Integration of On-Campus and Distance Students into Teams

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Abstract

As distance education tools and programs expand, more engineering educators are faced with the challenge of integrating on-campus and distance students within the same class. To help educators understand one of their options this paper presents the experiential results of one approach that grouped the students into integrated teams. Based on the behavior of the students and results of two surveys, it identifies the strengths and weaknesses of this approach. These surveys also capture the student's observations and preferences regarding team structure.

Opportunity

In the Fall Semester of 2000, the author had the opportunity to teach Advanced Financial Management, an Engineering Management class, in which half of the students were on-campus and half were distance students. There were fourteen graduate students that took this class in the traditional, on-campus, mode. They were all international students with limited industry experience. In addition there were fourteen distance students who were working engineers and used a variety of communication technologies to participate in the class. Seven utilized an audio-visual network that allowed them to see and hear the class, as well as be seen and heard by the other students. Four captured the streaming video signal through the web and participated in a telephone conference call during each of the classes. The other three received videotapes of the classes with a delay of approximately one week. In this class each team was responsible to prepare one current event presentation, and a final project that required financial analysis based on real-world information that was obtained and analyzed by the team. The projects were relatively unstructured since the team had a significant freedom to choose the topic, the scope, the methods, the form of analysis and the presentation form. This added difficulty to the project since they needed to reach consensus about these decisions, without face-to-face meetings.

Because of the maturity of the graduate students and the balance between on-campus and distance students, this course provided an excellent opportunity to study the integration of these students into teams. The students formed their own teams, but each team was required to consist of approximately half from each of the two student groups. As a result, six teams were formed. Two of them had four members, and the other four had five members each.

The instructor's expectations were that the unstructured nature of the projects would create major challenges for the teams, and initially there would be difficulties in learning how to communicate effectively. The current event presentation was designed to provide the first easy step in this teaming process. The deliverable was fairly simple, but it allowed the teams to develop ways to foster collaboration, learn to use the distance technologies, and develop team working. It was expected that by the end of the semester, when the final project was the main focus of the class, the communication issues would be largely worked out. In addition, it was expected that on-campus students would appreciate the perspectives of the working engineers, and the distance students would feel more integrated into the traditional educational environment. It was hoped that this would provide the synergy to enable superior team performance.

As part of the class, the teams were encouraged to share with the rest of the class what was working well in their teams and what were the major problems. At the end of the semester, the students were asked to complete a survey to express their opinions about integrated team structure, team size, prior experience with distance classes and the benefits and problems with integrated teams. Twenty-six of the twenty-eight students participated in the survey. Of these, 14 were on-campus, and 12 were distance. Sixteen were male and ten were female. In average they had taken 2.5 other distance courses, and a few had participated in integrated teams.

The Results

The students were asked, "If you were designing this class, based on your experience, would you control the teams regarding integration, or let them choose to form as they desire?" "Control" was given a value of "0" and "choice" was "1". The scores displayed in Table 1 are the mean scores that also reflect the percentage of the students that recommended "choice". For example, the score for all students was 0.65, and it means that 65% of the students recommended that they be given the choice. These scores are provided for students grouped based on their characteristics such as location, sex and level of satisfaction. The satisfaction grouping is based on the response of another question in the questionnaire that asked them to assess their overall satisfaction with the integrated project team design. There were five choices and students were characterized as "high satisfaction" if they selected "very satisfied" or "satisfied". All the other students were characterized as "low satisfaction" and they selected "neutral", "dissatisfied" or "very dissatisfied". The index on the right column of Table 1 highlights how the responses from each of these groups compares to the average class response. For example, the mean response for the campus students was 0.73, which was 12% higher than the class mean [(0.73-0.65)/0.65 = 0.12].

The responses to this question show that campus students felt stronger about the need to choose, compared to the average student, and this is reflected in the index score that shows that the score for campus students was 12% higher than the total class score. The female students also felt stronger about choice than the males, as did the students that reported lower satisfaction with the integrated team design. Half of the "high satisfaction" students recommended forced integration, but on the other hand, "low satisfaction"

students overwhelmingly asked for choice, at a rate 26% higher than the overall class. The students were also asked, "If you were designing this class, based on your experience, would you have integrated teams (on-campus with distance students), or segregated teams." In spite of the often-voiced complaints during the class, 71% would design the class with integrated teams. This implies that the teams saw the value of integrated teams, but they would recommend that the students choose their teammates and their locations.

Table 1. Survey Results - Choice Preference

Choice preference	Scores	Index
All students	0.65	0%
Campus	0.73	12%
Distance	0.55	-15%
Male	0.56	-14%
Female	0.80	23%
high satisfaction	0.50	-23%
low satisfaction	0.82	26%

The students were asked what would be the ideal size of three types of teams: integrated teams, campus only teams, and distance only teams. As shown in Table 2, they estimated the ideal integrated team size to be approximately 4. This is the smallest practical size, since there should be at least two on-campus and two distance students on the team. The ideal campus team would be a little smaller, with a mean score of 3.6 members per team. The ideal distance team size was even smaller, with an average score of 3.2 members per team. This is because distances, family needs, business travel and different work schedules make it harder to organize meeting for distance teams. The index data points out that these estimates did not vary much for the different student groups. However, the female students felt that the ideal size for distance team was 11% lower than the overall estimate. It should be noted that the on-campus students score for on-campus teams was 3.43, 5% lower than the overall score. However, the distance student score for distance teams was approximately the same as the overall score.

