Horizon J. Hum. & Soc. Sci. 2 (S): 11 – 16 (2020)

Journal of Humanities and Social Sciences Research
www.horizon-JHSSR.com

OPINION

Academic Challenges and Opportunities during the 2020 Pandemic

Dariush Khezrimotlagh

School of Science, Engineering and technology, Pennsylvania State University Harrisburg, PA, USA

ARTICLE INFO

Article history

Received: 26-Jun-20
Revised: 25-Sep-20
Accepted: 29-Sep-20
Published: 15-Oct-20

*Corresponding Author
Dariush Khezrimotlagh
E-mail: dk@psu.edu

ABSTRACT

The 2019 Novel Coronavirus pandemic substantially affects economics, social health, and education. Colleges and universities could face potential losses to their normal enrollment numbers. The pandemic forced instructors and students, who were comfortable with traditional face-to-face classrooms, to experience online classes, some for the first time. Research has shown that online classes are not as effective as in-person classes. In this study, hybrid classes are suggested as a solution to decrease the cost of reopening schools: providing personal protective equipment (PPE) for faculty and staff, and the need to sanitize facilities and classrooms thoroughly and repeatedly each day. From hybrid classes, active learning that might not be achieved from online classes could be experienced in regular classrooms. They can allow students to balance their course work and their regular life responsibilities and help them to avoid isolation that can occur in online classes.

Keywords: Online-classes, In-person class, Hybrid classes, COVID-19 pandemic, Global village.

Introduction

Throughout the written history, there were many severe pandemics that affected human life. Some of these pandemics are well-known: the Black Death during 1346 to 1353 with 75 to 200 million deaths [1], the Spanish flu between 1918 to 1920 with 50 million deaths [2], and the AIDS epidemic since 1981 to present with 36 million deaths [3]. The earlier pandemics did not have the ability to travel as they might today; there was no airline industry in 1918-1920 and long-distance transportation could only be conducted via cars and ships, however, the Spanish flu killed around 25 million people in the first 25 weeks of the pandemic, and overall, 500 million people were infected [2]. Today, the 2019 Novel Coronavirus (COVID-19) pandemic has caused around 450K deaths and is nowhere near extinct. With lessons of the past in mind and the modern international community aware of the potentially devastating effects of pandemics, there is one vital question about our current situation: were we ready for the COVID-19 pandemic?

As the world continues to monitor the ongoing effects of the pandemic, is it clear that education has also been greatly affected by the COVID-19 virus. Schools in 185 countries are closed and most classes are being held online [4]. Concerns have increased about the mental health stability of students in the long run as well as academic metrics. In a short period of time, instructors and students had to adapt their skills to the new pandemic environment. Although online classes have been developed in recent years, a lack of available tools and advanced software is still problematic in every country. Difficulty accessing to internet, requiring the electronic devices, and limited software availability are clearly enormous challenges in current education. Media and TV classes could be a solution to continue online teaching. However, how to engage students with class materials, how to explore active learning, how to adapt online learning skills for real-life environments, and how to assess students efficiently are still the predominant challenges for the education industry.

Most instructors around the world now have a minimum experience in online teaching. Instructors in every level have now adapted their skills with new generated software and electronic devices. A lot of ideas and methods were discussed and shared from one instructor to another. These experiments could be considered as an opportunity to enhance the efficiency of education. In this study, it is suggested that hybrid classes, that is, a combination of online and in-person classes in one course, could be considered as an opportunity to achieve the goals of education and prepare students for future real-life challenges.

The rest of this study is organized in 6 sections. The next section illustrates the lack of preparation for a pandemic. In the third section, pros and cons of online and in-person classes are discussed. A personal experience is demonstrated in section 4. Section 5 illustrates that hybrid classes should be considered to enhance education both during the pandemic and in the post-pandemic educational environment, and the paper is concluded in section 6.

Lack of preparation

The study of the COVID-19 pandemic shows that we were not ready for any pandemic. Even developed countries were struggling and are still fighting to find possible approaches to manage economics and industries. Millions of people are actively trying to survive, find first-aid requirements and stay safe. The USA federal government implemented a $3 trillion coronavirus stimulus bill to support the USA economy [5]. From this aid, global markets are starting to recover [6]. However, more than one third of American workers are still unemployed [7].

