

# Students' Experiences and Perceptions on Different Online Learning Platforms: The Cases of Rain Classroom and Blackboard Learn

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## ABSTRACT

Online education has been prominent ever since the Covid-19 pandemic. With the urgent need for more good online education resources, many online learning platform has made the online learning more available and made more educational resources accessible to students. Among several well-known online learning platforms, Blackboard Learn and Rain Classroom are chosen as two representative examples in this study to explore the strengths and limitations of online education platform. This study aims to find out what kind of design can make the online learning platform more efficient by comparing and analysing students' experiences and perceptions on the features of Blackboard Learn and Rain Classroom. This study applies the methods of survey and interview to collect data for the purpose of supporting potential findings and further analysis. Some suggestions have also been provided in this paper for both platforms and teachers to help them make adjustments and improve quality of online teaching and learning.

**Keywords:** Online Learning, Online Teaching, Rain Classroom, Blackboard Learn

## 1. INTRODUCTION

Online learning, as the main branch of distance education, involves students in the “classrooms” and allows them to work on their courses when they cannot physically present at schools. Although the history of online teaching can be traced back to the 19th century [1], online teaching never had attracted so much attention and became the main way of education until the outbreak of the pandemic of COVID-19. The nature of online learning is the process of education without a physical studying environment, which implies that it needs to be greatly depended on a stable and functional virtual learning platform to ensure the efficiency and quality of education. Different online learning platforms have their own unique designs to fit various learning needs, providing educational institutions with a range of options; however, they also have their own limitations, which sometimes may cause inconvenience to the process of teaching and learning.

Among several well-known online learning platforms, Blackboard Learn and Rain Classroom are

chosen as two representative examples in this study to explore the strengths and limitations of online education platform. Both Blackboard Learn and Rain Classroom are famous for their live-lecture functions. However, they also differ slightly. Initially released in 1997, Blackboard Learn has gradually become one of the widely used platforms in the arena of online learning; while in recent years, Rain Classroom has also started to be commonly used as a powerful tool for online learning, especially in China. Both platforms can provide reliable virtual environments for online learning, though their different designs and features may have diverse impacts on education. This study aimed to find out what kind of design can make the online learning platform more efficient by comparing and analysing students' experiences and perceptions on the features of Blackboard Learn and Rain Classroom.

## 2. LITERATURE REVIEW

Statistics show that the educational institutions around the globe have started to put more emphasis on online learning, since studies showed that students tend

to get better outcomes in online education than those who receive traditional in-class education [2]. The purpose of online learning is to provide students with quality education by using technology when the physical learning environment is unavailable. Research shows that the connections among learning strategies, motivation, technology, and students' self-efficacy are crucial to get satisfying outcomes in online education [3]; this implies that the online learning platform have to be functional enough to support different learning methods, motivate students to be engaged, and easy to use. In order to make sure the quality of online learning can be sustainable and considerable, the online learning platform needs to be somehow flexible [4]. Gadanidis [5] points out that when designing a decent online learning platform, it has to include the features like abundant editable text postings, multimedia resources and authority of control for educators. Gadanidis [5] mentions that such features not only are able to make the good use of the collaborative nature of online education, but also able to enable the virtual tools to support the construction of knowledge online. Besides, it can be crucial for online learning platform to develop and improve itself based on its own enormous amount of users' data; therefore, it is necessary for the platform to learn more about the data analysis and application [6]. The key features of online learning platform shall enable students to carry out self-study; to be specific, the important functions which may inspire students' self-discipline or self-direction [7]. Overall, a wide range of significant features are required to make a good online learning platform.

Among these platforms, Blackboard Learn and Rain Classroom are the two representatives that display a wide range of functions that a good online learning platform requires. Blackboard Learn is well-known for its various powerful features like Collaborate Ultra (for live lectures or seminars), Banner Self-Service (for self-management) and Group Blogs (for group discussion); in fact, it functions more like an education management platform rather than a simple virtual learning platform, though it does provide relevant functions. Via a considerable number of interactive designs and options for management, Blackboard Learn offer opportunities of improving individual abilities and knowledge exchanging to both teachers and students [8]. Rain Classroom, much alike Blackboard Learn, provides a series of functions supporting stable and efficient online learning. Studies indicated that Rain Classroom has gradually formed positive impacts on both teachers and students since its release in China, and the academic quality has been significantly improved ever since [9]. Based on the results of the Technology Acceptance Model (TAM), Rain Classroom is more widely accepted than other multimedia projecting systems, which indicates a greater influence on society and more significant academic outcomes [10]. Even though Blackboard Learn and Rain Classroom are somehow

similar and both have great reputations, their features are slightly different, and may have different impacts on online learning.

