Utilizing Interactive Pedagogy to Overcome the COVID-19 Pandemic Influence

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Abstract

The COVID-19 pandemic has affected students physically and mentally. Spending time in an isolated learning environment negatively influenced their education. To mitigate impacts of the pandemic, the author, a professor teaching an undergraduate program, has made the following endeavors. First, she taught students Chinese Tai Chi during class breaks. Tai Chi is an ancient Chinese exercise to enhance physical and mental health. Students were enthusiastic about the meditative practice of Tai Chi, becoming more focused and engaged in class. Second, increasing outdoor class activities have been utilized to boost student positivity. The author instructed the entire class on field investigations. Following her lectures and guidance, small student groups conducted three more field investigations to study the high-impact areas of the debris flow initiated from miles away. Students were excited about their interactive discoveries and learned that considering large-scale factors in site selection is critical to avoid potential failures. Finally, class debates have been designed to help students develop their ability to articulate and evaluate arguments, increasing communication among classmates. As a result, students have maintained a high attendance rate. Their presentations and essays have demonstrated educational outcomes and critical thinking. This experiment of interactive pedagogy indicates that enhancing students' physical and mental health is critical in undergraduate education. The professor is not merely a knowledge deliverer but also a learning facilitator.

Keywords: *Interactive Pedagogy, Pandemic influence, Tai Chi exercise, Field investigations, Critical thinking*

1. Introduction

Educators have realized the negative impact of Covid 19 pandemic on students' education. Remote teaching forced students into a passive and isolated learning environment, causing them to lose interest in their education. Students have fewer questions and reactions in online class discussions, resulting in shyness, anxiety, and sometimes depression. Although teaching has returned to being in-person, the Covid-19 impact still affects students. As a professor teaching senior undergraduate courses, the author implemented interactive pedagogy in her class on sustainability in postfire debris impact areas in Boulder County, Colorado. She designed the project to encourage students to return to nature to learn and explore independently. She shares her research findings and her method for the study, inspiring students' critical thinking with experimental learning.

In recent decades, the wildfires spreading over Colorado have caused severe destruction. The vast burn scar zones have covered various complex landforms and are vulnerable to additional hazards of postfire debris flows. During the historic 2013 Colorado flood, highly impacted areas often involved postfire debris flow. Debris flows are regarded as one of the most dangerous natural hazards [1] and are often referred to by the media as landslides, rockslides, mudslides, or flash floods. Debris flow results from heavy rainfall combined with large amounts of debris. Debris flows originate at higher elevations and descend, collecting more debris while gaining momentum and power [10].

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2. Method

The method of this interactive teaching and learning includes the following components: 1) Outdoor *Tai Chi* exercises are led by the professor during class breaks to inhale the fresh air, strengthen the body,

and relax the mind; 2) Lectures on landform patterns of areas prone to postfire debris flow and a vernacular sitting method of *feng-shui*. *Feng-shui* is an ancient Chinese practice used to harmonize people with their environment; 3) Field investigations. Visiting sites impacted by postfire debris is integral to interactive education. The professor demonstrates to students the landform patterns of the areas impacted by postfire debris. Then, student teams investigate three sites. These field trips encourage students' independence and team cooperation; 4) Class debates. Debates help students develop their ability to articulate and evaluate arguments. These debates increase communication among classmates and enhance students' critical thinking; and 5) Final presentation. Students write individual essays and share their team's findings and learning experiences with the class.

3. Interactive pedagogy

3.1. *Tai Chi* exercise

In the summer of 2022, Professor Beth Osnes of the University of Colorado Boulder demonstrated a workshop on creative pedagogy to boost students' positivity. Professor Osnes's energetic performance inspired the author to introduce Chinese *Tai Chi* into her course breaks. *Tai Chi* is a Taoist, slow-moving martial art that is a form of meditative exercise [3]. Research studies indicate that the performance of *Tai Chi* is a transformation of both physical and spiritual significance. The performance outcome is focused on the internal with a heightened awareness and calm feeling [3]. Coached by the professor, the class practiced *Tai Chi* for 10 minutes during each class break. Students were enthusiastic about the meditative practice of *Tai Chi,* becoming more focused and engaged in class.

3.2. Field investigations

To enhance experiential learning, field investigations are the highlight of this course and cultivate eagerness and curiosity among students during their field observations. A *feng-shui* master once said that to learn *feng-shui*, people must hike for thousands of miles, along with studying thousands of books [12]. Local sitting methods may provide wisdom when dealing with the increasing hazards in mountainous areas. Heavy rainstorms are known to trigger debris flows, and their spatial distribution appears to follow a pattern. This distribution pattern has yet to be well studied [5]. Adaptations to natural laws are directed toward enhancing life by promoting harmony between humans and nature [7]. This is the key to successful *feng-shui.*

Feng-shui practice in site selection evaluates mountains, hills, water, and orientation [13], considering environmental factors at various scales. The field investigations indicate that the impacted areas correspond to negative *feng-shui* criteria while the surviving areas correspond to favourable criteria. *Feng-shui*, with its simple terms and practical way, is easy for undergraduate students to absorb and practice. Based on geomorphic studies, landforms of debris flow-prone areas include the debris catchment, the debris flow track, and the debris flow fan/impact area [8]. Combining scientific knowledge with *feng-shui* criteria, the professor designed a matrix table for student field investigations.

