Full length article

Exploring undergraduates' perspectives and flipped learning readiness in their flipped classrooms

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Abstract

This study surveyed 84 undergraduate students, majoring in education, in order to gather their perspectives regarding flipped classrooms and investigate their readiness levels for flipped learning. After the implementation of flipped learning for an entire semester, surveys were distributed in two flipped classrooms that were taught by the same instructor. Students showed particular preferences for the "Bring Your Own Device" and the Instant Response System features of the flipped classroom. Approximately 60% agreed with the idea of flipped classrooms, but only 39% agreed that the flipped classrooms met their learning needs. Their readiness levels for flipped learning were moderately above the average levels, and males or juniors (compared with freshmen), felt more prepared for flipped learning. In general, course grades, self-directed learning readiness, and group work preference can predict the different readiness dimensions. The findings may enhance educators' understanding in how to apply the flipped learning model in ways that are most beneficial for their own students.

1. Introduction

Due to the emergence of instructional technologies, student-centered instruction has become more feasible over the past decade. Studies have indicated that student-centered instruction can lead to higher levels of learner autonomy, performance, and motivation (Smit, Brabander, & Martens, 2014). One of the most effective student-centered instructional models, the flipped learning approach, reverses the learning process from the traditional classroom by having students review learning materials before coming to class. Later, during a class session, teachers will guide students through homework assignments, problem-solving exercises and peer interaction sessions, in order to promote differentiated instruction, personalized learning, and high-order learning (Yarbro, Arfstrom, McKnight, & McKnight, 2014). As such, while students have to take control of their own learning, they can acquire personalized assistance. Throughout the entire process, the latest instructional technologies, especially video recording technologies, are integrated in ways that facilitate and nurture learning and teaching for both students and teachers (Bergmann & Sams, 2012).

Although some studies (Flumerfelt & Green, 2013; Tune, Sturek, & Basile, 2013) claim that students in flipped classrooms may outperform their counterparts in traditional lecture-based classrooms, other studies indicate that students' responses and readiness for flipped learning are not comprehensively positive (Missildine, Fountain, Summers, & Gosselin, 2013; Wilson, 2013). To better understand the flipped learning approach, this study investigated undergraduates' perspectives of flipped classrooms, their flipped learning readiness, and individual characteristics.

2. Literature review

2.1. Flipped classrooms

In recent years, the flipped learning model has become a fashionable instructional development in educational technology, particularly in the ways that technology relates to higher education (Johnson, Adams Becker, Estrada, & Freeman, 2014; Johnson, Adams Becker, Estrada, Freeman, 2015). In particular, digital videos have become the most popular form of technology employed in flipped classrooms (Bergmann & Sams, 2012), due to their wide accessibility on the Internet, including YouTube and related web sites. The Khan Academy collaborated with Microsoft to create a digital video library for K-12 students to facilitate academic learning, illustrating the type of online resources available for flipped classrooms. Two
high school chemistry teachers in Colorado successfully facilitated a flipped learning classroom in 2007. The teachers created PowerPoint slides and online video content so that students living in rural areas could view live lessons on YouTube before coming to class. During classroom meetings the teachers guided their students through the work that had been assigned. The teachers eventually found that their students were more engaged in classes and achieved better performance as a result of this new methodology (Bergmann & Sams, 2012).

While much has recently been made of flipped learning, it is not a new concept. In fact, flipped learning is based on the same framework that characterizes inverted classrooms, reversed instruction, and blended learning (Yarbro et al., 2014). Thus, students complete pre-views before coming to class, and teachers make the best use of class sessions by steering students through assignments, problem-solving, group discussions, and interactive classroom activities. Although no flipped classroom is identical, there are several important components that constitute the flipped method. For example, Hamdan, McKnight, McKnight, and Arfstrom (2013) created the acronym FLIP to highlight the key features of flipped classrooms, noting that a flexible environment helps create a learning culture with intentional content, which requires a professional educator. As noted in Policy-Maker Scenario: Flipped Classroom (Panzavolta & Carvalho, 2013), European Commission's Creative Classrooms Lab called for teachers to take advantage of emerging technologies to support their roles as facilitators in classroom learning. The idea is that student-centered learning environments, student empowerment and higher levels of student satisfaction with learning would emerge as a result (Smit et al., 2014).

The flipped learning model, which carries the true spirit of student-centered pedagogy, has been gaining increased attention at all levels of academia. Recent empirical studies have documented this latest trend in the field. For example, Baepler, Walker, and Driessen (2014) compared a traditional lecture-based course (about 340 students) in a chemistry department at a U.S. university in spring 2012 with two “active learning” courses in fall 2012 (about 340 students) and spring 2013 (about 314 students) in the same department. The study in Spring 2013 replicated the study in Fall 2012. Overall, approximately 55% of the students were female, while 80% were either freshmen or sophomores for the three courses analyzed. In contrast to the traditional lecture-based method, the two active courses blended face-to-face meetings with online resources, flipped some lectures with problem-solving activities (e.g., small group analytical exercises and computer simulation tasks), and utilized several interactive activities (e.g., question-and-answer sessions using Clicker, an instant response system). The two active courses combined aspects of both flipped and blended learning. The two flipped/blended courses produced student learning outcomes that equaled or exceeded the traditional lecture-based course. Moreover, the students in the flipped/blended courses reported higher satisfaction with their learning experience than their counterparts.

Forsey, Low, and Glance (2013) flipped a four-credit Australian Studies course by requiring that students take a nine-module massive online open course (MOOC) in sociology before attending 2-h weekly classes. They found that most of the students had the technological skills necessary for the course, expressed a neutral attitude toward flipped learning, and a few responded negatively. Most importantly, however, was the fact that engaged learning, peer learning, and structured learning activities clearly contributed to higher scores in quizzes. In general, 53% agreed or strongly agreed that the flipped classroom suited their needs. Moreover, more than 80% believed the flipped course design provided an effective learning experience. The interview results indicated that while some students were more accustomed to traditional face-to-face lectures, they appreciated the flexibility that online learning resources provided.