### 3. METHODS

This study applies the methods of survey and interview to collect data for the purpose of this study. Survey aimed at collecting quantitative data, while interview aimed at collecting qualitative data. Stratified sampling is used to identify potential participants: our participants are the university / college students who mainly study on Rain Classroom (Group A) and those who mainly study on Blackboard Learn (Group B). The population was expected to be 30 people for each group. All the participants are expected to take the survey, while two participants of each group were randomly chosen to be invited to be interviewed if they agree. The survey was expected to take approximately two minutes to complete, while the interview may take three to four minutes. This concise design of this study was to ensure that participants can be more focused on the questions and give higher-quality answers. Age, gender, race, nationality, and current year in university / college are not considered in this research. The survey assesses if students are familiar with the functions of the two platforms, how they like about the functions, and how they rate the platforms briefly; while the interview asks about how the platforms contribute to their learning in specific, if there is any suggestion for further improvement, and what is the attitude towards online learning and its prospect.

All the survey and interviews were carried out online, either via links or legal online meeting platforms, to ensure that the participants' information provided were secure. Any data provided is anonymised to protect participants' privacy. The purpose and the detailed information of this study were verbally provided to the participants as well as how their data will be used in this essay or any further research before they signed the consent form.

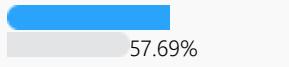
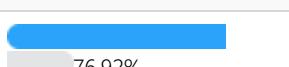
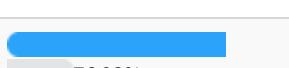
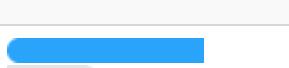
## 4. RESULTS

### 4.1 Quantitative Data Results

In this study, 60 survey responses (30 for Group A and 30 for Group B respectively) were delivered via links to the participants, while 52 responses (26 for Group A and 26 for Group B respectively) were received. The response rate of the survey is approximately 86.7%, which is slightly lower than expected. In this section, bar charts will be used to directly present the questions and data, while the paper for two groups will be analyzed together in order to make the comparison.

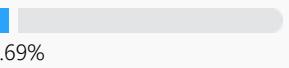
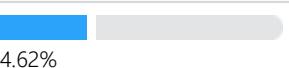
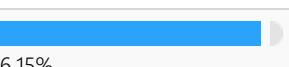
*Q1.A: Which function(s) do you know about the Rain Classroom? (Multiple Choice)*

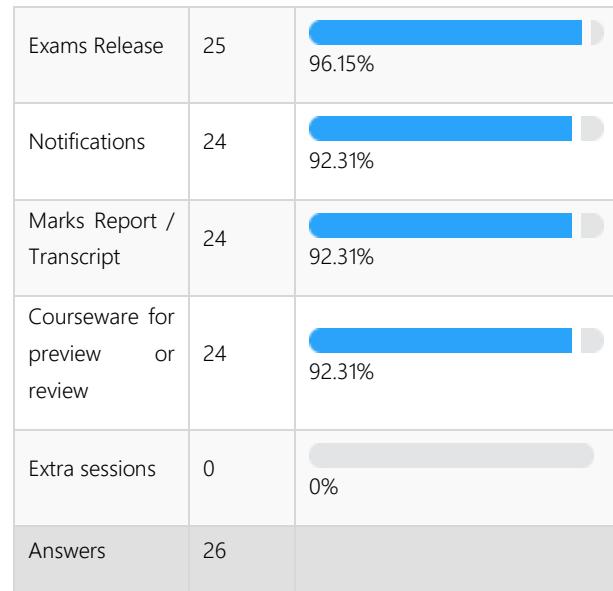
**Table 1.** Responses to Functions of Rain Classroom

	Answers	Percentage
Live lecture	19	 73.08%
Live subtitles	15	 57.69%
"Sign In" System	23	 88.46%
Recordings	14	 53.85%
Quizzes (in a live lecture)	20	 76.92%
Exams Release	20	 76.92%
Notifications	18	 69.23%
Marks Report / Transcript	17	 65.38%
Courseware for preview or review	20	 76.92%
Extra sessions	8	 30.77%
Answers	26	

*Q1. B: Which function(s) do you know about the Blackboard Learn? (Multiple Choice)*

