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Transitioning from Face-To-Face to Online Learning During COVID-19: Changes in China's Universities

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Abstract

This paper's purpose is to evaluate faculty members' and students' opinions regarding the quality, benefits and challenges of online learning, transitioning from face-to-face learning during and after COVID-19 in Chinese universities. The paper relied on a quantitative study involving an online survey using a random sample method in June 2020. The sample size was 400 persons, including 160 instructors and 240 students from a university in China. Scores earned by students who took a face-to-face Introduction to Economics course and students who took the same course online during the quarantine were compared with the Students' T-test. There was no significant difference in in the overall grade or the tests, term paper, and final exam grades. Time management skills, more freedom for instructors and students, and reliable Internet access at home were the extreme challenges most participants encountered in online courses. The research findings can be applied in further studies focusing on the quality, challenges, perspectives, and strategies of online education, the transformation of academic programs and instructor training to facilitate the transition to online learning. Future research could be done in other countries to get more comparative data.

Keywords: *COVID-19 pandemic; distance education; face-to-face learning; online learning; quality of education.*

Introduction

In 2019, before the COVID-19 outbreak, there was already high growth and adoption of educational technology, with a global investment of USD 18.66 billion in 2019

estimated to reach USD 350 billion by 2025 (Nusser, 2021). Learning management systems are now commonplace in higher education institutions for both full-time and part-time students. In 2015, online enrollment grew at an extremely rapid annual rate of more than 30 per cent each year, and in 2019, the number of students taking at least one online course grew to 34.7 per cent of total enrollment worldwide (Serhan, 2020). In early 2020, COVID-19 caused a lockdown, with schools and universities around the world closing their doors, resulting in approx. 1.2 billion students leaving their classrooms. This resulted in a marked increase in online learning (Unger & Meiran, 2020).

Online learning systems distribute, track, and manage courses over the Internet. This involves incorporating technological advances to guide, develop and deliver instructional content, as well as facilitate two-way communication between students and faculty (Komani & Chisomo, 2019). They contain features such as boards, chat rooms, polls, quizzes, discussion forums and surveys that allow instructors and students to communicate online and share course content. They can offer productive and convenient ways to achieve learning objectives. All over the world, institutions are using Microsoft Teams, Google Meet, Edmodo, and Moodle as learning management systems, along with video conferencing apps. Other commonly used video conferencing solutions include Zoom, Skype for Business, WebEx, Adobe Connect, etc. (Hebebci et al., 2020).

In response to the pandemic, the online classroom has become necessary to maintain a regular teaching process. Ding Ding, Fanya and other office meeting software in China provide services such as online classrooms and online training. However, these online learning platforms have problems, such as system glitches and the absence of live-streaming features (Schwartz et al., 2020).

So far, many studies have been conducted on how universities worldwide handled COVID-19 and how they are currently preparing for the upcoming semester (DAAD, 2020a). However, such an analysis is required to support higher education institutions in overcoming the lockdown. Information about steps taken by other universities, as well as an overview of other countries and their universities, can be beneficial. There have already been many published analyses and predictions about the possible impact of COVID-19 on higher education. Educations.com and StudyPortals (2020) are currently conducting three international surveys of university staff, students and prospective students about the impact of COVID-19 on their training plans or mobility (DAAD, 2020b). The findings of these surveys are presented in the form of conversations and blogs. Very few empirical studies have been published about this phenomenon. Available literature focusing on the impact of online learning (during the COVID-19 isolation) on academic practices in higher education institutions is still being developed. On top of that, few papers compare online learners' performance during isolation to face-to-face courses in previous semesters.

Most writings comparing face-to-face and online learning programs were published at higher education institutions in developed economies, where information technology

infrastructure, resources and support are available and reliable. There is a severe lack of similar comparative research in developing economies, where weak IT infrastructure, lack of financial resources and technical support, as well as the modest IT skills among instructors and students, are major challenges to implementing online learning (Chan et al., 2015; Komani & Chisomo, 2019; UNESCO, 2020).

This study examined the overall learning experience after a sudden switch from face-to-face to online learning due to the COVID-19-induced lockdown at a university in China. The study evaluated differences in student achievements and collected feedback from professors and students. The study provides a clear picture of the consequences of interrupting full-time education because of the pandemic. On top of that, the recommendations based on the research findings can help improve the situation and help educational administrators, professors, and education platform developers integrate online learning into their institutions' plans.

Literature review

Comparative studies of online versus face-to-face learning

A large number of studies prior to the pandemic compared face-to-face classes with online courses in terms of university student achievements as well as other academic and demographic variables. For example, first-year business students at Griffith Business School in Australia have the opportunity to take the same statistics course face-to-face or online. A comparative analysis revealed no significant differences in learning satisfaction and academic achievements between the two groups under the blended approach (Soesmanto & Bonner, 2019). In a similar study conducted at California State University, with proper training and technology support, university professors deliver both face-to-face and online sections of a business technology course with the same effectiveness as measured by student grades (Tan et al., 2019).

For another type of course, such as radiology courses taught online at a university in Australia, the research led to similar academic achievements with F2F (Lorenzo-Alvarez et al., 2019). The online and face-to-face learning outcomes were analysed by comparing grades of online and face-to-face learners at Ohio University, using a large data set of 5,000 courses taught by more than 100 instructors over ten academic semesters. Given the large scope of the study, the findings suggest no differences in student achievements in online and face-to-face courses. According to the regression analysis, the students' grade point averages had the primary influence on grades earned in specific courses. Students with higher grade point averages performed better in online courses, and students with lower grade point averages performed worse in online versus face-to-face courses (Cavanaugh & Jacquemin, 2015).

Effective ways to quickly deliver an online lecture on a course that is taught using traditional face-to-face lectures have been studied at Chapman University in California. The study compared student learning outcomes (using test scores) in three lecture modes:

- traditional face-to-face lecture;
- online learning, using a video of the lecture made in a face-to-face class;
- online learning, where the lecture was conducted by an instructor in the classroom.

The lecture was delivered using a static document created from an edited transcript of the classroom lecture, complete with diagrams, graphs, etc. The findings suggested that quickly developed online learning methods showcased less engagement than traditional face-to-face lectures. Online learners who listened to a lecture delivered using a static document and students who attended a face-to-face lecture reported better quality of notes compared to students who watched the recorded video. Finally, the impact of various learning resources and course content on student test scores depended on students' engagement and the perceived quality of notes (Nyer, 2019). Private middle schools in Khyber Pakhtunkhwa (Pakistan) evaluated online education in terms of quality of management, curriculum and facilities, teaching methods and extracurricular activities (Rahman & Aajiz, 2019).

Assessing the quality of Massive Open Online Courses (MOOCs) involves four important dimensions of enrollment, participation, quality and student achievement and creates a system to help MOOC organisations take monitoring and improvement steps (Chapman et al., 2016). Improvements in online learning require enhanced involvement of online learners (Botelho et al., 2019). The need to rethink learning was demonstrated through developing and delivering conventional online ethics courses, which encouraged online learners to build confidence by engaging them in a proactive and interactive online experience (Barak & Green, 2020). Public interest in online learning is growing, while educational institutions' interest in online learning is declining. Changing the adverse impact of online learning requires a suitable online learning environment (Kamali & Kianmehr, 2015). Satisfaction with online learning is measured by the number of class participants, involvement in homework, completion rates, and improvement in grades (Schwartz et al., 2020). A malfunctioning system, video failure, or unusable equipment affects user satisfaction (Anifowoshe et al., 2020). From a user and design perspective, visual content is essential to improve user engagement and interaction (Angelova, 2020). Satisfaction with online learning was analysed based on technology acceptance by 172 online learners. The findings suggested that online learners' user satisfaction was primarily determined by the user's perception of the course value and quality, the quality of the platform and service, and expected achievements (Bhat, 2019). Student satisfaction is affected by differences in technology, faculty and student personality traits, and course characteristic features (Duraku & Hoxha, 2020). MOOCs can develop instructors' careers, improve teaching skills, and allow instructors to view and analyse their teaching from a broader perspective (Hebebci et al., 2020). Social media contributes to the development of MOOCs (Joshi, 2017). Available literature (Karki, 2019; Mackness et al., 2020) suggests that student autonomy plays a vital role in learning through empirical MOOC research. Exploratory and confirmatory factor analysis made it possible to conclude that game is seen as a

motivating factor in the learning process that can promote greater student engagement in learning (Parra-Gonzalez & Segura-Robles, 2019).