Wilson (2013) flipped an undergraduate statistics course with 53 students by greatly decreasing the amount of time spent lecturing while increasing the number of interactive activities during class time. Online reading quizzes were administered before each class to motivate students to complete reading assignments. Students were also encouraged to search for online resources to answer questions that arose from their reading. Traditional lectures were minimized; knowledge transmission occurred outside of the classroom. During class sessions, students worked on group work assignments, team projects and group presentations. An end-of-the-semester survey showed a higher course evaluation rating than in previous semesters. Moreover, the students’ attitudes toward the course and the instructor improved, and their grades were higher. Then, several students complained about the quizzes on their online reading previews. Only 48% of them considered the reading quizzes to be helpful. In contrast, 58% indicated that reading the textbook was helpful.

Strayer (2012) compared the learning environments of a flipped introductory statistics course with a traditional lecture-based course, taught by the same instructor at the same university. Overall, 23 students from the flipped class and 26 of the students from the lecture class participated in the study. Gender was evenly split for both classes, and most of the students were either freshmen or sophomores who were majoring in a wide variety of disciplines. End of the semester surveys, interviews, and field notes were used to ascertain the effects and results of the contrasting teaching styles. The results indicated that “inverted classroom students were more open to cooperation when compared with traditional classroom students for both their preferred learning environment and their actual classroom experience” (Strayer, 2012, p. 190). Moreover, students from both groups preferred similar levels of task orientation, but students in the flipped classroom indicated significantly lower levels of task orientation than the students in the traditional setting (Strayer, 2012).

Yarbro et al. (2014) summarized recent research on flipped learning from K-12 to post-secondary education. Generally, flipped learning has been used in most disciplines, including math and foreign languages. In higher education, flipped learning has also been used in physics, chemistry, nursing education, statistics, human-computer interaction, pharmaceutics, and STEM courses. While some studies (Dill, 2012; Ruddick, 2012) report educational benefits of flipped learning such as improved student performance, others (Clark, 2013; Lape, Levy, & Yong, 2014) question the effectiveness of flipped learning. Additionally, while some students performed better in flipped classrooms, they reported less satisfaction with their flipped courses (Missildine et al., 2013). The limited number of empirical studies on flipped classrooms has shown conflicting results, emphasizing the need for more empirical studies to investigate related issues in different learning contexts.

To date researchers have not reached an evidence-based consensus with regard to the feasibility of the flipped learning approach. In the same way that many question the effectiveness of technology, the debate over the value of the flipped learning model continues. Yet, one of the key points in the argument over flipped learning, as Yarbro et al. (2014) noted, revolves around the question, “Are students truly ready for the flipped approach?” Thus, in order to maximize the benefits of the flipped approach, we need to know students’ perspectives regarding flipped learning as well as students’ readiness for flipped classrooms.

2.2. Individual Differences

One advantage of flipping a classroom is that it can personalize
and individualize instruction (Davies, Dean, & Ball, 2013). Yet, just as a one-size-fit-all approach to education can never fit all students’ needs, the flipped learning approach is not infallible. Still, in keeping with the student-centered spirit of the flipped model, this study examined several personal characteristics with regard to student learning readiness for flipped classrooms.

2.2.1. Self-directed learning

Self-directed learning (SDL) is an instructional method that can be defined as the amount of responsibility a student accepts in ownership of learning (Fisher, King, & Tague, 2001). Curriculum that emphasizes opportunities for students to develop self-directed learning behavior promotes lifelong learning (Blumberg & Michael, 1992). Since students are required to preview materials before coming to a flipped learning class, the ability to regulate one’s own learning is crucial for success. SDL allows students to design their own learning goals, adopt appropriate strategies for learning, and evaluate their learning results (Brockett & Hiemstra, 1991; Fisher & Scharff, 1998). The flipped classroom, a flexible learning environment, affords students a vast array of learning resources and appropriate technologies. In class, students can apply the learning content to solve problems or participate in discussions with the instructor’s guidance. Moreover, the tractive features of the flipped classroom may promote SDL. Therefore, this study hypothesizes that SDL and flipped learning readiness are associated.

2.2.2. Preference for group work

Several research studies have indicated the benefits of group-based learning for students (Slavin, 1996). Group-based learning, also termed with team-based learning, is a structured format of group work that is task-oriented and can bring students to deep learning (Millis, 2010). Additionally, group-based learning can make learning more effective for students who need affiliation (Klein & Pridemore, 1992). Additionally, as Vygotsky (1978) advocated, what learners can achieve with the assistance of others may be more indicative of their mental development than what they can do alone, which not only expresses his concept of zone of proximal development, but also, may be expanded through group-based learning. Yet, not all students have the same levels of preference for group work (Cantwell & Andrews, 2002), which may be problematic as group-based learning is one of the key features in flipped classrooms (Wilson, 2013). In fact, it is through group-based learning that students interact with their peers and the instructor to build knowledge and develop skills. Thus, this study hypothesizes that the willingness of students to participate in group learning activities is associated with students’ readiness for flipped learning.

2.2.3. Gender and other characteristics

Several scholars (Baxter Magolda, 1992; Spinath, Eckert, & Steinmayr, 2014) have identified gender as a factor that can influence academic performance or learning readiness. In fact, female students, who tend to have better verbal intelligence, higher agreeableness, or stronger self-discipline, may often adapt more effectively to a school environment. Baxter Magolda (2001) found that freshmen often have lower levels of learning readiness and actually prefer teacher-directed instruction, which is in contrast to junior year students. As such, gender and the academic status (e.g., sophomore, junior, senior) may play a role in student perspectives and learning readiness for flipped classrooms. Another personal characteristic, student learning outcomes or course grades may be associated with student readiness. Due to the lack of empirical studies regarding student perspectives and learning readiness for flipped classrooms, this study investigated gender, academic status, and course grades.

