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Student Perception of a Hybrid Learning Environment for a Lab-Based Construction Management Course

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This paper studies the perception of students who experience a hybrid learning environment (online classes + face-to-face (F2F) classes) used for a lab-based course for Construction Management (CM) majors. The following question guides this study: "What are the perceptions of CM students exposed to a hybrid instructional delivery on its impact on their learning such as learning attitudes, communication, learning styles, and technical understanding?"

The study utilizes two sets of surveys to assess students' perception on the hybrid approach. The first set of survey questions is mainly to gather students responses on various learning aspects related to the hybrid delivery approach. The second set of questions asks students to compare the hybrid delivery in comparison to the conventional 100% F2F delivery.

The survey outcomes show that the students in the study mostly agree that the hybrid format for the lab-based class provides positive experience in their learning. They perceive in large part the 50/ 50 hybrid delivery format (50% online + 50% F2F) is a better instructional approach than the traditional 100% F2F delivery. This is particularly true in its capability to make students self-responsible for their learning and its flexibility to be sensitive to learner's style and needs. The students also report weaknesses in the hybrid delivery such as reduced contact opportunity with the instructor, increased responsibility, and reduced in-class interactions with their peers.

Key Words: Hybrid Course Delivery, Lab-Based Course, Alternative Instructional Approach, Student Learning

Introduction

Hybrid instruction is an instructional delivery model to reap the benefits of face-to-face (F2F) classroom instruction and online instruction, whose emphasis is not on the technology but on pedagogy (Arabasz & Baker, 2003; Aycock et al., 2002; Berman, 2001). It is a relatively new but yet natural and evolutionary trend faced by educators at higher education institutions (O'Laughlin, 2007). These educators have a long history of teaching courses in a F2F format and look for opportunities to improve their conventional teaching practice by relying on an online delivery method.

Researchers reported various benefits of the hybrid instructional approach from the students', faculty's and institutional perspectives. These include, but not limited to: flexible learning environment; improved communication and interactions; more productive teaching and active learning; maximizing the limited institutional resource (Dziuban et al., 2004; Gould, 2003; Garnham & Kaleta, 2002; Leh, 2002; Lindsay, 2004 Paine, 2003; Spilka, 2002; Young, 2002)

Studies also reported improved learning outcomes, increased attendance, positive student perceptions on hybrid courses (Dewhurst et al., 2000, King and Hildreth, 2001; Tuckman 2002; Yazon et al. 2002).

Even though the existing research has discovered hybrid instruction's benefits and improved student performances, little information is available on how the hybrid delivery has been implemented in a lab-based course setting and its effectiveness as an alternative method for delivering lectures and conducting lab activities (Riffell & Merrill, 2005).

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Research Methodology

This paper presents an effort of implementing a hybrid instructional approach (online delivery + face-to-face (F2F)) into a lab-based class for Construction Management (CM) majors. This study in particular investigates the potential of the hybrid instruction as an alternative format for delivering lab-based courses based on student perception. The following question will guide this study: "What are the perceptions of CM students exposed to a hybrid instructional delivery on its impact on their learning such as learning attitudes, communication, learning styles, and technical understanding?"

Sample and Procedures

Study participants were enrolled in a lab-based CM course in the spring semester, 2010 where they would learn fundamental CM functions such as planning, estimating, scheduling, and control. Two sections of the same course were offered to total 57 students and only 48 students agreed to allow the author to use their responses for publications. This course was taught by the author for the past several years before the study. The typical course format of the previous offerings is presented in Figure 1. Students and the instructor met in a classroom twice a week and each 2-hr F2F class meeting had the lecture-based session for technical contents in the first half (designated as "Lc" in Figure 1). The second hour usually was assigned for lab activities such as hands-on exercises and discussions (designated as "Lb" in Figure 1). Therefore every class meeting has a lecture portion as well as lab activities combined together into a F2F format. This repeated every week throughout the semester.

