New Perspectives in Science Education
International Conference
NEW PERSPECTIVES in SCIENCE EDUCATION


Analysis of Students' Attitude towards Online Education

Victoria Torop[1], Lyudmila Egorova[2]

National Research University Higher School of Economics, Russian Federation[1,2]

Abstract

Recently appeared online courses rapidly gained their popularity due to the great opportunities. Absolutely different people can study any discipline for various purposes. Online courses can be useful both to children in preparing for lessons, and to adults in advanced training. Gradually, courses are becoming not only part of the additional curriculum at the university, but part of the mandatory program, too. However, not everyone supports the new way of education. Therefore, the goal of this work was to identify students' attitudes towards online education, the reasons for their preferences on online format of education and the willingness to replace traditional lectures into an online format. The study was carried out on the basis of a survey of more than 6,000 students as part of the Student Life Survey conducted every year at the HSE. The analysis was made by using various clustering methods, such as hierarchical clustering, clustering using the K-means method and analysis of latent classes, as well as analysis of variance. The students were divided into 6 clusters based on the different attitude towards the replacement of all lectures to the online format: devotees of HSE, amateurs of online courses, disciplined, social, learners for the grades, a mixed cluster.

Keywords: *online education, hierarchical clustering, K-means, latent classes, analysis of variance.*

1. Introduction

Online-platforms with massive open online courses (MOOC for short) like Coursera, edX and Udacity appeared in the Internet in the beginning of 2000s and rapidly gained their popularity. Many of online courses are available to anyone freely and every year the number of applicants grows faster and faster. According to the report in 2019 of MOOC aggregator Class Central [1], the number of people registered for at least one course is more than 110 million and the number of courses increased to 13500.

Some experts forecast the replacement of all traditional lectures by the MOOCs. Such an intention was expressed by the Rector of the Higher School of Economics (HSE) Yaroslav Kuzminov in his interview in 2018 [2]: "We will cancel the lecture classes in a classical form. I think that in five years we will definitely replace absolutely all lectures with online courses."

Today the online courses already became a part of education in HSE. All HSE educational programs have courses that have to be completed in an online format in whole or partly. But a complete transition to online education is a serious and fundamental reform of the education system, and before its implementation it is necessary to analyze the willingness of students to switch to online format. One of the most important problems of MOOCs is the lack of contact and direct interaction between the teacher and the student. Also, it is impossible to completely control how the student solves the assessment tasks. So, the certificates might not accurately reflect the knowledge of the student who received it and might not be appreciated by employers. Such possible disadvantages can be very frightening and cause a negative attitude to online learning both for students and teachers, as well as for future employers.

The goal of this work is to analyze the opinion of HSE students regarding the online learning format using the results of student surveys and several clustering methods to identify the factors that influence their attitude to the online format.

2. Literature review

Ku and Lohr [3] were among the first who draw attention to this and conducted a study in 2003. They interviewed students from America and China and revealed that students positively evaluated the main advantages of online learning, such as the lack of the need to spend time traveling to the university and the absence of parking problems. However, foreign students were faced with the lack of contact with new foreign people and the opportunity to improve their language skills.

Mostly, authors consider the activity of students during the course. Four types of activity during the study of the course: the number of videos watched, the number of attempts to pass the tests, the number of written posts on the forum and the number of clicks were considered in [4]. The data on

navigation of students on the course, completion of tests, watching videos, and participation in discussions were analyzed in [5,6].
In [4, 5] a general tendency to drop out of the course at the very beginning of its study was revealed, in addition, there is a very low activity during the course [6]. In the case when the course is compulsory, the number of people who drop out of the course decreases sharply, but the percentage of students who complete the course in tricky ways (that is, they pass tests for a high score without listening to video lectures) increases [4]. Even if students on average praised the quality of online courses, still the number of students who include these courses in their program is about a third of the total number of students [7].
It seems that students are not very interested in studying online courses or they are not satisfied with the quality of the courses. Therefore, it is important to identify factors that influence students' attitudes to online courses, and to increase the motivation of students to study courses of this format.

3. Data and methods

We used the data of the 2018 Student Life Survey. This survey is an annual survey at the HSE conducted by the Centre for Institutional Research in order to reveal the attitude of students to the quality of education at the university, to the conditions of study and living conditions, to involvement in student life, etc. The data contains answers of 6631 students. For our study we need only a part of the questions from this questionnaire, namely, the year of study, place of residence, citizenship, working status, financial situation, etc. Also, the general information about students, i.e. gender, average grade, state-funded or fee-paying place, and language were taken from the accounting and analytical system for managing the educational process of the HSE.
The main questions are questions about online courses and preferences regarding the online learning format described in Table 1.

Table 1. Questions about online education on Student Life Survey.