The purpose of this study was to investigate undergraduate students’ perspectives concerning flipped classrooms. Learning readiness for flipped classrooms and the effects of their personal characteristics are included in the exploration. Specifically, this study seeks to address the following questions:

Research Question 1: What are undergraduate students’ perspectives of their flipped classrooms?
Research Question 2: What are the levels of undergraduate students’ learning readiness in flipped classrooms?
Research Question 3: What are the relationships between students’ personal characteristics and their level of readiness?

3. Methodology

3.1. Participants

This study involved two undergraduate courses, “Information Technology and Education” and “Classroom Observation,” taught by the same instructor in the spring semester of 2014. In total, 84 students voluntarily participated in the study and received extra credit for their contributions. Over 90% of the students who registered for the two courses participated in the study, yet female students (79.1%) greatly outnumbered males (20.9%), which was fairly representative of the general composition of the two individual courses. Additionally, 58 students (68.1%) who took part in the study came from the requisite Information Technology and Education course, which largely consisted of freshmen, while the remaining 26 (31.9%) were from an elective course, Classroom Observation, which mainly consisted of juniors. The different percentages of the participants were a consequence of the course enrollment structure (i.e., general gender inequality in enrollment). According to the demographics collected in the surveys, 47.5% of the freshmen had no plan to teach in schools in the future, while a larger number of the juniors (62.5%) thought that they might pursue a career in education.

3.2. Context

In both courses, the same instructor facilitated the flipped classrooms by requiring that students watch online videos on YouTube, listen to recorded audios on the Moodle platform, read textbooks, and/or utilize online resources on the Internet before coming to class. In addition, students were required to take an online quiz each week through an online instant response system (IRS), which provided the results of the quiz and immediately assessed the students’ work and progress. Students were asked to “bring your own devices” (BYOD), including smart phones, tablets, or laptops to class in order to participate in cloud computing quizzes. Quizzes were designed to determine if students had completed the previews and create incentive for future previews. Thus, all students were exposed to the same learning resources before their assessment of learning readiness.

The instructor used class time to lead discussions and guide the students through group-based tasks. The discussion topics involved authentic issues in the education field that were either related to technology integration in the classroom, for the Information Technology and Education course, or involved matters and phenomena regarding classroom observation, for the Classroom Observation course. While group discussion of these topics was the norm, the instructor also provided a summary of the discussions at the end of each class. Students also spent class time on group-based tasks, such as evaluating web sites and software products. At the end of the semester, each group presented a portfolio of the work they completed in class. Moreover, at the end of each class meeting, the students were asked to reflect upon the issues and tasks that they
had worked on that day and to update the portfolio content in their learning journals. The course grades were assigned by their scores on quizzes (20%), learning journals (20%), group discussions (20%), group tasks/projects (20%), and peer assessments (20%). The peer assessments were conducted during the last week of the semester. To avoid peer pressure and preserve anonymity, students submitted their peer evaluations through Moodle.

3.3. Data collection

To investigate the students’ perspectives on flipped classrooms, the researcher constructed survey items to measure preferences regarding classroom features and general perceptions of the courses. Three open-ended questions were added to provide a more comprehensive picture of the overall perspectives concerning the flipped learning model. Finally, the survey identified a few features of flipped classrooms and asked questions about perceptions of the flipped courses. A 5-point Likert scale was utilized, and responses ranged from “dislike very much” (1) to “like very much” (5).

3.3.1. Flipped learning readiness

This study modified the Hung, Chou, Chen, and Own (2010) Online Learning Readiness Scale (OLRS) with confirmed validity and reliability, to measure the undergraduate students’ readiness for flipped learning. A 24-item survey was distributed to the students, which incorporated five dimensions: computer/Internet self-efficacy, self-directed learning, learner control, motivation for learning, and online communication self-efficacy. This modified Flipped Learning Readiness Scale was linked with a 5-point Likert scale to rate items from “completely disagree” (1) to “completely agree” (5). The face validity of these items was confirmed by two area experts, who compared them to items in McVay’s (2000) study, which had been successfully confirmed in Smith’s (2005) study. Three open-ended questions were added to record respondents’ preferences for or against the flipped classroom.

3.3.2. Self-directed learning readiness

Building on Guglielmino’s (1977) Self-Directed Learning Readiness Scale (SDLRS) and Fisher and King’s Self-Directed Learning Readiness Scale for Nursing Education (Fisher & King, 2010), this study utilized a modified readiness system that adopts a three-factor concept to measure students’ self-directed learning readiness, including self-management, desire for learning, and self-control. The responses were based on a Likert scale, ranging from 1 (completely disagree) to 5 (completely agree). The reliability estimate for this instrument is 0.87 (Fisher & King, 2010).

3.3.3. Group work preference

To measure students’ feelings towards group-based learning, Cantwell and Andrews’ (2002) Feelings Towards Group Work instrument was adopted. This instrument consists of 19 items presented as Likert items based on a five-point scale from 1, indicating not at all true of me, to 5, indicating very true of me. Three factors underlying group work were also included in the instrument: Preference for Individual Learning (Group_G), Preference for Group Learning (Group_I), and Discomfort in Group Learning (Group_D). Thus, Group G shows that the respondent preferred group work and enjoyed collaborating as well as sharing the workload with group members. Group I shows that the respondent felt ineffective in groups, as she/he liked individual learning and preferred to work alone. Group D shows that the respondent felt a sense of discomfort when working in groups, including feelings of nervousness, an inability to relax, fear of asking for help, and difficulty in understanding the nature of group work. The reliability estimate for the instrument is 0.70 (Cantwell & Andrews, 2002).

