Interdisciplinary Project-Based Model for Enhanced Instruction of Courses

Douglas Johansen
Florida State University, dljohansen@gmail.com

Claudia Scaff
University of North Florida, cscaff@unf.edu

Jace Hargis
University of the Pacific, jace.hargis@gmail.com

Interdisciplinary Project-Based Model for Enhanced Instruction of Courses

Abstract
This study examines ability of an interdisciplinary group project to develop student's abilities to work successfully in groups in a creative context. Group dynamics were investigated via interaction effects between students in a Graphic Design and Marketing class project. A repeated measures survey technique was used to assess student's perceptions of group projects and their attributes. As a result of the project, student perceptions concerning the importance of creative contributions, as well as group participation factors became more positive, demonstrating that interdisciplinary group projects with students in a creative discipline offer business students a unique "outside the box" learning opportunity.

Interdisciplinary Project-Based Model for Enhanced Instruction of Courses

Douglas Johansen
Florida State University
Tallahassee, Florida, USA

Claudia Scaff University
of North Florida
Jacksonville, Florida, USA

Jace Hargis University of
Central Florida Orlando,
Florida, USA
jace.hargis@gmail.com

Abstract

This study examines ability of an interdisciplinary group project to develop student's abilities to work successfully in groups in a creative context. Group dynamics were investigated via interaction effects between students in a Graphic Design and Marketing class project. A repeated measures survey technique was used to assess student's perceptions of group projects and their attributes. As a result of the project, student perceptions concerning the importance of creative contributions, as well as group participation factors became more positive, demonstrating that interdisciplinary group projects with students in a creative discipline offer business students a unique "outside the box" learning opportunity

Keywords: Project-Based Learning; Collaborative Learning; Interdisciplinary.

Introduction

In organizations employing business and graphic design students, for example, advertising agencies and marketing firms, success is predicated on the ability of individuals to work together productively and creatively. Such abilities are seen as highly desirable and are sought after by many employers.   Acquiring such abilities is problematic for both marketing and design students as these abilities are usually developed as a consequence of employment and simultaneously perceived by employers as a pre-condition for employment. Thus, students in both marketing and graphic design face the dilemma of how to develop and demonstrate the abilities required by employers.

A variety of tools are used by educators and educational institutions to develop such abilities. Historically, group projects have been used to engage students and to contextualize active learning. In both business and graphic design disciplines, group projects are seen as important tools for introducing students to the professional work environments to which they aspire. However, business students (and business professionals) are rarely exposed to the creative processes used by creative professionals such as designers and often have problems "thinking outside the box". Furthermore, group projects typically evoke mixed feelings among students and faculty members for reasons which might include inequity in division of labor, incompatible personalities and personal

habits, significant time requirements and schedules for group meetings and incongruities in student perceptions regarding project processes versus outcomes. Thus, this study intends to contribute to the body of literature examining the phenomenon of collaborative learning, interdisciplinary learning and professional skills development by assessing student attitudes about learning in the context of a cross-disciplinary group marketing project. In particular, business student attitudes regarding the significance of contributions by so-called creative types as well as their participation in a group project are assessed to establish the ability of the project to offer business students a unique experience.

In this investigation, the research design employed a repeated measures ANOVA technique to examine the interaction effects between students in a graphic design course and a marketing class project. The results support hypotheses that reveal increasingly positive attitudes regarding learning outcomes through group projects and also an increase in positive attitudes regarding the importance and contributions of creative disciplines in a business context.

Conceptualization

Literature supports multiple ways of addressing issues of group dynamics. Traditionally, class projects originating in business schools draw on the skills and abilities of business students, for example, quantitative skills, organizational skills, marketing, etc., while graphic design projects are focused on a complementary set of skills and abilities that are creative in nature. Determining how students can actively learn in cooperative environments can provide insights for both students and faculty members, for example, by assisting with the development of future group projects that stress the skills required in the business world. Since businesses rely on the skills and abilities of their employees to create advantages that lead to better performance, group projects that teach teamwork and collaborative learning are essential.

