

## **A comparison of cooperative learning and traditional lecture methods in the project management department of a tertiary level institution in Trinidad and Tobago**

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This study reports on students' performance after two groups of students were each exposed to different teaching methods; cooperative learning and traditional lecture formats. Knowledge and application of 'motivation' as a principle in project management was identified for this study. A pre-test and a post-test were administered and assessed. The differences in individual scores as the change in learning were used to test the null hypotheses. The findings have given sufficient evidence to infer that we accept the null hypotheses and reject the alternative hypotheses. The results of this study infer that there is no significant difference in learning as a consequence of different teaching methods with regard to knowledge and application in a project management course at a tertiary level institution in Trinidad and Tobago, and that there is no silver bullet for teaching and learning.

**Keywords:** cooperative learning, traditional lecture, heterogeneous students, Bloom's Taxonomy, project management

### **Introduction**

Project Management is accomplished through the application and integration of the project management processes: initiating, planning, executing, monitoring and controlling, and closing (PMI, 2008). Managers utilise project management tools and techniques to make successful strategic and operational decisions in an effective and efficient manner. Success in the project management process is highly contingent on the manager's ability to recall, and effectively apply relevant principles in various contexts and stages of a project's development. Within the cognitive domain, according to Bloom's Taxonomy of Educational Objectives (Bloom et al, 1956) knowledge is defined as the remembering of previously learned material. It may involve recall or the bringing to mind of appropriate information and it represents the lowest level of learning. Application, on the other hand, is the ability to use learned material in new and concrete situations. The application of rules, methods, concepts, principles, laws, and theories provide examples of this level of learning. To facilitate the learning of project management concepts a lecturer must carefully consider the teaching strategies employed to best align with the range of cognitive demands of the discipline. The approaches used to teach knowledge based course content may differ from those used to teach application content. This study explores the impact of selected teaching methods, traditional lecture and cooperative learning, on student learning in a Project Management course offered at the undergraduate level in a tertiary level institution in Trinidad and Tobago, subsequently referred to as "the College". The investigation seeks to answer the following question: Are there any differences in the

knowledge and application of project management principles between two groups of students after participating in cooperative learning versus traditional lecture forms of instruction?

This question is considered from an examination of the effectiveness of the two methods in addressing the issues of knowledge acquisition and the application of knowledge in specific contexts. The relevant sub-questions are stated as follows:

1. Is the traditional lecture a more effective method for teaching the knowledge level within the cognitive domain when compared with cooperative learning?
2. Is the traditional lecture a more effective method for teaching the application level within the cognitive domain when compared with cooperative learning?

The results of this investigation can provide further insights into the selection of appropriate teaching methods when addressing specific skills within project management.

### **Background to the problem**

The College, located in Trinidad and Tobago, offers a Bachelor of Science Degree in Project Management which prepares graduates to function effectively as project managers in numerous industrial fields. A survey of the first-year project management students at the College reveals that students are not homogenous. There are variations in academic achievements, age, qualifications, number of years out of school, occupation and motivation to study. The range of diversity is unique to this institution because of its mandate. The instructor's role in the project management programme is primarily to ensure that students have a fundamental understanding of the basic concepts and are able to apply these fundamentals to a realistic project context. The dominant teaching method at the College is the traditional lecture format in which the lecturer positions himself/herself as the sole performer, communicating knowledge to students who listen in rapt attention. It is felt that students may have problems understanding the intricacies of project management concepts because of the method chosen to teach them.

As indicated earlier, the students are diverse in many respects. Powell and Kalina (2009) defined diversity as a combination of ethnicity, identity and biological differences that give varied experiences and understanding to each individual. In addition to the concepts enshrined in the definition, an individual's prior level of academic achievement is also a key element of diversity in a tertiary level institution. For example, at the College it has been observed that students with higher levels of academic success berate their colleagues from lower level academic backgrounds when the latter group seeks clarification on and further explanation of basic content during class sessions. The lecturer, in pursuit of the creation of an interactive classroom that engages all students, thus faces a peculiar challenge when the relationships and interrelationships amongst students are problematic. Further, selecting an effective teaching method that caters to the diversity of students' ages, academic qualifications and work experience is a major challenge for educators at the College. The chosen teaching method should not only motivate students but should also allow for application, participation and accomplishment of curriculum objectives. The key consideration for a lecturer is, therefore, his/her responsiveness to the diverse needs of the students. When the lecturer is responsive to the needs of his/her

students he/she will select appropriate teaching strategies and methods that will ensure that students achieve the desired learning outcomes. Being responsive to the academic needs of students can be particularly challenging in a classroom with great diversity, as in the case of the College. The reality is that the dominant teaching method of traditional lecturing employed at the College may not fit some of the students' learning styles and needs.