Available literature reports various effects of interrupted education due to COVID-19. In addition to assessing each case by country, the major issues that emerged from the interruption of education during COVID-19 were highlighted, such as inequality and the digital divide, the need for alternative assessment methods, the necessary transition to formative assessments synchronous and asynchronous means, and the use of online proctoring services as a way to control fraud and academic dishonesty (Bozkurt et al., 2020; Hjelsvold et al., 2020).

Four nationwide surveys in China were conducted in May 2020 to evaluate online education practices implemented at Chinese universities and higher education institutions to determine a comprehensive vision for the future of online education in Chinese universities. The findings suggested that the majority of educational administrators felt positive about online learning in higher education. Based on the recommendations of these nationwide surveys, the Chinese government has decided to integrate face-to-face distance education with online learning into all future higher education plans (Shahzad et al., 2021).

Methodology

Research sample, data collection and processing

A total of 200 instructors and 316 students from a Chinese university were randomly selected as the sample for the study. Selected participants were emailed or sent via Facebook Messenger a link to a questionnaire that included close-ended and open-ended questions prepared in Google Forms. However, only 400 participants answered the questions. Therefore, the actual sample size was 280 persons, including 160 instructors and 240 students in two groups (face-to-face and online learning groups with the same number of participants, 120 in each group). Some of the participants who submitted responses were weeded out by random selection in order to form two groups of the same size for the convenience of statistical studies. The survey was conducted in June 2020.

Based on the size of the general sample, i.e. the total number of students at the university of the given course, the allowable sampling error does not exceed $p = .41$, which indicates the representativeness of the sample within the specified limits.

This online survey examined instructors' and students' perceptions of online learning in terms of quality, benefits, challenges, and strategies during and after the COVID-19 pandemic in China's higher education system. Data were collected using three sets of close-ended questionnaires and one set of open-ended questionnaires.

The questionnaire was created based on the analysis of a significant amount of research literature and the identification of several important factors that can largely determine the attitude of teachers and students toward the transition processes to online learning. The questionnaire was not previously used or published and was created for the purposes of this study. To test the validity of the questionnaire, participants

were asked to rate, for each question on the questionnaire, on a 5-point Likert scale, how this question corresponded to their assessment of what factors are significant to them in terms of quality, benefits and challenges of online learning. None of the questionnaire items scored below 3.11 points, which is significantly higher than the median; the average score for the entire questionnaire is 4.23 points from 5 points. Thus, the validity can be considered sufficient for the purposes of the study. The Cronbach Alpha method was used to assess reliability, which was applied according to the results of this assessment on the Likert scale. On the scale, 1 point corresponded to the assessment "the factor does not correspond to my ideas," and 5 points meant "the factor fully corresponds to my ideas." Cronbach $\alpha = .711$, which allows us to evaluate the internal consistency as relatively high.

Women comprised 43 % of the study participants, and men comprised 57 % of the study participants. The percentage of women was approximately the same in both samples (44 % of women in the face-to-face sample and 39 % in the online sample). The grade point average amounted to 3.15 points for all participants and was nearly identical for both samples (3.41 and 3.02 for the face-to-face and online samples, respectively). All participants were second-year students who completed an average of approximately 42 and 45 credit hours for the face-to-face and online samples, respectively. Participants' ages were nearly identical in both samples. Table 1 shows sample demographics and independent variables separated by learning arrangements.

Table 1
A sample of demographic and independent variables separated by learning arrangements

Variable	Face to face	Online	Total
Number of students	120	120	240
Gender (female)	.44	.39	.43
Grade point average	3.41	3.02	3.15
Credit hours	42.54	45.11	44.25
Age	19.48	20.00	19.98

The main question of this study is whether there was a difference in students' academic achievements between face-to-face and online learning for the same course taught for two consecutive semesters at the same university. To investigate this, a T-test was first made to calculate the mean value, standard deviation, and difference.

Research design

A hybrid research method combining quantitative and qualitative tools was used in this paper. Scores were compared between two modes of instruction for the same *Introduction to Economics* course taught to second-year business school students at a private university in China: face-to-face mode in spring (February–June 2019) and online mode in spring (February–June 2020) during COVID-19. 2019 and 2020 courses with the same specifications and intended learning outcomes have the same curriculum, learning resources, item bank, number of tests and assignments, student assessment methods and schedule, and score weighting.

Students' progress was determined by their grades in the *Introduction to Economics* course. The calculation of course grades was identical in face-to-face and online modes. The total score for the course is 100 points, which is the sum of students grades on the final exam (40 points) plus the term paper (60 points). The term paper is the sum of three tests (each test is graded 10 points; four tests were taken in the face-to-face and online course, and the top three grades were obtained) plus three grades (10 points each).

The Students' T-test was used to test whether there was a statistically significant difference in the distribution of scores between two groups of students. Scores of 90, 85, 80, 75, 70, 65, 60, 55, 53 and 50 refer to grades A, A-, B+, B, B-, C+, C-, D+, and D, respectively. A grade below 50 is considered unsatisfactory, and according to university regulations, a student may withdraw from a course after their term paper is graded, which is usually announced two weeks before the final exam.

The data in this study were collected and stored in a Google form database, evaluated and analysed after responses from all respondents were received. After all responses were collected, the data were analysed using a statistical tool, followed by descriptive statistics, and then the results were interpreted in a discussion.

Statistical processing

All averaged survey findings and the objective knowledge evaluation results (received through questionnaires) were analysed to determine the standard deviation in the study group. The Students' T-test was also conducted to determine gender-related differences in academic achievement among online and face-to-face learners. The Students' T-test had a statistical significance of $p = .05$.

Research instruments

Statistics were processed and visualised in Microsoft Excel 2017.

Ethical issues

The purpose, procedure and goals of the study were explained to the respondents as much as possible. Therefore, their involvement was entirely voluntary. Among those who agreed to participate in the experiment, a limited number of individuals who met the sample statistical homogeneity requirements were selected. No personal data of the involved individuals were collected, processed, or stored during or after the study. Each participant had own unique email address with a unique identification number—this guaranteed complete anonymity and, yet, the reliability of the results.

Research limitation

This is the representative sample of individual institutions only. The study was conducted in one major city in China, while the level of education, its quality and other socio-economic factors vary significantly by region and may also differ from similar figures obtained in other countries. It was impossible to engage all faculty and students in this study due to its time constraints and scope. In this context, it was important to

ensure that the sample was representative. Although this study produced a number of statistically significant results, some caution should be exercised when interpreting and summarising the results. In fact, online learning can vary from context to context in terms of specific technological and pedagogical strategies and phenomena.

Results

Online learners' preferences

In order to explore the benefits of online learning in higher education institutions in China, respondents were asked a question with 15 possible answers where they were allowed to choose more than one subject. Figure 1 shows participants' responses regarding the benefits of online learning at higher education institutions in China.