While business schools in general are responsive to the needs of business, skills associated with teamwork and collaborative learning are difficult to incorporate in many classrooms. Yet, teamwork and collaborative learning are mainstays of North American corporations, who have found ways to gain leverage over their competitors, by using advantages associated with these skills. Furthermore, up to 82 percent of American companies apply the team concept to their daily operations (Chaney & Lyden, 2000). There are numerous benefits to successful teamwork, some of which are: increased productivity, improved communication, creativity, problem solving, and higher-quality decisions. Most companies believe that cross-disciplinary teams save time and money. Cross-disciplinary teams are typically composed of people with various skills, so that each individual would take a different role in the team. The teams develop the project from start to finish, but they are also creating new applications for the project/problem solving.

Higher education is addressing the need for sufficient training in teamwork by developing multidiscipline teams similar to those found in industry. A multidiscipline teamwork experience allows students to understand the challenges to working in a team before entering the field (McCahon & Lavelle, 1998). These teams collaborate to reach their goal so many would label this approach as Collaborative Learning. Collaborative Learning is commonly used in the college and university context because of its applicability to the real world. Prospective employers appreciate students who are able to function effectively in a team environment (Colbeck, Campbell, & Bjorklund, 2000). The more one understands

how to work in a group, the more likely they will succeed in the business culture. In industry it is common for managers to serve on many different teams at one time. Moreover, managers participate in group activities from 60% to 90% of the time (Chapman & Auken, 2001).

Collaborative learning involves student problem solving, answering questions, and producing a team product (Colbeck, Campbell, & Bjorklund, 2000). Another opportunity provided by team work is the development of effective communication skills. This contextualized approach helps students understand the complexities and challenges of working in a group. In fact, many companies are known to ask if a student has previously worked in a team climate (Chapman & Auken, 2001). The learning process in team projects involve both faculty and peer interaction, as both will act as "agents of socialization" (Colbeck, Campbell, & Bjorklund, 2000). These experiences equip students with the knowledge necessary to handle interpersonal conflict and improve their employment skills.

Hartenian, Schellenger, Frederickson (2001) look at the adaptation of business schools to real world business situations, by developing appropriate course work utilizing project teams. These teams reflect the forms of organizational structure and functions in industry. Project teams are concerned with issues involving strategic decision making, implementation challenges, and operations. Since the tasks assigned to groups are various in nature, training is offered to various disciplines, (e.g., accounting, finance, human resources, management, management information systems, marketing, operations) giving a student a well rounded understanding of both their field and complementary business areas. In order for corporations to compete in the ever changing world of business, they need to develop systematic decision-making processes and guarantee feedback from each department. Many companies have devised various methods to address this need; "…the continuum has ranged from integrative tools (i.e., liaisons), to multidiscipline problem-solving teams (i.e., cross-functional work teams), to fully integrated team-based structures" (Hartenian, Schellenger; Frederickson, 2001, p 149).

History of the Interdisciplinary Project

During a three year period the fact that Packaging Design and International Marketing courses have been taught concurrently has been used to attempt to create a more meaningful classroom experience for students in both classes. By having students work together on the same project in what might be identified as a Designer – Client relationship, the instructors in these two different disciplines have attempted to challenge students of both the design and business disciplines by engaging them in tasks that reach across disciplinary boundaries. In sum, the idea has been to have a design student work to support a team of international marketing students developing a plan for market entry in an emerging market by creating a design for the product being marketed. The goal has been to create a "real world" context for the application of students' knowledge and skill in recognition of the applied nature of both disciplines.

Prior to collecting data, this method was used twice and subsequently modified to accommodate various issues such as student complaints, the observations and suggestions of the instructors, and scheduling.

Project One: The Initial Project

In the first attempt to use this methodology, the marketing students were broken up into groups, a design student was assigned to each of the approximately 16 groups in an arbitrary manner. That is, students were forced to take on the groups as clients, and the groups forced to use the designers assigned to them. Then, the instructors attempted to facilitate the exchange of information and ideas in such a way that students, design students in particular as a result of the Packaging Design course schedule, were able to meet the deadlines of their respective project assignments.

In terms of outcomes, there were many positives, especially for the design students, who as a whole responded well to the demands of the marketing groups. While the design students produced many exemplary packaging designs working within the limits of the interactions with the marketing students, the marketing student's projects seemed only tangentially affected by the design students efforts. That is, the benefits for the marketing students were only apparent in elements of their projects, such as the presentation or advertisements, where information was presented graphically.

