How to Prevent Online Learners from Cheating?

Bao-xun HE

Educational Information Technology Center, China West Normal University, Nanchong, China

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Abstract. Cheating is prevalent in online learning. Copying answers of objective questions and subjective questions, and browsing (not carefully watching) videos are the main forms of cheating in online learning. These cheating will bring poor learning results, the decline of online teaching quality, and the unfair online learning. Non-technical and technical preventive ways, to a certain extent, can play a role in preventing cheating. Facing the browsing videos cheating, a new technical strategy, Embedding Questions in Videos (EQV), was used. This strategy involves it automatically pause playing video, pop up questions embedded, and wait for the students submit correct answer to continue learning. We use a small-scale experiment to verify EQV and estimate its effect on our online course, named Educational Technology, for 154 participants of sophomore pre-service teachers. We identify EQV that can lead to two-up and one-drop: increase the total page traffic (132% of average) and the ruminant ratio (jumped from 106% to 130%), and decrease task completion rate (dropped from 100% to 78%). However, this strategy does not significantly improve the performance of the learners. Although EQV has shown value for preventing learners from cheating, it also has certain business risks and is not necessarily widely adopted by online course platforms. Stakeholders need to find some delicate balance between difficulty of learning and learner loyalty, between difficulty of curriculum and teaching quality.

Introduction

When covid-19 was widely distributed in China, almost all Chinese college students take part in online learning. During this period, Massive Open Courses (MOOCs) and Small-scale Private Open Courses (SPOCs) were widely used. In the learning process of MOOCs, learners are far away from teachers in space and can learn anytime and anywhere through the network. Learners are free to watch the videos they want to study, complete assignments, participate in discussions and exams, and finally complete learning tasks.

Because of the high degree of freedom in MOOC learning, learner is required to have a high degree of learning enthusiasm and initiative in thought, and a good independent learning skill in ability. Only on the premise that learner has made full preparation for learning in thought and ability, and then started learning MOOC, he can resist all kinds of interference in the MOOC learning process, and then can fully devote himself to the MOOC learning, so as to get a good learning effectiveness.

However, the fact is that not all MOOCs learners are ready in both thought and ability before they begin the learning. MOOCs learners have different motivations for a variety of reasons. Inevitably, some learners have the ultimate goal of getting credits earning certificates with less effort instead of learning hard and obtaining more knowledge. In addition, these learners, subjectively, are lazy and do not want to learn intermittently. Objectively, there is not enough time to participate in learning, and various wrongful means are adopted by learners to passively complete the learning task of MOOCs instead of actively participating in learning.

Therefore, the abnormal activity of cheating inevitably occurs in the learning process of MOOCs. What are the specific manifestations of cheating in MOOC learning, what are the harms caused by cheating, what are the prevention strategies to avoid cheating, and how effective are these strategies?
The Forms and Harms of Cheating in MOOC Learning

Cheating in online teaching can take many forms. According to the learning content, the most common forms of cheating are as follows.

Firstly, Copying answers of objective questions to cheat. The learners copy others’ answers when they complete the objective questions. Some learners directly share their answers, for others to copy and share freely, in QQ group and other real-time communication tools.

Secondly, Copying answers of subjective questions to cheat. Some learners download others’ homework on the Internet, simply modified them, and submit to the teacher, when they answer the subjective questions. However, the general teachers do not have the technology tools for check in the repeated information of subjective questions, so it is difficult to find the trick, which leads to the muddled pass of these students’ homework.

Finally, Browsing (not carefully watching) videos to cheat. Some learners may open the MOOC video, and then do something else instead of watching the video carefully. Although some learners, after open the video, sit in front of the video and didn't go to do other things, they have no desire to learn mentally, didn’t pay attention to video, and allowed the video play until the end. The MOOC system can’t aware of the learners did not seriously to watch video, and record the learning tasks have been done successfully. In fact, learners didn’t watch the video. Thus it constitutes a recessive cheating.

In China, people usually refer to the first two types of cheating as Brushing the Questions, and the last type of cheating as Brushing the Video. American scholar, Curtis G. Northcutt, found a cheating strategy called Copying Answers using Multiple Existences Online (CAMEO). The strategy is using multiple existences online accounts to trial and error firstly, and then share the correctly answers to eithers to cheat. In the paper, they report that at least 1.3% of certificates were earned by CAMEO. Among earners of 20 or more certificates, 25% have used the CAMEO strategy [1]. It can be seen that cheating in the learning process of MOOC is quite popular around the world.