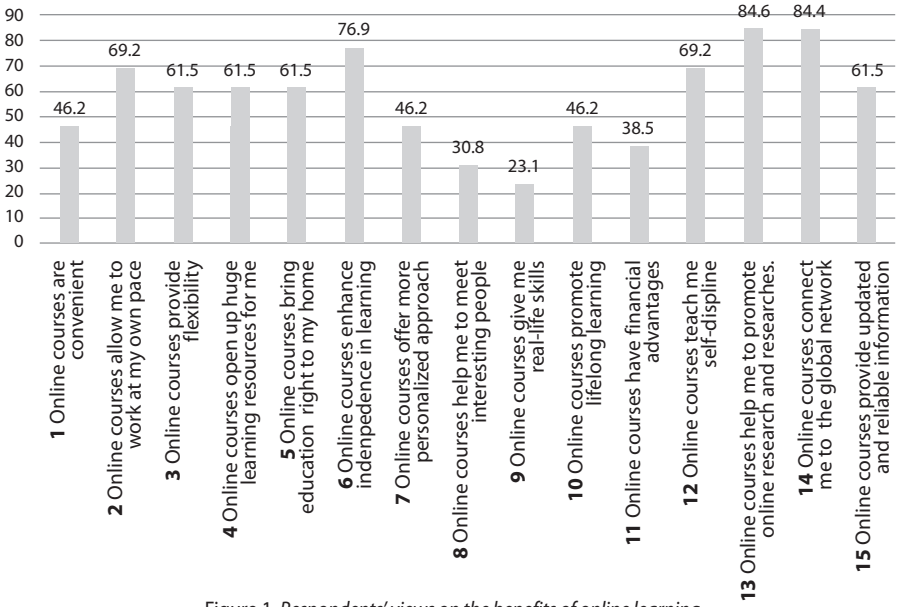

Figure 1. *Respondents' views on the benefits of online learning*

On top of that, Figure 1 shows that many respondents found online learning useful, even if it was their first experience teaching and learning online courses developed because of COVID-19.

Challenges in online learning

A set of questionnaires was provided to examine online learners' attitudes toward the challenges they faced. The questionnaireincluded a single question with 15 possible answers, where respondents were free to choose more than one answer. Figure 2 shows participants' experiences with the challenges of teaching and learning online courses in higher education institutions in China.

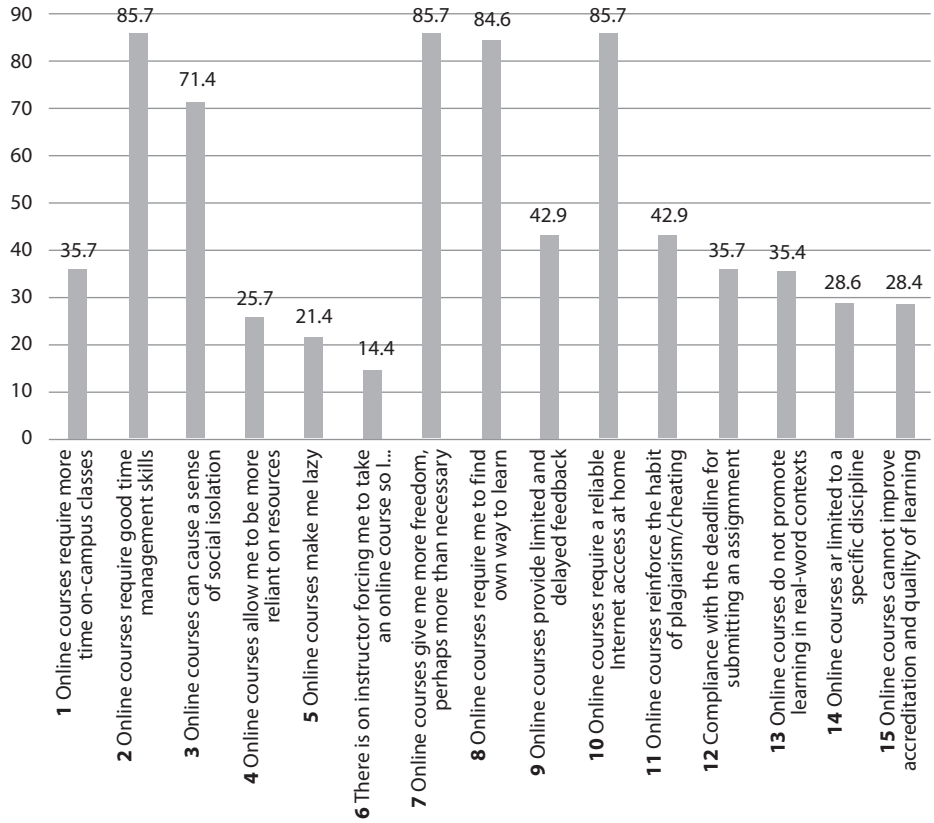

Figure 2. Problems encountered in online learning

Figure 2 shows that time management skills, more freedom for instructors and students, and reliable Internet at home are the extreme challenges most participants encountered in online courses. The findings suggest that time management for online courses, access to a reliable online service, and greater freedom given to participants are accelerating tasks in online learning, while the instructor forcing them to complete assignments is a less important parameter in online courses.

Online learners' qualities

In order to explore the personality traits required for effective online teaching and learning from the online learners' and instructors' perspectives, participants were asked a question with ten possible answers and were allowed to choose more than one answer. Figure 3 shows respondents' responses regarding the required personality traits for online learning at Chinese institutions of higher education.

Figure 3 shows that most of the respondents believe that computer literacy, technology, and time management skills are the most necessary human qualities for effective and successful online learning.

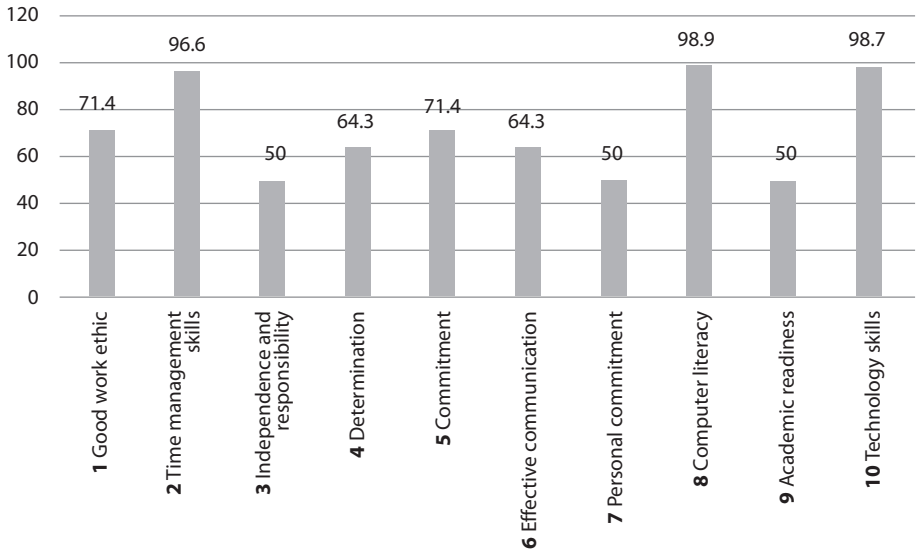

Figure 3. Personality traits required for online learners

Course assessment

Table 2 presents the findings of a survey designed to identify student performance before and during COVID-19. This table compares the mean and standard deviation of course grades for different learning arrangements. There was no significant difference in the overall grade or the tests, term paper, and final exam grades. The grade point averages for both modes were similar. Furthermore, both groups had somewhat similar standard deviations.

Table 2
Comparison of grades for the Introduction to Economics course

Evaluation parameters	Face to face		Online		Differential t-test			
	Mean	Standard deviation	Mean	Standard deviation	Value	Significance	*t* stat.	*p*-value
Tests	26.12	4.81	25.12	5.27	1.00	1.44	3.18	.21
Term paper	25.67	4.35	25.00	4.75	.55	1.16	4.08	.09
Final exam	26.01	12.14	25.12	12.655	.66	.26	2.99	.11
Overall grade	87.81	17.35	85.37	19.34	2.33	.74	3.34	.07

Online learners had a slightly higher percentage of A and B grades compared to face-to-face learners. On the other hand, face-to-face learners had a slightly higher percentage of C and D grades, with a not significantly higher success rate. Hence, no statistically significant difference was found between the two groups in terms of the distribution of scores.

Table 3 shows the distribution of scores for both the face-to-face and online modes.