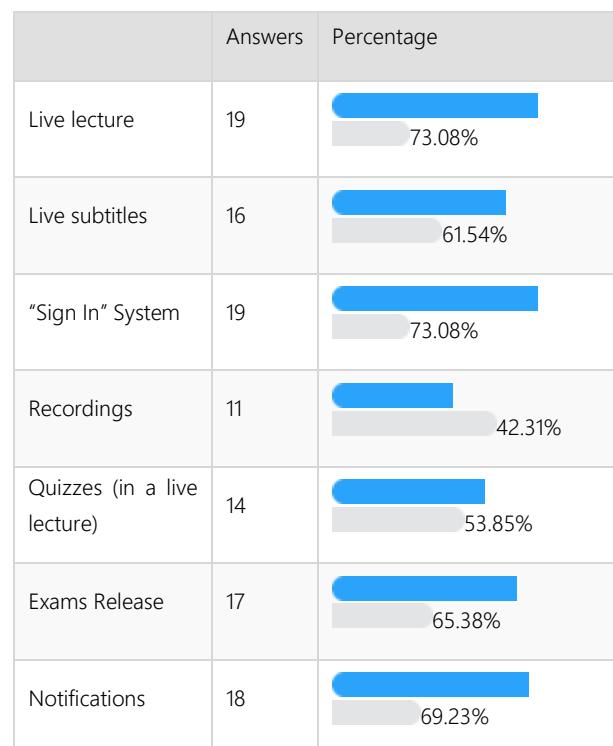
**Table 2.** Responses to Functions of Blackboard Learn

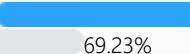
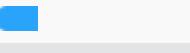
	Answers	Percentage
Live lecture	26	 100%
Live subtitles	2	 7.69%
"Sign In" System	9	 34.62%
Recordings	25	 96.15%
Quizzes (in a live lecture)	1	 3.85%



As shown in Table 1 and 2, from the first question of the paper, it can be seen that students are overall familiar with the functions of both Rain Classroom and Blackboard Learn. It is somehow surprising that only 73.08% of participants of Group A have heard of live lecture, since this function is what Rain Classroom is known for. It is also notable that as for Group B, very limited amount of participants have heard of live subtitles and quizzes, which implies that these functions are not commonly used in daily teaching and learning.

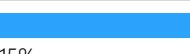
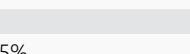
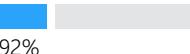
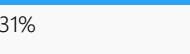
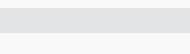
*Q2. A: Which function(s) have you used in the Rain Classroom? (Multiple Choice)*

**Table 3.** Responses to the Functions used about Rain Classroom


Marks Report / Transcript	18	 69.23%
Courseware for preview or review	16	 61.54%
Extra sessions	4	 15.38%
Answers	26	

*Q2. B: Which function(s) have you used in the Blackboard Learn? (Multiple Choice)*

**Table 4.** Reponses to the Functions used about Blackboard Learn

	Answers	Percentage
Live lecture	25	 96.15%
Live subtitles	1	 3.85%
"Sign In" System	7	 26.92%
Recordings	24	 92.31%
Quizzes (in a live lecture)	0	 0%
Exams Release	25	 96.15%
Notifications	24	 92.31%
Marks Report / Transcript	24	 92.31%
Courseware for preview or review	25	 96.15%
Extra sessions	0	 0%
Answers	26	

From the second question, it can be concluded that most of the functions that students have heard of are commonly used in their learning, which meets the expectation. It also proves that, as mentioned earlier, Blackboard Learn's live subtitles and quizzes are not

common teaching tools, which proportions are 3.85% and 0% respectively.

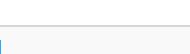
*Q3. A: How do you interact with teachers? (Multiple Choice)*

**Table 5.** Responses to Ways of Interaction on Rain Classroom.

	Answers	Percentage
To turn on the microphone to speak with the teacher	9	 34.62%
To send live subtitles	22	 84.62%
To send messages in the chat box	14	 53.85%
Answers	26	

*Q3. B: How do you interact with teachers? (Multiple Choice)*

**Table 6.** Responses to Ways of Interaction on Blackboard Learn.

	Answers	Percentage
To turn on the microphone to speak with the teacher	11	 42.31%
To send live subtitles	2	 7.69%
To send messages in the chat box	25	 96.15%
Answers	26	

The answers shown in Table 5 and 6 suggest that participants from both groups prefer to send messages or subtitles to interact with teachers. It meets the expectation that relatively fewer participants intend to turn on the microphone: this may be due to the phenomenon that many students will feel nervous and awkward when speaking to teachers, especially when they are uncertain about the answers; therefore, they are more likely to choose typing to express their ideas.

*Q4. A: Do you think the current interactive ways can make the class efficient?*

**Table 7.** Responses on Whether the interactive ways in Rain Classrooms make the class efficient

	Answers	Percentage
Yes.	22	 84.62%
No.	4	 15.38%
Answers	26	

*Q4. B: Do you think the current interactive ways can make the class efficient?*

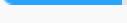
**Table 8.** Responses on Whether the interactive ways in Blackboard Learn make the class efficient

	Answers	Percentage
Yes.	21	 80.77%
No.	5	 19.23%
Answers	26	

It seems from Table 7 and 8 that most of the participants find the current interactive way efficient on both platforms, with the proportions of 84.62% and 80.77% respectively. However, it needs to be noticed that nearly 20% of participants find the interactive way inefficient; even though it may not look like a large number, it can still have an unignorable impact on learning quality of many students.

