

Study on Learning Data Analysis of MOOCs on MOOCs Online Courses



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Abstract. This study combines ARCS motivation model with MOOC implementation and the learning history information provided by platform to investigate the impact on the learning effectiveness of MOOCs on MOOCs online courses imported motivation model. We found that it has obviously affected the registration of teachers who re-ally want to apply the MOOC projects and start their courses. We also found that learning patterns have changed a lot and the rate of MOOC completion increases significantly from 3.9% to 29%. The research results can be used as a reference for MOOC teaching staff. It can effectively stimulate students' learning motivation and improve learning effectiveness.

Keywords: ARCS, learning data analysis, MOOC, motivational strategy

1 Introduction

In recent years, Massive Open Online Courses (MOOCs) have gradually become the mainstream trend in the field of education. Both MOOCs and OCW are online and open educational resources. The difference between the two can be compared from the “platform characteristics” [1]. In the aspect of “course content quality”, OpenCourseWare (OCW) usually records directly in class, but it does not provide 100% of course video; MOOCs are recorded in the studio and 100% of course videos are provided. In the aspect of “course and teacher-student interaction”, OCW has almost no interaction; MOOCs provide online discussions, online tests, assignment sub-missions, and peer review, which means that teachers, students, and peers can communicate. In the “course history record”, OCW does not have such mechanism; MOOCs can provide virtual course certification or entity examination certification. In the MOOC curriculum, the low completion rate is a bottleneck that needs to be broken. Therefore, the mechanism for effectively increasing the completion rate is highly concerned by re-researchers [2].

If we lack learning motivation in teaching, even the best curriculum design and the best teaching materials, it will reduce learning effectiveness. Motivation is not only enable learners to generate learning motivation, but also enable learners to grasp the learning objectives [3]. Some research also point out that there is a highly positive relationship between learning motivation and learning achievement [4-5].

The most perfect combination and widespread use of instructional design and motivation theory is the ARCS model proposed by John M. Keller at Florida State University [6]. The ARCS model provides a

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series of motivational strategies for teachers, and it can stimulate learners' interest in learning and ultimately improve their learning effectiveness. In this study, we combine ARCS motivation model with MOOC implementation and the learning history information provided by platform to investigate the impact on the learning effectiveness of MOOCs on MOOCs online courses imported motivation model.

2 Literature Review

The learning mode of MOOC courses can be classified as self-paced learning in e-learning. Learners learn by themselves through virtual classroom resources, such as online teaching materials. The teaching materials must have the characteristics of self-learning and can guide learners to arrange appropriate learning progress [7-8]. Due to the characteristics of independent study, so it is very suitable to achieve lifelong learning or educational aspirations through the Internet [9]. In "The Relationship of Nursing Staffs Learning Motivation, Self-Efficacy and Satisfaction at a Synchronous e-Learning in Nursing Continuing Education", the results revealed significant positive correlations among the self-learning efficiency of Internet, learning motivation and satisfaction on synchronous e-learning education [10].

The ARCS Model defines four major conditions (Attention, Relevance, Confidence, and Satisfaction) that have to be met for people to become and remain motivated [11-12]. Attention Strategies are divided into six items: (Incongruity, Conflict), (Concreteness), (Variability), (Humor), (Inquiry) and (Participation). In terms of attention, we must consider the learners themselves and draw up strategies that are beneficial to them in order to effectively achieve the goal from the learners' perspective. Relevance Strategies are divided into six items: (Experience), (Present Worth), (Future Usefulness), (Need Matching), (Modeling) and (Choice). These strategies are designed to allow learners to believe that those things learned in class activities are meaningful to themselves. Confidence Strategies are divided into five items: (Requirements), (Difficulty), (Expectations), (Attributions) and (Self-Confidence). These methods allow students to understand that the course content will be successfully completed by their efforts. Satisfaction Strategies are divided into six items: (Natural Consequences), (Unexpected Rewards), (Positive Outcomes), (Negative Influences) and (Scheduling). These methods provide learners with the opportunity to show their strengths and build personal achievements and satisfaction.