Table 3
Distribution of total grades for the semester (part 1)

Class	Success (per grades, %)									
	A	A-	B+	B	B-	C+	C	C-	D+	D
Face to face	12.72	7.51	13.01	10.98	10.98	13.58	8.96	9.24	2.89	2.89
Online	13.58	8.32	14.21	12.09	9.03	14.98	8.89	4.51	2.04	2.95

Distribution of total grades for the semester (part 2)

Class	Success (total, %)	Failure (%)
Face to face	92.76	7.24
Online	90	10

Table 3 shows that students with higher grade point averages do better in online courses, while students with low grade point averages do worse in online courses compared to face-to-face mode. This result was expected because online learning during COVID-19-induced quarantine deprived students with low grade point averages of the support and mentoring facilities provided by the university. Hence, no statistically significant difference was found in the effect of the four independent variables on achievement in the two groups of students.

Discussion

This finding corroborates many previous studies conducted in 2019 prior to the pandemic, suggesting there are no differences in students' academic achievements between online and face-to-face courses (Botelho et al., 2019; Chapman et al., 2016; Expósito López et al., 2020; Thor et al., 2017). Although the unplanned and rapid transition to online learning during the pandemic was expected to result in a poor learning experience (Chen et al., 2020), current research suggests that despite the lack of infrastructure and practices in online learning, students' academic achievements were not affected.

Survey findings about online courses useful for promoting online research, connecting practitioners to the global community, and gaining tremendous knowledge are supported by Serhan (2020) and Finch and Jacobs (2012), who argue that online learning reduces travel time and costs and improves collaborations. The respondents' assessment of online learning flexibility in terms of time and space is confirmed by Shrestha (2018), who argues that online learning can give students and instructors the flexibility to access courses at their convenience, allowing them to adjust courses and content. In this sense, online learning meets the needs of an ever-growing number of students who cannot or choose not to attend traditional classes. Many adult learners can enjoy the flexibility of balancing work, school, and family obligations. The wide range of various technological innovations used by universities' online programs

can improve interaction between students and faculty, as well as between students in general (Anifowoshe et al., 2020). On top of that, anonymity may allow more online learners and persons who cannot attend face-to-face classes because of their personal circumstances to learn online without seeing each other. Finally, upgraded technology and software can allow faculty, students and university administrators to collect data, feedback and evaluations regarding their online experience.

Similar to the findings of the study, Kebritchi et al. (2017) argue that time management is a serious problem in online education. Bhusal and Rimal (2020) suggest that many university faculty and students do not have adequate Internet access, which supports the conclusions of this study. These findings are also consistent with those of Angelova (2020), who found that the lack of interaction and communication (that leads students to isolation, problems with exams, traditional study habits, tasks and time management) is a problem that online learners face. More than 70 % of respondents felt that online classes cause social isolation, which contrasts with Duraku and Hoxha (2020), who argue that online learning positively impacts individuals by providing support to more easily overcome periods of isolation. If online learning is based on the education quality drivers, its implementation can have positive long-term effects, as evidenced by previous studies arguing that instruction quality affects student wellbeing (Gjoshi & Kume, 2014). The findings suggest that perfect online learning resorts to online tutorials and learning activities in an interactive manner, harnessing online learning strengths to build positive attitudes among students and supporting various learning experiences (Meylani et al., 2015).

The demand for online courses is driven by the desire to provide quality education to all students, regardless of location or time (Unger & Meiran, 2020). Online learning is perceived as a hope for authentic resources and global communication. The study results align with studies that argue that face-to-face learning meets the needs of learners with specific preferences, while online learning can provide better autonomy in learning (Akyildiz, 2020). Specific ICT policies in education help institutions, instructors, and students manage their digital tools, resources and security, improving the quality of online learning. The growing number of online courses and programs is creating a need for more research in this area (Paul & Jefferson, 2019).

Conclusion

This paper focused on the views of 160 faculty and 240 students regarding online learning in terms of quality, benefits, challenges and strategies during and after the COVID-19 pandemic in China's higher education system. Comparisons of grades in the *Introduction to Economics* course and student and faculty feedback were reviewed to gain insight into the overall learning experience. There is no significant difference in the quality of face-to-face and online learning obtained by comparing the grades of these courses. The research suggested that online learning benefited 84.6 % of students, even though it was their first experience with online-only courses. They found that

online learning was very helpful in promoting online research (84.4 %), connecting practitioners to a global community, gaining the vast and reliable knowledge needed for professional and academic endeavours, and making them self-disciplined (69.2 %).

When it comes to the transition (due to the COVID-19-induced lockdown) from traditional teaching and learning to online education, participants reported the following important issues: time management skills, reliable Internet access (85.7 %), student autonomy in finding their own learning pathway and greater freedom in terms of time and space (84.6 %), social isolation (71.4 %), delayed feedback (42.9 %), plagiarism (42.9 %). Online learning and its success depend on the participants and their human qualities. The research suggests that time management skills, technology skills and computer literacy (96.6 %), a good work ethic (71.4 %), effective communication and focused learning (64.3 %), academic readiness, personal commitment (64.3 %), independence and responsibility (50 %) are the online learners' main human qualities.

The paper also showcases participants' willingness to take online courses (98.7 %) because of updated and authentic resources that they can learn in their own ways. However, their doubts about the online learners' age (75 %) open opportunities for further research on the mode and methods of online learning in the Chinese context. This study provides feedback for instructors and students on the online learners' desirable qualities, as well as for policymakers, curriculum developers and textbook authors to develop appropriate ICT policies, ICT-centered curricula and courses appropriate in the Chinese context even after COVID-19. Further research might focus on the quality of face-to-face and online learning during and after COVID-19 in different countries.

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Prijelaz s učenja licem u lice na online učenje tijekom pandemije COVID-19: promjene na sveučilištima u Kini

Sažetak

Cilj je ovoga članka je procijeniti mišljenja nastavnika i studenata o kvaliteti, prednostima i izazovima online učenja, kao i prijelaz s nastave licem u lice tijekom i nakon pandemije bolesti COVID-19 na kineskim sveučilištima. Rad se oslanjao na kvantitativnu studiju koja uključuje internetsku anketu metodom slučajnoga uzorkovanja provedenu u lipnju 2020. Veličina je uzorka 400 ispitanika, uključujući 160 nastavnika i 240 studenata s jednoga sveučilišta u Kini. Rezultati koje su dobili studenti koji su pohađali kolegij „Uvod u ekonomiju" licem u lice i studenti koji su isti kolegij pohađali putem interneta tijekom karantene uspoređeni su s T-testom studenata. Nije bilo značajne razlike ni u ukupnoj ocjeni niti u ocjenama na testovima, seminarskim radovima i završnim ispitima. Vještine upravljanja vremenom, veća sloboda za nastavnike i studente i pouzdan pristup internetu kod kuće bili su iznimno zahtjevni izazovi s kojima se suočavala većina polaznika internetskih kolegija. Rezultati istraživanja mogu se primijeniti u daljnjim istraživanjima koja se bave kvalitetom, izazovima, perspektivama i strategijama online obrazovanja, transformacijom akademskih programa i obukom predavača kako bi se olakšao prijelaz na online učenje. Buduća istraživanja mogla bi se provesti u drugim zemljama kako bi se dobilo više usporednih podataka.

Ključne riječi: *pandemija; COVID-19; obrazovanje na daljinu; učenje licem u lice; online učenje; kvaliteta obrazovanja.*

Uvod

Već je 2019. godine, prije izbijanja bolesti COVID-19, zabilježen visok rast i usvajanje obrazovne tehnologije, a procjenjuje se da će globalna ulaganja od 18,66 milijardi USD u 2019. doseći 350 milijardi USD do 2025. (Nusser, 2021). Sustavi upravljanja učenjem sada su uobičajeni u visokoškolskim ustanovama i za redovne i za izvanredne studente. U 2015. godini *online* upis rastao je izuzetno brzim tempom od preko 30 % godišnje, a u 2019. godini broj studenata koji pohađaju barem jedan *online* kolegij porastao je na 34,7 % ukupnoga broja upisanih u svijetu (Serhan, 2020). Početkom 2020. godine, COVID-19 dovodi do karantene, škole i sveučilišta širom svijeta zatvaraju svoja vrata,

zbog čega oko 1,2 milijarde učenika napušta učionice. To je dovelo do značajnoga rasta *online* učenja (Unger & Meiran, 2020).

