and acquire information that they need. (cf. Appendix C, Lines 333-334, 338-339)

Zoom helps teachers keep in touch with students. Students said that they appreciated how teachers assist them which makes them feel like in actual classroom. (cf. Appendix C, Lines 344-346)

The results illustrate that teachers utilize several OCTs based on their functions. OCTs that enable the teachers to conduct a virtual discussion, such as Zoom, are commonly used. On the other hand, those that allow the teachers and students to disseminate information, share files, and edit videos and photos are utilized during asynchronous sessions.

Challenges encountered by teachers in employing Online Collaboration Tools

Three themes were determined in connection to the second research question.

These themes are (1) Student-related challenges encountered when integrating ICTs, (2) Teacher-related challenges encountered when integrating ICTs, and (3) Coping strategies employed by the teachers to mitigate or eliminate the challenges. These are shown in Table 2.

Table 2. Challenges encountered by JHS teachers in employing Online

Collaboration Tools Themes
Student-related challenges encountered when integrating ICTs
Teacher-related challenges encountered when integrating ICTs
Coping strategies employed by the teachers to mitigate or eliminate the challenges.

Theme 3: Student-related challenges encountered when integrating ICTs

The results show that teachers and students experience difficulties conducting and attending online classes. Although there are significant improvements when OCTs are integrated with online instructions, challenges are still encountered. Student-related challenges include poor internet connection, limited data, and technical difficulties. These student-related challenges are revealed in the extracts below:

Extract 3:

Participant 1: Most of the time, internet issues. Students would disconnect to the online meeting and send me a message that it is because of the internet connection. I do understand because I also experience the same issue from time to time. (cf. Appendix C, Lines 109-111)

Participant 2: Students' varied learning setups may cause difficulty in collaborating.

The most common student-related challenge when using online collaboration tools is the technical difficulty. Not all students can participate due to problems with the gadget and slow or intermittent connection. (cf. Appendix C, Lines 249-252)

Other students/members would complain that their classmate cannot work with them actively because of poor or slow internet connection. It is verry difficult for them because everybody's input is important. (cf. Appendix C, Lines 263-265)

But in terms of the students, yes. I guess some students use mobile data only, so, whenever they need to watch videos, it consumes so much data, sometimes it lags the connection. They had to buy more load. (cf. Appendix C, Lines 271-274)

Participant 1 and 2 shared their experiences in conducting synchronous classes. It is clear in their statements that the common difficulties encountered by the students are internet connection and the students' gadgets. When attending online classes, it is understood that students should be able to connect to a reliable internet connection to be able to join online conferences; however, there are students who do not have access to a reliable wifi. As a result, students avail prepaid data connection which is limited which becomes another challenge.

Theme 4: Teacher-related challenges encountered when integrating ICTs

Another challenge that arose from the responses of the participants was teacher-related challenges. Teachers, like students, experience difficulties because of their internet connection. Moreover, active student participation during synchronous sessions becomes problematic, especially when a response from the students is needed. Additionally, it was said that monitoring the students' output and activities in real time and managing time are complex tasks. Lastly, some OCTs require a subscription, meaning teachers must purchase a specific tool.

Extract 4:

Participant 1: The students sometimes are ashamed to open their camera and talk. When I call them and ask to participate, sometimes there are delayed responses from the students. It would take several minutes for them to start talking which is time consuming. (cf. Appendix C, Lines 123-126)

I guess when it comes to Collaborative Tools, some required premium subscriptions/ payment. (cf. Appendix

C, Lines 133-134)

Participant 2: Sometimes it is difficult for a teacher to monitor all students' outputs in a short amount of time. Motivating students to take initiative can also be less effective. (cf. Appendix C, Lines 257-258)

Participant 3: Some students were not very interactive; some would not use their mics during class but whenever they are called they use chat box at least. I do not force them or wait for them to turn their mic because of the time. Our synchronous classes are for 45 minutes only, so waiting for them may be impractical. What I do is I tell them that they can use the chat box to provide their answers. (cf. Appendix C, Lines 382-386)

I could say internet connection and time management. I mentioned that we only have less than an our per session. Sometimes, when an activity is very interesting to the students, it consumes much of the time. It is either we have to shorten the activity or in some instances, we don't start the discussion right away. (cf. Appendix C, Lines 391-394)

For me, some platforms require subscriptions and payments like for some journals, apps, and software. I would just avail free versions. Other are provided by the school. (cf. Appendix C, Lines 405-407)

Participant 1 and 3 shared the same challenge – students not being very interactive during online classes. Students tend to keep their cameras off which makes it difficult for the teachers to monitor the students whether they are still actively listening. Also, it takes a significant amount of time for the students to respond when called to participate which can be time consuming according to the participants. Because of delayed responses from the students, the teachers experience difficulties managing their time. The last teacher-related challenge is related to OCT subscriptions.