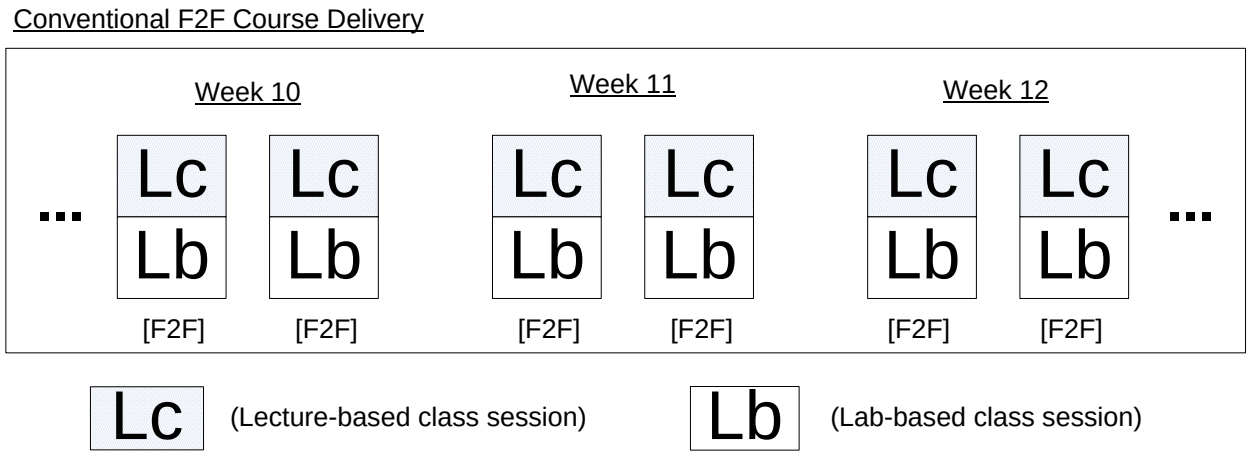

Figure 1. Typical Course Delivery Format before Converted to Hybrid Format

In this study, however, this traditional format was converted to a hybrid format. Instead of combining technical lectures and lab exercises together in one class, in this new format, the instructor delivered the entire technical subject matter of a given week in one online course (as shown in Figure 2 as "Lc") mainly through pre-recorded video lectures. Students were required to finish the online lecture for the week and associated assignments at their own pace and convenience until they would come to the next week's F2F class (designated as "Lb" in Figure 2). In this ensuing F2F class, the students were engaged in learning by relying on hands-on exercises and discussions, which was based on the technical understanding of the subject matter the students acquired in the preceding online class. Based on the progress made, the instructor would post the pre-recorded video lecture on another technical topic for the following week's online class and the same process repeated. Note that the instructor covered the same amount of technical subjects for his lectures and learning activities in this hybrid delivery as he would do in the conventional 100% F2F course.

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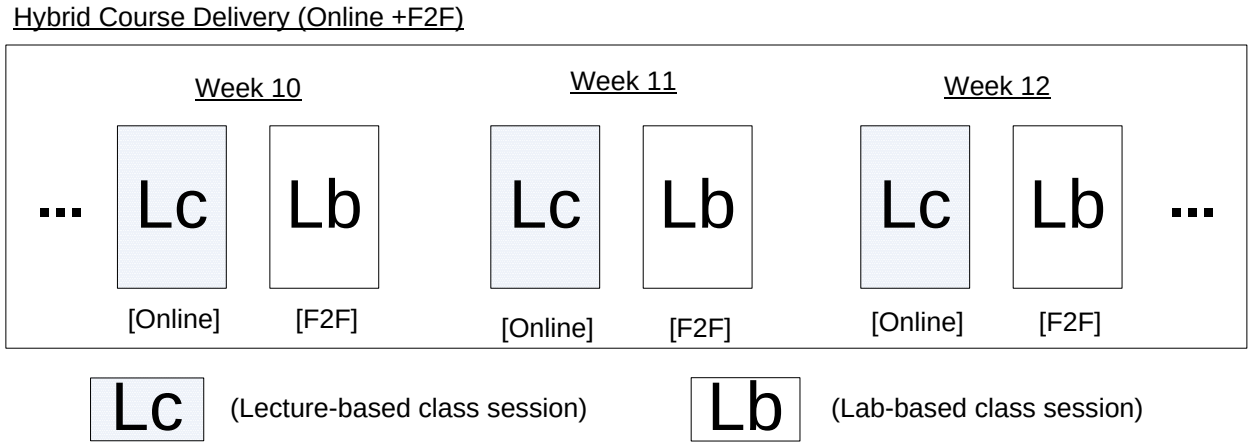

Figure 2. 50/50 Hybrid Course Delivery (50% Online + 50% F2F Class Meetings)

To make it possible to for students to provide their perception on different learning environments, the course was offered in a 100% F2F format and in the second half of the semester it was conducted in a 50/ 50 hybrid format.