3 Research Methods

In order to study combine ARCS motivation model with MOOC implementation and the learning history information provided by platform to investigate the impact on the learning effectiveness of MOOCs on MOOCs online courses imported motivation model. We specially built a series of MOOCs on MOOCs courses, mainly to "share how to develop a MOOC course, in a series of MOOC courses." And then "MOOCs on MOOCs Level 1" is the first course. Course objectives are divided into six units:

- (1) Understand MOOCs through case studies and experience sharing.
- (2). Apply MOOC curriculum planning and design elements, implement teaching plans.
- (3) Select appropriate multimedia materials, common MOOC teaching materials, practice instruction design.
- (4) Recognize common self-made digital teaching materials, tools and applications.
- (5) When necessary, plan a suitable process for development of collaborative digital teaching materials.
- (6) Propose suitable online activities and promotional programs.

The subjects were those who were interested in the production of MOOCs and applying for the MOOC projects. After the first course started on July 1, 2016, it was found that the completion rate was very low from the platform data analysis, so we add motivational strategy in accordance with the ARCS model in this study. The Participation in Attention Strategies, the Future Usefulness in Relevance Strategies, the Expectations in Confidence Strategies, and the Unexpected Rewards in Satisfaction Strategies.

Thus, we provide strategies for learners to stimulate learning motivation in this study:

"Those who have completed the course, "MOOCs on MOOCs Level 1", and received a certificate, will be given a point in the next project application."

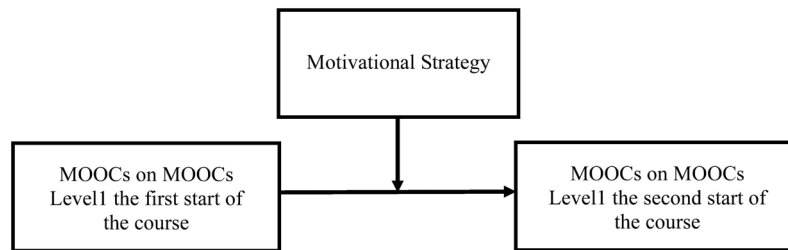


Fig. 1. Research structure process

4 Research Results

In this study, we explore motivational strategies which impact on the learning effectiveness of the “MOOCs on MOOCs Level 1.” From the analysis of the platform data, we get the following results:

Analysis of the number of participants. For the first start of the course, the total number of registered students on the day of opening the registration day (June 15) is 30. After that, it will be registered before the start of the course (July 1). The number of students rose sharply. The total number of registered students is 202. In the sixth week after the start of the course, it was found that the number of registered students is increasing and the trend was gradually stable. The total number of registered students is 408 (Fig. 2). From the above, it can be seen that the majority of students registered during the period of about 2 to 3 weeks after the start of the course. It is suggested that the instructors can make good use of the time from the open registration course to the third week after the start of the course in the future. This is the best time to promote the course.

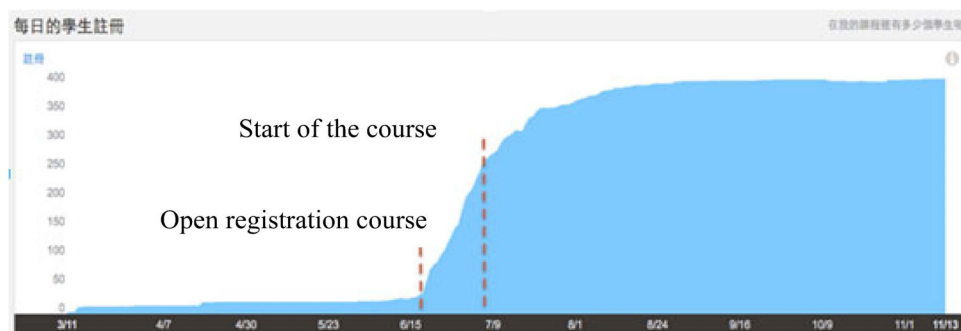


Fig. 2. Daily student registration in the first start of the course

For the second start of the course, the total number of registered students on the day of opening the registration day (September 14) is 10. After that, it will be registered before the start of the course (October 16). The number of students rose sharply. The total number of registered students is 253. In the sixth week after the start of the course, it was found that the number of registered students is increasing and the trend was gradually stable. The total number of registered students is 254 (Fig. 3).