Mrežni sustavi učenja distribuiraju tečajeve, prate ih i upravljaju njima putem interneta. To uključuje korištenje tehnoloških dostignuća za usmjeravanje, razvoj i isporuku sadržaja za učenje te olakšavanje dvosmjerne komunikacije između učenika i nastavnika (Komani i Chisomo, 2019). Sadrže značajke poput oglasnih ploča, *brbljaonica*, anketa, kvizova, foruma za raspravu i upitnika koji nastavnicima i studentima omogućuju internetsku komunikaciju i dijeljenje sadržaja kolegija. Nude produktivne i pogodne načine za postizanje ciljeva učenja. Obrazovne institucije širom svijeta rabe Microsoft Teams, Google Meet, Edmodo i Moodle kao sustave za upravljanje učenjem, uz aplikacije za videokonferencije. Ostala široko korištena rješenja za videokonferencije uključuju Zoom, Skype for Business, WebEx, Adobe Connect itd. (Hebebci i sur., 2020).

Kao odgovor na pandemiju, internetska učionica postala je neophodna za održavanje redovitoga procesa učenja. Programi za sastanke, kao što su Ding Ding i Fanya, u Kini pružaju usluge *online* nastave i *online* obuke. Međutim, ove mrežne platforme za učenje imaju problema, poput kvarova sustava i nedostatka značajki prijenosa uživo (Schwartz i sur., 2020).

Dosad je provedeno mnogo istraživanja o tome kako se sveučilišta širom svijeta nose s pandemijom COVID-19 i kako se trenutačno pripremaju za nadolazeći semestar (DAAD, 2020a). Takva je analiza, međutim, potrebna kako bi se pružila podrška visokoškolskim ustanovama u prevladavanju karantene. Informacije o koracima koje su poduzela druga sveučilišta, kao i pregled drugih zemalja i njihovih sveučilišta, mogu se pokazati korisnima. Već su objavljene mnoge analize i predviđanja o mogućem utjecaju koji je COVID-19 mogao imati na fakultetsko obrazovanje. Educations.com i StudyPortals (2020) trenutačno provode tri međunarodna istraživanja sveučilišnog osoblja, studenata i budućih studenata o utjecaju pandemije COVID-19 na njihove planove usavršavanja ili mobilnosti (DAAD, 2020b). Rezultati ovih anketa predstavljeni su u obliku razgovora i blogova. O ovom je fenomenu objavljeno vrlo malo empirijskih studija. Dostupna literatura koja se bavi utjecajem internetskoga učenja (tijekom izolacijskoga perioda pandemije COVID-19) na akademsku praksu u visokom obrazovanju još se uvijek razvija. Osim toga, malo radova uspoređuje uspješnost *online* studenata tijekom izolacije s kolegijima održavanim licem u lice prethodnih semestara.

Većina radova koji uspoređuju programe licem u lice i na daljinu objavljeni su u visokoškolskim ustanovama razvijenih zemalja, gdje su infrastruktura informacijske tehnologije, resursi i podrška dostupni i pouzdani. Postoji ozbiljan nedostatak sličnih komparativnih studija u zemljama u razvoju, gdje su slaba informatička infrastruktura, nedostatak financijskih sredstava i tehničke podrške te skromne informatičke vještine nastavnika i studenata glavni izazovi za implementaciju *online* nastave (Chan i sur., 2015; Komani i Chisomo, 2019; UNESCO, 2020).

Ova studija ispitala je cjelokupno iskustvo učenja nakon naglog prelaska s nastave licem u lice na *online* učenje zbog pandemijom izazvane karantene na jednom sveučilištu u Kini. Studijom se procijenilo razlike u postignućima studenata i prikupila povratne

informacije profesora i studenata. Studija pruža jasan uvid u učinke prekida učenja licem u lice zbog pandemije. Osim toga, preporuke temeljene na rezultatima istraživanja mogu pomoći u poboljšanju situacije i pomoći administratorima obrazovnih ustanova, profesorima i programerima obrazovnih platformi da integriraju *online* učenje u planove svojih institucija.

Pregled literature

Usporedne studije internetskoga učenja i učenja licem u lice

Mnoga su istraživanja prije pandemije uspoređivala nastavu licem u lice s internetskim kolegijima u smislu postignuća sveučilišnih studenata, kao i drugih akademskih i demografskih varijabli. Na primjer, studenti prve godine fakulteta Griffith Business School u Australiji imaju priliku pohađati isti kolegij statistike licem u lice ili putem interneta. Usporedna analiza nije otkrila značajne razlike u zadovoljstvu učenjem i akademskim postignućima između dviju skupina u mješovitom pristupu (Soesmanto i Bonner, 2019). U sličnoj studiji provedenoj na Kalifornijskom državnom sveučilištu, uz odgovarajuću obuku i tehnološku podršku, sveučilišni profesori provode segmente kolegija poslovne tehnologije licem u lice i na internetu s jednakom učinkovitošću mjerenom ocjenama studenata (Tan i sur., 2019).

Za drugu vrstu kolegija, kao što su kolegiji radiologije koji se poučavaju *online* na jednom australskom sveučilištu, studija je dovela do sličnih akademskih postignuća kao i kod nastave licem u lice (Lorenzo-Alvarez i sur., 2019). Ishodi učenja *online* i učenja licem u lice analizirani su usporedbom ocjena *online* studenata i studenata koji su pohađali nastavu licem u lice na Sveučilištu Ohio, koristeći veliki skup podataka od 5000 kolegija koje je predavalo više od 100 profesora tijekom deset akademskih semestara. S obzirom na velik raspon istraživanja, nalazi sugeriraju da nema razlike u postignućima učenika na internetskim kolegijima i predavanjima licem u lice. Prema regresijskoj analizi, prosjek ocjena studenata imao je glavni utjecaj na ocjene dobivene na određenim kolegijima. Studenti s višim prosjekom ocjena pokazali su se uspješnijima na internetskim kolegijima, dok su studenti s nižim prosjekom ocjena lošije prolazili na internetskim kolegijima u usporedbi s kolegijima izvođenim licem u lice (Cavanaugh i Jacquemin, 2015).

Na Sveučilištu Chapman u Kaliforniji istraženi su učinkoviti načini za brzo provođenje internetskoga predavanja na kolegiju koji se inače izvodi tradicionalnim predavanjem licem u lice. U studiji su uspoređivani ishodi učenja studenata (koristeći rezultate testova) u tri načina predavanja:

- tradicionalno predavanje licem u lice
- *online* učenje pomoću videozapisa predavanja snimljenoga u učionici tijekom nastave licem u lice
- *online* učenje pri čemu je predavanje održao profesor u učionici.

Predavanje je održano pomoću statičkoga dokumenta stvorenoga iz uređenoga transkripta predavanja u učionici, dopunjenoga dijagramima, grafikonima itd. Rezultati

su pokazali da brzo razvijene metode *online* učenja pokazuju manje angažmana od tradicionalnih predavanja licem u lice. Studenti koji su slušali *online* predavanje održano pomoću statičnoga dokumenta i studenti koji su nazočili predavanju licem u lice izvijestili su o boljoj kvaliteti bilješki u usporedbi sa studentima koji su gledali snimljeni video. Konačno, utjecaj različitih nastavnih resursa i sadržaja kolegija na rezultate testova studenata ovisio je o angažmanu studenata i percipiranoj kvaliteti bilješki (Nyer, 2019). Privatne srednje škole u Hajber Pahtunvi (Pakistan) ocjenjivale su internetsko obrazovanje u smislu kvalitete upravljanja, kurikula, opreme, nastavnih metoda i izvannastavnih aktivnosti (Rahman i Aajiz, 2019.).