Data Collection

The study utilized two sets of surveys to assess students' perception on the hybrid approach. The first set of survey questions in Table 1 was mainly to gather students responses on various learning aspects related to the hybrid delivery approach. The second set of questions shown in Table 2 asked them to compare the hybrid delivery (experienced in the 2nd half)in comparison to the conventional 100% F2F delivery (experienced in the 1st half). The survey questions were as follows:

Table 1. Survey Questions on Hybrid (50% Online + 50% F2F) Course Delivery

[Q1] The hybrid (50% online + 50% F2F) course delivery encouraged you to take responsibility in your learning.
[Q2] The hybrid (50% online + 50% F2F) course delivery promoted active learning and participation.
[Q3] The hybrid (50% online + 50% F2F) course delivery allowed efficient communication/ interactions with the instructor.
[Q4] The hybrid (50% online + 50% F2F) course delivery was sensitive to students' learning style, needs, and preferences.
[Q5] The hybrid (50% online + 50% F2F) course delivery helped you easily understand the technical topics covered.
[Q6] Overall, the hybrid (50% online + 50% F2F) course delivery is believed to provide a good learning experience for CM education.

Table 2. Survey Questions on Comparison of 100% F2F Approach vs 50-50 Hybrid Approach

"Based on your experience, please indicate your thoughts on which delivery method (100% F2F delivery vs 50-50 hybrid delivery) would be better for each question below";
[Q1] "Which course delivery method encourages student to take more responsibility in their learning?"
[Q2] "Which course delivery method promotes more active learning and participation?"
[Q3] "Which course delivery method allows more efficient communication/ interactions with the instructor?"
[Q4] "Which course delivery method is more sensitive to students' learning style, needs, and preferences?"
[Q5] "Which course delivery method helps students understand the topics more easily?"
[Q6] "Overall, Which course delivery method is believed to provide a better learning experience for CM education?"

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[Q7] "If you took this course again, which delivery method would you choose?"

Results

Figure 3 and Figure 4 summarizes the outcomes of the survey questions. The following description provides the specific results and its interpretation for each question.

Learning Responsibility (Q #1)

The students seemed to strongly agree that the hybrid delivery encouraged them to take responsibility in their learning (4.5 points out of 5, with 5 being "Strongly Agree", 4 "Moderately Agree", 3 "Neither Agree or Disagree", 2 "Moderately Disagree", and 1 "Strongly Disagree"). 83 % of students agreed that the hybrid format was better than the 100% F2F delivery to encourage them to be responsible in their own learning. They acknowledged "time management", "self restricted deadlines", and "absence of the instructor" as reasons why their learning responsibility improved.

Active Learning and Participation (Q #2)

As far as active learning and participation in the hybrid delivery, the students expressed moderate agreement (4.2 points of 5). However, when compared to the 100% F2F, they rated the hybrid instruction almost the same as the F2F in terms of promotion of active learning and participation (hybrid favored 51% vs. F2F favored 49%). "Immediate help from the instructor", "instant Q&As" and "discussion with classmates" made the F2F an easy choice for promoting active learning and participation. Almost half the students, on the other hand, shared the opposite opinion because they felt that "self reliance" and "capability to change learning speed" made them more active learners.

Note that this outcome may be interpreted that some students did not understand the intended meaning of the question. This might be the reason why the result of this question seems inconsistent and somewhat contradicting when compared to that of Q#1 as shown in Figure 4.

Efficient Communication and Interaction (Q #3)

The students showed little agreement (3.8 points out of 5) that the hybrid allowed efficient communication and interactions with the instructor. The response in this category was consistent with their preference of the F2F to the hybrid (F2F favored 82% vs. hybrid "18%). They seemed to prefer easy access and immediate communication opportunities with the instructor. However, some students noticed that their communication was better because the online part of the hybrid instruction allowed them to think topics in more depth and bring up quality questions, thereby resulting in quality interactions with the instructor.

Note that this outcome may also be interpreted that some students did not understand the intended meaning of the question. This might be the reason why the result of this question seems inconsistent and somewhat contradicting when compared to that of Q#1 as shown in Figure 4.

Learning Style and Needs (Q #4)

70% of the students responded that the hybrid format was more sensitive to their learning style and needs than the 100% F2F. They stated that the online portion of the hybrid delivery allowed them to study at their own learning pace. The flexibility that learning can be done around their busy schedule yet not losing contacts with the instructor was mentioned another positive reason why the hybrid was preferred.

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Technical Understanding (Q #5)

The students' rating was high (4.3 points out of 5) on the hybrid's capability to have students understand the technical topics. It was reported that the main reason was they were given opportunities to learn and digest the topics first at their own learning speed and reinforce the understating through the hands-on exercise and the Q&A session in the ensuing F2F class meeting.