There are numerous articles about global warming and natural disasters. Conferences and seminars are organized to address the importance of paying attention to these issues. Theories and models are developed to estimate and forecast global warming affects. Variety lessons have been planned to educate people in different age groups and to prepare people to stay safe during an earthquake or a tornado. Students are taught the necessary steps to take when a flood, hurricane, or volcano occurs. Since the term *Global Village* was introduced by McLuhan 1962 [8-9], there have been several pandemics, such as AIDS (1981-present day), H1N1 Swine Flu (2009-2010), Ebola (2014-2016), Zika virus (2015-present day), and the COVID-19 virus. As the entire world becomes more connected though a shared challenge, the disease clearly spreads faster, and the effects of such a pandemic become increasingly disastrous. With all the previous examples available, shouldn't we have developed lessons, conferences, and models to learn how to deal with a pandemic before COVID-19?

Our communities are constantly reminded that "safety is important", that is, being prepared to decrease the risk of an accident and possible prevention of a disaster is vital. Have people been educated to follow a similar safety plan to decrease the spread of a virus? The World Health Organization (WHO) suggested that wearing medical masks can indeed prevent the spread of the COVID-19 virus [11]. However, according to the New York Times [10] even police officers are rarely wearing masks to protect themselves and others during the COVID-19 pandemic. Was following such a safety plan not part of their training? Could safety now get attention in education to decrease the risk of future pandemics? To prepare for a less disastrous future, it seems it must be a considered change.

Online and in-person classes

The available studies show that online classes are less productive in comparison with regular face-to-face classes [12]. During a class, students are naturally engaged with the content and shared materials, can see other students and their motivations, can discuss a problem and the way of solving the problem in face-to-face group activities, can learn educational behavior from their instructors, and can increase their social behaviors and their awareness of diversity.

Protecting tests and exams, academic integrity, and preparing a fair environment for every student during a test, are main concerns in the educational industry. Even for in-person exams, there are a number of academic integrities violations each semester. Online testing and exams, in contrast, would not be effective for both students and educational purposes. From one side, students can use multiple sources to find solutions without thinking and developing their skills. For example, the CHEGG website [13] is designed to solve homework and get step-by-step solutions 24/7 in less than 30 minutes on average. There are plenty of apps [14] such as PHOTOMATH, that one can use to get a step-by-step solution to solve a mathematical problem just by taking a shot screen or a picture of that problem. Even with 360-degree cameras (which is impossible to provide for every student and in every environment) there are still numerous ways that one can get around an exam. In contrast, there are many methods that instructors can use to decrease the

violation of academic integrity, but at the same time, each way could increase the stress level of students. For example, not all students have enough bandwidth or internet connections, and not all students can afford electronic devices that are suitable for testing. From both sides, the results of online tests or exams would not be useful to explore the knowledge of students, and several adjustments should be considered to make sure that a fair environment is provided for all students.

On the other hand, colleges and universities are facing many significant risks in their struggle to remain open. Many universities financially depend on the number of students' registrations and tuition fees. Reopening schools, virus testing students, staff and faculty, and conducting complete classroom sanitation several times a day, increase costs substantially. Research estimates that a weekly virus testing for faculty, staff, and students just for the University of California would be US$1 billion a year [15].

As a result, from one side, online classes can be ineffective to prepare students to deal with future life challenges, and from another side, in-person classes can increase the risk to students' health and the costs of education. It is not unreasonable to anticipate that the educational skills achieved during this time would not effectively be as high as those of the pre-pandemic era. There is a need to schedule several plans to restore the loss quality of education for the post-pandemic time. With this aim, some universities (for example, Michigan State University) are going to offer hybrid-classes, that is, a part of class is held online and a part in-person. For example, one third of classes can be in person during a week. From hybrid classes, both the educational cost and the quality loss of education are decreased.