*Q5. A: If the Rain Classroom can turn on the camera, you will\_\_\_\_ it.*

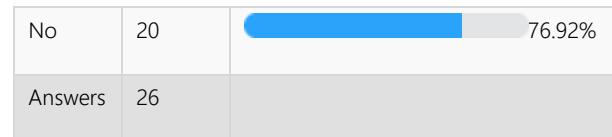
**Table 9.** Perception on Camera Function in Rain Classroom

	Answers	Percentage
support	15	 57.69%
oppose	11	 42.31%
Answers	26	

*Q5. B: Are you willing to turn on the camera in class?*

**Table 10.** Perception on Camera Function in Blackboard Learn

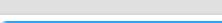
	Answers	Percentage
Yes	6	 23.08%



Since student cannot turn on the camera during the live lecture on Rain Classroom, this question assesses the willingness of turning on the camera if such function is added in the future. The results do not quite match the hypothesis though, that as for Group A, more than half of the participants choose to support the function, while for Group B, there are significantly more participants who are not willing to turn on the camera. This is probably because those students who study on Blackboard Learn know that turning on camera can be slightly awkward to them, especially when they have to answer difficult questions.

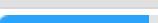
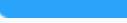
*Q6. A: If the Rain Classroom can turn on the microphone, you will\_\_\_\_ it.*

**Table 11.** Perception on the Microphone Function in Rain Classroom.

	Answers	Percentage
support	21	 80.77%
oppose	5	 19.23%
Answers	26	

*Q6. B: Are you willing to turn on the microphone in class?*

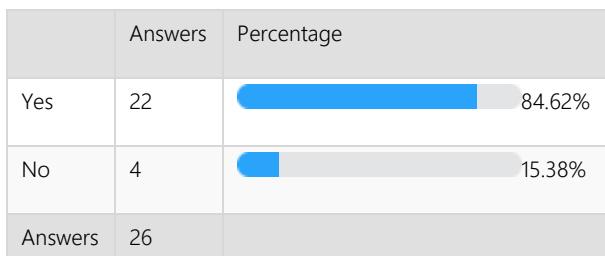
**Table 12.** Perception on the Microphone Function in Blackboard Learn.

	Answers	Percentage
Yes	14	 53.85%
No	12	 46.15%
Answers	26	

Like the last question, students cannot turn on microphones either on Rain Classroom. However, participants seem to be more willing to turn on the microphones in class: over 80% of the participants from Group A choose to support the function, while for the participants of Group B, over half of them are willing to do so. This is understandable that turning on microphones can be less awkward to students; besides, such function may also help students to feel engaged in online learning [11].

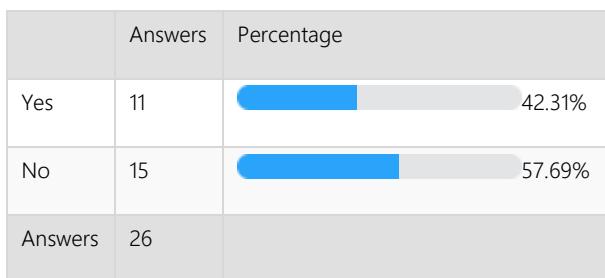
*Q7. A: Have you ever met technical issues like signal delay?*

**Table 13.** Experiences of Technical Issues in Rain Classroom.



*Q7. B: Have you ever met technical issues like signal delay?*

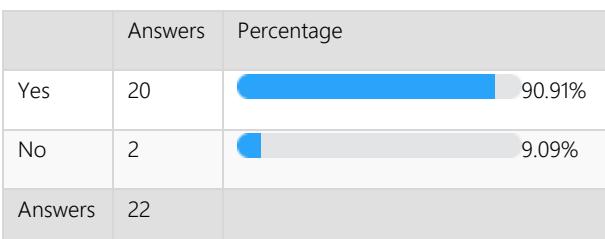
**Table 14.** Experiences of Technical Issues in Blackboard Learn.



It is somehow worrying that nearly 85% of the participants from Group A have met technical issues, which means that many users of Rain Classroom may have experienced delays, bugs, etc. This needs to be noticed and improved, otherwise this can have negative impact on the using of the platform. This is also a notable issue for Blackboard Learn, since still nearly half of the participants have reported technical issues. This problem is actually faced by almost every online learning platform, even those with mature technologies and designs, which means that this area urgently needs to be improved to ensure the good using experience.