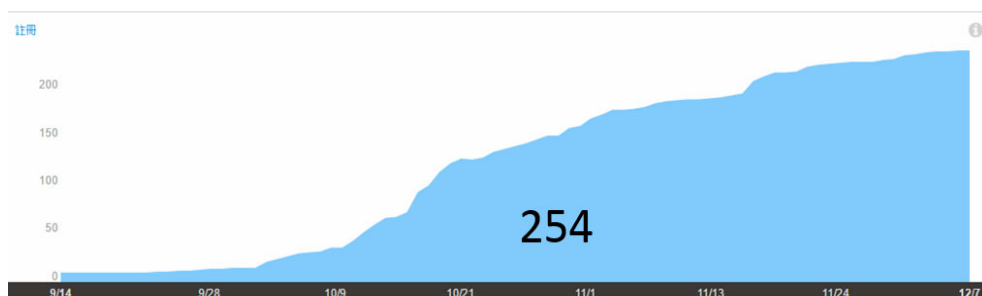


Fig. 3. Daily student registration in the second start of the course

However, there is a significant increase in the number of registrations for doctor degrees, from 25.7% to 31.4% (Fig. 4 and Fig. 5).

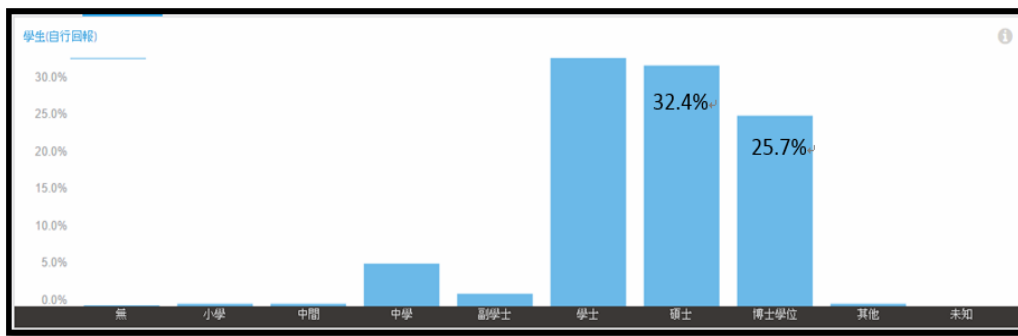


Fig. 4. Degree of student registration in the first start of the course

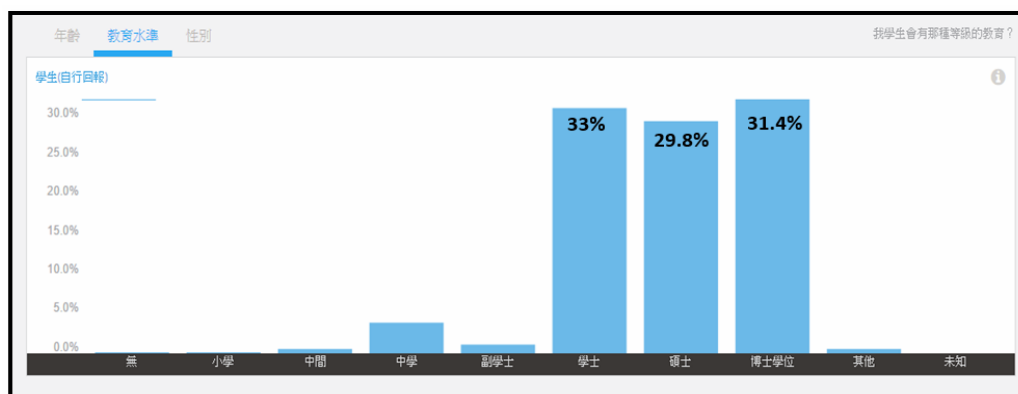


Fig. 5. Degree of student registration in the second start of the course

Obviously, learning motivation strategies have the effect of teachers who really want to apply for the MOOC projects.

Analysis of video viewing conditions. For the first start of the course, the video completion rate is obtained from the platform data (Fig. 6). It is found that the video completion rate of the third week and the fifth week are relatively low.