Qualitative data collected via interviews with the student groups revealed many common perceptions. Negative outcomes were more obvious as a result of student interviews. Typically, these took four common forms: complaints about responsiveness, e.g., "they don't email back", complaints about poor communication, e.g. "they won't provide the information I require", complaints about expectations, e.g. "they aren't doing what we want" or "I can't do what they want" and finally, complaints about perceptions of effort required, e.g. "they are too difficult to deal with".

From this initial attempt, two prototypical models of project interactions were identified that proved helpful in modifying the assignment for future classes, one prototypical model of positive interactions between the design and marketing classes and one of negative interactions. From the instructors' perspective, both models should be considered successes in terms of completion of the respective assigned projects. As such, both the project models offer the same potential for learning.

In the model of positive interactions, the designer worked closely with the marketing students and contributed to the process of developing product image and positioning. For example, in one group, the marketing students had conceived of a package formed in the shape of a woman and the designer dissuaded them from using such a concrete representation by explaining the negative points of such a design (negative associations, cultural impediments etc.) and worked with them to develop a packaging solution that was more symbolic of the product attributes desired by the marketing students. The result was evaluated very positively by both the marketing and design instructors. In qualitative interviews, the students reported similar positive results. There was good, responsive communication, good collaboration and the final packaging design was well received by the marketing students. This model came closest to the desired Designer – Client relationship we had envisioned.

The negative model had an abundance of each of the complaints identified. While there was much and frequent communication, this communication was largely negative. There were differing expectations about what the role of the designer should be – an active participant in the process or a passive interpreter of what the client, (i.e. the marketing students), wants. There were also differing perceptions about the success of the outcome. Clearly, this type of relationship is also characteristic of that between Designer and Client

in the so-called "Real World", just not the relationship the instructors sought to promote.

Project Two: Revising the Project
To correct the complaints registered in the first project, a more complete of integration the projects was attempted. Three principal changes were made to the implementation of the cross-disciplinary component of the project. First, the project schedules were revised to facilitate this integration, including critical tasks such as due dates, for both classes. Secondly, rather than using the more arbitrary method of assigning design students to the marketing groups, marketing students presented their projects and design students presented examples of their work for review by the marketing students. Then, the students were encouraged to identify good matches between marketing students and designers with minimal facilitation of the instructors. Finally, additional information requirements were placed on the marketing students to make it easier for the design students to focus on design and to meet their deadlines. Specifically, the marketing students were asked to present the necessary background information (culture, target market, product features, etc...) to the designers to eliminate the designers' need to engage in extensive research.

These revisions to the project resulted in a decrease in the general number, but also the intensity of the complaints experienced after the first experience. Notably, communications between the designer and the marketing groups improved and expectations about the designer's role and output were more aligned between the groups and designers. In this second iteration, there were no instances of the negative model identified above, and in general, to varying degrees, interactions between designers and the marketing groups resembled the positive model above.

Project Three: Source of the Study Data
Predicated on these results, the collaborative exercise was repeated with the revised assignment used in Project Two. In this instance, however, the process of observing student attitudes, motivations and learning experiences was formalized by implementing the methodology recorded in the methodology section below.   Prior qualitative data collection via interviews with the student groups resulted in four hypotheses which address key learning objectives for the instructors. First, do marketing students learn from interacting with design students in the context of a marketing project?   Since design students are focused on creative activities, i.e. designing, their focus, their language, their processes are creative in nature, differences in disciplines, and related factors, may create "real world" situations that develop marketing student managerial abilities. As noted, cross disciplinary teams are prevalent in the "real world" and the ability of business professionals to communicate across disciplinary boundaries is essential. Thus, the first hypothesis:

> H_1: There is a positive change in mean relationships over time between student attitudes and motivations and the perceived value of the creative influence of design students in the group projects.

The implication here is that marketing students will develop more positive attitudes about the inputs of design students.