3.4. Data analysis

This mixed-methods study employed a convergent parallel design in which the data from survey items and open-ended questions were collected and analyzed at the same time, which allows the researcher to compare and interpret the results (Creswell, Plano Clark, Gutmann, & Hanson, 2003). Meanwhile, the qualitative data from the open-ended questions, in complement to the survey data, was carefully analyzed to gain a comprehensive understanding of the students’ flipped experience. Thus, the researcher followed the guidelines for narrative data analysis with the inductive constant comparative method (Glaser & Strauss, 1967), in order to better understand the undergraduates’ experience. In addition, the researcher also read the undergraduates’ answers to the open-ended questions and marked the key words that were related to their likes, dislikes, and their perspectives regarding flipped classrooms, in order to search for specific themes. Afterwards, the researcher searched for patterns among the themes to confirm issues related to flipped classrooms. Finally, the patterns that emerged from their likes, dislikes, and perspectives were summarized for all participants, based on the components of flipped classrooms (e.g., previews, technology integration, and interactive activities in classes).

SPSS 21 Software was utilized to analyze the survey data. Descriptive statistics were used to present the data gathered from the surveys and to respond to the research questions: What are undergraduate students’ perspectives of the flipped classrooms and what are their levels of flipped learning readiness? The Pearson Product-Moment Correlation was calculated to evaluate whether there was a relationship between the students’ individual differences and their readiness and feature preferences. Furthermore, t-tests, one-way analyses of variance (ANOVA) and multiple regression analyses were conducted to investigate the effects of individual differences on student readiness levels.

4. Results

The results are organized according to the research questions that were posed. Thus, the overall student perspectives concerning the flipped classroom will be reported first, followed by the results of students’ readiness with regard to the flipped classroom and the relationship between personal characteristics and readiness. The following results are significant at or beyond p = .05.

4.1. What are undergraduate students’ perspectives with regard to flipped classrooms?

This study investigated students’ perspectives from two aspects: their general perspectives of the courses they took and their preferences concerning the features of the flipped classroom. In addition, three open-ended questions addressed the following questions: 1). Why do you like the flipped classroom? 2). Why do you dislike the flipped classroom? 3). How do you perceive the flipped classroom? The narrative data helped provide an evidence-based understanding of the students’ perspectives.

4.1.1. General perspectives

To understand the students’ general perspectives of the courses, four survey items and three open-ended questions were utilized for assessment (Table 1). 59.5% of the respondents agreed or strongly agreed with the idea of flipped classrooms. Additionally, 54.8% of the respondents agreed or strongly agreed that flipped learning was a good experience. 44% agreed or strongly agreed that they would take a flipped course again in the future, and 39.30% held a neutral attitude. Only 39.3% agreed or strongly agreed that the
flipped course met their learning needs, while 40.5% had a neutral attitude. Finally, the students in Classroom Observation showed higher levels of positive agreement in regard to the flipped course. Individual characteristics of gender and academic status did not influence students’ perspectives the flipped classrooms. The details are in Table 2.

The students liked the flipped classroom, because the spirit of the flipped classroom is student-centered, which broadens the learning experience. One student commented, “I like when the instructor has to consider things in our shoes.” Another noted, “The instructor spent time having us communicate ideas, develop inspirations, and gave us the freedom to decide how much we’d like to learn.” Working in groups was identified as an advantage of flipped learning. “In the flipped classroom, we can work in groups, hear varieties of opinions and get lots of inspiration.” Several students mentioned that while they were forced to conduct previews, they regarded the exercise as a way to train themselves, and thus valued it highly. “I appreciate the fact that the instructor made sure that we did the previews. Doing previews kind of helps me learn to self-regulate and self-study.” Some commented that they thought the class time was used more efficiently than it was in other courses. “We did activities in class and no more lectures. I like it! The way the class time was spent is good for me!” A few students mentioned that they learned more than the textbook content. “The instructor gave us different learning materials in class, and the learning supplements helped me better understand the content.” Finally, some students specified that the flipped learning was a good experience and useful training for self-directed learning. “We were required to do previews, which was difficult to achieve. But I can see that this type of learning can develop our self-discipline disposition.”

Some students disliked the flipped classroom, because they were unwilling to conduct the previews before coming to class. One admitted, “I know it’s my own problem. I just hate to do previews for any reason.” One complained, “Sometimes I just can’t understand the content when I read. I’d rather the instructor lecture and I don’t need to take extra time outside the classroom.” The students admitted that there were merits in flipped learning but felt hesitant to have flipped learning for the entire semester and for all the course content. “When the course content was getting difficult to comprehend, I had difficulty and low motivation to do previews and felt great pressure in the flipped classroom.” Some students had concerns regarding individual difference, such as, “I hate the flipped classrooms. OK, I admit I lack self-discipline skills. I don’t feel like my learning needs were met. What about individual preferences? Shouldn’t they be considered? Aren’t flipped classrooms supposed to be student-centered?” Furthermore, a few students mentioned that some of their classmates did not seem to be doing the previews or contributing to group discussions or projects. Others complained about the quality of group discussion and “free-riders” in their groups. One disclosed, “One of my group members seemed to be skipping the previews. I didn’t think she cared about the quizzes. She did nothing for our group!”

The students emphasized that flipped classrooms cannot be applied to all students, all contexts, and all disciplines. Some students indicated they prefer learning from lectures. One noted, “What if all instructors adopt the flipped classrooms? All courses would need previews! The students would want to die!” One student reported, “There is a certain time budget for each course. Our life is not only for school.” Another wrote, “I know the instructor’s good intentions, but I don’t care how much I can learn from the course.” One complained, “I felt less learner control in this kind of classroom.” Clearly, individual differences are an issue to consider in flipped classrooms. The results of the open-ended questions are summarized in Table 3.