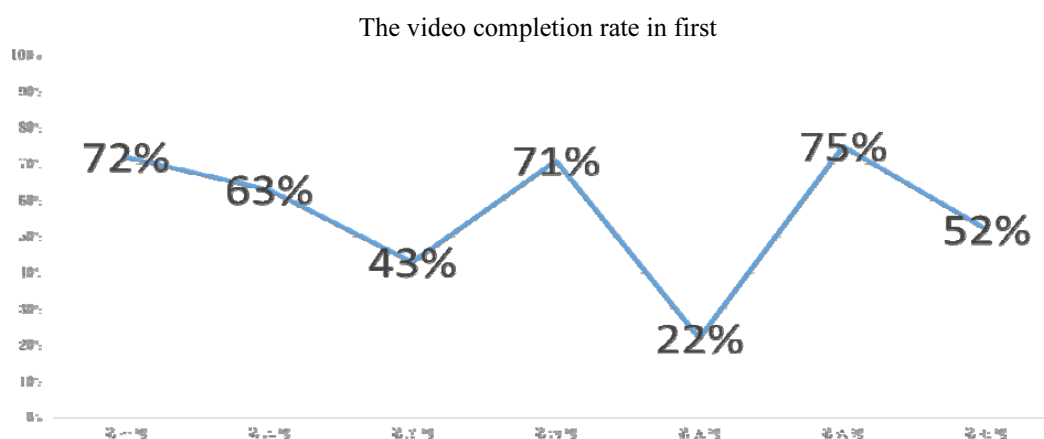


Fig. 6. The video completion rate in the first start of the course

For the second start of the course, the video completion rate is relatively average (Fig. 7).

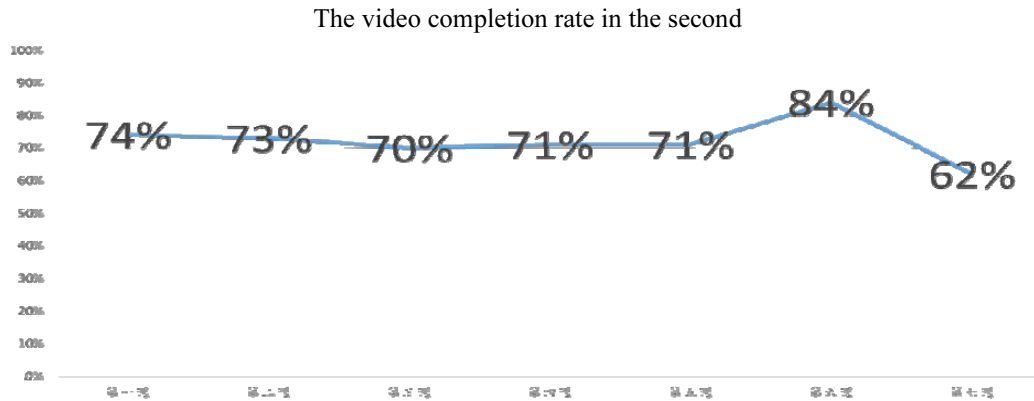


Fig. 7. The video completion rate in the second start of the course

There is a general increase in the video completion rate in each week (Table 1).

Table 1. General increase in the video completion rate

	Week1	Week2	Week3	Week4	Week5	Week6	Week7
first start of the course	72%	63%	43%	71%	22%	75%	52%
second start of the course	74%	73%	70%	71%	71	84%	62%

Analysis of learning participation. There are four aspects of the learning participation provided by the platform information: number of participants in the course activity, number of videos watched, number of questions in the course and number of questions asked.

For the first start of the course, all four aspects of the highest peaks are in the second week (July 9). Number of participants in the course activity is 129, number of videos watched is 80, number of questions in the course is 83 and number of questions asked is 23 (Fig. 8).