The second hypothesis tests student attitudes regarding the effort required by group projects. As noted, one common concern of students regarding group projects was the amount of perceived effort associated with tasks such as communication and coordination

of cross disciplinary activities. This hypothesis tests in a general way the student's perception of value (i.e. the benefits of the project weighed against the sacrifice involved). It is important to the instructors that students perceive increased value as a result of engaging in the project. Therefore, the second hypothesis is offered

> *H2: There is a positive change in mean relationships over time between student attitudes and motivations and the perceived individual challenges of group projects.*

The instructors were also eager to learn how student attitudes toward group project changed over the course of the group project. That is, did they perceive group projects more positively as a result of undertaking this project? This is the subject of the third hypothesis:

> *H3: There is a positive change in mean relationships between student attitudes and motivations about group projects experiences as a result of undertaking a cross-disciplinary group project.*

Finally, since business students aren't perceived as working in a creative field, the question of how they perceived their interaction with the design students, who are part of a creative field. In the context of marketing, above all other business discipline, the ability to work with individuals from creative disciplines is more highly valued. Hence, the last hypothesis addresses student perceptions of the value of the creative inputs supplied by the design students.

> *H4: There is a positive change in mean relationships over time in student perceptions of the value of the inputs provided by design students.*

Methods

Setting
The study was conducted using the 112 class members of three sections of an International Marketing class at a southeastern university. The design is a pre-assessment/post-assessment with a mid-point test as well. Students were grouped in approximately seven groups per class for a total of 22 groups. The first survey was conducted at the start of the semester when students had been assigned to groups but before they had any experience working together as a group. The second survey was conducted at the first critical point in the project, a point when the first group assignment was due approximately 6 weeks after the first survey. The final survey was conducted after the project had been completed, approximately seven weeks after the second survey.

The survey instrument was derived from the qualitative data generated in previous years and was intended to measure student attitudes and motivations about their experience in group projects. The survey items appear in Appendix 1. The survey was implemented online using an electronic format on the Blackboard system. All information was coded using a unique identifier, student id number, and confidentiality was maintained to the extent stated and required. The total enrollment of 112 students were given the incentive of extra credit for responding to the surveys, but respondents were able to respond anonymously, as the survey tool used recorded only the completion of the survey, but not identifying information. Of these 112, 107 responses were obtained of which there were 98 usable responses.

Exploratory Factor Analysis

Since this data set consists of observational data, the data was cleaned and recoded. Preliminary analysis showed that there were no issues identified that would indicate violations of multivariate normality assumptions. Exploratory factor analysis was performed using the Principal Component Factor analysis with Varimax rotation, consistent with recommendations for exploratory factor analysis. A four factor model was identified based on Kaiser's rule (number of factors greater 1) and inspection of a scree plot. The results re given in Table 1

Table 1. Rotated Factor Loadings and Communalities. Varimax Rotation

Variable	Factor1	Factor2	Factor3	Factor4	Communality
C6	0.721	0.004	0.136	-0.014	0.539
C7	0.538	0.075	0.104	-0.309	0.401
C8	0.648	-0.064	0.257	-0.262	0.559
C9	0.658	-0.376	0.038	0.068	0.58
C2	0.163	-0.727	0.172	-0.263	0.654
C3	-0.141	-0.704	0.085	0.069	0.528
C5	0.217	-0.683	0.008	-0.227	0.565
C11	0.033	-0.286	0.683	0.041	0.552
C12	0.147	0.046	0.735	-0.196	0.603
C13	0.227	-0.039	0.654	-0.074	0.487
C14	0.099	-0.145	0.040	-0.643	0.446
C15	0.065	-0.019	-0.000	-0.65	0.427
C16	0.129	-0.164	0.360	-0.617	0.554
Variance (eigenvalues)	1.86	1.77	1.700	1.5563	6.8925
% Var	0.143	0.137	0.131	0.120	0.530

The four factors identified explained 53% of the variable variance with communalities ranging from .40 to .65. Upon review, these were judged to be consistent with the intent of the survey questions.   As a result of an iterative purging process questions 4 and 10 were dropped from the model, because they did not load on any of the dependent response variables identified. The resulting model was judged to be consistent as a parsimonious model that fits the data well and the objective of simple structure was judged to be achieved. The factors identified were as followed:

Questions 1, 2, 3 and 5 loaded on the first factor (F1). Since these items tested student's attitudes regarding past efforts in group projects, this factor was called Group Effort.

Questions 6, 7, 8 and 9 loaded on factor F2. The domain common to these uestions was student's perceptions of group interactions, thus F2 was called roup Experience.

Questions 11, 12, and 13 which relate to student's individual efforts in group projects, all loaded on the third factor (F3) which was labeled Rel Individual Effort.

Finally, the fourth factor consists of Questions 14, 15, and 16, all of which relate to the importance of creativity in group projects, thus the label Creative Influence was chosen for factor F4.