The harm of cheating in MOOC learning is manifold. For the learners themselves, because they do not pay attention to learning, the learning results will be discounted, knowledge will be unable to obtain, and ability will not be improved. Over time, they will also form bad habits of not love to learn. Therefore, cheating in MOOC learning does great harm to learners. For the school, because some students don't study hard, and obtain the credits or certificates by means of cheating, on the one hand, it will be to cause a decline in the quality of teaching and talents cultivated cannot get social recognition, on the other hand, some learners through hard effort to get credits or certificates, and the another part of the learner is to get without pains, it will produce a new education unfair. Therefore, cheating in MOOC learning needs to be prevented.

Non-technical and Technical Preventive Ways on Preventing Cheating

In order to prevent cheating in MOOC or other online learning environment, we need to recognize the learners how to cheat. So researches on detection are urgent to prevent cheating. There are many detection technologies, including Machine Learning and General Purpose, to be adapted to detect multiple-account cheating[2][3].

Detect cheating is the first step in preventing cheating. We need to figure out how to keep learners from cheating. In general, there are two types of strategies for preventing cheating in MOOC learning, one is non-technical, and the other is technical.

Non-technical prevention strategies are meaning that, for personally, by ideological education and moral education to improve the moral level of learners and persuade them not to cheat, also through knowledge education to improve the understanding of the learning value of courses and motivation of learning, to indirectly avoid cheating. And for school, it can establish the corresponding regulation to punish the student who cheats, and play an effective role to deterrent student does not dare to cheat. Evidence shows that establish strict rules and give learner a stern warning that spells out the potential consequences of cheating leads to a significant reduction in cheating in online learning
environments[4]. Improving online learners’ self-regulated ability and metacognitive level is a way of preventing cheating. By the intervention, such as videos or text in MOOC learning content including with metacognitive knowledge or self-regulated feedback information, learners can improve their self-regulated learning ability and metacognitive level. The implemented self-regulated learning intervention has been successful in improving learners' course completion and has likely also been successful in improving learners' self-regulated learning activity [5]. Once the learners' self-regulated learning ability is improved, they can manage their learning action, and complete the task without cheating. So this strategy can indirectly prevent cheating.

In addition, there are some direct technical intervention strategies to prevent cheating. Currently, some MOOC platforms offer some settings to prevent students from cheating. For example, the functions of preventing video dragging, preventing window switching, disorderly and random order of questions, forbidden to copy answers, forbidden to repeat answers and so on are good solution to prevent cheating. The first two, preventing video dragging and preventing window switching, aim to prevent learners from cheating when watching the video. The purpose of disorderly and random order of questions, forbidden to copy answers, and forbidden to repeat answers, is to prevent the learner from cheating when the learners are answering the questions. A study has showed that randomizing question parameters and delaying feedback reduce cheating significantly [6]. So, when we design the online course, we should increase the use of randomization when possible, and delay feedback, especially on high-stake questions.

A New Strategy to Prevent Cheating: Embedding Questions in Videos

For the students whose independent learning ability needs to be improved, they stayed at home to study online during the outbreak of covid-19, and were restricted by the environment, and made it difficult to control external interference. Looking as studying hard, but in fact their perception and consciousness are not being. There are many students who have this negative learning state. Therefore, active precautions are needed. And those above preventing cheating functions are not up to this requirement. Fortunately, most online course platforms have a new tool, Embedding Questions in Video (EQV), to deal with this question, and we need to make full use of this tool.

EQV can realize the function that pause playing video, pop up questions embedded, and wait for the learners submit correct answer to continue learning. If the learners do not answer or submit a wrong answer, according design rules the system can set learners back a certain time, for example 5 minute, to watch the video again. If the learners answer correctly, the system may let learners continue to play the video. By this intervention, learners’ fully brushing video actions are avoided. Learners who watch the video carefully can successfully complete their tasks. By this technical means, the normal learning states, including eye being, heart being, and hand being, are coming. This strategy is greatly forcing the students to learning video carefully.

How to set the platform function of Embedding Questions in Videos? In online course platform, Chaoxing-Fanya, after we edit chapter content of course and insert video, there will be an Insert Object function, through which we can insert pictures, quizzes, PPT and captions at any time-point of video. In another online course platform, Icourse163, after we insert the video, there will be a similarly function of Quiz during Classroom, by which we can insert any number of test questions at any time.