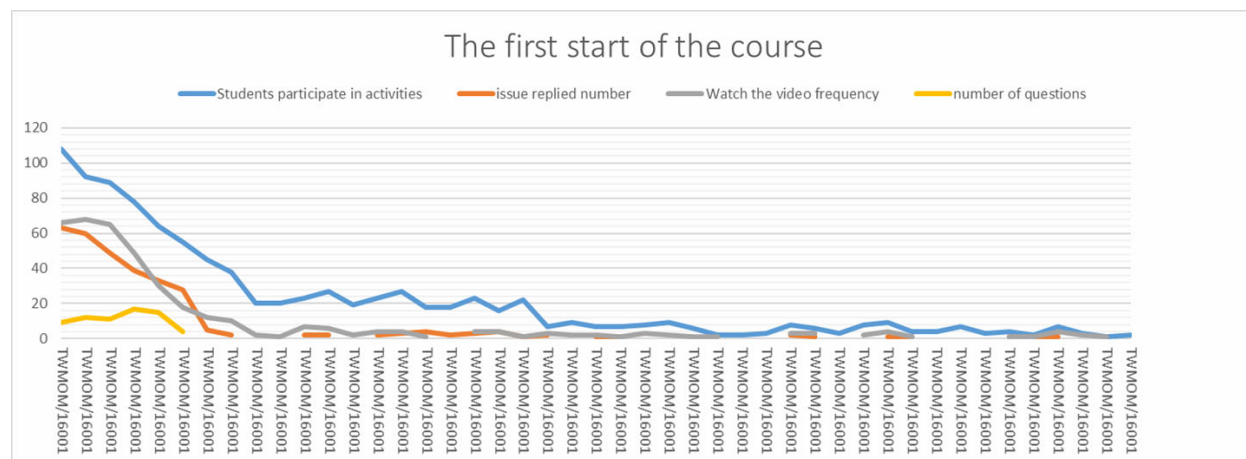


Fig. 8. The platform information in the first start of the course

For the second start of the course, the platform information shows that there are interactive performances in weekly course. The highest peak of number of participants in the course activity is 92 on October 23, the highest peak of number of videos watched is 56 on November 27, the highest peak of number of questions in the course is 72 on December 4 and the highest peak of number of questions asked is 32 on November 21 (Fig. 9).

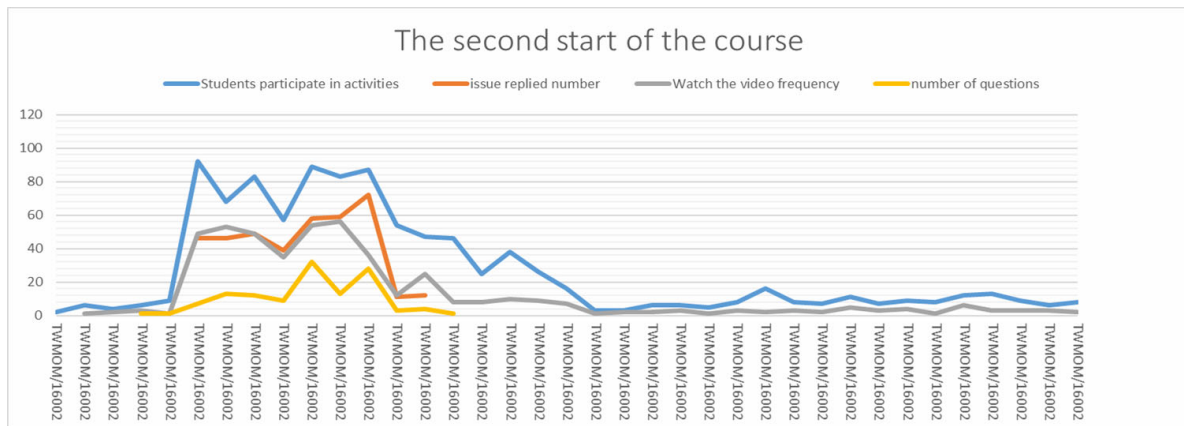


Fig. 9. The platform information in the second start of the course

From four aspects of the learning participation provided by the platform information: number of participants in the course activity, number of videos watched, number of questions in the course and number of questions asked, we find that learning patterns have changed a lot. We compare data of two courses to percentages (Fig. 10 to Fig. 13). The blue line is the first start of the course and the orange line is the second start of the course. We can see that the learners' behaviors are declining in all four aspects without the support of the motivational strategies (blue line). However, this results are completely different in the second start of the course, learners are quite active in all four aspects during the course (orange line).