### 4.1.2. Preferences concerning the features

The students showed the highest preference levels for BYOD and IRS (see Table 4). Not only did the IRS feature impress the students, but also, the students repeatedly mentioned how much they loved both IRS and BYOD. One junior wrote in response to the open-ended questions, “The IRS got me less anxious about pop quizzes and made me look forward to taking a quiz.” Comparatively, the freshmen who reportedly had low motivation and self-discipline skills especially loved BYOD. One student noted, “I was never allowed to use my cell phone in class. I’m amazed that cell phones can be used for educational use in class. It’s so cool!” Another favorite feature was the absence of formal lectures and inclusion of a group discussion format. “I like to exchange opinions with my peers. The discussions stimulated me to think from different aspects,” one emphasized. “Lectures are boring. I prefer doing activities in class!” In contrast, the features students reported disliking the most were quizzes and previews in the audio format. The freshmen complained that the quizzes created pressure for them. Some admitted that they were visual learners, and they found it difficult to learn by just listening to lectures. Moreover, none of the students identified the reading or video previews as their favorite feature. “I hate previews. The course took me too much time!” was one student’s view. Another student commented, “I can learn the content in class. Previewing is redundant.”

### Table 2

<table>
<thead>
<tr>
<th></th>
<th>Courses</th>
<th>Classroom observation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good learning experience</td>
<td>0.92</td>
<td>0.76</td>
</tr>
<tr>
<td>Meets my learning needs</td>
<td>0.85</td>
<td>0.56</td>
</tr>
<tr>
<td>Agrees with the idea of flipped courses</td>
<td>0.88</td>
<td>0.68</td>
</tr>
<tr>
<td>Will take flipped courses</td>
<td>0.80</td>
<td>0.56</td>
</tr>
</tbody>
</table>
Table 3
The overall perspectives of the students for the flipped classrooms.

<table>
<thead>
<tr>
<th>Perspectives</th>
<th>Patterns</th>
</tr>
</thead>
<tbody>
<tr>
<td>likes</td>
<td>recognition of students' learning needs</td>
</tr>
<tr>
<td></td>
<td>more interaction in classes</td>
</tr>
<tr>
<td></td>
<td>more effective use of class time</td>
</tr>
<tr>
<td></td>
<td>enriched learning materials</td>
</tr>
<tr>
<td>dislikes</td>
<td>development of self-directed learning readiness</td>
</tr>
<tr>
<td></td>
<td>requirement of self-discipline</td>
</tr>
<tr>
<td></td>
<td>requirement of certain levels of prior knowledge and academic motivation</td>
</tr>
<tr>
<td></td>
<td>requirement of the instructor's intensive monitoring for group interaction</td>
</tr>
<tr>
<td></td>
<td>less learner control</td>
</tr>
</tbody>
</table>

Compared to freshmen, the juniors had higher levels of preference on most features (except BYOD, peer evaluation, and preview by audios), yet no other individual difference showed significant variation. The students in Classroom Observation, which mainly consisted of juniors, also showed higher preference levels for most of the course features, except BYOD, peer evaluation, and previews by audio materials, in contrast to the freshmen in Information Technology and Education. Some freshmen indicated that they were accustomed to teacher-centered instruction and preferred lectures instead of having to express their own thoughts in class. They also disliked the fact that they had been given control of their own learning, which made them feel disoriented in class. Table 5 displays the details.

4.2. What are the levels of undergraduate students’ learning readiness in flipped classrooms?

From an exploratory factor analysis, five items from the original 24 items were removed because of low factor loadings. The four factors (dimensions) were verified: technology self-efficacy, self-directed learning, communication self-efficacy, and motivation for learning in flipped classrooms. In general, the students held an above average level of readiness for flipped learning (M = 3.45, SD = 0.53) (Table 6). The means of the four factors differ significantly (p < .01). The pair-wise comparisons indicate that the highest level of readiness is in technology self-efficacy (M = 3.79, SD = 0.64). The second highest readiness level is in self-directed learning (M = 3.44, SD = 0.58). In contrast, the lowest readiness levels are in communication self-efficacy (M = 3.27, 0.70) and motivation for learning (M = 3.28, 0.68), which show similar results. The subscales of the instrument were examined for reliability with sufficient alpha levels ranging from 0.64 to 0.88 as shown in Table 7.

4.3. What are the relationships between students’ personal characteristics and their level of readiness?

The analysis in this study included variables such as self-directed learning, group preference, gender, academic status, and course grades.

4.3.1. Self-directed learning

Table 8 displays the bivariate correlations among readiness dimensions and self-directed learning dimensions. All self-directed learning dimensions were associated with the overall readiness dimensions and most of the individual readiness dimensions. From multiple regression analyses, the following cause-effect relationships were found: self-management predicted the readiness