Procjena kvalitete masovnih otvorenih *online* kolegija (Massive Open Online Courses, MOOC) uključuje četiri važne dimenzije - upise, sudjelovanje, kvalitetu i postignuća studenata te stvara sustav koji pomaže MOOC organizacijama da poduzmu mjere praćenja i poboljšanja (Chapman i sur., 2016). Poboljšanja u *online* učenju zahtijevaju veći angažman *online* učenika (Botelho i sur., 2019). Potreba za preispitivanjem procesa učenja dokazana je osmišljavanjem i provođenjem tradicionalnih *online* kolegija iz područja etike koji su poticali *online* studente da izgrade samopouzdanje uključivanjem u aktivno i interaktivno internetsko iskustvo (Barak i Green, 2020). Javni interes za *online* učenje raste, a interes obrazovnih institucija za *online* učenje opada. Za promjenu negativnoga utjecaja *online* učenja potrebno je odgovarajuće okružje za *online* učenje (Kamali i Kianmehr, 2015). Zadovoljstvo *online* učenjem mjeri se brojem polaznika nastave, angažmanom u domaćim zadaćama, stopom završetka te poboljšanjem ocjena (Schwartz i sur., 2020). Neispravan sustav, kvar video signala ili neupotrebljiva oprema utječu na zadovoljstvo korisnika (Anifowoshe i sur., 2020). Iz perspektive korisnika i dizajna, vizualni sadržaj je neophodan za poboljšanje angažmana korisnika i interakcije s njima (Angelova, 2020). Zadovoljstvo *online* učenjem analizirano je na temelju usvajanja tehnologije od strane 172 *online* studenata. Dobiveni rezultati pokazali su da je zadovoljstvo korisnika *online* učenja prvenstveno određeno percepcijom korisnika o vrijednosti i kvaliteti kolegija, kvaliteti platforme i usluge te očekivanim postignućima (Bhat, 2019). Na zadovoljstvo učenika utječu razlike u tehnologiji, osobine ličnosti nastavnika i studenata te karakteristične značajke tečaja (Duraku i Hoxha, 2020). Masivni otvoreni *online* kolegiji mogu potaknuti razvoj karijere nastavnika, poboljšati nastavne vještine i omogućiti nastavnicima da sagledaju i analiziraju svoje poučavanje iz šire perspektive (Hebebci i sur., 2020). Društvene mreže doprinose razvoju masovnih otvorenih *online* kolegija (Joshi, 2017). Dostupna literatura (Karki, 2019; Mackness i sur., 2020) sugerira da autonomija studenata igra vitalnu ulogu u učenju kroz empirijsko istraživanje masivnih otvorenih *online* kolegija. Istraživačka i potvrdna faktorska analiza dovela je do zaključka da se igra smatra motivirajućim čimbenikom u procesu učenja koji može potaknuti veći angažman studenata u procesu učenja (Parra-Gonzalez i Segura-Robles, 2019).

Dostupna literatura izvijestila je o različitim učincima prekida obrazovanja zbog COVID-19 pandemije. Uz evaluaciju svakog slučaja po državama, istaknuti su glavni

problemi koji su proizašli iz prekida obuke tijekom COVID-19 pandemije, poput nejednakosti i digitalne podjele, potrebe za alternativnim metodama ocjenjivanja, nužnoga prelaska na sinkrona i asinkrona sredstva formativnoga ocjenjivanja i korištenja internetskih usluga nadzora i kontrole kao načina borbe protiv prijevara i akademskoga nepoštenja (Bozkurt i sur., 2020; Hjelsvold i sur., 2020).

U Kini su tijekom svibnja 2020. provedena četiri nacionalna istraživanja kako bi se procijenila praksa internetskoga obrazovanja koja se provodi na kineskim sveučilištima i visokoškolskim ustanovama kako bi se utvrdila sveobuhvatna vizija budućnosti internetskoga obrazovanja na kineskim sveučilištima. Nalazi sugeriraju da većina obrazovnih administratora ima pozitivan stav prema *online* učenju u visokoškolskim ustanovama. Na temelju preporuka ovih anketa u cijeloj zemlji, kineska vlada odlučila je integrirati obrazovanje na daljinu licem u lice s *online* učenjem u sve buduće planove visokoga obrazovanja (Shahzad i sur., 2021).

Metodologija

Istraživački uzorak, prikupljanje i obrada podataka

Ukupno 200 nastavnika i 316 studenata s kineskoga sveučilišta nasumično je odabrano kao uzorak za studiju. Odabranim sudionicima poslana je Facebook Messengerom ili e-pismom poveznica na upitnik koji je uključivao zatvorena i otvorena pitanja pripremljena u alatu Google Forms. Međutim, samo je 400 sudionika odgovorilo na pitanja. Stoga je stvarna veličina uzorka bila 280, uključujući 160 nastavnika i 240 učenika u dvije skupine (licem u lice i *online* studijske skupine s istim brojem sudionika, po 120 u svakoj skupini). Neki od sudionika koji su poslali odgovore uklonjeni su slučajnim odabirom kako bi se formirale dvije skupine slične veličine radi praktičnosti statističkih studija. Istraživanje je provedeno u lipnju 2020. godine.

Na temelju veličine ukupnoga uzorka, odnosno ukupnoga broja studenata određenoga kolegija na sveučilištu, dopuštena pogreška uzorka ne prelazi $p = 0{,}41$, što ukazuje na reprezentativnost uzorka unutar navedenih granica.

Ovim internetskim istraživanjem ispitala se percepcija nastavnika i studenata o *online* učenju u smislu kvalitete, koristi, izazova i strategija tijekom i nakon COVID-19 pandemije u kineskom sustavu visokoga obrazovanja. Podatci su prikupljeni pomoću tri skupa zatvorenih upitnika i jednoga skupa otvorenih upitnika.

Upitnik je stvoren na osnovi analize značajnog broja istraživačke literature i identificiranjem nekoliko važnih čimbenika koji u velikoj mjeri mogu odrediti stavove nastavnika i učenika prema procesima prijelaza na *online* učenje. Upitnik prethodno nije korišten ni objavljen i stvoren je u svrhu provođenja ove studije. Kako bi se provjerila valjanost upitnika, sudionici su zamoljeni da za svako pitanje upitnika na Likertovoj ljestvici od 5 bodova ocijene koliko je to pitanje u skladu s njihovom procjenom koji su im čimbenici značajni u pogledu kvalitete, koristi i izazova *online* učenja. Nijedna stavka upitnika nije postigla manje od 3,11 boda, što je znatno više od medijana; prosječna ocjena na cijelom upitniku je 4,23 boda od 5 mogućih. Stoga se valjanost može smatrati dovoljnom za potrebe istraživanja. Za procjenu pouzdanosti korištena

je Cronbachova Alfa metoda, koja je primijenjena u skladu s rezultatima ove ocjene na Likertovoj ljestvici. Na ljestvici je 1 bod odgovarao ocjeni „faktor ne odgovara mojim idejama", a 5 bodova značilo je „faktor u potpunosti odgovara mojim idejama". Cronbachova $\alpha = 0{,}711$, što nam omogućuje da unutarnju dosljednost procijenimo kao relativno visoku.

Žene su činile 43 % sudionika istraživanja, a muškarci 57 % sudionika istraživanja. Postotak žena bio je približno jednak u oba uzorka (44 % žena u uzorku licem u lice i 39 % u mrežnom uzorku). Prosječna ocjena bila je 3,15 bodova za sve sudionike i bila je gotovo identična za oba uzorka (3,41 za uzorke nastave licem u lice i 3,02 za *online* uzorke). Svi sudionici bili su studenti druge godine koji su u prosjeku odradili oko 42, odnosno 45 priznatih sati za uzorke nastave licem u lice odnosno za uzorke *online* nastave. Dob sudionika bila je gotovo slična u oba uzorka. Tablica 1 prikazuje demografske podatke uzorka i neovisne varijable odvojene prema oblicima učenja.

Tablica 1

Glavno pitanje ovoga istraživanja bilo je postoji li razlika u akademskim postignućima studenata između onih koji su pohađali nastavu licem u lice i onih koji su pohađali *online* nastavu na istom kolegiju koji se predaje dva uzastopna semestra na istom sveučilištu. Da bi se to istražilo, prvo je proveden T-test za izračunavanje srednje vrijednosti, standardne devijacije i razlike.