Table 2. Survey Results - Team Size

Team Size	Scores			Index		
	Integrated	Campus	Distance	Integrated	Campus	Distance
All students	3.90	3.60	3.18	0%	0%	0%
Campus	3.90	3.43	3.20	0%	-5%	1%
Distance	3.91	3.89	3.15	0%	8%	-1%
Male	3.97	3.50	3.38	2%	-3%	6%
Female	3.80	3.81	2.83	-3%	6%	-11%
high satisfaction	4.04	3.38	3.12	4%	-6%	-2%
low satisfaction	3.73	3.95	3.27	-4%	10%	3%

During the semester it became clear that the communication challenge was greater than any of us expected. Based on status report summaries, it was clear that all the team were struggling with communications. E-mail was the main communication link among the students, but it was not as effective as any of the teams expected. Some of the students did not respond to questions and their teammates interpreted this as lack of commitment. However, it is possible that some of these messages were never received.

The students were asked to rate their overall satisfaction with the integrated project team design, where 5 was "very satisfied", 4 "satisfied", 3 "neutral", 2 "dissatisfied" and 1 was "very dissatisfied". As shown on Table 3, the mean score was 3.46, approximately halfway between satisfied and neutral. High satisfaction was defined as scores of 4 or 5, with a mean score of 4.07, while low satisfaction were all the others, with a mean score of 2.68. There was no major difference in satisfaction based on demographic characteristics, but in general on-campus students and males were slightly more satisfied than the others.

Other dependent variables were analyzed. The size of the team involved and the grades received by the teams had no visible impact on the results. It was interesting however, to see that students that had more experience with distance classes tended to form smaller teams.

Table 3. Survey Results - Student Satisfaction

Satisfaction	Scores	Index
All students	3.46	0%
Campus	3.57	3%
Distance	3.32	-4%
Male	3.53	2%
Female	3.35	-3%
high satisfaction	4.07	18%
low satisfaction	2.68	-23%

In order to allow the students to voice their opinions in their own words, they were asked three open questions:
1) What were the main benefits of an integrated team?
2) What were the main problems with integrated teams?
3) Any comments you would like to add regarding integrated project teams?

Table 4 shows that although communication was by far the biggest problem, it also provided the greatest benefit. In order to overcome the communication problems, the teams learned to recognize its importance and find ways to do it better. It was a frustrating experience from which they learned. In addition, there was appreciation for the value that is gained from teams with a diverse background, but there were also

individuals that felt there was too much diversity, making it too hard to obtain effective teaming.

Table 4. Summary of Benefits and Problem Responses

Benefits	**Problems**
Diversification (9)	Communication (22)
Communication learning (8)	Difficult to find consensus (5)
Adds experience (7)	Delays in timing (5)
Synergy (4)	Lack of trust (4)
Project management (3)	E-mail problems (3)
Get to know students (2)	Hard to schedule (3)
Use of technologies (2)	Lack of time (3)
Learn more (2)	Too much diversity (3)
More members (2)	Lack of participation (3)
Learn to work together (2)	
More realistic (2)	

(The numbers represent the number of times that these issues were cited.)

The student comments consisted of recommendations for ways to improve the performance of the teams, and additional comments. Realizing the difficulties that exist in distance communication, the students recommend that the teams be given access to more distance communication tools and be trained to use them. In addition they recommend that the teams be created earlier and team structure be added through the establishment of team leaders and other explicit team roles.

Table 5. Summary of "Other Comments"

Recommendations:

Should organize or support tele-conferences and other communication tools (4)
Should allow for individual to work alone
Should create the teams earlier
Should have team assign a leader

Additional Comments:
The problems are due to individuals more than the team structure (2)
Valuable experience but frustrating
Integration skills are very important to success
Not realistic

Conclusions

Communication is one of the great challenges for distance and culturally integrated teams, particularly when they are chartered to perform unstructured tasks. However, although these situations can generate considerable frustration and are time consuming, they do enhance learning for the students and the students recognize it.

Recommendations

The results of this study point to some action that faculty can take to reduce some of the concerns, without giving up on the learning benefits. These recommendations include:

- Allow the students to choose the team make-up. Individuals can choose whether they want integrated teams and invest their time and energy to improve their distance communication skills. If they choose to integrate, they will be more prepared to make the investments necessary to succeed.
- Slow down the implementation of integrated teams - Even though distance communication tools are being developed at a fast rate, many of these tools are not currently available. Over time these tools will improve, and greater use of integration can be required in the future.
- Simplify the projects - One of the factors that magnifies the communication challenge is the unstructured nature of the projects. Until we learn how to incorporate better distance communication tools, we should provide more structure in the projects to reduce some of the complexity.
- Provide more communication tools - In particular, tele-conferencing was found to be a valuable tool for distance team communication. However, the teams didn't know how to take advantage of this communication channel until late in the semester. Faculty should identify the tools that are available and communicate it to the teams.
- Invest in training - There were many technological tools available to the teams, but they were not properly trained to use them. Even with e0mails there were problems that could have been prevented with training early during the semester. If acknowledgements of receipts of messages were routinely used, many problems could have been prevented.
- Form teams with appropriate size - The students recommended that integrated teams should have 4 to 5 members to allow for at least two on-campus and two distance members. Segregated campus teams should have 3 to 4 members and distance teams should have 2 to 4 members.

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