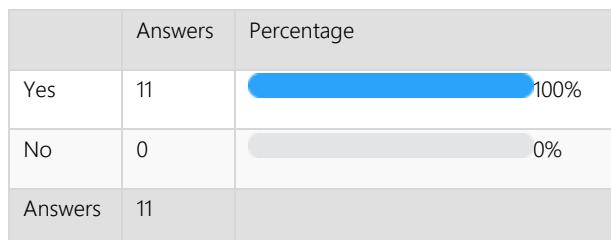
*Q8. A: Do you think technical issues would influence your class?*

**Table 15.** Perception on How Technical Issues Affect their Learning in Rain Classroom



*Q8. B: Do you think technical issues would affect your class?*

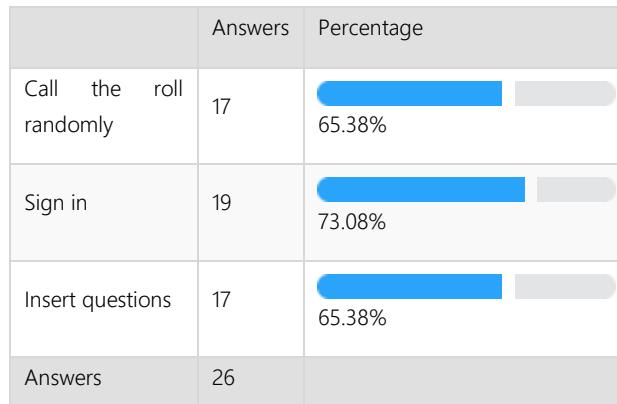
**Table 16.** Perception on How Technical Issues Affect their Learning in Rain Classroom



It is clear from this question that technical issues can affect students' learning experiences negatively, which as mentioned above, such problem needs to be improved as soon as possible.

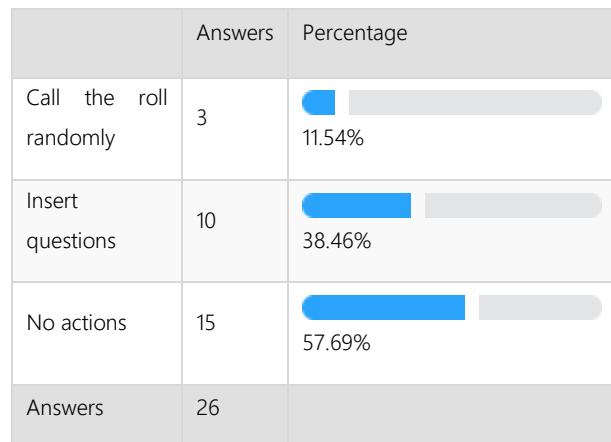
*Q9. A: How do teachers catch your attention in class? (Multiple Choice)*

**Table 17.** Response to Q9.A about Rain Classroom



*Q9. B: How do teachers catch your attention in class? (Multiple Choice)*

**Table 18.** Response to Q9.B about Blackboard Learn

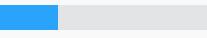


Generally speaking, it seems that the teachers on Rain Classroom are more likely to take actions to catch students' attentions than those on Blackboard Learn. It is due to the different educational patterns of Chinese teachers and European/American teachers to some extent. Teachers in China are more likely to focus on discipline and hence requires students to be concentrated throughout the lessons; however, European/American

teachers prefer the pattern that students need to be self-controlled and self-disciplined instead being taught so, especially those university / college students.

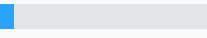
*Q10. A: Have you ever watched the recording after class?*

**Table 19.** Responses to Q10.A about Rain Classroom

	Answers	Percentage
Yes	19	 73.08%
No	7	 26.92%
Answers	26	

*Q10. B: Have you ever watched the recording after class?*

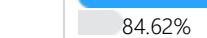
**Table 20.** Responses to Q10.B about Blackboard Learn

	Answers	Percentage
Yes	23	 88.46%
No	3	 11.54%
Answers	26	

Recording is a crucial part of online learning. When students cannot attend live lectures or miss some points of the lessons, recording will be a powerful tool for them to enhance learning. The data directly shows that most of the participants have watched the recording, which implies the importance of the function.

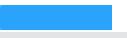
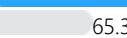
*Q11. A: Which advantage(s) do you think the recording have? (Multiple Choice)*

**Table 21.** Responses to Q11.A about Rain Classroom

	Answers	Percentage
To check leakage to fill the vacancy	21	 80.77%
To focus on the important knowledge	22	 84.62%
To adapt to my learning progress	22	 84.62%
To have an extra chance to make up missed lessons	18	 69.23%
Answers	26	

*Q11. B: Which advantage(s) do you think the recording have? (Multiple Choice)*

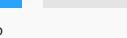
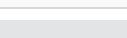
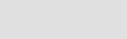
**Table 22.** Responses to Q11.B about Blackboard Learn

	Answers	Percentage
To check leakage to fill the vacancy	11	 42.31%
To focus on the important knowledge	12	 46.15%
To adapt to my learning progress	17	 65.38%
To have an extra chance to make up missed lessons	20	 76.92%
Answers	26	

It can be seen that recording is believed to have a number of advantages. It is notable that a significant amount of participants from Group B agree that recording can help them to make up missed lessons, while relatively fewer of them mention the other advantages. This is due to the fact that Blackboard Learn has more students from overseas; since there is usually few hours' time differences among continents, international students are likely to miss some of the lessons, so they have to make use of recording to do the online learning.