The results of the individual survey elements were then aggregated to create the variables used in the repeated measures ANOVA

Table 2 presents the descriptive statistics for these variables.

Table 2. Descriptive Statistics

Variable	Mean SE	Mean	StDev	Variance
Group Effort	16.085	0.154	2.642	6.980
Group Experience	15.646	0.123	2.108	4.445
Rel. Individual	12.360	0.0787	1.349	1.821
Creative Influence	11.214	0.0912	1.565	2.448

The hierarchical structure of the data is also important. As seen in Figure 1, the design is such that each of the Treatments (surveys) is administered to the individuals who have been placed in one of 22 Groups. Each of the Groups has been nested in one of three Classes. Knowledge of this hierarchical design is critical for achieving a correct result.

Figure 1: Hierarchical Structure of Data

22 groups total, 112 total students, 3 surveys of 98 usable responses
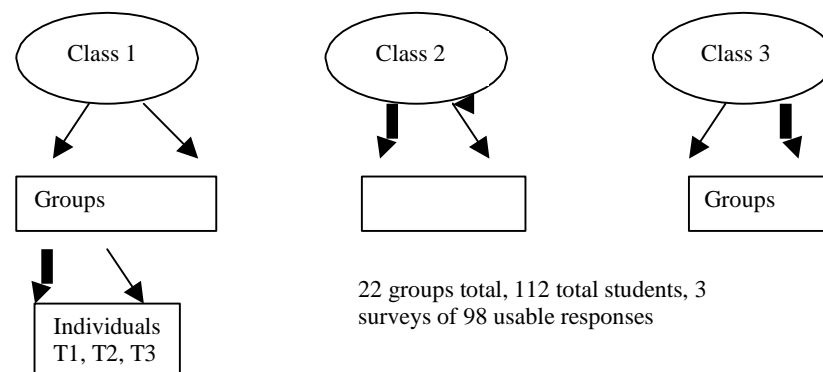
Analysis of Variance

The data collected was analyzed using a general linear model. Tables 3 through 6 present the results of the ANOVA conducted on each of the 4 independent response variables described above, using a significance level of alpha = .05. These variables were tested for and meet the underlying assumptions relating to normality and heterogeneity of variance for an ANOVA model. In the ANOVA, Time and Group have been modeled as fixed variables to be able to permit observation about changes of the mean over time and by group. Class has been modeled as a random variable. Further, Time has been crossed with Class, which means that each individual's response occurs each and every time (thus may change) a

class was surveyed. On the other hand, Group is nested in Class, which means Group occurs within the context of Class and does not change from survey to survey. The ANOVA technique is appropriate for this analysis since it will permit changes in mean values to be evaluated over the course of the project.

Table 3. Analysis of Variance for Group Effort

Source	DF	Seq SS	Adj SS	AdjMS	F	P
Time	2	4.600	6.102	3.051	0.91	0.471*
Class	2	13.204	11.301	5.650	1.24	0.377*
Time*Class	4	13.338	13.338	3.335	0.48	0.753
Group(Class)	20	157.874	157.874	7.894	1.13	0.321
Error	265	1856.16	1856.16	7.004		
Total	293	2045.18				

* Not an exact F-test.

S = 2.64658 R-Sq = 9.24% R-Sq(adj) = 0.00%

Table 4. Analysis of Variance for Group Experience

Source	DF	Seq SS	Adj SS	AdjMS	F	P
Time	2	10.648	11.514	5.757	7.64	0.039*
Class	2	18.524	17.949	8.975	2.47	0.165*
Time*Class	4	2.926	2.926	0.732	0.17	0.953
Group(Class)	20	139.886	139.886	6.994	1.64	0.044
Error	265	1130.39	1130.386	4.266		
Total	293	1302.37				

* Not an exact F-test.

S = 2.06533 R-Sq = 13.21% R-Sq(adj) = 4.03%

Table 5. Analysis of Variance for Rel. Individual Effort

Source	DF	Seq SS	Adj SS	Adj MS	F	P
Time	2	1.446	1.460	0.730	0.84	0.495*
Class	2	5.273	4.911	2.456	1.76	0.260*
Time*Class	4	3.463	3.463	0.866	0.48	0.751
Group(Class)	20	45.304	45.304	2.265	1.26	0.209
Error	265	478.086	478.086	1.804		
Total	293	533.572				

* Not an exact F-test.