Dizajn istraživanja

U ovom radu korištena je hibridna metoda istraživanja koja kombinira kvantitativne i kvalitativne alate. Uspoređene su ocjene nakon dva oblika nastave na kolegiju Uvod u ekonomiju koji pohađaju studenti druge godine studija ekonomije na privatnom sveučilištu u Kini: oblika licem u lice održanoga od veljače do lipnja 2019. godine i *online* oblika održanoga od veljače do lipnja 2020. godine tijekom COVID-19 pandemije. Kolegiji iz 2019. i 2020. imaju iste specifikacije i predviđene ishode učenja, isti kurikul, resurse za učenje, repozitorije ispitnih pitanja, broj testova i zadataka, metode i raspored ocjenjivanja studenata te ponderiranje bodova.

Uspjeh studenata određen je njihovim ocjenama na kolegiju Uvod u ekonomiju. Izračun ocjena za kolegij bio je identičan u obliku licem u lice i u *online* obliku. Ukupna ocjena za kolegij je 100 bodova, što je zbroj studentskih ocjena na završnom ispitu (40 bodova) plus seminarski rad (60 bodova). Seminarski rad je zbroj tri testa (svaki test je ocijenjen s 10 bodova; četiri testa su položena licem u lice i *online* te su postignute tri najbolje ocjene) plus tri ocjene (po 10 bodova).

Studentski T-test korišten je za ispitivanje prisutnosti statistički značajne razlike u raspodjeli rezultata između dvije skupine studenata. Bodovi 90, 85, 80, 75, 70, 65, 60, 55, 53 i 50 pripadaju ocjenama A, A-, B+, B, B-, C+, C, D+ i D. Ocjena ispod 50 bodova smatra se nezadovoljavajućom, a prema sveučilišnim pravilima, student može odustati od kolegija nakon što mu se ocijeni seminarski rad, što se obično najavljuje dva tjedna prije završnoga ispita.

Podatci u ovoj studiji prikupljeni su i pohranjeni u bazi podataka u alatu Google Forms te su procijenjeni i analizirani nakon dobivanja odgovora svih ispitanika. Nakon što su prikupljeni svi odgovori, podatci su analizirani pomoću statističkoga alata, nakon čega je slijedila deskriptivna statistika, a rezultati su zatim interpretirani u raspravi.

Statistička obrada

Svi prosječni rezultati ankete i rezultati objektivne procjene znanja (dobiveni upitnicima) analizirani su kako bi se odredila standardna devijacija u ispitivanoj skupini. Također je proveden T-test studenata kako bi se utvrdile rodne razlike u postignućima među studentima na *online* nastavi i studentima na nastavi licem u lice. Studentski T-test imao je statističku značajnost $p = 0{,}05$.

Istraživački alati

Statistika je obrađena i vizualizirana u programu Microsoft Excel 2017.

Etička pitanja

Ispitanicima je na najdetaljniji mogući način objašnjena svrha, postupak i ciljevi studije. Stoga je njihovo sudjelovanje bilo potpuno dobrovoljno. Među onima koji su pristali sudjelovati u istraživanju, odabran je ograničen broj osoba koje su zadovoljile zahtjeve statističke homogenosti uzorka. Tijekom ili nakon studije nisu prikupljeni, obrađeni ili pohranjeni osobni podatci uključenih osoba. Svaki je sudionik imao svoju jedinstvenu adresu e-pošte s jedinstvenim identifikacijskim brojem, što je jamčilo potpunu anonimnost i valjanost rezultata.

Ograničenja istraživanja

Ovo je samo reprezentativni uzorak pojedinih institucija. Studija je provedena u jednom velikom gradu u Kini, dok se razina obrazovanja, kvaliteta i drugi socioekonomski čimbenici značajno razlikuju ovisno o regiji, a mogu se razlikovati i od sličnih pokazatelja dobivenih u drugim državama. Bilo je nemoguće uključiti sve nastavnike i studente u ovu studiju zbog vremenskih ograničenja i opsega istraživanja. U tom je kontekstu bilo važno osigurati reprezentativnost uzorka. Iako je ova studija dala niz statistički značajnih rezultata, treba biti oprezan pri tumačenju i sažimanju rezultata. Zapravo se *online* učenje može razlikovati od konteksta do konteksta u smislu specifičnih tehnoloških i pedagoških strategija i pojava.

Rezultati

Afiniteti online studenata

Kako bismo ispitali prednosti *online* učenja u kineskim visokoškolskim ustanovama, ispitanicima je postavljeno pitanje s 15 mogućih odgovora u kojem im je bilo dopušteno odabrati više od jedne stavke. Slika 1 prikazuje odgovore sudionika u vezi s prednostima *online* učenja u kineskim visokoškolskim ustanovama.

Slika 1.

Slika 1 također pokazuje da mnogi ispitanici smatraju da je *online* učenje korisno, čak i ako je to bilo njihovo prvo iskustvo u poučavanju i učenju na *online* kolegijima zbog pandemije COVID-19.

Izazovi online učenja

Podijeljeni su upitnici za ispitivanje stavova *online* studenata prema problemima s kojima se suočavaju. Upitnik je uključivao jedno pitanje s 15 mogućih odgovora u kojem su ispitanici mogli slobodno odabrati više od jednoga odgovora. Slika 2 prikazuje iskustva sudionika koji su se suočili s izazovima poučavanja i učenja na *online* kolegijima na visokim učilištima u Kini.

Slika 2

Slika 2 pokazuje da su vještine upravljanja vremenom, veća sloboda za nastavnike i studente i pouzdana internetska veza kod kuće izuzetno zahtjevni i značajni izazovi s kojima se suočavala većina sudionika *online* kolegija. Rezultati sugeriraju da upravljanje vremenom kod *online* kolegija, pristup pouzdanoj internetskoj vezi i veća sloboda polaznika ubrzavaju zadatke u *online* učenju, dok je nastavnik koji ih prisiljava na ispunjavanje i završavanje zadataka manje važan parametar u *online* kolegijima.

Osobine online studenata

Kako bismo ispitali osobine ličnosti potrebne za učinkovito *online* poučavanje iz perspektive *online* studenata i njihovih nastavnika, sudionicima je postavljeno pitanje s deset mogućih odgovora i dopušteno im je odabrati više od jednoga odgovora. Slika 3 prikazuje odgovore ispitanika u vezi s potrebnim osobinama ličnosti za *online* učenje u kineskim visokoškolskim ustanovama.

Slika 3

Slika 3 pokazuje da većina ispitanika smatra da su računalna pismenost, tehnološka znanja i vještine upravljanja vremenom najpotrebnije ljudske osobine za učinkovito i uspješno *online* učenje.

Evaluacija kolegija

Tablica 2 prikazuje rezultate ankete koja je imala za cilj identificirati napredak učenika prije i za vrijeme COVID-19 pandemije. Ova tablica uspoređuje srednju vrijednost i standardno odstupanje ocjena tečaja za različite oblike nastave. Nije bilo značajne razlike ni u ukupnoj ocjeni ni u ocjenama na testovima, seminarskim radovima i završnim ispitima. Prosjeci ocjena u oba oblika nastave bili su slični. Štoviše, obje su skupine imale donekle slična standardna odstupanja.

Tablica 2

Tablica 3 prikazuje raspodjelu rezultata za nastavu licem u lice i za *online* nastavu.

Tablica 3

Online studenti imali su nešto veći postotak ocjena „A" i „B" u usporedbi s onima koji su studirali licem u lice. S druge strane, studenti koji su studirali licem u lice imali su nešto veći postotak ocjena „C" i „D" s neznatno većom stopom uspješnosti. Stoga nije pronađena statistički značajna razlika u raspodjeli rezultata između dviju skupina.