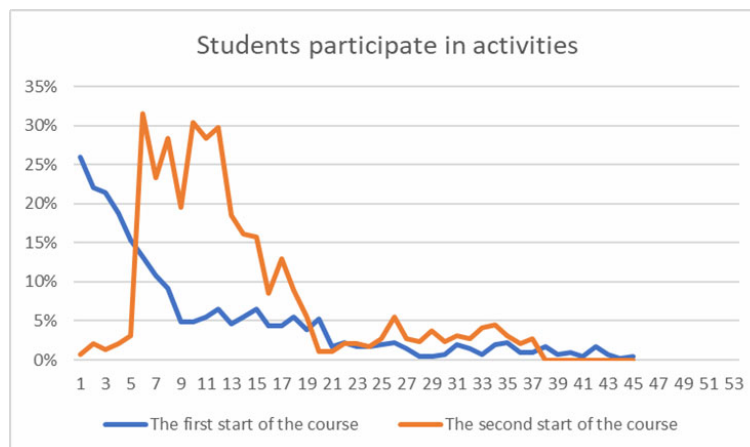


Fig. 10. Students participate in activities

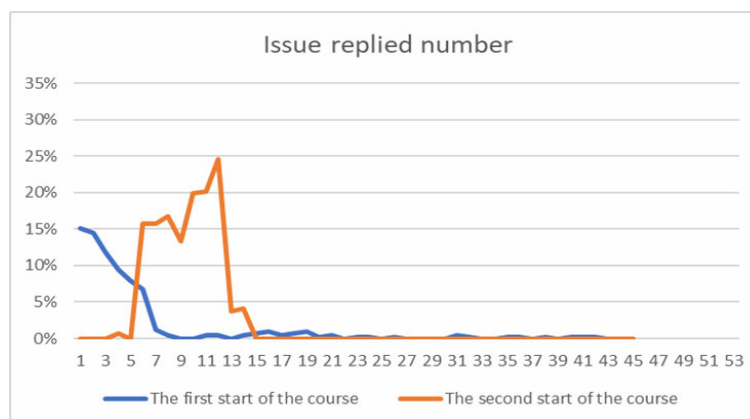


Fig. 11. Issue replied number

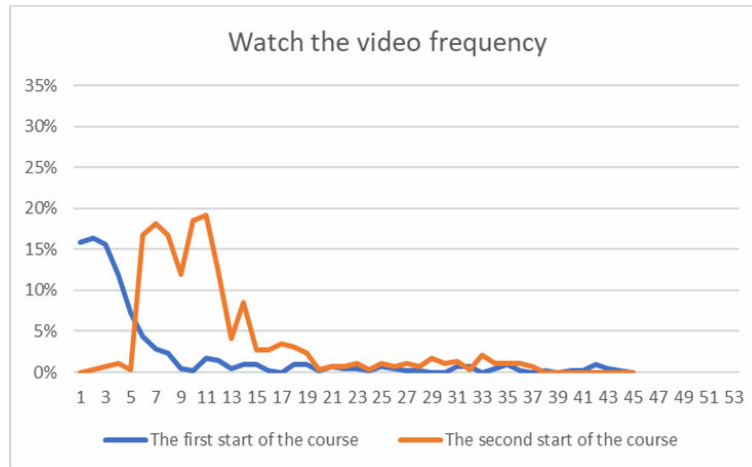


Fig. 12. Watch the video frequency

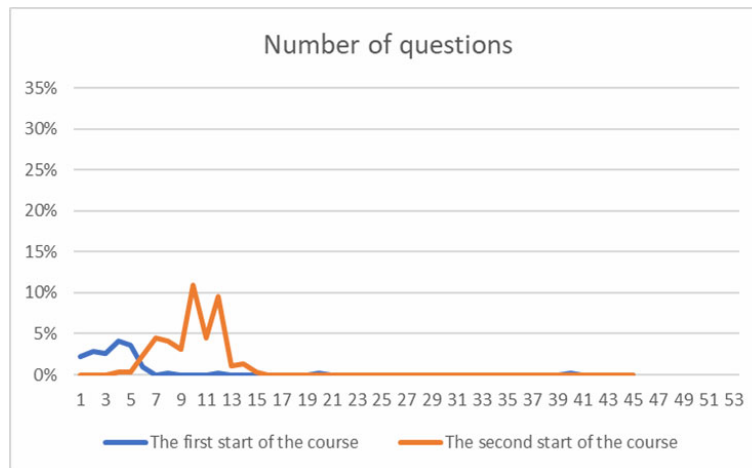


Fig. 13. Number of questions

Analysis of performance results. For the first start of the course, the correct answer rate of the overall test is 80.8%. From the statistical bar graph, blue is the number of correct answer, red is the number of errors answer. The correct per-centages for the first three weeks of the test are 84%, 76.3%, and 81.9%, respectively. Due to the number of students has not yet stabilized in first-second week of the course, the correct answer rate has shown an unstable state. The number of students tends to be stable after the fourth week. There-fore, the rate of correct answers in the later period is higher than that in previous (95.8%> 80.8%) (Fig. 14.).