The lecture is probably the oldest instructional format and today it is still the most common form of instruction (Hrepic, Zollman & Rebello, 2007). A study by Doucet et al (1998) reported that in the lecture format learners are passive recipients of knowledge in an externally driven process. Using this format at the College students are introduced to learning outcomes, followed by a session of teacher-centred lectures supported by PowerPoint presentations. In my own use of the lecture method students are also encouraged to ask questions for clarification. Nevertheless, the lecturer is seen as "the sage on the stage" and the approach can be clearly classified as very teacher-centered. In this scenario, student efforts and motivation are very individualistic. Peek, Winking and Peek (1995) state that the traditional lecture technique is preferred by many lecturers because it may be perceived as a strategy for establishing and maintaining order in the class and serves as safety net for new teachers who may be unfamiliar with using other methods.

As a teacher aspiring to be effective, it is imperative to find alternative teaching methods that produce statistically significant improvement in students' performance. My own observations reveal that when students participate in group work, there is a greater impetus for interaction and participation. The new paradigm in teaching which portrays a social constructivist approach to teaching and learning promotes cooperative learning as an alternative to the traditional lecture format. Cooperative learning creates an interactive classroom for all students. This interactivity may alleviate the challenges faced by lecturers and may assist in achieving other organisational objectives. Atkins (2010) mentioned that advocates of collaborative classrooms assumed that students learn better from each other and that the teacher is not the only source of information in the classroom. The introduction of collaboration in the diverse classroom at the College is an opportunity to allow students to meaningfully convey their life experiences. Applying this method in the project management class promotes students' interaction. They are usually given facts and asked to apply these facts to new situations. This teaching method provides immediate reinforcement of a principle and students' issues are addressed and understanding clarified. Since project managers need higher level competencies of application and analysis in order to be successful in the field learning to apply rather than simply recall information is believed to be more appropriate for teaching the subject matter. Based on my professional goal to improve student performance and prepare well trained project managers I sought to systematically explore and compare the effects of cooperative teaching and traditional lectures in the context of undergraduate project management programme at the College.

### **Literature review**

The concept of system theory as illustrated in Figure 1 sets the foundation for developing the framework for conducting this research. System theory is a set of interdependent and interacting parts. This theory traverses disciplines. One component is the concept of

