Improvement of students' enthusiasm by introduction of barrage into online teaching during COVID-19 pandemic

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Abstract
The outbreak of the COVID-19 pandemic results in the turning from offline teaching to online teaching. Students enjoy short videos and like barrage during the pandemic. We found that the introduction of barrage into online teaching is of great help to improve the students' attention and enthusiasm. In order to verify the correctness of this conjecture, we launched a questionnaire survey. According to the preliminary conclusions, we found that student's think that such adaption is not only interesting, but also can promote the interaction, and therefore improve the learning effect. It should conform to the trend of teaching development in the new era.

KEYWORDS
barrage, COVID-19, interactive, online teaching, student education

1 | INTRODUCTION

The outbreak of the COVID-19 pandemic forced teaching turn from offline to online. Teachers need to record videos and do live teaching online. Since all courses are online, students always feel bored facing the computer screen. The emergence of the barrage has changed this situation.

After the outbreak of the COVID-19 pandemic, short videos, such as Douyin (Chinese version of TikTok), Bilibili, etc. became very popular with people due to staying at home. As a new generation, college students are very accepting short videos. Moreover, in China, students also like to send barrage.

Barrage is called “Danmu” in Chinese. It refers to the commentary subtitles that pop up when watching videos on the Internet. Similar to the criticism between the lines in the novel, the comments floating across the screen in the video are called barrages, which originally meant to provide intensive shelling with a large or small amount of artillery. Barrage, as the name suggests, refers to a curtain formed by a large number of bullets. When a large number of comments float across the screen, the effect looks like a barrage in a flying shooting game. The main form of the barrage in this article is that in the teacher's live broadcast course, students can interact with the teacher and students in real time; the general understanding of the barrage refers to whether it is in the live broadcast or recorded video, or whether the barrage is sent sooner or later, comments are all related to the current playing topic. We can see its application in online social networking in our daily life.

However, due to the limited speed of development, barrage is more popular on Chinese social platforms. In the past year, the domestic version of TikTok has also added this function. Before that, there were also researches with the user experience of the barrage in Bilibili. At the same time, there is also the emergence of the commercialized form of barrage. In terms of attracting the attention of viewers, it seems that some business people have smelled this business opportunity very early. Thus, the form of barrage has emerged and developed in recent years.

The increase in the frequency of the students' use of barrage has also enhanced classroom interaction. According to the research, the improvement of classroom
interaction is conducive to promoting learning efficiency. This is also the key to our exploration of the substantive role of the barrage. Therefore, we designed a questionnaire to find out the students' subjective evaluation of the barrage and the factors that affect different evaluations. We hope to analyze the degree and factors of the impact of barrage on interactivity from the questionnaire, and also hope that this data can provide a reference for follow-up research.

Young students grew up in the Internet age. Barrage, short videos, VR and other new technologies, new methods, and new contents can mostly arouse their interest in learning. Barrage was originally a kind of real-time commentary for the video, and in many cases, it was just complaints and humor. The entry of barrage into online teaching has stimulated two-way communication based on interaction and greatly enriched educational methods and content.

College students already have a certain knowledge reserve, and no longer blindly listen to teachers. Instead, they hold an appreciation but cautious attitude to teachers. The course must not only deliver knowledge, but also attractive. The introduction of barrage into online teaching, can give students the opportunity to feedback questions and ideas. To the teachers, it is not only a way to communicate with students, but also the demonstration of confidence that their knowledge and teaching skills can withstand the test of students.

Furthermore, it is not uncommon for teachers to make mistakes in teaching, and no one can ensure that they are foolproof. The introduction of barrage allows teachers to face the students' play, and that reflects the teachers' confidence and friendliness. In the experimental results, 24.04% of the students would send barrages to play with the teachers. In addition, scientific knowledge itself is not funny. But some barrage comments are humorous. Videos with barrage can often make learning of scientific content interesting.