Table 4
Preference levels for the course features in the flipped classrooms.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Like very much</th>
<th>Like</th>
<th>Neutral</th>
<th>Dislike</th>
<th>Dislike very much</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>quiz</td>
<td>3.6</td>
<td>14.3</td>
<td>34.5</td>
<td>36.9</td>
<td>10.7</td>
<td>2.63</td>
<td>0.98</td>
</tr>
<tr>
<td>IRS</td>
<td>13.1</td>
<td>44.0</td>
<td>27.4</td>
<td>10.7</td>
<td>4.8</td>
<td>3.50</td>
<td>1.01</td>
</tr>
<tr>
<td>BYOD</td>
<td>15.5</td>
<td>47.6</td>
<td>25.0</td>
<td>9.5</td>
<td>2.4</td>
<td>3.64</td>
<td>0.94</td>
</tr>
<tr>
<td>peer evaluation</td>
<td>7.1</td>
<td>32.1</td>
<td>36.9</td>
<td>14.3</td>
<td>9.5</td>
<td>3.13</td>
<td>1.06</td>
</tr>
<tr>
<td>group discussion</td>
<td>3.6</td>
<td>45.2</td>
<td>28.6</td>
<td>17.9</td>
<td>4.8</td>
<td>3.25</td>
<td>0.96</td>
</tr>
<tr>
<td>no lecture</td>
<td>3.6</td>
<td>45.2</td>
<td>28.6</td>
<td>17.9</td>
<td>4.8</td>
<td>3.25</td>
<td>0.96</td>
</tr>
<tr>
<td>read online resources</td>
<td>4.8</td>
<td>34.5</td>
<td>40.5</td>
<td>13.1</td>
<td>7.1</td>
<td>3.17</td>
<td>0.97</td>
</tr>
<tr>
<td>preview by reading text</td>
<td>4.8</td>
<td>32.1</td>
<td>40.5</td>
<td>17.9</td>
<td>4.8</td>
<td>3.14</td>
<td>0.93</td>
</tr>
<tr>
<td>preview by videos</td>
<td>4.8</td>
<td>25.0</td>
<td>50.0</td>
<td>17.9</td>
<td>2.4</td>
<td>3.12</td>
<td>0.84</td>
</tr>
<tr>
<td>preview by audios</td>
<td>1.2</td>
<td>17.9</td>
<td>42.9</td>
<td>4.5</td>
<td>3.6</td>
<td>2.79</td>
<td>0.82</td>
</tr>
</tbody>
</table>

Table 5
Means and standard deviation for preferences.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Academic status</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Freshmen</td>
<td>Juniors</td>
<td></td>
</tr>
<tr>
<td>n = 84</td>
<td>58</td>
<td>26</td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>quiz</td>
<td>2.38</td>
<td>0.86</td>
<td>3.19</td>
</tr>
<tr>
<td>IRS</td>
<td>3.28</td>
<td>1.01</td>
<td>4.00</td>
</tr>
<tr>
<td>BYOD</td>
<td>3.57</td>
<td>0.94</td>
<td>3.81</td>
</tr>
<tr>
<td>peer evaluation</td>
<td>3.02</td>
<td>1.07</td>
<td>3.38</td>
</tr>
<tr>
<td>group discussion</td>
<td>3.03</td>
<td>0.96</td>
<td>3.73</td>
</tr>
<tr>
<td>no lecture</td>
<td>3.03</td>
<td>0.96</td>
<td>3.73</td>
</tr>
<tr>
<td>online resources</td>
<td>2.97</td>
<td>0.94</td>
<td>3.62</td>
</tr>
<tr>
<td>preview by reading text</td>
<td>2.93</td>
<td>0.92</td>
<td>3.62</td>
</tr>
<tr>
<td>preview by videos</td>
<td>2.95</td>
<td>0.78</td>
<td>3.50</td>
</tr>
<tr>
<td>preview by audios</td>
<td>2.71</td>
<td>0.73</td>
<td>2.96</td>
</tr>
</tbody>
</table>

Table 6
Descriptive statistics for Readiness for the Total Participants.

<table>
<thead>
<tr>
<th>Stage</th>
<th>Mean± SD</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>3.45±0.53</td>
<td>2.12</td>
<td>4.89</td>
</tr>
<tr>
<td>Technology Self-Efficacy</td>
<td>3.79±0.64</td>
<td>1.83</td>
<td>5.00</td>
</tr>
<tr>
<td>Self-Directed Learning</td>
<td>3.44±0.58</td>
<td>1.86</td>
<td>5.00</td>
</tr>
<tr>
<td>Communication</td>
<td>3.27±0.70</td>
<td>1.60</td>
<td>5.00</td>
</tr>
</tbody>
</table>

n = 84.
dimension of self-directed learning \((p < .01)\). Desire for learning predicted the overall readiness \((p < .05)\) and the individual readiness dimensions of technology self-efficacy \((p < .05)\) and motivation \((p < .05)\). Self-control did not predict any readiness dimension. Table 9 indicates the details of the regression analyses.

### 4.3.2. Preference for group work

Table 10 displays the bivariate correlations among readiness dimensions and feelings toward group work. The Group_G dimension is associated with the overall readiness dimensions and all of the individual readiness dimensions. The Group_D dimension is negatively associated with the overall readiness dimensions and motivation readiness. Through multiple regression analyses, some cause-effect relationships were found: the Group_G dimension predicted the overall readiness and the individual readiness dimensions. Table 11 indicates the details.

### 4.3.3. Gender and other characteristics

Gender showed significant differences in the overall readiness levels \((t(82) = 2.25, p < .05)\) and the readiness dimension of communication self-efficacy \((t(82) = 3.02, p < .01)\). In general, male students \((M = 3.70, SD = 0.68)\) had significantly higher readiness levels than their female counterparts \((M = 3.38, SD = 0.47)\). Specifically, male students \((M = 3.71, SD = 0.91)\) had significantly higher readiness levels regarding communication self-efficacy than females \((M = 3.16, SD = 0.60)\). Table 12 presents the details.

The overall readiness levels between the freshmen and the juniors differed \((t(82) = -6.63, p < .01)\). Specifically, the freshmen and juniors had different readiness levels in the dimensions of self-directed learning \((t(82) = -2.42, p < .05)\), communication self-efficacy \((t(82) = -4.31, p < .01)\), and motivation for learning \((t(82) = -9.81, p < .01)\). Namely, junior students had significantly higher readiness levels regarding overall readiness and the individual readiness dimensions, including self-directed learning, communication self-efficacy, and motivation for learning, in contrast to freshmen. Table 13 presents the details.