Conclusion

Overall, the students mostly agreed that the hybrid format used in this lab-based class (50% online + 50% F2F) provided positive experience in their learning. They perceived in large part the hybrid format was a better instruction delivery than the traditional 100% F2F delivery. This was particularly true in its capability to make students self-responsible for their learning and its flexibility to be sensitive to learner's style and needs.

As much as the hybrid instructional strategy was viewed positively, some students reported its weaknesses such as reduced contact opportunity with the instructor, increased responsibility, and reduced in-class interactions with their peers.

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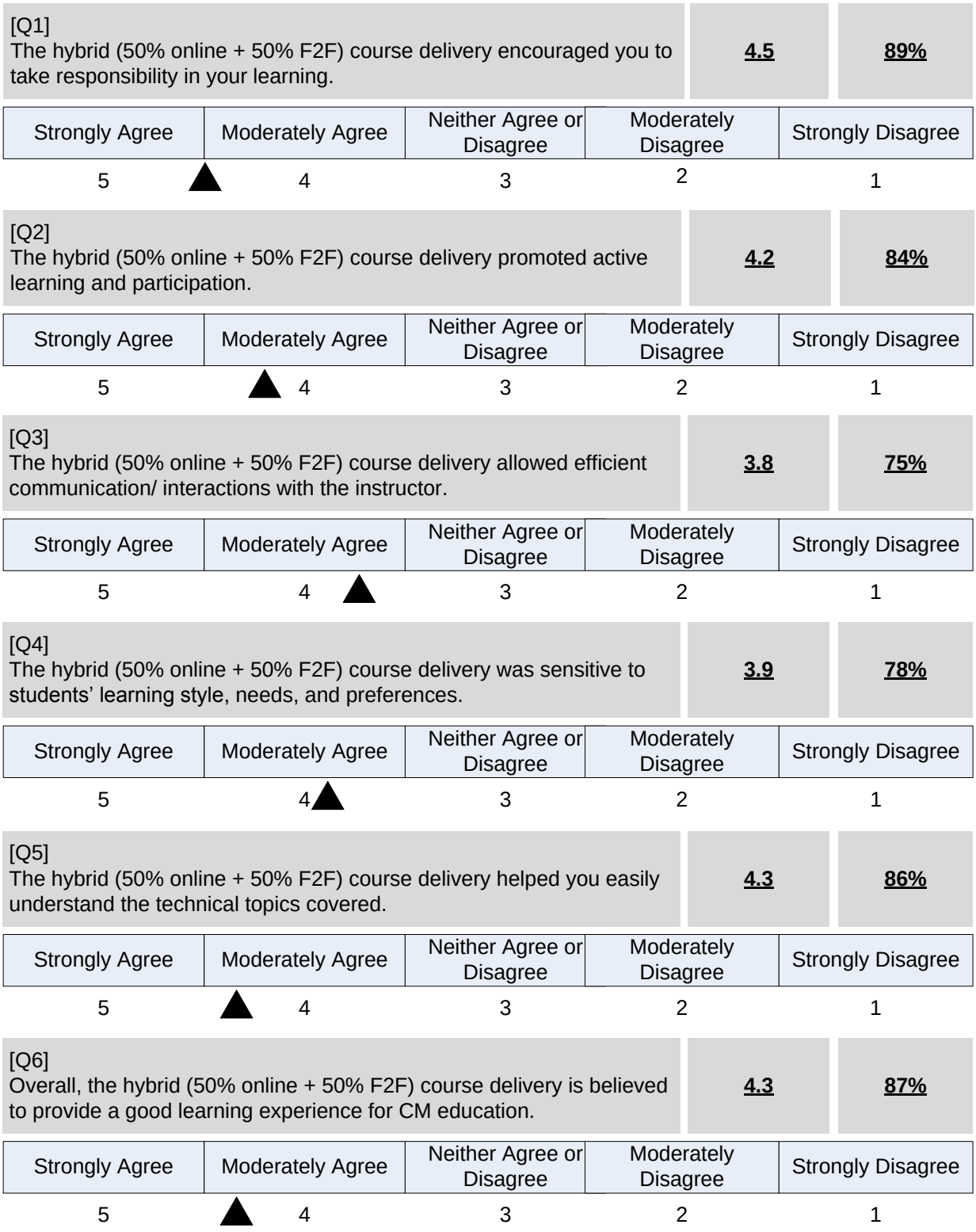