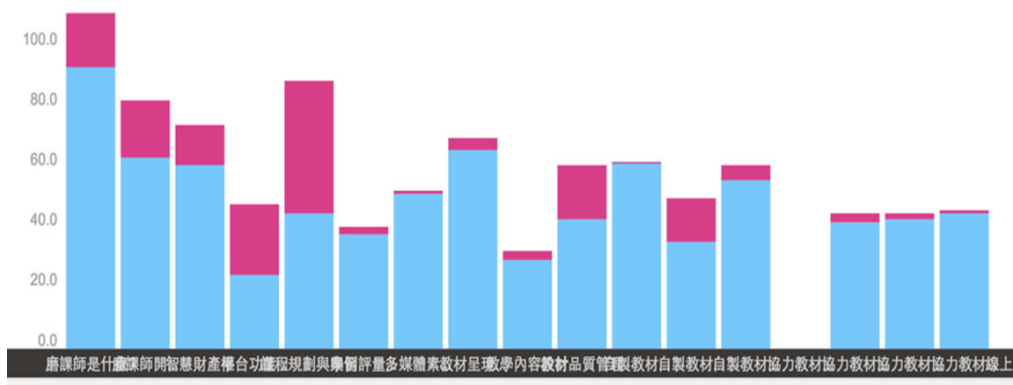


Fig. 14. The correct answer rate in the first start of the course

For the second start of the course, the correct answer rate of the overall test is 83.9%. From the statistical bar graph, it is similar to the first start of the course. Therefore, the rate of correct answers in the later period is higher than that in previous ($93.8\% > 83.9\%$) (Fig. 15).

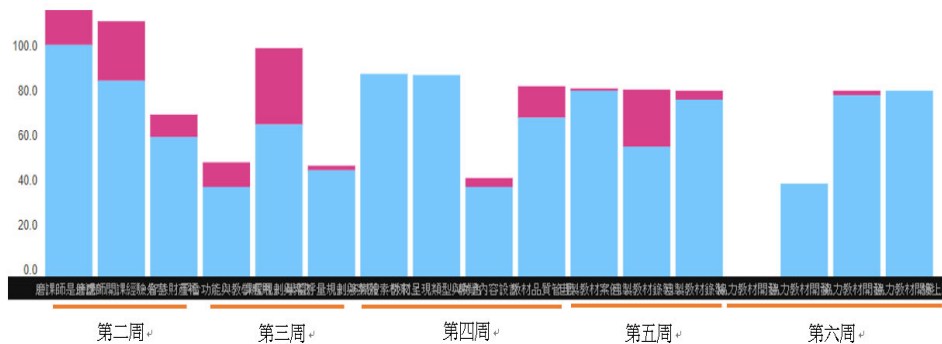


Fig. 15. The correct answer rate in the second start of the course

We find that the corrective rate of the overall test rise from 80.8% to 83.9%.

Analysis of the number of posts and results. For the first start of the course, the more active is in the forum (Learners have more than 5 activities), the higher the score is. From the perspective of the number of participating discussions and the scores of the test, there are two polarizations (Fig. 16). Those who post articles and reply to questions more than 5 times are regarded as serious learners (about 4.6% of the total learners). The scores of students who seldom participated in the discussion are less than 50 points (about 92% of the total learners).

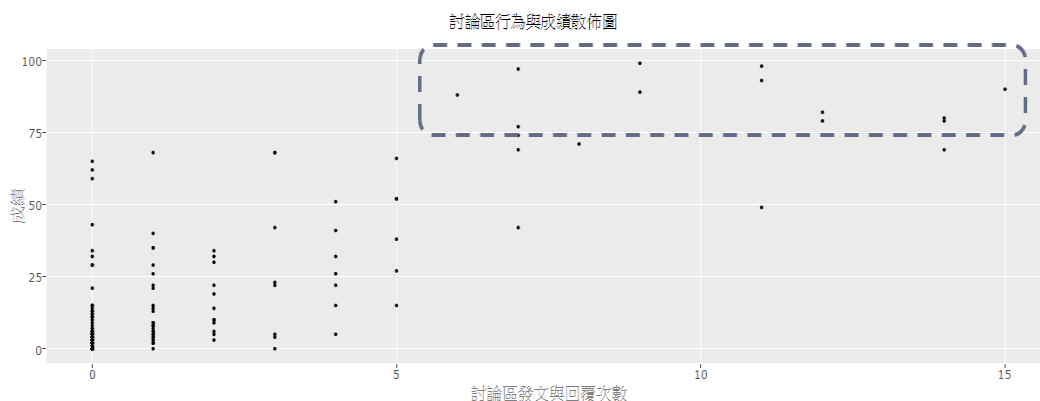


Fig. 16. The number of posts and results in the first start of the course

For the second start of the course, those who post articles and reply to questions more than 5 times are regarded as serious learners (about 13.7% of the total learners) (Fig. 17). The scores of students who seldom participated in the discussion are less than 50 points (about 76% of the total learners).