*Q12. A: Do you think it is effective to preview or review the courseware?*

**Table 23.** Responses to Q12.A about Rain Classroom

	Answers	Percentage
Extremely effective	10	 38.46%
Relatively effective	8	 30.77%
Not so effective	3	 11.54%
Relatively ineffective	4	 15.38%
Extremely ineffective	1	 3.85%
Answers	26	

*Q12. B: Do you think it is effective to preview or review the courseware?*

**Table 24.** Response to Q12.B about Blackboard Learn.

	Answers	Percentage
Extremely effective	13	50%
Relatively effective	11	42.31%
Not so effective	0	0%
Relatively ineffective	2	7.69%
Extremely ineffective	0	0%
Answers	26	

Courseware released by teachers is usually used by students to do the preview and review. The results of this question do meet the expectation; however, it needs to be noticed that approximately 30% of the participants from Group A find the courseware ineffective, and on the contrary, only 7.69% of the participants from Group B agree. This can probably be explained by the quality of courseware, or its correlation to the course itself.

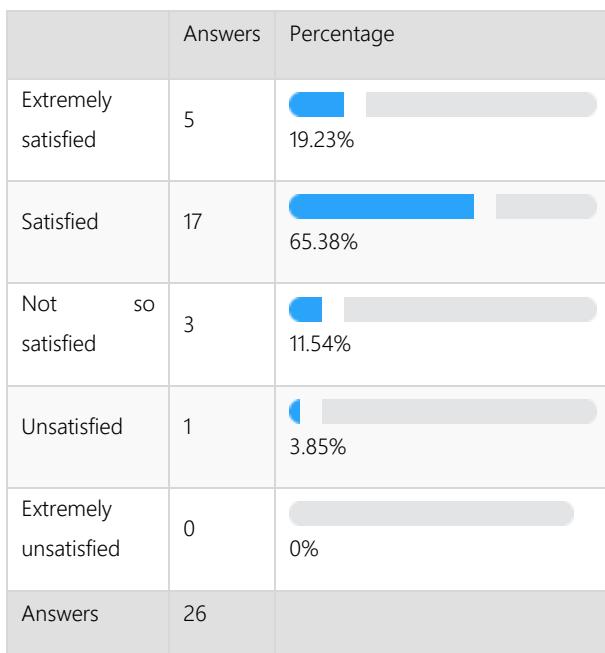
*Q13. A: Are you satisfied with Rain classroom?*

**Table 25.** Responses to Q13.A about Rain Classroom

	Answers	Percentage
Extremely satisfied	6	23.08%
Satisfied	14	53.85%
Not so satisfied	2	7.69%
Unsatisfied	2	7.69%
Extremely unsatisfied	2	7.69%
Answers	26	

*Q13. B: Are you satisfied with Blackboard Learn?*

**Table 26.** Responses to Q13.B about Blackboard Learn



Overall, most of the participants are satisfied with the two platforms to varying degrees, with the proportion of 76.93% and 84.61% respectively. Blackboard Learn seems to be slightly more welcomed than Rain Classroom, which may because that it is more mature in regards of technology, functions, and designs.

#### 4.2 Qualitative Data Results

Two participants from each group were interviewed for the purpose of this study. Generally speaking, all of the participants have relatively good impression of the two platforms. One participant stated that Rain Classroom is “inseparable” from daily learning. When talking about the contributions and features of the platforms, a participant believes that Blackboard Learn has made the learning flexible and controllable, while another participant mentions that “I do not think that the platform is a simple learning platform; it helps me with a number of self-service options and provides me with almost everything I need at school; which to some extent, it is more like my personal butler”. When asking about the suggestion to the platforms, one participant answered that he is quite concerned about lack of functions like camera and microphone during the live lecture; he considered that if students are able to turn on camera and microphone, the efficiency and quality of interaction will be greatly improved. One participant stated that Blackboard Learn needs to fix the issues that overseas students, especially those who are based in Asia, cannot properly connect to the server. She mentioned that a number of students have reported such issues, and she thinks that the using experience will be much better if the issue can be solved. All of the participants held positive and optimistic attitudes toward online learning and its prospect. As one of the participants mentioned, “Online

learning is a good product in the information age. It improves the efficiency of learning and promote educational quality"; he also suggested that online learning platform ought to be improved to "meet people's all-round needs".