2 | METHOD

After discussion with the team members and suggestions from the teacher, the questionnaire consists of three major parts. Questions 1–4 are the basic characteristics of the participants, including grades, whether they have participated in online classes, the teaching methods they participated in, and whether they can concentrate. Considering that fact the participants accepted online teaching with no other choices, questions 5, 7, and 9 collected the participants' subjective willingness to accept online teaching and their personal usage, and this is conducive to a more comprehensive analysis of the effectiveness. In order to identify the factors affecting the participants' willingness, we designed questions 6, 8, 10. The entire questionnaire can be completed in about 10 min.

| TABLE 1 | The details of questionnaire |
|---------|-----------------------------|
| 1. Your education? |
| A. Freshman, B. Sophomore, C. Junior, and D. Senior year |
| 2. The teaching methods you have participated in during the epidemic |
| A. Through interactive apps such as DingTalk and Tencent |
| B. Play the recorded video for teaching |
| C. Take precautions and go to offline classes |
| 3. Have you ever had online class experience? |
| A. Yes, B. No |
| 4. Can you concentrate during the online class? |
| A. Concentrate, B. Occasional thoughts wandering |
| C. Cannot concentrate but try hard to attend class |
| D. Hanging online class just to complete the task |
| 5. Have you participated in the “Classroom Barrage” during the online course? |
| A. Participate and send barrage frequently |
| B. Participate but not often barrage |
| C. Seldom barrage |
| 6. What do you think if you use barrage to communicate during the online class? |
| A. Very interesting and practicable |
| B. Will affect the efficiency of listening to lessons |
| 7. If the teacher answers questions through the barrage that appear on the multimedia, then will you ask questions or different opinions that you have doubts about? |
| A. Will do, B. Maybe, and C. Will not |
| 8. When teaching online, will your teacher take the initiative to use the barrage function |
| A. Frequently used, B. Occasionally use, and C. Never use |
| 9. When do you send the barrage? |
| A. When you hear interesting knowledge points |
| B. When the teacher asks a question, answer it through a barrage |
| C. To ask questions yourself |
| D. Answer questions from classmates |
| E. Remind the teacher mistakes in a humorous way |
| 10. If you are in favor of introducing barrage in the teaching process, then the reason is? |
| A. Promote communication and interaction |
| B. Promote student engagement in the classroom |
| C. Improve teaching quality |
| D. Show a sense of humor |
| E. Joking with the teacher |
Our survey was administered to 105 undergraduate students at the Hangzhou Dianzi University in China. All participants were over 18 years old. Each student signed a consent form before the survey. They can ask questions at any time and withdraw at will. IRB was consulted for the approval of the implementation of the students’ feedback survey and this study was exempt from the approval.

The survey was conducted with Sojump software, a free online questionnaire survey, evaluation and voting platform. We used Sojump to set up online survey, and the link was sent to students. The questions in the survey are summarized in Table 1. The data collection and survey results analysis were conducted by Sojump software.

3 | RESULTS

We conducted a survey of 105 students from Hangzhou Dianzi University. Among them, freshmen, sophomores, juniors, and seniors accounted for 49.52%, 37.14%, 11.43%, and 1.9%, respectively. Most of them were freshmen and sophomores.

4 | HIGH ENGAGEMENT, BUT MEDIOCRE ATTENTION

According to the questionnaire data, during the epidemic period, 97.09% of students had participated in DingTalk, Tencent Classroom and other teaching methods, which accounted for more than recording and broadcasting and offline classes. This fully reflects the teachers in the process of online education. There is a high probability that students will be exposed to the barrage. Please see Figure 1a for the data.

Most students (38.83%) will occasionally drop off, and some students (36.89%) are trying hard to listen despite the small difference. A few students (19.42%) are just trying to complete the task, and a very small number of students (4.85%) ability to concentrate. Please see Figure 1b for the data. This may require increased regulation to ensure participation in online learning, and this may be the problem exposed by online education More than half of the students (51.46%) have participated in the barrage activity, a small number of students (36.89%) will participate but infrequent barrage, and a very small number of students (11.65%) never participate. Please see Figure 2a for the data.