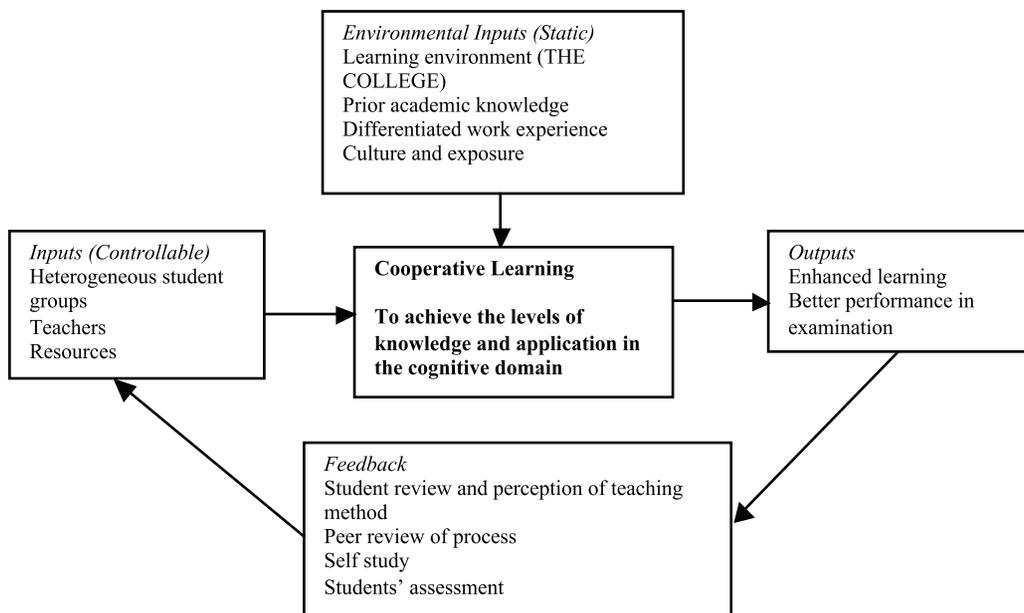


Figure 1. A Systems Approach to Classroom Research.

synergy where the whole is greater than the sum of its parts or where two or more things applied together have a greater or significantly different effect than the sum of effects of the things applied separately.

In the framework illustrated in Figure 1, the environmental components are static whereas the inputs are controllable. The inputs include the heterogeneous student population within learning groups and teacher capability to develop cooperative teaching methods (jigsaw, carousel, think/pair/share and round robin activities as described by Allison and Rehm (2007)). The College provides the resources (suitable classrooms, copying facilities, internet facilities and library facilities) for facilitating the cooperative learning experience. When the various inputs, including the heterogeneous students and the elements of the learning environment, are brought together in a social constructivist classroom, the playing field is levelled through the cooperative learning initiatives. This collaborative and active participation enhances deeper knowledge and application of project management principles which should transform into better performance in examinations. The link of feedback through the lecturer, the students and their peers informs the discipline, other departments and prospective students with a view to continuous improvement.

Powell and Kalina (2009) report that the social constructivist theory, involving individual and cognitive constructivism, is a highly effective method of teaching which all students can benefit from since collaboration and social interaction are incorporated. In the social constructivist classroom there are different approaches: inquiry, discussion, problem solving, conversation, debate, and cooperative learning. Regardless of the approach, engagement is present. The researchers further explain that engaged students have regular opportunities to communicate, collaborate and interact socially. These are critical experiences in the classroom as Atkins (2010) argues that effective communication

and collaboration are essential to becoming successful learners. Students learn best when engaged in activities that reflect their interests and experiences.

Cooperative learning is a highly structured form of group work that focuses on problem solving that can lead students, when directed by a teacher, to deeper learning and genuine paradigm shifts in their thinking and two givens are positive interdependence and individual accountability (Mills, 2009, p. 17).

Chanchalor and Somchitchob (2007) support the concept of “a highly structured form of group work” as they have suggested that these learning activities must be well planned; instructors effectively managed the learning process in the learning environment and good relations created among learners. The literature has documented positive results regarding the effects of cooperative learning pedagogy which enhances learners’ ability to solve problems that require analysis of the subject matter (Hwang & Tong, 2008).

Of the more than 300 studies that compare relative effectiveness of cooperative, competitive and individualistic learning on individual achievement in college and adult settings, more than 168 of these studies investigated academic achievement and found that cooperative learning promotes higher individual achievement compared to competitive approaches (Lancaster & Strand, 2001). However, it is noted that is has been only under certain conditions that cooperative efforts may be expected to be more productive than competitive and individualistic efforts. Johnson and Johnson (1990), Huss (2006), and Koutselini (2008) identify these ideal conditions as positive interdependence, face-to-face interaction, individual and group accountability, interpersonal and small-group skills and group processing. Individualistic learning exists when the learning or achievement of one student is independent and separate from the achievements of the other students in the class. Competitive learning exists when one student’s goal is achieved but all other students fail to reach that goal. In a diverse setting such as the College, Allison and Rehm (2007) recommend that cooperative learning is an appropriate teaching method to meet the need for developing stronger interpersonal friendships which in turn lead to higher interaction and communication.

Although most of the literature is pointing towards the use of cooperative learning as a method for enhanced and deeper learning, Peek et al (1995) state that cooperative learning is not applicable to all subject matter in all disciplines. They identify the lecture format as a better technique than cooperative learning when:

- a large quantity of information is to be disseminated;
- the teacher wants to establish a class culture that suits his/her delivery style;
- students want to take notes for examination preparations;
- students can use information other than what is presented;
- the learners are auditory.

