Flipped Classroom for Online Textile Course

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Significance of concept. Many U.S. colleges and universities now offer full degree programs online, which open up the possibilities for students around the world including non-traditional students. Online classes give students more flexibility in balancing their academic works with extracurricular activities and help students graduate on time or even early (Dunkelberger, 2017). Recently, online classes are integrated with interactive systems such as discussion forums, instant messages and audio/video capture. Despite the benefits and advantages that online classes may offer, many instructors and students prefer traditional settings largely because of face-to-face interaction and communication (e.g., speaking to instructors in person, collaborating with classmates). Traditional class is believed to be more appropriate for textile course because understanding textiles requires kinesthetic learning that students use their tactile senses to evaluate the characteristics of materials. It is often more effective when such instruction is demonstrated in person to help students acquire knowledge constructed from a result of actions, feelings and thought. Thus, the limited interaction is of a concern for online textile course. However, some introductory textile courses are offered online because both student and institution benefit from convenience, flexibility, cost-effectiveness, and student enrollments.

Flipped classroom (FCR) shifts a class from teacher-centered learning to student-centered learning, where students are the focus of the learning process (Balan, Clark, & Restall, 2015). Instead of lecturing, FCR uses class meeting time for activities that increase student engagement with the course and encourage deeper meaningful learning by preparing the lesson prior to the intended lecture, participating actively in class and working with classmates to achieve a common academic goal. Therefore, it is expected that FCR with the help of technology will increase class interaction and provide an alternative educational technique for online textile course in higher education. *The purpose of the study* is to explore the concept of FCR and its application to online textile course. Results of the study may provide pedagogical insights for effective learning activities and improved interaction in online textile class.

Synthesis of theory and literature. The foundation of FCR stemmed from both Behaviorist Theory and Social Constructivist Theory (Bishop & Verleger, 2013). Before the class, students get the foundational accredited content (e.g., lecture notes by instructor) that is required in the behaviorist principles. In the class, students are exposed to explore the concepts in depth and to construct their own knowledge. FCR is also known to address issues related to the limited time to cater to the different learning styles (e.g., taking in information through conceptualization or experiences) (Lage, Platt, & Treglia, 2000). Previous research showed that FCR helped students be more extrinsically motivated and learn important skills such as critical thinking and problem solving (Froyd & Simpson, 2010). FCR is noted as active, cooperative, and collaborative learning while traditional class is considered as passive learning (Tune, Sturek, & Basile, 2013).

According to Bishop and Verleger (2013), FCR is an educational technique that consists of two parts: interactive group learning activities inside the classroom and direct computer-based individual instruction outside the classroom. FCR is often implemented in hybrid learning; however, hybrid class is not as flexible as online class and must utilize some campus facilities (Crawford, Barker, & Seyam, 2014). Thus, this study implements advanced technologies (e.g., remote video conferencing) in FCR to provide virtual interactive group activities in online textile class via live-connection.

Implication. A sample FCR for online textile course is initially developed based on the concept of this study using the interactive online resources that are currently available (e.g., D2L™, iTextiles™, Textile Kit™, Zoom™ Video Conferencing). The process of delivering the online textile course through the subject, *Fabric Hand*, is as follows: Students access to the designated lecture online. Lecture notes and short video clips are available for students to learn basic knowledge such as the definition of surface contour and how to evaluate the attribute in fabric samples. Students may choose the most convenient time and take as much time as they need to learn the subject. After the self-learning process, students take an online quiz related to fabric hand. Then, students join a class via online conference room, which is scheduled at the best time for all enrolled students. Having students connected live, instructor may begin the class by reviewing the important sections of lecture and answering questions. Then, instructor creates separate conference rooms and assigns students into small groups for remote-collaboration. Students are exposed to peer-assisted learning that is design to gain advanced knowledge though activities, such as selecting the best fabric for a product they may choose based on the sample evaluation. Each student evaluates two potential samples that might be appropriate, and the group calculates the average of each sample per attribute. Then, the group analyzes the result to select the best sample for its end use. The outcome is shared with the classmates.

Proposal for future action. After implementing FCR for online textile course, the effectiveness of the technique can be accessed in various ways. Course evaluation that covers all aspects including activities, tutorials, lectures, and assessment may indicate students' experience of active learning. Comparison of student performances (e.g., grade) in a traditional textile course and FCR for online textile course may measure the difference in individual students' learning styles. In addition, students' soft skills (e.g., critical thinking) can be measured and compared. Based on the results, plans for continuation, revision, or follow-up must be made.

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