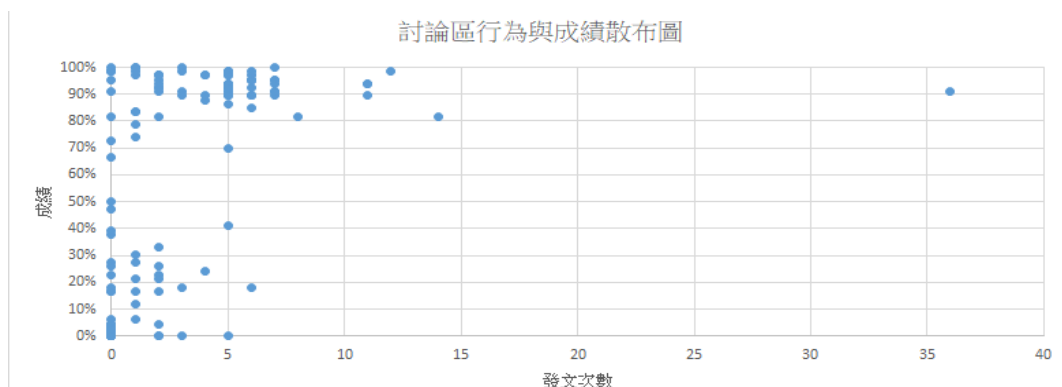


Fig. 17. The number of posts and results in the second start of the course

We find that serious learners increase from 4.6% to 13.7% and learners with scores below 50 dropped from 92% to 76%.

Analysis of completion rate. “MOOCs on MOOCs Level 1” performs two times online courses. There are 408 registered people, 16 passers, and a pass rate of 3.9% in the first start of the course. And there are 254 registered people, 73 passers, and a pass rate of 29% in the second start of the course.

It is found that course add learning motivation strategies for learners, the completion rate increases dramatically from 3.9% to 29% (Fig. 18).

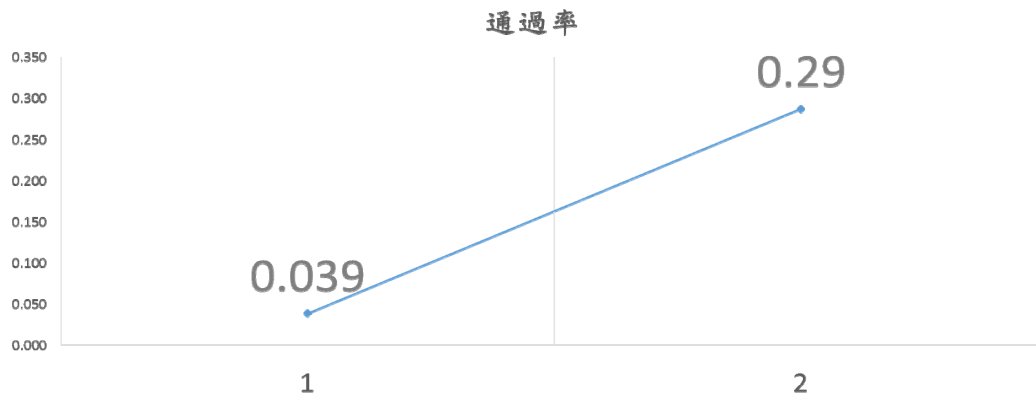


Fig. 18. Completion rate

5 Conclusion

Motivation has always been seen as an important potential factor in changing individual learning achievements. And MOOCs education is a particular focus on the motivating individuals' motives. Due to the MOOC's feature, the platform will retain the learner's learning process. It can improve each learner's individual learning motivation and make them active in learning activities by using these learning processes to modify each course.

In this study, we provide motivational strategies for learners to stimulate learning motivation by the ARCS model and find that:

(1) Obviously, learning motivation strategies have the effect of teachers who really want to apply for the MOOC projects. There is a significant increase in the number of registrations for doctor degrees, from 25.7% to 31.4%.

(2) There is a general increase in the video completion rate in each week.

(3) We find that learning patterns have changed a lot.

(4) We find that the corrective rate of the overall test rise from 80.8% to 83.9%.

(5) We find that serious learners increase from 4.6% to 13.7% and learners with scores below 50 dropped from 92% to 76%.

(6) The completion rate increases dramatically from 3.9% to 29%

We also expect the research results can be used as a reference for MOOC teaching staff. It can effectively stimulate students' learning motivation and improve learning effectiveness.

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