In a class field trip, the professor showed students evidence of the 2013 debris damage and the surrounding landscape patterns that triggered the 2013 debris flow in Jamestown, Boulder, CO. During the field investigation, students were surprised that a portion of a house destroyed during the flood was now restored in the same location. When heavy rainfall occurs again, a similar disaster would be repeated.

Student teams visited Chapel on the Rock in Allenspark, CO. During the 2013 flood, the Chapel saw the effects of massive debris flow coming from Mt. Meeker five miles away. This debris flow initiates at the top of a large concave basin full of rocks and sand. When the slope drops, the debris flow dumps tremendous amounts of debris, destroying anything in its path. Fortunately, the Chapel survived the debris flow attack because of its location off the track and sitting at a higher elevation.

The last site student teams investigated was 100 Arapahoe Ave, located on the north hillside of Flagstaff Mountain in Boulder, CO. Students' first impression of the site was peaceful and lovely, especially after they heard this site had the occasional mountain lion cubs come to visit. Unfortunately, this site contains landforms, posing a threat to the residents. Though not apparent from the site, the dangerous factors are noticeable on a dry wash from Flagstaff peak down to the site. During the field investigation, students realized that through this dry wash, the 2013 debris flow split a building at 100

Arapahoe into two parts. Such factors could be ignored by developers, who have never hiked this trail as the students did, nor studied the recurring nature of debris flow. The structure has since been rebuilt in its original, high-risk location. Students learn that ignoring large-scale hazard impacts could lead to buildings being destroyed in the next debris flow attack. Large-scale considerations are crucial in avoiding future design failure [9].

3.3. Class debates

To overcome the impacts of an isolated learning environment, class debates increase the interactive communication among peers, sharing and inspiring new thoughts. Students participated with great interest in the class debates guided by the professor. The debates explored why people were rebuilding their houses in the same high-impact spots. First, many mountain residents often lack knowledge of postfire debris flow and its reoccurring nature. Second, insurance policies often mandate reconstructing damaged homes on their original property and replacing a house "like for like" with the original one. For most residents, rebuilding the same house on the same site sounds feasible and affordable. Students understand that this cycle of rebuilding and re-destruction at high-impact sites does not benefit a developing community's sustainability and endangers the lives of residents.

The class debates further discussed human responsibilities for the Colorado wildfire, an initial reason for causing postfire debris flow. Students learned that fire strikes are often called "wildfires." However, over sixty percent of Colorado "wildfires" are caused by human ignition [11], particularly campfires. These wildfire hazards can swiftly destroy hundreds of thousands of acres of forest, taking homes and lives. Even after the initial disaster, vast landscapes are left vulnerable to the deadly threat of postfire debris flows. Students recognized that asserting freedom and independence regardless of risks associated with hazard-prone zones harms society. Humans are responsible for causing or enlarging the effects of natural hazards, and people should learn from their mistakes.

4. Learning outcome

Implementing the interactive pedagogy enhances students' physical and mental health and increases their interest in education. Students have maintained a high attendance rate. Their presentations and essays have demonstrated successful educational outcomes and critical thinking. First, students identified the current problems of ignoring site issues. Constructing a building in a hazard-prone zone will lead to an unsustainable rebuilding cycle. Therefore, ignoring the site selection process is detrimental to the safety of the building and its inhabitants.

Secondly, students commended field investigations and emphasized their significance. They noticed we unnecessarily challenge ourselves by living in hard-to-endure areas. A correctly assessed site is substantially more efficient than our tendency to overengineer. That is why observations are the first defensive mechanism for our structures against natural disasters.

Thirdly, students learned that landform patterns could inform designers and planners of where natural disasters may occur. It is irresponsible to neglect these patterns and continue making the same mistakes. Optimal locations, a stable base, and a raised foundation can mitigate damage in high-impact areas. Considering the building site and its surrounding landforms is essential, as it is the first defense barrier when constructing against natural disasters. Finally, students also highly regarded the vernacular practice. They wrote in their essays that history had shown several vernacular tactics to have worked. Thus, we should adopt these ancient principles to minimize severe damage, economic hardship, and fatality from a hazard like debris flow.

5. Conclusion

This interactive pedagogy emphasizes teaching theory, practice, and methods, supporting students' critical thinking. Education's primary goal is to move students forward as critical thinkers [2]. The most important strategy is to inspire students to learn through the process [6]. Students receive knowledge, judge knowledge, and discover knowledge. Students are co-authors rather than passive knowledge-receivers, fulfilling their potential and creativity.

Encouraging students to go to the physical world to find problems and seek solutions enhances their critical thinking. An old Chinese saying goes, "a person who can read a book without words is a real

scholar." In addition, increasing field investigations benefit teaching theory courses because students can use first-hand experience while examining a theory. Encouraging students to hike, see, feel, observe, and discover in the field is essential to learn environmental design.

Outdoor activities are a refreshing intermission during class [4]. *Tai Chi* exercises and field investigations have been integral to education, enhancing experiential learning, boosting physical and mental health, and unleashing joy for students. To increase communication among classmates, class debates have been designed to help students develop their ability to articulate and evaluate arguments. By exercising students' social skills and collaboration, teamwork is essential in interactive learning.

Implementing Interactive pedagogy can improve educational quality, boost students' interest in education and guide their independent learning activities, allowing them to engage in their education. This interactive approach can be an effective tool to heal educational wounds caused by Covid-19. In this approach, the professor is not only a knowledge deliverer but also a learning facilitator.

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