Question	Responces
Did you include the following types of courses in your curriculum in the past or current academic year?	1. Online courses (all classes and exams were held in an online format) 2. Mixed courses, where you had to listen to online lectures and attend offline seminars 3. Mixed courses with offline exam only 4. None of them
Which course format is preferable for you: an online course or a course that involves offline sessions with a teacher?	1. I definitely prefer online courses 2. I mostly prefer online courses 3. I have the same attitude to both formats 4. I prefer courses that combine online lectures with offline seminars with a teacher 5. I mostly prefer courses that involve classroom sessions with a teacher 6. I definitely prefer courses that involve classroom sessions with a teacher 99. I find it difficult to answer
Rate the degree of agreement with the following statements	1. The list of online courses offered to students is short (there are not enough options) and of low-quality (there are no courses of interest to me) 2. There are problems with translating grades into the HSE rating system 3. I had to pay for online course included in my curriculum 4. It is easy to cheat at the exam 5. The office manager makes mistakes in working with online courses. 6. The program of online lectures did not correspond to the program of offline seminars
How do you assess the idea of converting all HSE lectures to an online format?	1. I definitely support it 2. I mostly support it 3. I mostly do not support it 4. I definitely do not support it 5. I find it difficult to answer
For what reasons do you	1. Personal communication with the teacher is important for me

not support this idea?	2. Personal communication with other students is important for me 3. It is important for me to have a strict schedule 4. I perceive information better in the audience 5. Other

The attitude of students is rather heterogeneous, so we applied different clustering methods to identify groups of people with similar preferences. We used the hierarchical clustering method, K-means and latent class analysis, and the latter method gave us the most clear results that is described below.

4. Results

Using the hierarchical clustering method, we found that the best number of clusters is 6, that was confirmed with the Bayesian information criterion (BIC) test. The main difference between obtained clusters is described in Table 2.

Table 2. The average responses of students from different clusters.

Cluster	Inclusion of online courses	Preference for online, offline or mixed format	Attitude to the disadvantages	Attitude for conversion into online format
1	Nobody included	No response	No response	Definitely support
2	All included (online and mixed)	Mixed, offline	Mostly do not agree	Definitely support
3	Nobody included	No response	No response	Definitely do not support
4	All included (online and mixed)	Mixed	Mostly do not agree	Definitely do not support
5	Nobody included	No response	No response	Definitely support
6	Mostly included (online)	Mixed, offline	Equal support	Mostly do not support

To analyze the difference between clusters and factors affecting attitude we used the ANOVA analysis of variance on all set of questions from the survey and identified several significant parameters that can describe the type of students in each cluster.

Students in cluster 1 most likely are very loyal to HSE and highly appreciate any university innovations, as well as transfer of lectures to the online format. Students in cluster 2 are fond of online courses and also support the idea of translation. Students from the cluster 3 might be very disciplined, who like everything to be on schedule and listen carefully to the teacher in class, so the online format of education does not fit their usual way of life. Cluster 4 includes social people who like to communicate and interact with people, and this group of people is also against changes. People from the 5th cluster can be called students, studying only for the grades, and they also favor the online format. Cluster 6 can be described as mixed and diverse.

5. Conclusion

We found six clearly separated clusters that differ in their attitude to the translation of traditional lectures into an online format, and the reasons for this relationship. Briefly, clusters can be characterized as HSE devotees, online courses devotees, disciplined, social, students for grades, and mixed cluster.

References

[1] Shah, D. “By The Numbers: MOOCs in 2019”, MOOC Report, https://www.classcentral.com/report/mooc-stats-2019/

[2] “Lectures will be transferred to an online auditorium”, Newspaper Kommersant No. 179 of October 2, 2018, p. 5, https://www.kommersant.ru/doc/3758336

[3] Ku, H.-Y., Lohr, L. L. “A case study of Chinese student’s attitudes toward their first online learning experience”, Educational Technology Research and Development, 51(3), pp. 95-102, 2003.

[4] Khalil, M., Ebner, M. “Clustering patterns of engagement in Massive Open Online Courses (MOOCs): the use of learning analytics to reveal student categories”, Journal of Computing in Higher Education, 29(1), pp. 1-19, 2016.
[5] Ferguson, R., Clow, D. “Examining engagement: analysing learner subpopulations in massive open online courses (MOOCs)”, 5th International Learning Analytics and Knowledge Conference (LAK15), Poughkeepsie, NY, USA, ACM, 2015.
[6] Kovanovic, V., Joksimovic, S., Poquet, O., Hennis, T., Hatala, M., Vries, P., Dawson, S., Siemens, G., Gasevic, D. “Examining communities of inquiry in Massive Open Online Courses: The role of study strategies,” The Internet and Higher Education, 40, pp. 20–43, 2019.
[7] Maiorescu I., Razvan D., Sabou G. C., Dobrea M., “The value of MOOC based learning as perceived by higher education students,” The 12th International Scientific Conference eLearning and Software for Education Bucharest, 2016. 10.12753/2066-026X-16-184.