S = 1.34317 R-Sq = 10.40% R-Sq(adj) = 0.93%

Table 6. Analysis of Variance for Creative Influence

Source	DF	Seq SS	Adj SS	Adj MS	F	P
Time	2	6.68	6.36	3.18	6.08	0.050*
Class	2	6.003	3.119	1.559	0.76	0.508*
Time*Class	4	2.047	2.047	0.512	0.22	0.929
Group(Class)	20	76.578	76.578	3.829	1.62	0.048
Error	265	625.921	625.921	2.362		
Total	293	717.229				

* Not an exact F-test.
S = 1.53687 R-Sq = 12.73% R-Sq(adj) = 3.51%

The results of the ANOVA show that Class and the TimeClass interaction were insignificant for all the factors. However, Time relative to two factors was significant, indicating that the mean response changed over the course of the project, for two of the measured variables, Group Experience and Creative Influence, forming the basis of hypotheses H2 and H4.

Specifically, Time and Group were significant at an alpha =.05 level for the variables of Group Experience (with F = 7.6, p=.04, and F=1.64, p=.044 respectively) and Creative Influence (F=6.08, p=.057, and F= 1.62, p=.048 respectively). The r squared values for both Group Experience and Creative Influence were approximately 13%, that is 13% of the variance for each of these variables was explained by the model. While this clearly does not explain a large amount of the variance, for a human studies experiment, this is an acceptably large r squared.

Based on the results of the ANOVA, the hypotheses H1 and H3 are rejected, while H2 and H4 are supported.   An increase in these mean values would mean that students' responses on items relating to the factors of Creative Influence and Group Experience have trended toward the Strongly Agree end of the scale. The nature of the change may be seen in the main effects plots in Figures 2 and 3.
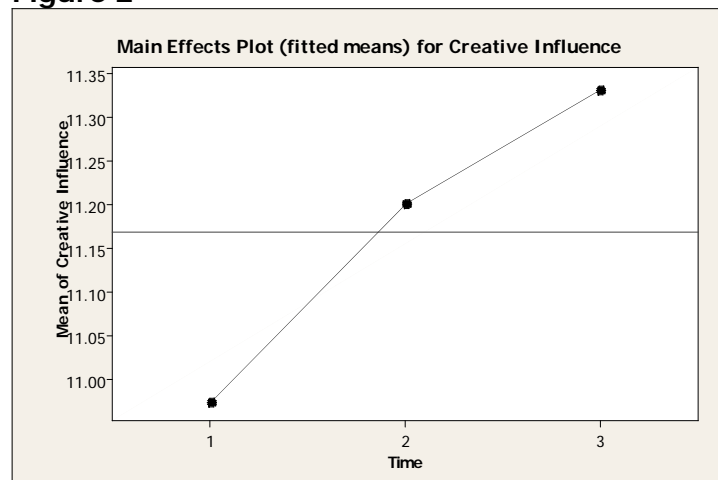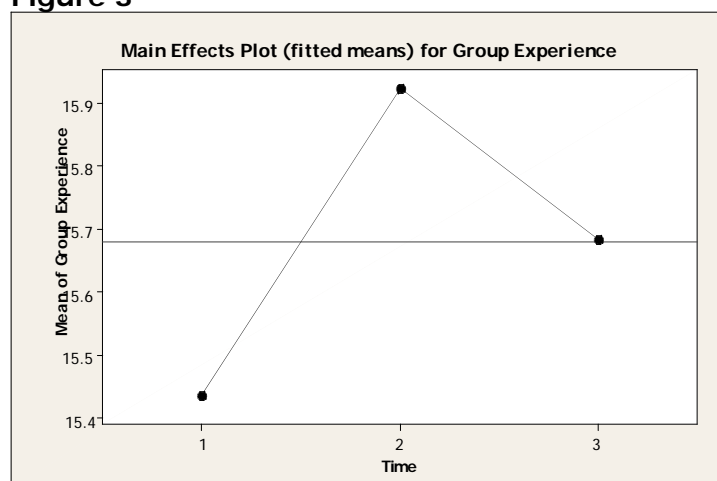
Figure 2

Main Effects Plot (fitted means) for Creative Influence

Figure 3

The clearest effect, and the most general is the effect due to Time. As is clearly seen in the plot of Time against Creative influence, the mean value of the Creative Influence response increased over the course of the project. Similarly, the plot of Time versus Group Effort also shows a significant increase over the course of treatment. In the plot, the means, and overall distribution of variables reveals an upward trend over time.