Tablica 3 pokazuje da studenti s višim prosjekom ocjena imaju bolji uspjeh na *online* kolegijima, dok oni s niskim prosjekom ocjena imaju lošiji uspjeh na *online* kolegijima u usporedbi s nastavom licem u lice. Ovaj je rezultat bio očekivan jer je *online* učenje tijekom COVID-19 karantene studente s niskim prosječnim ocjenama lišilo podrške i mentorstva koje je pružalo sveučilište. Stoga nije pronađena statistički značajna razlika u utjecaju četiriju neovisnih varijabli na uspješnost u dvije skupine studenata.

Rasprava

Ovo otkriće potvrđuje mnoga prethodna istraživanja provedena 2019. godine prije pandemije koja sugeriraju da ne postoje razlike u akademskim postignućima učenika između internetskih tečajeva i predavanja licem u lice (Botelho i sur., 2019; Chapman i sur., 2016; Expósito López i sur., 2020; Thor i sur., 2017). Iako se očekivalo da će neplanirani i brzi prijelaz na *online* učenje tijekom pandemije dovesti do lošega iskustva učenja (Chen i sur., 2020), trenutačna istraživanja pokazuju da, unatoč nedostatku infrastrukture i praksi *online* učenja, akademska postignuća učenika nisu bila pogođena.

Rezultate ankete o internetskim tečajevima korisnim za promicanje internetskoga istraživanja, povezivanje praktičara s globalnom zajednicom i stjecanje nevjerojatnoga znanja podržavaju Serhan (2020) i Finch i Jacobs (2012), koji tvrde da *online* učenje smanjuje vrijeme putovanja i troškove te poboljšava suradnju. Procjenu fleksibilnosti *online* učenja koju su dali ispitanici koja se odnosila na vrijeme i prostora potvrđuje Shrestha (2018), koji tvrdi da *online* učenje može studentima i nastavnicima pružiti fleksibilnost pristupa kolegijima u vrijeme koje im odgovara, omogućujući im da prilagode kolegije i sadržaj. U tom smislu, *online* učenje zadovoljava potrebe sve većega broja studenata koji ne mogu ili ne žele pohađati tradicionalnu nastavu. Mnogi odrasli studenti mogu uživati u fleksibilnosti kombinirajući posao, fakultet i obiteljske obveze. Širok raspon različitih tehnoloških inovacija koje koriste internetski sveučilišni programi može poboljšati interakciju između studenata i nastavnika, kao i među studentima općenito (Anifowoshe i sur., 2020). Nadalje, anonimnost može omogućiti da veći broj *online* studenata i pojedinaca, koji zbog svojih osobnih okolnosti ne mogu pohađati nastavu licem u lice, uči putem interneta a da ne vide jedni druge. Naposljetku, nadograđena tehnologija i softver mogu omogućiti nastavnicima, studentima i sveučilišnim administratorima prikupljanje podataka, povratnih informacija i evaluacija u vezi s njihovim *online* iskustvom.

Slično nalazima ove studije, Kebritchi i sur. (2017) tvrde da je upravljanje vremenom glavni problem u internetskom obrazovanju. Bhusal i Rimal (2020) sugeriraju da mnogi fakulteti i studenti nemaju odgovarajući pristup internetu, što podupire zaključke ove studije. Ovi su nalazi također u skladu s nalazima Angelove (2020), koja je otkrila da

je nedostatak interakcije i komunikacije (što dovodi studente do izolacije, problema s ispitima, tradicionalnih navika učenja, zadataka i upravljanja vremenom) problem s kojim se suočavaju *online* studenti. Više od 70 % ispitanika vjeruje da *online* nastava dovodi do socijalne isključenosti, što je u suprotnosti s podatcima istraživanja koje su proveli Duraku i Hoxha (2020), u kojem tvrde da *online* učenje pozitivno utječe na ljude jer pruža podršku koja olakšava prolazak kroz razdoblja izolacije. Ako se *online* učenje temelji na čimbenicima koji određuju kvalitetu obrazovanja, njegova primjena može imati pozitivne dugoročne učinke, što pokazuju prethodna istraživanja koja tvrde da kvaliteta učenja utječe na dobrobit učenika (Gyoshi i Kume, 2014). Rezultati upućuju na to da savršena *online* nastava rabi *online* vodiče i nastavne aktivnosti na interaktivan način, iskorištavajući prednosti *online* učenja kako bi stvorila pozitivne stavove kod studenata i podržala različite vrste učenja (Meylani i sur., 2015).

Potražnja za *online* kolegijima potaknuta je željom za pružanjem kvalitetnoga obrazovanja svim studentima, bez obzira na lokaciju ili vrijeme (Unger i Meiran, 2020). *Online* učenje doživljava se kao nada autentičnim resursima i globalnoj komunikaciji. Rezultati studije u skladu su s istraživanjima koja tvrde da učenje licem u lice zadovoljava potrebe učenika s posebnim afinitetima, dok *online* učenje može pružiti bolju autonomiju u učenju (Akyildiz, 2020). Specifične IKT politike u obrazovanju pomažu institucijama, nastavnicima i studentima da upravljaju svojim digitalnim alatima, resursima i sigurnošću, poboljšavajući kvalitetu *online* učenja. Sve veći broj internetskih tečajeva i programa stvara potrebu za dodatnim istraživanjima u ovom području (Paul i Jefferson, 2019).

Zaključak

U ovom su radu analizirana mišljenja 160 nastavnika i 240 studenata o *online* nastavi s obzirom na kvalitetu, korist, izazove i strategiju tijekom i nakon pandemije bolesti COVID-19 u kineskom sustavu visokoga obrazovanja. Analizirane su usporedbe ocjena na kolegiju Uvod u ekonomiju i povratne informacije studenata i nastavnika kako bi se dobio uvid u cjelokupno iskustvo učenja. Kada se uspoređuju ocjene na ovim kolegijima, nema značajne razlike u kvaliteti nastave kolegija koji se održavao licem u lice i kolegija koji se održavao *online*. Studija je pokazala da je 84,6 % studenata imalo koristi od *online* učenja, iako im je to bilo prvo iskustvo s kolegijima koji se izvode pomoću interneta. Otkriveno je da je *online* učenje vrlo korisno za promicanje *online* istraživanja (84,4 %), povezivanje praktičara s globalnom zajednicom, stjecanje opsežnoga i pouzdanoga znanja potrebnoag za profesionalno i akademsko usavršavanje i povećanje samodiscipline (69,2 %).

Kada je riječ o prijelazu (zbog pandemije bolesti COVID-19) s tradicionalnoga poučavanja na internetsko obrazovanje, sudionici su izvijestili o sljedećim važnim problemima: vještine upravljanja vremenom, pouzdan pristup internetu (85,7 %), autonomija studenata u pronalaženju vlastitoga puta učenja i veća sloboda u smislu vremena i prostora (84,6 %), socijalna izolacija (71,4 %), kašnjenje povratnih informacija

(42,9 %), plagiranje (42,9 %). *Online* učenje i njegov uspjeh ovise o sudionicima i njihovim ljudskim osobinama. Studija sugerira da su vještine upravljanja vremenom, tehničke vještine i računalna pismenost (96,6 %), dobra radna etika (71,4 %), učinkovita komunikacija i ciljano učenje (64,3 %), akademska spremnost, osobna predanost (64,3 %), neovisnost i odgovornost (5 0 %) osnovne osobine *online* studenata.

Rad također pokazuje spremnost sudionika da pohađaju *online* kolegije (98,7 %) zbog ažuriranih i autentičnih resursa koje mogu usvajati na svoj način. Međutim, njihove sumnje u dob *online* studenata (75 %) otvaraju mogućnosti za daljnja istraživanja načina i metoda *online* učenja u kineskom kontekstu. Ova studija daje povratne informacije nastavnicima i studentima o poželjnim kvalitetama *online* učenika, kao i tvorcima politike, kreatorima kurikula i autorima udžbenika za razvoj relevantnih IKT politika, kurikula usmjerenim na IKT i kolegije koji su prikladni u kineskom kontekstu čak i nakon pandemije bolesti COVID-19. Daljnja istraživanja mogla bi se usredotočiti na kvalitetu učenja licem u lice i *online* tijekom i nakon bolesti COVID-19 u različitim zemljama.