At the start of this essay, the authors confront one of the central problems facing higher education today: the failure of our current model of teaching and learning to “adequately education students.” More specifically, the authors note that a raft of studies indicate that students are leaving college without the critical thinking or communication skills necessary in many, if not most professional endeavors. Given this situation, there have been numerous calls for significant reform in the way that teaching and learning occurs in the college classroom. In response to that challenge, the authors propose as a solution a “radical, yet intuitive educational model called the flipped classroom.”

The essence of the flipped classroom is a redistribution of the work conducted in the traditional classroom. Rather than spend class time giving lecture, and thereby imparting foundational knowledge, the flipped classroom model shunts that content to an online learning system, and then employs class sessions as a forum for student centered activities. Within this structure, students are expected to come to class with a basic understanding of the materials presented online so that they can fully participate in the active learning techniques employed during class sessions.

In order to assess the efficacy of the flipped classroom model, the authors redesigned a Basic Pharmaceutics II course offered on multiple campus of their university system and used these classes to serve as the basis for a study on the impact of the model on student learning. The stated goals of the course design were to improve student learning, develop critical thinking, problem solving, and teamwork skills, and fully engage students and instructors. The course redesign itself had several transformational elements. First, all lectures for the class were “off-loaded” to self-paced, online videos. The lecture videos, referred to as “integrated learning accelerator modules” or iLAMS, were made available to students on the courses learning management system. Students were able to access all videos multiple times. The average length of each iLAM was 34.6 minutes; the twenty-five videos together contained 14.4 hours of material.

The second key change made to the course was the creation of a series of four student centered active learning exercises for use during class sessions. The first of these exercises was an audience response and open question forum. The professor would begin class by asking a series of questions that pertained to the relevant iLAM in order to assess student understanding of the basic concepts outlined in the video. Students were given approximately thirty seconds to respond to each of seven to ten questions through the use of a clicker. The professor then analyzed the responses, provided necessary feedback, and answered any questions raised by students. Following this initial segment, students were put into pairs to work on one of three different types of pair-share activities: rapid pair-share; reflective pair-share, in which they dealt with questions posed on line 24-36 hours prior to class; or, proactive pair-share, in which one or two student pairs, with input from the professor, were responsible for “designing, preparing, and moderating a discussion related to the given class session topic.” The third activity
employed in the flipped classroom was group presentations and discussions. Students were put into
groups of four or five, which were then responsible for presenting a summary and interpretation of
assigned readings. Each class session, three of the groups were told to be prepared to present the
assigned materials, and one would be selected via a roll of a die. All groups chosen for a given session
would have their materials graded regardless if they had presented or not. By the end of the semester,
all groups had presented at least one time. The fourth and final activity employed each class was
individual or paired quizzes. At the end of each session, the professor would give ten question multiple
choice quizzes to the students. Eight of the quizzes were selected, based on workload and exam
schedules, to count towards students’ grades.

One final element was consistently employed within the flipped classrooms. Instructors gave “micro-
lectures” of one to three minutes duration when they deemed their use necessary. Professors utilized
the “micro-lectures” to provide clarity when a class seemed to be struggling with a concept or to
redirect student learning during the course of a class session.

The flipped classrooms included multiple facets of assessment. Student presentations, the eight selected
quizzes, and two projects (one at the beginning and one at the end of the semester), collectively
constituted approximately 22.5% of the final grade. Additionally three midterm exams and one
cumulative final were administered, and together they counted as approximately 78% of students’
grades. Finally, students’ in-class pair/share activities were worth up to approximately 3.5% bonus
points.

In examining the impact of the flipped classroom on student learning, the authors examined a number
of data points. The professors administered two student surveys (one at the beginning and one at the
end of the course) that included questions pertaining to student demographics, perceptions of active
learning, typical engagement behaviors, and learning format preferences. The authors also examined
the number of times each student accessed the iLAMs, the number of iLAMs students self-reported
watching, and the number of online extra-credit exercises completed by each student. Finally, the
authors looked at the traditional end of course surveys administered to the class and the students’ final
grades.

Based on the data noted above, the authors reported several key findings. Eighty-two percent of
students reported listening to all twenty-five iLAMs, while another fifteen percent watched between
twenty and twenty-four of the videos. The authors found little correlation between online engagement
measures, but a moderate correlation between final grades and the number of online extra credit
exercises completed. Over ninety percent of the students reported that active engagement had been
effectively promoted by the professors and the course materials, found the resources employed in the
class helpful in promoting understanding and application of the concepts presented in the course, and
agreed that these learned skills and applications would be helpful to them in the future. Finally, the
authors reported that class attendance was higher and that there had been a statistically significant
improvement in final grades.
Conclusions

Based on the findings of their study and experiences in the classrooms, the authors argue that the flipped classroom is both feasible to achieve and effective in promoting not only improved student learning, but also more meaningful learning. In order to improve upon their results, the authors also offered several suggestions for future iterations of the flipped classroom. First, they suggested eliminating the textbook they had used, as students found it redundant (given content in iLAMs). Second, the authors intended to eliminate the student presentation exercise and replace it with a new exercise in which groups of students would engage in discussions pertaining to contemporary research articles. Third, the authors decided to maintain use of the two aforementioned projects, but reconfigured the end of semester project so that on the last day students would review and grade the work of three of their peers (intended to serve as an additional learning experience). The authors also felt that the flipped classroom structure would benefit from changes in the online portion of the course. Specifically, they counseled administering a series of online, graded quizzes and developing a portal that would provide students with access to additional relevant materials.

Applications

This article presents a wealth of information of both the concept of the flipped classroom and its implementation. Certain elements of the flipped classroom constructed and studied by the authors seem inefficient or lacking, to some degree, in creativity. Similarly, the grading system employed in these classes appeared to greatly underemphasize the actual active learning portions of the course. That said, the focus the authors place on creating a well-structured, consistent format for both daily class sessions and the course as a whole seems wholly rational and necessary. Overall, the key benefit to be derived from the article is the potential for shifting the locus of foundational knowledge from the classroom to an online platform of the type that we already have. This then allows for the use of limited class session time to the implementation of higher order thinking exercises, which can be adjusted and supplemented for both greater creativity and engagement, as well as to fit the specialized contours of specific fields of study. There is, however, one particular concern worth considering when advocating a shift to the flipped classroom, and it is one that I have encountered myself in placing responsibility for foundational knowledge squarely on the shoulders of my students: to what extent and in what numbers will students comply with out of class learning responsibilities. In this sense, it would seem vital to ensure that our learning management system allowed us to track student use of online material and that compliance was enforced through the structuring of course grades.

Citations of Interest