Effectiveness of Using the Embedding Questions in Videos

During the covid-19 outbreak, we use a small-scale experiment to verify EQV and estimate its effect on our online course, named Educational Technology that aims to cultivate using skills of Information and Communication Technology (ICT) for pre-service teachers. 154 sophomores, students of China West Normal University are participants. The course was beginning run at March 1, 2020. We inserted questions into the videos, during the course run into the fourth week (from 2020-3-23 to 2020-3-29). We inserted two or three objectively questions, including true or false and multiple
choice, into a video (a total of 7 video). We observed the changes in the learning status, by the big data analysis of platform.

We identify EQV that can lead to two-up and one-drop: increase the total page traffic and the ruminant ratio, and decrease task completion rate.

The number of visits to the learning pages (page traffic) of the four-week learners is 1195, 2606, 2318 and 3029. From these data, it can be seen that in the fourth week, as the number and difficulty of learning tasks are remain unchanged with second and third weeks (first week task is smaller), the page traffic (3029), 132% of average (2287), increased significantly.

Figure 1. The page traffic of fourth week in EQV intervention.

According to our analysis, the learners were used to cheat when watching the video in the early stage, but now they had to visit the video several times in this week due to the blocking of the embedded questions, until correct answer the embedded question. That they repeat watching videos lead to the increase of clicks. This strategy is effective in detecting and preventing cheating.

The statistics also showed that the rumination rate of the video jumped from 106% to 130%. The ruminant ratio refers to a ratio that the real students' viewing time of a single video is divided by the original time of the video. It reflects the degree to which students repeatedly watch the video. It also is an intuitive data analysis concept of teachers to monitor the status of the video learning. From the theoretical analysis, in the process of video learning cheating, the learners opened the video and allowed it to play freely. But they did not immediately notice the change, suddenly pop up the embedded question, in this week. They had to return to watch the video repeatedly, resulting in ruminant ratio rise. That again shows that the method of EQV can effectively prevent cheating.

Data shows that the tasks completion rate of video learning dropped from 100% to 78% in this week. We can conclude that the EQV intervention has been successful in preventing cheating. As the dishonest learners have not completed their learning tasks, teachers can send messages to them through Tecent QQ, Wechat and other technical means to urge them.

Figure 2. Tasks completion status of video learning of fourth week in EQV intervention.

The data also shows that this strategy did not improve online learning performance. The reason may be that when we published the assignments and tests, in order to give learners more knowledge, we set advanced options that allow learners to redo the questions before the assignment deadline and see the correctly answers. In this way, learners can improve their scores by submit again to get more correct answers. Therefore, under the EQV intervention, students' performance did not improve significantly.
Summary and Risk

To conclude, the implemented EQV intervention has been successful in detecting cheating, and has likely also been successful in improving learners' participation. Dropping of learners' course completion was an indicator of cheating, and it can partly choose the dishonest learners out. The EQV intervention also helps the learners intending to cheat change their intention to learning carefully. The results thereby provide evidence for the benefit of implementing EQV support in online learning. More research into the effects of different EQV interventions, and how to best implement EQV support to improve online learning effectiveness, is necessary. The current study provides a valuable base to build on.

As an old Chinese saying goes, when the priest climbs a post, the devil climbs ten. Prevent cheating strategy are varied, but learners should seek to cheat. It cannot be completely eradicated for a platform or teachers. Study knowledge needs the learner's active participation. Technology to prevent cheating is only one means to promote teaching. In order to improve the learning effect, learners need to cooperate and participate deeply.

Driven by commercial interests, online learning platforms have been searching for a suitable profit model. Under the premise that preventing cheating means are not uniformly deployed on all online learning platforms, learners must avoid the difficult point and willing to choose the platforms those are beneficial to their own learning and by which can easily get credits or certifications. As a result, there will be fewer users choose the platforms that actually adopt preventing cheating strategies to ensure the quality of learning. Similarly, even in the same platform, there is a competitive relationship between homogeneous courses. After all, when universities evaluate courses on the platform, the number of learners selecting the course is one of the core evaluation indicators. In order to attract more learners to the course, stakeholders, for example teachers of course managers and platforms managers, need to find some delicate balance between difficulty of learning and learner loyalty, between difficulty of curriculum and teaching quality.

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