## 5. DISCUSSION

From the above analysis, Rain Classroom and Blackboard Learn have its own advantages and disadvantages. As online teaching and learning platforms, they are convenient and meet the demand of both teachers and students. Different from the traditional face-to-face teaching mode, online teaching and learning separates teachers from students and students from each other, which leads a sense of isolation and then a sense of dissatisfaction [12]. Since these feelings would be very likely to have negative impacts on students in the long term, learning platforms should address the problem urgently. As Lehman and Conceição [12] mentioned, providing a sense of presence in online teaching and learning is of great significance. Thus in this paper, we suggest Rain Classroom improve its functions by designing functions that can turn on the camera and microphone when necessary. Rich and colourful interactive ways are effective in attracting the attention of distant and separated students during the lecture [13]. It is worthy to mention that the two platforms have the function of sending live subtitles. Students can send their doubts and questions, teachers can provide the answers, which facilitates the interaction in the classroom. Oftentimes, in online classes, online students usually get less informal feedback than face-to-face students, so it is particularly important to provide effective assignment feedback [14]. Rain Classroom thus should provide students with the quizzes or tests including formative assessment and summative assessment that created by teachers, which are not available in Blackboard Learn. These questions can be objective questions or subjective questions (mainly objective questions). After students complete the questions, the platform will immediately score the questions of objectivity, and the teacher will be able to comment on the subjective questions. Feedback is one of the most powerful influences on learning and achievement [15]. According to previous research, the timely feedback of student work is significant to successful knowledge and skill acquisition [16]. With the help of feedback, students can reflect themselves and make conclusions to improve the quality of learning. At the same time, teachers will be able to self-assess their quality of teaching because they can see the results and accuracy of every single question. Therefore, Blackboard should create more similar functions so that teachers can get feedback from students.

Courseware can also be created by teachers in Rain Classroom which can be previewed or reviewed by students to make good preparations for the coming lesson

or strengthen their memory about the knowledge points that teachers want to emphasize in the courseware. It still has much space to improve, however, in view of its limitation. This new learning and teaching method which bring together the benefits of online technologies and the advantages of traditional class like expressing a face-to-face mode is likely to be "a useful additional resource" [17]. The courseware in Rain Classroom lacks the ability of record video, so it may have effect on efficiency and quality.

As for recordings, it proves that it is both beneficial to students and teachers from different perspectives. Students can make use of recordings to compensate for the missing content for some reasons. Besides, since recordings can be adjusted to keep up the pace if some points in the class are not understood or to improve the efficiency of self-study if some students want to review after class to strengthen their memory. Also, to teachers, they can adjust their curriculum or change their ways of teaching on time if they find out any problems by watching recordings. As is admitted, students intend to use recordings to help their study and what's more important is that they believe that recordings are indispensable since they will be badly influenced without recordings [18].

Furthermore, technology issues should also be taken into consideration because it may probably occur in online learning and teaching. It may bring some problems like unstable Internet or the delay of signal, which will lead to bad experiences, for example, the inconvenience of communication or the postponement of learning progress.

With the discussion above, some suggestions have been given to the two platforms. To Rain Classroom, it should add some new functions to turn on the camera and microphone so that students and teachers can have more choices to interact with each other firstly. Secondly, it should optimize its function for teachers to create courseware which can record video to form an atmosphere of face-to-face. While to Blackboard Learn, the same advice is given to Blackboard Learn relating to courseware. Besides, it should add the function of inserting quizzes during the lesson or releasing tests to attract their attentions and exam their learning outcomes.

In addition, teachers should also be advised since they play an significant role in teaching as the vital participants. They should interact more with students by involving and using interactive ways, and they should actively explore the functions in the platform to make the best use of it.

## 5. CONCLUSION

With the analysis and discussion in this study, the main differences between the two platforms have been made by students' comparing and contrasting in the data.

As an increasingly popular mode, online learning and teaching has showed its bright future because it is advantageous in some aspects. Limitations still exist in both platforms researched in this paper, and there is much space to improve in the future to help online learning more efficient. Thus, some suggestions have also been provided to both platforms and teachers to help them make adjustments. During the pandemic time, online teaching and learning has given expression to its benefits and convenience, compared with traditional teaching mode. It is undoubtedly that it will be still be indispensable and last for a long time even in the post-pandemic era. Platforms, teachers and students, therefore, should take an active part in online teaching and learning, especially the platforms need to be progressed to meet ever-changing demands.