5 | TEACHERS USE THE BARRAGE MORE OFTEN AND STUDENTS ARE WILLING TO PARTICIPATE

Most students (63.11%) think it is very interesting and highly feasible, while the rest (36.89%) think it is not conducive to the guarantee of classroom efficiency. Please see Figure 2b for the data. About 45.63% of the students think they will participate in it, 44.66% of the students think they may participate in it, and only a few students (9.71%) think they will not participate in it. To a certain extent, it shows that many students will actively participate in the answering of the barrage, and it also reflects the students’ recognition of the teaching form of barrage. Please see Figure 3a for the data. It can be seen that only 28.43% of the students’ corresponding teachers do not use barrage, and the most teachers still use barrage frequently. This also reflects the feasibility of the use of barrage and the larger development space. Please see Figure 3b for the data.

![Figure 1](image1.png)

**Figure 1** (a) Students’ participation in different teaching methods during the epidemic. More students have experienced online APP teaching methods such as DingTalk and Tencent classroom. (b) Students’ attention in class. Most students will occasionally drop off, and some students are trying hard to listen despite the small difference.
About 54.81% of the students responded by barrage when the teacher asked questions, 42.31% of the students posted barrage when they had their doubts, and 29.81% of the students were interested in asking themselves among the remaining students, 28.85% of the students interacted with the students to ask questions, and 24.04% of the students would post some barrages to remind the teacher mistakes in a humorous way. Please see Figure 4a for the data. About 60.58% of the students think the barrage can improve the enthusiasm of the class, 58.65% of the students think it will promote the communication between student

**FIGURE 2**  (a) The situation of the students' use of barrage. More than half of the students have participated in the barrage activity. (b) Students' perceptions of the classroom barrage. Most students think the barrage is very interesting and highly feasible

**FIGURE 3**  (a) The willingness of students to answer questions with the barrage. Most of students think that they will or may participate in it. (b) the situation of the barrage for teachers. Most teachers still use barrage frequently

**FIGURE 4**  (a) Scenarios of students using the barrage. About 54.81% of the students responded by barrage when the teacher asked questions, 42.31% of the students posted barrage when they had their doubts. (b) reasons why students like the barrage. About 60.58% of the students think it can improve the enthusiasm of the class, 58.65% of the students think it will promote the communication between student

## 6 | REASONS TO BE INVOLVED AND REASONS TO SUPPORT

About 54.81% of the students responded by barrage when the teacher asked questions, 42.31% of the students posted barrage when they had their doubts, and 29.81% of the students were interested in asking themselves among the remaining students, 28.85% of the students interacted with the students to ask questions, and 24.04% of the students would post some barrages to remind the teacher mistakes in a humorous way. Please see Figure 4a for the data. About 60.58% of the students think the barrage can improve the enthusiasm of the class, 58.65% of the students think it will promote the communication between students, and 38.46% of the students think it can improve the quality of teaching, a small part (32.69%) students think that humor can be shown in it, and 13.46% of students think that barrage can joke with
the teacher. Please see Figure 4b for the data. The joke in this paragraph refers to communicating with the teacher in good faith, not maliciously.

7 | DISCUSSION

We evaluated the use of barrage into online teaching of course “Human Health and Disease” in 2020. Students only need to use APPs such as “Tencent classroom” to send barrage in the online class and barrage comments would present on the teacher’s multimedia screen. When there are frequent “barrages” showing on the screen, it shows that these instructional designs have hit the students’ points of interest and aroused the students’ extended thinking. We found that after introducing barrage to online teaching, the enthusiasm of students in the classroom has improved a lot. For each question given by the teachers, the students gave various answers in the form of barrage, and they were very motivated. However, how to control the scale and content of the student’s barrage remains to be further studied.

This novel form of online class has also been generally recognized by students. They believe that this method of teaching is not only interesting, but also can promote the interaction between teachers and students to a greater extent, attract the students’ attention, and improve teaching quality. Students think that such adaption conforms to the trend of teaching development in the new era. However, the fact that most students prefer to chat with barrage precisely because of their anonymity suggests that students prefer to express their thoughts anonymously, rather than using their words and actions, further confirming that students are opposed to direct communication. While anonymity can boost enthusiasm, it can also have negative effects. Due to concealment of anonymity, some students may make inappropriate remarks and disrupt the order of the classroom. Therefore, we should control anonymous barrage as much as possible. Everything has two sides, but we can fix it and make it what we want it to be. In the near future, this new way of discussing learning may become an integral part of education.

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