Table 14 displays the bivariate correlations among readiness dimensions and course grades. The results indicated that the overall readiness and the motivation readiness dimensions were negatively correlated with course grades. In addition, some cause-effect relationships were also found, as determined by multiple regression analyses. Thus, overall readiness and the motivation dimension negatively predicted course grades respectively at \(p < .05\) and \(p < .01\). Table 15 indicates the details. Course grades were assessed through multiple learning tasks with different weighting. To further understand the effect of individual learning tasks, correlation coefficients were calculated, and no significant relationship was identified between the learning readiness dimensions and individual learning tasks.

### 5. Discussion

This study investigated undergraduates’ perspectives of flipped classrooms and disclosed their learning readiness with regard to the technology-integrated learning environment. All of the qualitative and quantitative data was examined as a way to provide support and present a more complete picture of the students’ flipped learning experience.
b. Dependent variables: overall and the individual readiness dimensions.


Means and standard deviation of freshmen and juniors.

<table>
<thead>
<tr>
<th></th>
<th>Gender</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>3.70</td>
<td>0.68</td>
<td>3.38</td>
</tr>
<tr>
<td>Female</td>
<td>3.38</td>
<td>0.47</td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>3.70</td>
<td>0.68</td>
<td>3.38</td>
</tr>
<tr>
<td>SD</td>
<td>0.47</td>
<td>0.68</td>
<td>3.38</td>
</tr>
</tbody>
</table>

Generally, about 60% of the students recognized the advantages of flipped classrooms, which resonated with their comments in the open-ended questions, where they clearly stated that they not only realized how flipped classrooms are student-centered, but how they also appreciated this aspect about flipped classrooms. The results were consistent with Forssey et al.'s (2013) study, which showed that students can understand the merits of flipped learning. On the other hand, the two features with the highest preference levels were IRS and BYOD. IRS lets students gain instant feedback that immediately alerts them in class and may inspire them to be more attentive and motivated in the classroom (Filter, 2010; Fike, Fike, & Lucio, 2012). The BYOD strategy is a trend in education, based on the affordances of mobile learning, which can increase student engagement and improve communication (Kim, Mims, & Holmes, 2006). Both features can help engage students in the learning process, which may explain the students’ positive feedback. Only 38% agreed that their learning needs were met. Moreover, less than 50% stated that they would take a flipped course again. Quizzes and previews (especially in the audio format) were their least favorites, which were common complaints among the participants, as they believed they had less learner control in flipped classrooms. Several participants indicated that peer evaluation created distrust among students and pushed them toward sabotage each other. This may explain why peer evaluation was also rated low in the preference levels. While the data may look conflicting, the results are in line with the answers retrieved from the learning readiness level data.

Although the students appreciated the spirit of student-
centered learning, their perspectives indicated that they did not seem to be ready to take on responsibility for their own learning. The results correspond with the findings of Forsey et al. (2013) and Wilson (2013), who showed that a considerable number of students still prefer lecture-based instruction. In addition, some complained about the extra time they had to spend on the flipped courses, which coincides with Brint and Cantwell (2010) findings that current students regard school work as a part-time job and do not think school work deserves so much of their time.

Further investigation of the types of readiness showed that four dimensions emerged: technology self-efficacy, self-directed learning, motivation for learning, and communication self-efficacy, which were similar to the dimensions in Hung et al.’s (2010) online learning readiness scale, except that the present study combined learning control with self-directed learning through factor analyses. Again, like Hung et al., the students showed the highest readiness levels for technology self-efficacy. This phenomenon is understandable, as digital natives have been categorized as competent technology users (Prensky, 2001). While self-directed learning was ranked as the second highest dimension, the mean score was only slightly above the median. Again, this phenomenon may be explained by the students’ answers to the open-ended questions. The students expressed their lack of disposition for active learning, indicated that they did not feel like doing previews before coming to class, and admitted that they were not used to taking control of their own learning, which was particularly true of the freshmen (the main participants). Meanwhile, communication self-efficacy and motivation for learning were ranked at the lowest readiness levels. Males had higher levels of flipped learning readiness than females (the main participants) in terms of overall readiness and the communication self-efficacy dimension. Some female participants indicated that they were not accustomed to expressing ideas in class. The freshmen had lower levels of flipped learning readiness than the juniors in all readiness dimensions, except the technology self-efficacy dimension. Several freshmen also mentioned they were unfamiliar with practicing communication skills in class and were afraid that their classmates might regard them as being too talkative or showy. Baxter Magolda’s studies (1992) indicated that male students are more confident in technology-integrated learning environments and have more public engagement, which may explain why the female students in this study showed lower overall readiness and lower communication self-efficacy in the flipped classroom. Furthermore, the present study indicated that freshmen are less ready for flipped learning, which echoes Baxter Magolda’s (2001) study that freshmen have lower levels of learning readiness and tend to be passive learners. This may help explain why the juniors or males had higher preferences and readiness levels, and why the readiness dimensions of communication self-efficacy and motivation for learning were at the lowest levels.

In general, regarding the two courses, the students in Classroom Observation were more ready for flipped learning than the students in Information Technology and Education. Specifically, the students in Classroom Observation were more ready in terms of self-directed learning and communication self-efficacy. The two courses differed in student composition (freshmen vs. juniors), class size (62 vs. 29 students), and course content (hands-on vs. concept-oriented). As mentioned above, freshmen and juniors had different learning readiness. Regarding class size, Information Technology and Education was a large class, which made it difficult for each individual to get the instructor’s full attention. Additionally, the content of Information Technology and Education involved instructional technology and technology integration in education, which requires a great deal of discussion and critical thinking activities. Besides, the freshmen may have been unfamiliar with this instructional style or felt that it was unrelated to their future career. On the other hand, Classroom Observation was about classroom observation, which is more concept-oriented. Students may need to be familiar with certain key issues, since more than 60% thought they would teach in schools in the future. Finally, as the juniors had taken courses taught by the same instructor before, they may not have felt like they were hurting the instructor’s feelings in their responses. All these reasons may explain why Classroom Observation showed significantly higher readiness levels across all dimensions except technology self-efficacy. However, further study is necessary to verify the results.