## REFERENCES

- [1] Sarkar, S. (2020). A Brief History of Online Education. *Adamas University*. Retrieved Aug 28, 2021, from <https://adamasuniversity.ac.in/a-brief-history-of-online-education/>
- [2] Pishva, D., Nishantha, G. G. D., Dang, H. A. (2010). A Survey on How Blackboard is Assisting Educational Institutions around the World and the Future Trends. *2010 The 12<sup>th</sup> International Conference on Advanced Communication Technology*, 1539-1543. Retrieved Sep 8, 2021, from <https://ieeexplore.ieee.org/abstract/document/5440323>
- [3] Wang, C., Shannon, D. M., Ross, M. E. (2013). Students' Characteristics, Self-Regulated Learning, Technology Self-Efficacy, and Course Outcomes in Online Learning. *Distance Education*, 34(3), 302-323. doi:10.1080/01587919.2013.835779
- [4] Liu, Z., Lomovtseva, N., Korobeynikova, E. (2020). Online Learning Platforms: Reconstructing Modern Higher Education. *International Journal of Emerging Technologies in Learning*, 15(13), 4-21. doi:10.3991/ijet.v15i13.14645
- [5] Gadanidis, G. (2007). Designing an Online Learning Platform from Scratch. *EdMedia + Innovate Learning*, 1642-1647. Retrieved Sep 8, 2021, from <https://www.learntechlib.org/p/25591>
- [6] Zhang, W., Qin, S. (2018). A Brief Analysis of the Key Technologies and Applications of Educational Data Mining on Online Learning Platform. *2018 IEEE 3rd International Conference on Big Data Analysis*, 83-86. doi:10.1109/ICBDA.2018.8367655
- [7] Liu, M., Kang, J., Cao, M., Lim, M., Ko, Y., Myers, R., Weiss, A. S. (2014). Understanding MOOCs as An Emerging Online Learning Tool: Perspectives from the Students. *American Journal of Distance Education*, 28(3), 147-159. doi:10.1080/08923647.2014.926145
- [8] Kashghari, B., Asseel, D. (2014). *Conference Proceedings. ICTfor Language Learning*. Florence, Italy: Pixel.
- [9] Xiangming, L., Song, S. (2018). Mobile Technology Affordance and Its Social Implications: A Case of "Rain Classroom". *British Journal of Educational Technology*, 49(2), 276-291. doi:10.1111/bjet.12586
- [10] Yu, Z., Yi, H. (2020). Acceptance and Effectiveness of Rain Classroom in Linguistics Classes. *International Journal of Mobile and Blended Learning*, 12(2), 77-90. doi:10.4018/IJMBL.2020040105
- [11] Schwenck, C. M., Pryor, J. D. (2021). Student Perspectives on Camera Usage to Engage and Connect in Foundational Education Classes: It's Time to Turn Your Camera On. *International Journal of Educational Research Open*, 2-2. doi:10.1016/j.ijedro.2021.100079
- [14] Lehman, R. M., & Conceição, S. C. (2010). *Creating a sense of presence in online teaching: How to "be there" for distance learners* (Vol. 18). John Wiley & Sons.
- [15] Zhu, G., Yu, X., Liu, Y., Yang, Y., & Xie, X. (2020, October). Challenges and innovations in online teaching during the outbreak of COVID-19 in China. In *2020 IEEE Frontiers in Education Conference (FIE)* (pp. 1-6). IEEE. doi: 10.1109/FIE44824.2020.9274272
- [16] Poyatos-Matas, C., & Allan, C. (2005, July). Providing feedback to online students: A new approach. In *Higher Education in A Changing World, Annual International HERDSA Conference* (pp. 3-7), from [https://conference.herdса.org.au/2005/pdf/refereed/paper\\_429.pdf](https://conference.herdса.org.au/2005/pdf/refereed/paper_429.pdf)
- [17] Hattie, J., & Timperley, H. (2007). The power of feedback. *Review of educational research*, 77(1), 81-112. doi: 10.3102/003465430298487
- [18] Ahren, T. C. (2005, October). Using online annotation software to provide timely feedback in an introductory programming course. In *Proceedings Frontiers in Education 35th Annual Conference* (pp. T2H-1). IEEE. doi: 10.1109/FIE.2005.1611917

- [19] Woods, R., Baker, J. D., & Hopper, D. (2004). Hybrid structures: Faculty use and perception of web-based courseware as a supplement to face-to-face instruction. *The Internet and Higher Education*, 7(4), 281-297. doi: 10.1016/j.iheduc.2004.09.002
- [20] Yeung, A., Raju, S., & Sharma, M. D. (2016). Online Lecture Recordings and Lecture Attendance: Investigating Student Preferences in a Large First Year Psychology Course. *Journal of Learning Design*, 9(1), 55-71, from <https://eric.ed.gov/?id=EJ1096715>