This provides this provide evidence in support of the hypotheses H2 and H4, that is, mean student attitudes about Group Experience and the Creative Influences rose over time. Students became more positive, more frequently agreeing or strongly agreeing with survey items related to the variables of Creative Influence and Group Experience. The evidence in support of an upward change in Group means for these two variables over time is less clear.

Discussion and Interpretations

Business educators are always seeking ways of motivating students and giving them a richer, more "real world" experience. One well-documented method of achieving this is by using a group project approach. Another is to use a cross-disciplinary approach that exposes business students to different types of students, students that may have different or complementary approaches. Both of these would be ways of enhancing student learning experiences and this study attempts to examine both of these methods.

The question then becomes how much do students learn from such projects? This study reveals they learn something, if only just a little. The results above show that on average, student attitudes about the importance of the creative process changed over the course of the project. That is the average responses to the survey question showed that students more strongly agreed with the questions pertaining to the importance of the creative process. Similarly, students' attitudes regarding their experiences with the group project also change, but it is less clear that this change was positive.

The bottom-line here is that students seem to have perceived some benefits to doing cross-disciplinary group projects and became more positive about key aspects of the project. This should be sufficient reason to keep assigning this project.

By combining the categories of Strongly Agree and Agree and, correspondingly, Strongly Disagree and Disagree, a generalized set of observations yields many points of interest. Those of lesser interest might simply support the a priori observations of experienced instructors. For example, as seen in the results for Questions 6, 7, 8 at all three points tested during the process students expressed positive feelings about their classmates, and their ability to communicate and work with each other. Understandably, students have a certain collegiality and empathy with one another. Other observations reveal much more about students' learning outcomes. For example, the results indicate an increase in the number of students that find they learn more from group projects than working alone (Figure 4) and also that there is an increase in their perception that group projects are challenging (Figure 5).

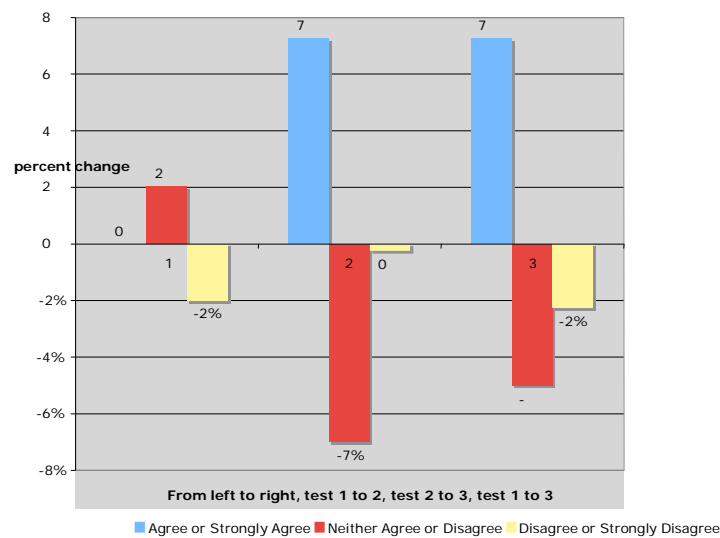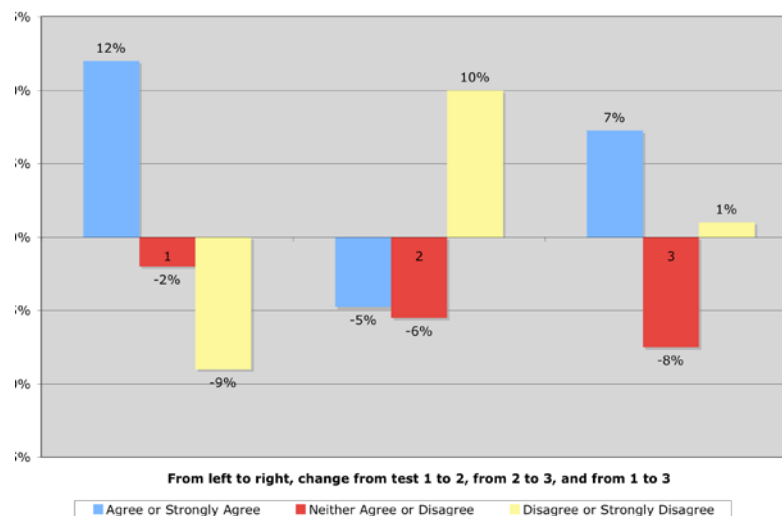**Figure 4**. Generalized Results Q1