Enhanced learning is not only to be found in the social constructivist classroom. The traditional lecture classroom can also enhance learning once there is appropriate content and design of teaching/learning. When content is difficult to relate to and the teacher wants to develop critical thinking skills in a didactic lecture Cardoso, Cristiano and Arent (2009) recommend the need for the development and implementation of new educational practices to make classrooms more interesting and interactive even in a lecture format.

Miller (2003) compares student outcomes following the use of problem based learning versus traditional lectures for teaching in a theoretical graduate pharmacology course over a semester. She found that while the lecture delivery was a more effective way of teaching particular material, the final course averages produced a normal distribution in both groups of students; those exposed to problem-based learning and those exposed to the traditional lecture. The findings infer that there is virtually no difference with respect to student performance.

Learning outcomes such as profession-specific skills, knowledge-creation capacity and theoretical knowledge are bases for teaching using more social constructivist techniques in undergraduate programmes. The findings of Hanson and Sinclair (2008) suggest that lecturers may perceive a positive association between the use of social constructivist teaching methods and the superior development of students' profession-specific skills and knowledge-creation capacity, but not with the superior development of their theoretical knowledge. Seemingly, lecturers value the development of theoretical knowledge over profession-specific skills. The researchers further report that there is continuing divergence between business practitioners and university lecturers regarding the importance placed on each set of attributes in the educational development of undergraduate students and in the selection of new graduate employees. However, it can be argued that in the project management discipline the development of profession-specific skills are more important for the industry and thus teaching methods that target the development of those skills seem to be more appropriate.

### **Methodology**

This study is primarily quantitative, although there was a small qualitative part that was included to complement the findings of the quantitative aspects. The quantitative component of the study mainly sought to compare the performance of two groups of project management students at the College after having been taught using the traditional lecture and cooperative learning.

For the quantitative aspects of this study two  $H_0$  (null hypotheses) were considered:

- That no difference in the understanding of theories will be found with different methods of instruction.
- That no difference in the application of theories will be found with different methods of instruction.

The corresponding  $H_1$  (alternative hypotheses):

- That difference in the understanding of theories will be found with different methods of instruction.
- That difference in the application of theories will be found with different methods of instruction.

To identify students' perceptions of their learning, a core course entitled Managing Project Teams in which motivation is a topic was selected. Students who registered for the course in Semester 1 of the academic year 2010/2011 were placed into two groups (A and B) as opposed to allowing them to form their own groups. This was done following

recommendations made by Herreid (2009) who pointed out that when people self select their group they tend to choose companions that are much like themselves. The preference is to have learning groups that are as heterogeneous as the student population. Each group consisted of 25 students. The characteristics of the groups were similar as it related to age range and prior academic level attained:

Instructor-selected, diverse groups increase the likelihood that students will face challenges to their assumptions and the diverse approaches to problem solving needed for critical thinking. Students also learn to work with people unlike themselves, an important workplace skill (Mills, 2009, p.18).

Based on the work of Allison and Rehm (2007), students of Group A were exposed to cooperative learning techniques using a combination of think-pair-share, carousel (round robin), jigsaw and discussion methods. Think-pair-share involves a three-step cooperative structure. During the first step individuals think silently about a question posed by the instructor. Individuals pair up during the second step and exchange thoughts. In the third step, the pairs share their responses with other pairs, other teams, or the entire group. The carousel technique is a method in which the class is divided into small groups of four to six students with one person appointed as the recorder. Questions are posed and students are given time to think about the answers. After the “think time”, members of the group share responses with one another round robin style. Each group member writes down the answers they arrive at, then passes along his/her sheet with recorded responses to the next group member until they have all contributed to the various questions. The jigsaw technique is a method in which base groups with a small number four or five students are set up. Each group member is assigned some unique material to learn and then teach to his group members. Students across the class working on the same sub-section get together in an expert learning group to decide what is important and how to teach it to others in the base group. After practice in these “expert” groups the original groups reform and students teach one another. There are other teaching techniques of cooperative learning such as case studies, problem based learning, and social networks, but for this study the focus is on the think-pair-share, carousel (round robin) and jigsaw techniques.