Except for the lack of relation between self-management and technology self-efficacy, all dimensions of self-directed and flipped learning readiness levels were associated. Self-directed learning in self-management predicted the readiness dimension of self-directed learning, and self-directed learning in desire for learning predicted the overall readiness, technology self-efficacy, and motivation for learning. Previous studies (i.e., Fisher & King, 2010) have concluded that when students have high levels of self-directed learning disposition, they may not only manage their schedules better, but also have more desire for learning and control themselves better. Thus, when students have better self-management skills or more desire for learning, they may know better what to do next, have more learning motivation and better prepare themselves for flipped learning. Some admitted they sometimes felt disoriented in class, which may have resulted from the fact that the instructor no longer sequentially lectured. The
students without self-directed learning readiness may have had difficulty catching up with the class and had lower levels of flipped learning readiness. This line of reasoning may explain why the scope of self-directed learning predicted the overall readiness and other individual readiness dimensions.

With regard to feelings about group work, the preference for group learning was not only associated with all types of readiness, but it also predicted the level of readiness. The discomfort in group learning was negatively associated with the overall readiness and learning motivation, although no cause-effect relationship exists. Yet, the feelings about group work revealed a certain sense of fulfillment that may be obtained from a group learning environment (Slavin, 1996), which contributed to the higher levels of readiness. As flipped learning is often operated in the form of groups, this may explain why the preference for group learning can predict all types of readiness. In particular, some interviewees indicated that working in groups provided them with significant assistance, insight and mental support, which may strengthen their levels of learning in the flipped classroom. On the other hand, students’ preference for individual learning had no association with any type of readiness. The flipped classrooms combined individual and group learning to differentiate instruction, which may explain the lack of association between the readiness dimensions and the preference for individual learning.

The students’ overall readiness levels and the motivation dimension negatively predicted their course grades. This phenomenon contradicts previous studies (i.e., Mega, Ronconi, & De Beni, 2014) that showed that higher motivation levels will contribute favorably to better student achievement. Yet, students who had lower motivation and lower achievement levels may have acquired interactive instruction and achieved more success due to the flipped classrooms. Future study is necessary to verify how preferences interact with motivation, how preferences may be sustained and if any other individual differences exist in terms of student perspectives.

The findings lead to some important implications. First, to flip or not to flip, is a concept that is similar to the idea of spectrum and not a yes-no question. Before students are trained with sufficient skills for flipped learning, it is essential for instructors to evaluate student readiness levels to flip their classrooms. Gradual implementation of flipped learning may be a good starting point, perhaps by selecting a few units for students to experience initially. Second, no flipped classrooms are identical. Instructors need to be adaptive and tailor their flipped classrooms to meet the needs of individual students. Interactive technologies (e.g., IRS) or hands-on activities (e.g., group discussions) are considered “best practices” for engaging students during class meetings. Additionally, instructors need to create learning opportunities for their students in order to develop self-directed learning skills and preferences for group learning, which can positively promote students’ readiness levels. Yet, instructors might avoid flipping a class with a large number of students, as it may be difficult for an instructor to handle large group discussions simultaneously. Third, although students will dislike anything they need to do outside of the classroom, instructors still need to not only design curriculum and instruction with students’ personal characteristics and preferences (i.e., in the form of videos but not audios) in mind, but they also make the curriculum relevant to students’ lives. Finally, both instructors and students need to flip their minds; namely, change their mindsets. Students need to first recognize the merits of flipped learning, then take responsibility for their own learning, and afterwards cultivate a self-directed temperament, before getting benefits from flipped learning. Moreover, instructors should also give students specific suggestions or positive feedback to help them develop communication self-efficacy skills and self-directed disposition in class, which is essential for being prepared for the student-centered flipped classrooms.

There are limitations in this study. First, the researcher was also the instructor in the two flipped classrooms. When the students were rating their preference levels or agreement levels in the surveys, their decisions may have been influenced by the teacher-student relationship. Future researchers need to replicate this study in various classrooms and different cultures to confirm the results. Second, the students reported their learning readiness levels and perspectives through self-reported surveys, which may also be biased. Again, future study is suggested in order to integrate with the observation method and triangulate the results. Third, the differences in readiness levels between the two courses were significant, and they may result from the course enrollment structure, course content, familiarity with the instructor, and/or class size, which future study might need to verify. Furthermore, the sample size was small, and the findings were investigated in education courses, which may not necessarily be applicable or generalized to other discipline areas. Finally, this study indicated that students’ motivation-for-learning levels negatively predicted course grades. The grades consisted of different learning tasks, which were weighted differently. There may be some mediated variables that contributed to the results. Future study is suggested to further investigate the impact of different learning tasks.

6. Conclusion

Due to the emergence of user-friendly and cost-efficient instructional technologies, flipped learning is quickly gaining educators’ attention globally. While administrators and instructors are rushing to catch the trend, it is important to first determine if students are indeed ready to embrace flipped learning and take responsibility for their own learning, in order to maximize the merits of flipped learning. Most importantly, instructors must determine if they are indeed aware of their own students’ learning needs and if they are willing to change for students’ sake. Thus, the student-centered spirit of flipped learning may be realized in their classrooms. By then, to flip or not to flip, will no longer matter.

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References


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