Figure 3. Survey Outcomes on Students' Perception on Hybrid Delivery

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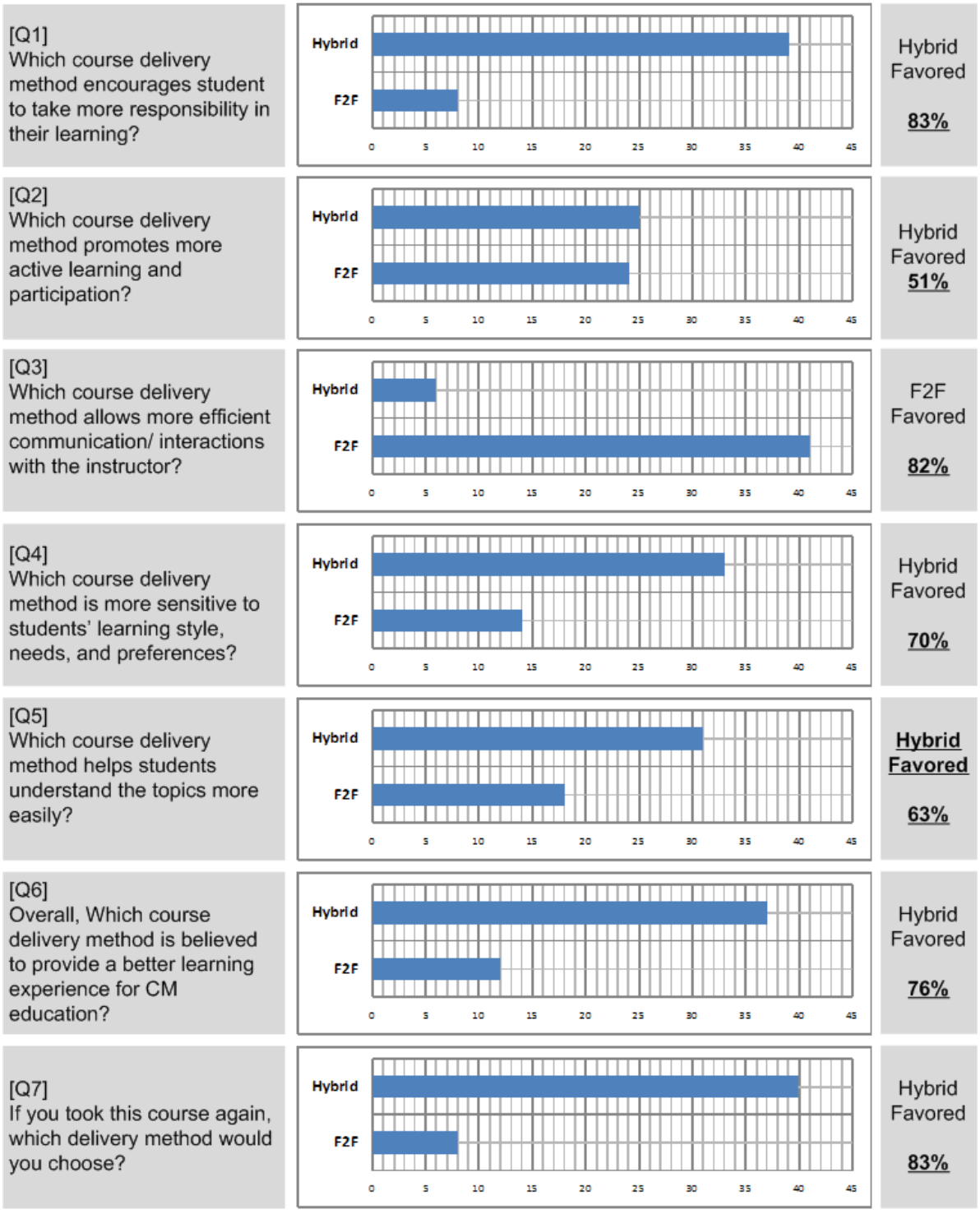

Figure 4. Survey Outcomes on 100% F2F vs 50-50 Hybrid Comparison

** Note that each bar in the figure represents the number of students who favored a certain delivery method. The data was based on 48 students but certain questions show different numbers because a few favored both delivery methods or did not provide a particular preference.*

Recommendation and Future Work

Currently, the comparison of the hybrid method to a 100% online learning is being conducted and the result will be shared in the future publication. The future publication will also expand the hybrid delivery effort from an educator's perspective in terms of its implementation process such as technology involved, time investment, strategies and some pedagogical considerations.

In this study, a 50/50 distribution was used in the hybrid delivery based on the fact that the course traditionally had been taught in the 50% lecture and 50% lab format. However, it should be noted that, even though it was a reasonable approach, it was still an arbitrary decision. How we distribute classes between online and F2F in the hybrid delivery is a fundamental question that is worth a systematic future research.

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