Students in Group B students were also taught the topic of motivation using the traditional lecture format. The researcher conducted both approaches to teaching to minimise perceived bias if another lecturer participated. In addition, this was a means of control to guarantee that the lesson plans were strictly adhered to.

Prior to both sessions and immediately following teaching, the pre- and post-test below was administered:

The College  
PRM 230 Managing Project Teams

Pre/Post-test: Time: 30 minutes

Name of Student: .....

Instructions: You are to attempt both questions. Both questions carry equal marks.

1. Describe the contemporary approaches to motivation that are available to the project manager.
2. Suggest how the project manager can motivate project team members

The pre-test informed the student level of achieving the objectives prior to instruction and the post-test informed the level after the instruction.

Separate lesson plans for both approaches were prepared with the same learning outcomes. The classroom sessions were of 180 minutes duration – 30 minutes for the pre-test, followed by 120 minutes for teaching, and another 30 minutes for the post-test. Both the pre- and the post-tests carried a maximum of 24 marks. The responses were assessed by a single independent faculty member with the standardised grading rubric (Appendix 1). The score of the post-test accounted for 10 % of the coursework mark. This created an increased level of students' commitment toward the learning process.

The other component of the study was conducted at the end of the pre- and post-test sessions. The students were asked to complete a questionnaire (Appendix 2) that was used to triangulate the data obtained from both tests. This questionnaire contained both quantitative and qualitative elements. Data obtained by this method were used to identify students' perception of their learning via the different teaching methods. This latter was used to indicate whether the students felt comfortable and whether the learning outcomes were achieved with the different teaching methods. This information on students' perception assisted in answering the research questions because the results from the primary pre- and post-tests can be compared with the responses from the students as a form of triangulation.

### *Constraints*

Four likely constraints were identified. Firstly, the study required a minimum of 60 students participating in order to use the z test, however only 50 students participated. As such the F ratio was used to test the hypotheses. The number of students registering for the course determined the student population. Secondly, the cooperative learning method entails high student interaction which could be perceived as disruptive to the adjacent classes because the acoustics of the classrooms at the College do not facilitate interactive classes. Thirdly, effective learning in a cooperative class is dependent on the degree of trust and sharing done by the students. This cannot be guaranteed. Fourthly, these students were taught previously in two different courses by the researcher and the perception of familiarity can be a limiting factor towards the findings.

### **Results**

The students' individual scores were analysed and differences in learning from the pre- and post-test were used to test the null hypotheses. The scores from question 1 were used to test hypothesis 1 and the scores from question 2 were used to test hypothesis 2. As N (sample size) was 25 the F Test was used to test both hypotheses at the significance test of 1% level. The one-way ANOVA examines the two sets of data, scores of post-test minus scores of pre-test (differences in learning) and test the null hypotheses  $H_0$  that they were drawn from the same set of data through the comparison of means.

Calculations were done by the researcher and reviewed by a colleague for accuracy. The F ratio for question 1 was 3.68 and the coordinates for the F matrix degrees of freedom were for the numerator 1 and for the denominator 48. At the 1% level of significance the critical value was 7.31 which provides sufficient evidence to infer that the  $H_0$  (null hypothesis) for question 1 cannot be rejected as the ANOVA variation is less than the test statistic at the predetermined level of significance of 1%. The critical value at a 5% level of significance is 4.08 which further infers that the  $H_0$  (null hypothesis) for question 1 cannot be rejected as the ANOVA variation is less than the test statistic at the predetermined level of significance of 5%.

The F ratio for question 2 was determined as 0.13 and the coordinates for the F matrix degrees of freedom for the numerator was 1 and for the denominator 48. At the level of significance of 1% the critical value is 7.31 which provides sufficient evidence to infer that the  $H_0$  (null hypothesis) for question 2 cannot be rejected as the ANOVA variation is less than the test statistic at the predetermined level of significance of 1%. The critical value at a 5% level of significance was 4.08 which further infers that the  $H_0$  (null hypothesis) for question 2 cannot be rejected as the ANOVA variation was less than the test statistic at the predetermined level of significance of 5%.