Theme 5: Coping strategies employed by the teachers to mitigate or eliminate the challenges.

The last theme determined from the analysis of the transcripts is the strategies the teachers employ to overcome the challenges they experience when OCTs are integrated with teaching online. Based on the results, the teachers could anticipate on their own the possible challenges that may arise and can employ appropriate strategies to deal with them. Apart from this, the educational institutions the participants are part of are reported to assist the teachers in coping with the discerned challenges.

Extract 5:

Participant 1: I always practice working on how to use these tools. I also plan the lessons and tools before executing them. This includes thinking of probable difficulties that may be encountered by both me and the students. (cf. Appendix C, Lines 147-149)

During the orientation I told them already that in case something like that happens, they should try to reconnect immediately and tell me what happened. I still let them join the meeting if it is possible. If I am the one who gets disconnected, I tell them to wait for me to reconnect and they do wait for me. (cf. Appendix C, Lines 115-118)

Participant 2: When experiencing technical difficulties, I make sure that the activities are posted in Google Classroom so that when students cannot join in the synchronous discussion, they can still view our activities. Moreover, students were also provided with digital and printed modules. Recorded lessons were sometimes shared as well. As a teacher, I always keep my lines open for a more effective communication. (cf. Appendix C, Lines 287-291)

Participant 3: I guess teachers have to be more patient and have to learn more 21st motivations and strategies for 21st century learners. Some teachers should probably start embracing that today's generation is another level, so the teachers. And students must learn to exert extra efforts for their own future. (cf. Appendix C, Lines 419-422)

Participants 1 and 3 both reveal that one of the most effective ways to mitigate the challenges encountered in using OCTs in education is for the teachers to comprehend their uses and applications. The two participants declared to understand the significance of learning and practicing using the tools more to achieve better student engagement. Participant 2, on the other hand, makes sure to have a recourse when difficulties such as poor or limited internet connection is experienced either by the teacher or the students; one way is to post the activities and the instructions in the employed Learning Management System such as Google Classroom and Canvas. Another method, as suggested by Participant 1, is to inform the students beforehand what they can do in case specific difficulties like disconnection arise. This way, the students will be informed and well-directed.

Teachers also need to be supported by their respective institutions. All of the participants disclosed that their respective schools could provide them with the appropriate assistance they need, such as webinars regarding OCTs, gadget and connection allowances, OCT subscriptions, and IT support. This is illustrated in the extracts below.

Extract 6:

Participant 1: They [the school] give trainings in using ICT and other technological tools just like last year. They also try to purchase all the suggested collaborative tools for the employees. They also suggest tools with trial subscriptions. They ask us to try and explore the features. If we like the features, they would be considering purchasing the tool. (cf. Appendix C, Lines 139-142)

Participant 2: Our school, together with the Department

of Education, usually conducts webinars and workshops that can increase our knowledge on the use of these tools in teaching. They also provided support by giving laptops and load allowance for a certain period of time. (cf. Appendix C, Lines 279-282)

Participant 3: Well, they always update Moodle, assist teachers on whatever related needs, I.T is always responsive, and they conduct collaboration workshops to improve learning materials and other related matters. (cf. Appendix C, Lines 412-414)

The three participants revealed that they are able to attend OCT webinars and workshops, which their respective schools initiate. This is useful as the teachers must also be updated on the technical knowledge and the most effective methods of integrating them in specific content. The teachers also declared that the school purchases certain OCTs to make sure that the teachers can utilize them in their sessions. Participant 3 added that responsive IT support can also effectively mitigate the challenges experienced when OCTs are used.

Discussion

Teachers' understanding of OCTs, uses of OCTs synchronously and asynchronously, student-related challenges, teacher-related challenges, and coping strategies employed are the five themes that were determined in this qualitative study based on the data collection results. In this study, the effectiveness of OCTs as employed in online teaching has been emphasized. The result of the present study strongly supports the results of the study conducted by Martin et. al. (2018), claiming that Online Collaboration Tools are integrated to promote more engaging learning activities. Thus, student engagement is expected to be improved, provided that OCTs are effectively employed. It was determined that student-related and teacher-related challenges arise when OCTs are utilized. One common difficulty experienced is poor internet connection. The internet connection in the Philippines is known to be one of the slowest in the world. With this, Filipino students and teachers often experience disconnections and/or slow data upload and download. Nevertheless, problems like these can be mitigated if appropriate coping strategies are employed. Going back to the study by Roddy et al. (2017), the teachers' ability to effectively interact with the students, manage technology, and present and evaluate content displays an essential position in online environments. Teachers are known to be very creative and resourceful. One of the skills along with these that teachers best possess is problem-solving to efficiently resolve problems in integrating OCTs into instruction. This is true, especially when educational institutions support their teachers.