Figure 1: Generalized Results Q 1

From left to right, test 1 to 2, test 2 to 3, test 1 to 3

■ Agree or Strongly Agree ■ Neither Agree or Disagree ■ Disagree or Strongly Disagree

Figure 5. General Results Q2

General Results Q 2

From left to right, change from test 1 to 2, from 2 to 3, and from 1 to 3

■ Agree or Strongly Agree ■ Neither Agree or Disagree ■ Disagree or Strongly Disagree

The validity of these responses is substantiated, at least in part, by students' responses to item 5, which shows a strong shift in student preferences about group projects, with students deciding they do not prefer group projects to individual projects. Nothing more will be made of the correlation between the challenges relating to the project and students learning to prefer easier assignments.

The significance of the study supports the prior literature base of active learning in the context of cooperative learning. One of the major assets of this study was the well developed and facilitated groups, especially focused on interdisciplinary studies, which are ideal for deep, rich, authentic learning. The methods used in this study were dynamic, meaningful and attended to how students process information and subsequently make multiple conceptual connections. The applications which can be inferred from the work are for students to continue to work together in other courses and in the workplace. A typical challenge for most educational research was present in this study, which was the lack of longitudinal data collection. Further work would include tracking students on their next coursework, and possibly even a process to collect data during employment.

References

Chaney, L. & Lyden, J. (2000). Making U.S. teams work. Supervision. No. 6-8.

Chapman, K. & Van Auken, S. (2000) Creating positive group project experiences: An examination of the role of the instructor on student's perceptions of group projects. The Journal of Marketing Research. Vol. 23, No. 2, pp. 117-127.

Colbeck C., Campbell, S. & Bjorklund, S. (2000) Grouping in the dark: What college students learn from group projects. The Journal of Higher Education, vol. 71, pp. 60-83.

Hartenian, L., Schellenger, M., & Frederickson, P. (2001) Creation and assessment of an integrated business course: One college's experience. Journal of Education for Business, 76, no3, pp. 149-59.

Maccoby, M. (1999) Building cross-functional capability: What it really takes. Research Technology Management, vol. 42, no. 3, pp. 56-8.

McCahon, C., & Lavelle, J. (1998) Implementation of cross-disciplinary teams of business and engineering students for quality improvement projects. Journal of Education for Business, vol. 73, pp. 150-7.

Appendix : 1

Survey Assessment Instrument

Name Group Project Survey
Description. This is a 15 item survey with a five point scale designed to assess your attitudes about group work. It will be used in research and to improve for future students.
Instructions. Please indicate the response that most accurately reflects your attitude

1. I find working in a group on assignments more challenging than working alone.
2. I learn more working in a group on assignments than I do working alone on assignments.
3. I work harder on an assignment when working in a group than when working alone
4. I believe that group projects are more reflective of the professional workplace than individual assignments.
5. In general, I prefer group projects to individual assignments.
6. It is easy for me to get along with other members of my group when doing a group project.
7. It is clear what is expected of me by my group members when doing a group project.
8. I enjoy the interaction I have with group members when doing a group project.
9. Differences of opinion, for example, about group goals, are easily resolved by group members.
10. When working on group projects, group members frequently have perspectives different from mine.
11. The input from the other members of my group influences my thinking.
12. When individual group members contribute different skills to a group project, the results are better.
13. Individual in a group work harder when working together than they would when working as individuals
14. Individuals tend to be more creative when working in groups than when alone.
15. Creative thinking about a particular problem is important to achieving the best solution to the problem.
16. I enjoy working with individuals whose perspectives are different from mine.

All the questions above employed a five point Likert scale where 5=Strongly Agree, 4=Agree, 3=neither Neither Agree nor Disagree, 2= Disagree, 1 = Strongly Disagree.