Personal experience

The COVID-19 pandemic occurred at the middle of the Spring 2020 semester. In the first half, classes were held in-person and the other half online. Before the pandemic, for my Probability class, I taught lessons on an iPad during class, instead of using the white board. I could record all the notes that I was writing during class and then share them on Canvas [16] for students' review. I found this method effective, as (a) I had a record of all my notes and the shared materials during class, (b) students could review their own notes and check with the shared notes to see if they missed any part, (c) students could ask questions after class on a specific part of the notes, (d) students who were absent could still access the class notes, and (e) I could review the notes, copy and paste a table and a graph, use several colors, undo a part, and correct any unclear section during and even after the class. As a result, my way of teaching was almost the same before and during the pandemic and it was also convenient for students to follow my lessons and adapt to course materials. The only differences were the change in environment and online classes versus in-person classes. I gave two exams to students in each half of the semester. My pre-pandemic exams were closed-notes and closed-books with no electronic devices, no calculators except a very basic calculator, and included 5 written response questions within 50 minutes. The exams during the pandemic were online, open notes and books, and students could use internet, any type of calculator and software, but there was a limited time, a large number of questions, they could only see one question at a time, and some questions required writing the final solutions only and some required uploading a step-by-step handwritten written solution response. Students were randomly grouped to have different types of questions or the same questions, but the questions were sorted in different order for each student. Students were required to solve as many questions as possible in 50 minutes. The best achieved score was considered as 100% and the rest of the scores were relatively calculated. Students had to connect to a Zoom meeting to get a code to start their exams. Breakout rooms were utilized to assign each individual into one particular room. This allowed students to ask their possible questions during the exam without distracting others. No camera was required. To decrease the stress level of exams in both situations, sets of questions and homework were also provided before the exams for students. Some of the questions were solved during class and some were left for students to practice. A similar style to select questions was considered for exams before and during the pandemic. Questions which were solved during lessons were also considered for exams and, for some questions, the numbers were not changed, that is, exactly the same questions that had been shared previously were used in exams. Students who had the highest score before the pandemic still had the highest scores during the pandemic and it was the same for students with the lowest scores. However, I found that the students' problem solving skills were worse. It is worth mentioning that a relative score was assigned for the exam during the pandemic, whereas the pre-pandemic exam was scored from a constant number. The important issue is that most students could solve 3.5 questions correctly on average pre-pandemic but could only solve two questions correctly on average during the pandemic online class period. A very few students could attempt and solve the questions that had already been shared and

provided for student practice. My experience supports the outcomes in recent studies [12] that online classes are not as effective as in-person classes.

Hybrid classes

Hybrid classes can be a reasonable solution in this pandemic. The hybrid design provides the best learning opportunities to experience both in-person learning and online digital learning. Teaching for some courses such as engineering, chemistry, biology can be held online while practicing and lab activities can be conducted in labs or classrooms. Other courses such as mathematics and statistics can be taught in classrooms and the activities and applications can be performed online. The online part of hybrid classes helps students to practice their basic time management skills, improve their keyboarding skill, become familiar with related software and technologies, and decrease transportation costs. Of course, a fast bandwidth Internet connection is required to achieve expectations. The in-person section of hybrid classes helps students to work on their communication skills, experience real-world situations, and build their network and friendships. Overall, from hybrid classes, students can balance between their coursework and their regular life responsibilities, avoid the potential isolation that occurs in exclusively online classes, and experience face-to-face interaction as part of their community [17]. From hybrid courses, the number of classes during a day can be decreased such that one third are in-person and the rest are online. For each course, one, two or three classes are normally scheduled within a week. For a course that required one class a week, the in-person classes can be scheduled every other week. For a course with two classes a week, one class can be conducted online and the other in-person. For a course with three classes a week, either classes can be merged into two classes as discussed, or one class can be arranged in-person and the other two held online.

Conclusion

COVID-19 is not the first pandemic in history, and it is hard to believe that it will be the last. It is vital that we prepare for unexpected situations and educate new generations to be ready for future life challenges. Hybrid classes could be a solution during pandemics to sustain the learning process and support social interactions. For mathematics and statistic courses, teaching could be held in-person and practicing skills, completing homework, and performing pair and group activities could be accomplished online. Engineering courses could be taught online, and the lab activities could be planned in-person.

The needs of developing user-friendly software, extending the bandwidth and speed of internet globally, providing electronic devices for both instructors and students, and designing suitable rooms for online and hybrid courses are now essential tasks for current and future educational development.

Competing Interest Statement

The author has read and approved the manuscript and takes full responsibility for its contents. No potential conflict of interest was reported by the author.

Acknowledgements

The author would like to thank the reviewers and editors of this manuscript.