IV. CONCLUSIONS AND RECOMMENDATIONS

Teaching online during the pandemic is challenging for teachers and learners due to the immediate and premature shift of modality from face-to-face. It is fortunate, however, that teachers are equipped with ample knowledge and understanding of how Online Collaboration Tools can be utilized in the context of education prior to the said pandemic. Student engagement is revealed to be heightened with the help of OCTs. These tools promote collaboration between the students and the teachers when online synchronous and asynchronous classes are conducted online. Nevertheless, student-related and teacher-related challenges still arise when they are utilized. The results show, however, that these challenges can be mitigated through proper education and school support.

Online Distance Education is new to many individuals engaged in education since face-to-face had been the primary modality employed before the pandemic. The slow internet connection in the Philippines has become one of the main struggles of the teachers and the students. Based on the study's results, the researcher recommends using Learning Management Systems (LMS) to ensure that the instructions and activities are well-communicated to the students. Moreover, it is suggested that educational institutions continue to support both students and teachers by:

1. Offering webinars or workshops to teachers for a better understanding of the tools,
2. Providing responsive IT support,
3. Subscribing to OCTs that effectively promote student engagement, and
4. Providing gadgets and connectivity allowances

This study is limited to the experiences of Junior High School teachers. Future researchers interested in exploring the same topic may also consider understanding the students' experiences.

REFERENCES

[1]. Etfita, F., & Wahyuni, S. (2021). Collaborative Discussion Using Padlet-based Materials in Writing for ESP Course. *AL-ISHLAH: Jurnal Pendidikan*, *13*(1), 523–529. https://doi.org/10.35445/alishlah.v13i1.432

[2]. Everette, D. R. (2015). Adding Value: Online Student Engagement. *Information Systems Education Journal (ISEDJ)*, 68–76.

[3]. Gorra, C. et al. (2016). Students' perception on use of technology in the classroom at higher education institutions in Philippines. *Faculty of Business - Papers* (Archive). 874. https://ro.uow.edu.au/buspapers/874

[4]. Gordonas, A. A. (2018). Teaching Strategies in Literature Subjects in Pup Taguig Branch Towards the Development of Instructional Modalities. *KnE Social Sciences*, *3*(6), 76. https://doi.org/10.18502/kss.v3i6.2375

[5]. Humes, D.H. (2015) *Effects of Online Collaborative Learning on Student Engagement and Academic Success*. University of Wisconsin- River

[6]. Kyofuna, S. (2013). Is anybody there? Engaging learners in synchronous online classes Insights Gleaned from Faculty

Experiencing the Transition from Face-Face to Online Instruction

[7]. Lu, H. (2020). Online Learning: The Meanings of Student Engagement. *Education Journal*, *9*(3), 73. https://doi.org/10.11648/j.edu.20200903.13

[8]. M. Tarun, I. (2019). The Effectiveness of a Customized Online Collaboration Tool for Teaching and Learning. *Journal of Information Technology Education: Research*, *18*, 275–292. https://doi.org/10.28945/4367

[9]. Martin, F., & Bolliger, D. U. (2018). Engagement Matters: Student Perceptions on the Importance of Engagement Strategies in the Online Learning Environment. *Online Learning*, *22*(1). https://doi.org/10.24059/olj.v22i1.1092

[10]. Nwankwo, A. (2015). *Students' Learning Experiences and Perceptions of Online Course Content and Interactions*. https://scholarworks.waldenu.edu/cgi/viewcontent.cgi?article=1187&context=dissertations

[11]. Parker, C. L. (2015, September). *2.Online Student Engagement: Perceptions of the Impact on Student Learning and Effective Practices*. College of Professional Studies Northeastern University Boston, Massachusetts. https://repository.library.northeastern.edu/files/neu:rx917x36v/fulltext.pdf

[12]. Peng, W. (2017). Research on Model of Student Engagement in Online Learning. *EURASIA Journal of Mathematics, Science and Technology Education*, *13*(7). https://doi.org/10.12973/eurasia.2017.00723a

[13]. Roddy, C., Amiet, D. L., Chung, J., Holt, C., Shaw, L., McKenzie, S., Garivaldis, F., Lodge, J. M., & Mundy, M. E. (2017). Applying Best Practice Online Learning, Teaching, and Support to Intensive Online Environments: An Integrative Review. *Frontiers in education*, *2*. https://doi.org/10.3389/feduc.2017.00059

[14]. Wong, L. (2013). Student Engagement with Online Resources and Its Impact on Learning Outcomes. *Journal of Information Technology Education: Innovations in Practice*, *12*, 129–146. https://doi.org/10.28945/1829