

TEACHING DURING THE COVID-19 PANDEMIC

BY

DANA M. BARRY¹ AND HIDEYUKI KANEMATSU²

PUBLICATION DATE: June 25, 2020

1. *Department of Electrical & Computer Engineering, Clarkson University, STEM Lab, SUNY Canton, U.S. (dmbarry@clarkson.edu)*
2. *Department of Materials Science and Engineering, KOSEN's National Institute of Technology, Suzuka College, Japan (kanemats@mse.suzuka-ct.ac.jp)*

Abstract

The coronavirus pandemic has had a profound impact on teaching. As a result of the crisis, instructors world-wide had to quickly adapt and shift to remote teaching. This paper describes three useful methods of instruction used in Northern New York State Colleges (United States) and KOSEN's National Institute of Technology at Suzuka College (Japan), during the crisis. It also provides suggestions to enhance one's teaching experiences as well as students' learning during the pandemic. General information about the coronavirus is included too.

Introduction

The coronavirus pandemic has had a profound impact on teaching. As a result of the crisis, instructors had to quickly adapt and shift to remote teaching. College faculty in Northern New York State had no advance notice that they would be required to teach their courses online after the February 2020 spring break. Their colleges immediately closed during the break and only allowed essential workers (like security, information technology staff, etc.) on campus. Lockdown was enforced at this time. Students were given an extra week of spring vacation, so instructors could have a few days to prepare their online courses. These students were not allowed to return to campus (except to gather their belongings several months later). A small number of them (with no place to go) were permitted to stay in the dorms on campus until the end of the semester.

Lockdown

Just about everything was closed during lockdown. However, stores that sold food and medicine were open. In order to help prevent and slow down the spread of the virus, individuals were encouraged to stay home and only go out to buy food and medicine. They were strongly advised to wear masks (especially inside buildings), to wash their hands frequently with soap and warm water, and to keep a social distance of six feet from other people.

Teaching continued during lockdown. Since daycare centers and K-12 schools were closed, instructors and parents, etc. (working from home) had to care for their children and assist them with their online schoolwork and lessons. Many individuals also experienced the following problems: loss of a business, loss of a job, loss of income, loss of a home, being sick with the coronavirus or some other illness, etc. It should be mentioned that students' lives were drastically changed. They had to adjust to online learning instead of being in a classroom and to function without sports, social activities with friends, and the benefits of campus life.

Coronavirus

The coronavirus is contagious and can affect most parts of the human body. Symptoms for the virus vary from person to person. Some general ones include a cough, digestive problems, trouble breathing, a fever, and the loss of taste and smell. It is primarily spread between people in close contact and by droplets from coughs, sneezes, etc. of individuals with the virus. COVID-19 is caused by infection with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Figure 1 shows the structure of a coronavirus [1].

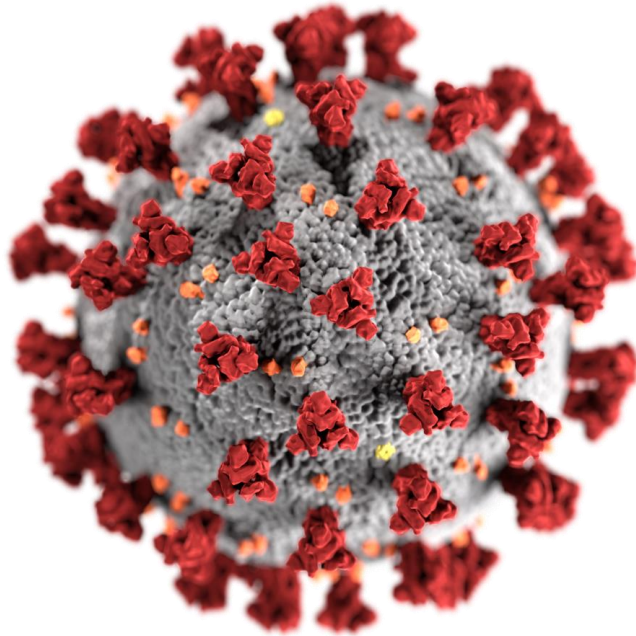


Figure 1: This figure shows the structure of a coronavirus with its harmful spikes.

Teaching Methods during the Pandemic

The authors Dr. Barry (Clarkson University and SUNY Canton) and Dr. Kanematsu (KOSEN's National Institute of Technology, Suzuka College, Japan) share their remote teaching experiences during the pandemic. They mainly used Zoom and Microsoft Teams. However, as experts at teaching classes with avatars in a virtual world, they were also prepared to use this method (which is a form of Gamification). As for carrying out research activities, professors in Japan were permitted to continue their work in the college laboratories. On the other hand, researchers in Northern New York State were not allowed on campus during the lockdown.

Zoom

Zoom was used for audio / video conference meetings, the teaching of classes, office hours, student presentations, etc. [2]. Participants were recruited via email invitations. Instructors could mute everyone to prevent distracting background noise or just mute and unmute individuals as they pleased. Screen views could be selected to show everyone at once or just the person talking. This platform allowed instructors to meet online with students (a virtual face to face) and deliver lessons as synchronous instruction at the normally scheduled class times each week. Some classes were asynchronous, where students did lessons and assignments on their own.