References

Benedictow, O. J., & Benedictow, O. L. (2004). The Black Death, 1346–1353: the complete history. Boydell & Brewer.

Johnson, N. P., & Mueller, J. (2002). Updating the accounts: global mortality of the 1918-1920 “Spanish” influenza pandemic. Bulletin of the History of Medicine, 105–115.

Stanecki, K. A. (2004). The AIDS pandemic in the 21st century. US Census Bureau.

Kamenetz, A., (2020, April 2). 9 Out Of 10 Children Are Out Of School Worldwide. What Now? *The USA National Public Radio* (NPR) *WITF*. Retrieved from https://www.npr.org/2020/04/02/824964864/nine-out-of-10-of-the-worlds-children-are-out-of-school-what-now

CNN Staff (2020, March 25), What’s in the $3 trillion coronavirus stimulus bill. *CNN Media Company*. Retrieved from https://www.cnn.com/2020/03/25/politics/stimulus-package-details-coronavirus/index.html

Jones, L., Palumbo, D. & Brown D. (2020, April 30) Coronavirus: A visual guide to the economic impact. *BBC News*. Retrieved from https://www.bbc.com/news/business-51706225

USA FACTS (2020, June 15). Unemployment rate during COVID-19 highest among Hispanic and Black Americans. *USA FACTS*. Retrieved from https://usafacts.org/articles/unemployment-rate-during-covid-19-highest-among-hispanic-and-black-americans/

McLuhan, M., Gordon, W. T., Lamberti, E., & Scheffel-Dunand, D. (2011). The Gutenberg galaxy: The making of typographic man. University of Toronto Press.

McLuhan, Marshall (1962). The Gutenberg Galaxy: the making of typographic man. Toronto, Canada: University of Toronto Press. pp. 293. ISBN 978-0-8020-6041-9.

Wilson, M., (2020, June 15). Why Are So Many N.Y.P.D. Officers Refusing to Wear Masks at Protests? *The New York Times*. Retrieved from https://www.nytimes.com/2020/06/11/nyregion/nypd-face-masks-nyc-protests.html?action=click&module=Top%20Stories&pgtype=Homepage

Department of Communication, Health Emergencies Preparedness and Response (2020, June 7). Q&A: Masks and COVID-19. *World Health Organization*. Retrieved from https://www.who.int/emergencies/diseases/novel-coronavirus-2019/question-and-answers-hub/q-a-detail/q-a-on-covid-19-and-masks

Alpert, William T., Kenneth A. Couch, and Oskar R. Harmon. 2016. "A Randomized Assessment of Online Learning." American Economic Review, 106 (5): 378-82. DOI: 10.1257/aer.p20161057

Wikipedia, the free encyclopedia. Retrieved from https://en.wikipedia.org/wiki/Chegg

NDTV Correspondent (2020, November 2014). 11 apps that will make you hate math a little less. *Gadgets 360 An NDTV venture*. Retrieved from https://gadgets.ndtv.com/apps/features/11-apps-that-will-make-you-hate-maths-a-little-less-619256

Daley, B., (2020, June 11). Going online due to COVID-19 this fall could hurt colleges' future. *The Conversation*. Retrieved from https://theconversation.com/going-online-due-to-covid-19-this-fall-could-hurt-colleges-future-138926

Canvas, Professional development for Educators. Retrieved from https://www.canvas.net/

Zappia, S., (2018). Pros & cons of hybrid courses. *Seattle pi*, Retrieved from https://education.seattlepi.com/pros-cons-hybrid-courses-3288.html

Biographical Statements of Author(s)

Dr. Dariush Khezrimotlagh is Assistant Professor of Mathematics at Penn State University, Harrisburg, Pennsylvania. He was a Visiting Assistant Professor at the College of Arts and Science at Miami University, Ohio. He was previously an Assistant Professor of Statistics at the University of Malaya, Malaysia.

He has more than 20 years of experience as an educator. He earned his MS in Pure Mathematics and his PhD in Applied Mathematics, specializing in Operations Research and Data Envelopment Analysis.

Dr. Khezrimotlagh is a committee member of the Data Envelopment Analysis International Conference.

Assistant Professor Dr. Dariush Khezrimotlagh
Assistant Professor
Penn State University
Harrisburg, Pennsylvania
U.S.A

E-mail: khezrimotlagh@gmail.com