Microsoft Teams

Microsoft Teams was used for a variety of tasks [3]. It has built-in meeting features to successfully hold classes and share documents (by using posts for the attachment of power point presentations, interactive websites, videos, e-books, etc.). Virtual whiteboards and video calls are available too. A multi-part, note-taking tool (One Note) is built into Teams for a variety of lessons and activities. By using this method, faculty and students belong to teams such as the STEM team at SUNY Canton. Each member of the faculty has his or her own channel for carrying out classes, etc. and the ability to access other individuals' channels for collaborative projects, etc. (STEM refers to science, technology, engineering, and mathematics.)

For the use of both Microsoft Teams and Zoom, instructors were free to conduct their own laboratory activities for students. Some used YouTube videos and simulations. A few carried out science demonstrations online. Others described experiments in detail and gave the results to the students. Then the students used the experimental data to write reports that included figures and tables. A final goal in Japan is to have remote laboratories for experiments. Director Dr. Kanematsu and all members of the K-Drive Virtual Research Center (nationwide) are involved with this effort. (A remote laboratory is the use of telecommunications to remotely conduct real experiments.)

Gamification

The third potential teaching method during the pandemic is a form of Gamification. Gamification is the use of game design elements outside of a game environment [4]. This technology makes learning fun through exciting problem-solving activities that offer awards.

The authors are experts at using avatars to teach classes in virtual worlds like Second Life (an online three-dimensional community). Each taught the same lessons with students in their own countries (United States and Japan) and compared the results. They used virtual classrooms in Second Life. The classrooms were built on an island owned by Nagaoka University of Technology, Japan. They included red chairs, tables, a podium, and whiteboards (for posters, power point presentations, etc.). Communication tools were the "Chat" and "Speech" functions. The authors' students successfully completed the following problem-solving activities [5-6]. They designed and built a house of the future during the global warming era, an economic car (that is safe, environmentally friendly, and energy efficient), and a special airplane that uses wind energy (a renewable source of energy). The students created three-dimensional objects (primitives) of specific shapes, sizes, and color to build their houses, cars, and airplanes. They were awarded Certificates of Excellence for their great work. Figure 2 shows Dr. Barry's avatar (instructor: front and center) watching students' avatars

build their airplane for renewable energy. They worked in the area outside of the virtual classrooms [7].



Figure 2: Dr. Barry's avatar observes students building a plane for renewable energy.

Conclusion

We conclude with some suggestions to enhance one's teaching and students' learning experiences during the pandemic. No matter what online teaching method you decide to use, it is important to be flexible and express concern for the students. Email your class members and tell them that you are available to assist them and encourage them to ask questions whenever necessary. Teach with an upbeat positive attitude and focus on student support instead of rigorous instruction.

Be flexible because some students and /or their parents may be sick with the virus, or their parents may have lost their jobs, incomes, etc. Keep in mind that some students may not have access to computers and the Internet, etc. Therefore, they may need special accommodations to enhance their learning. Also seek appropriate permission (example: from a college dean) to replace a required topic in a course curriculum that is too complicated for students to learn online.

It is interesting to note that colleges in Northern New York State and others have allowed students to select a "pass / fail" instead of a specific letter or number grade. As for K-12 students in the United States, many were provided online lessons along

with packets of learning materials. However, teachers were not allowed to grade their work.

References

1. Eckert, Alissa and Higgins, Dan. File: SARS-CoV-2 without background.png. Date: January 30, 2020. License: This work is from the Centers for Disease Control and Prevention. It is in the public domain.
https://commons.wikimedia.org/wiki/File:SARS-CoV-2_without_background.png
2. Bellan, Rebecca (March 24, 2020). What You Need to Know about Using Zoom, *Forbes*. <https://www.forbes.com/sites/rebeccabellan/2020/03/24/what-you-need-to-know-about-using-zoom/#439e80df3284>
3. <https://docs.microsoft.com/en-us/microsoftteams/teams-overview>
4. Robson, K., Plangger, K., Kietzmann, J., McCarthy, I. & Pitt, L. (2015). Is it all a game? Understanding the principles of gamification. *Business Horizons*. **58** (4) pp. 411–420. doi:10.1016/j.bushor.2015.03.006
5. Barry, D.M. Kanematsu, H. Fukumura, Y. Kobayashi, T. Ogawa, N. and Nagai, H. (2014) Problem-Based Learning Activities in Second Life. *International Journal of Modern Education Forum*, **3** (1) pp. 7-11.
6. Kanematsu, H. Kobayashi, T. Ogawa, N. Barry, D. M. Fukumura, Y. and Nagai, H. (2013) Eco Car Project for Japan Students as a Virtual PBL Class, *Procedia Computer Science*, **22**, pp. 828-835.
7. Barry, D.M. Kanematsu, H. Lawson, M. Nakahira, K. and Ogawa, N. (2017) Virtual STEM Activity for Renewable Energy, *Procedia Computer Science*, **112**, pp. 946-955.