### *Questionnaire Findings*

An analysis of the results of the questionnaire indicates that 92% of the students from the lecture format class reported that the lecturer's preparation for the session was good to very good, whilst 96% from the cooperative format class reported the same. Of the lecture format class, 84% of the students reported that the lecturer was good to very good in helping to develop their self confidence in the class topic, whereas 92% of the students from the cooperative learning class reported the same.

For the extent to which the lecturer developed in-class interaction, 88% from the lecture format class reported a good to very good response, whilst 97% reported the same from the cooperative format class. 80% of the students from the lecture format class reported a good to very good response on the effectiveness to which the lecturer created a comfortable learning environment, whilst 92% reported the same from the cooperative format class. 100% from both classes agreed or strongly agreed that the learning outcomes were clearly defined and articulated. When students were asked to evaluate if the teaching method was appropriate for the learning outcome of understanding, 75% from the lecture format class agreed to strongly agreed and 88% from the cooperative learning format class gave the same response. On the subsequent question 'The teaching method was appropriate for the learning outcome of application' 84% from the lecture format class agreed to strongly agreed and 92% from the cooperative learning format class gave the same response. 92% of the students rated the lecture format class as good to very good whilst 96% of the cooperative format class gave the same response.

When students were asked to compare the teaching method used in their particular session to another teaching method, the responses from the cooperative classroom included preferences for the cooperative session because it caters for interaction, participation, and discussion. They reported that the method allows for clarification and benefitted from the varying points of view within the classroom. However, some students found the noisiness created by their interactions with each other disturbing and this affected their learning. Responses from the lecture format class included their preference for the lecture because this method allows the teacher to lead in a structured way as compared to

the group work where discussion among students may lead to unnecessary chatter. Some students reported that they learn more from what they see and hear, and rated the lecture format as being effective.

### **Analysis**

The F ratio of the means of the differences in learning for question 1 is 3.68 and the critical value at the 1% is 7.31. The critical value at 5% was 4.08. As the F ratio was within the critical values of both the 1% and the 5% level of significance there was sufficient evidence to infer that we accept the  $H_0$  (null hypothesis) that no difference in the understanding of theories was found with different methods of instruction and reject the  $H_1$  (alternative hypothesis) that difference in the understanding of theories was found with different methods of instruction. The F ratio of the means of the differences in learning for question 2 is 0.13 and the critical value at the 1% is 7.31. The critical value at 5% was 4.08. As the F ratio was within the critical values of both the 1% and the 5% level of significance there was sufficient evidence to infer that we accept the  $H_0$  (null hypothesis) that no difference in the application of theories was found with different methods of instruction and reject the  $H_1$  (alternative hypothesis) that difference in the application of theories was found with different methods of instruction.

As the  $H_0$  for question 1 and question 2 cannot be rejected, the research question “Are there any differences in the understanding and application of project management theories by undergraduate students at the College after participating in cooperative learning versus traditional lecture forms of instruction?” can be answered with the inference that there was no difference in the understanding and application of project management theories by undergraduate students at the College after participating in cooperative learning versus traditional lecture forms of instruction based on the analysis of the pre- and post-test results. The secondary questions can also be answered in the negative as the results infer that in the project management department at the College there was no significant difference between cooperative learning and didactic (traditional lecture) formats of instruction.

An analysis of students’ responses from the questionnaire reveals that at both the traditional lecture and the cooperative classroom session, the lecturer was prepared for the session, the sessions catered for in-class interactions, the learning outcomes were clearly defined and articulated, the teaching method was appropriate for the learning outcomes and the learning outcomes were achieved. These responses from the students provide sufficient evidence to infer that in their opinion there was no difference in the method of instruction towards the same learning outcomes in the project management department at the College. These findings support the findings of the ANOVA of the means of the differences of the pre- and post-test scores that were presented earlier.

However, a significant percentage (60% from the lecture format class and 52 % from the cooperative classroom session) reported that the time allotted for teaching the content was inadequate which suggests that they were overwhelmed by the amount of content that was covered during the sessions. This may have contributed to the lower than expected scores from the post-tests of both groups of students.

### **Discussion and implications**

The findings suggest that there is no statistical difference in students’ understanding and application of the project management principle of motivation after being exposed to

different methods of instruction. With regard to students' perceptions, there may be a disconnect between the existing literature which suggests that cooperative learning can be more effective in enhancing students' ability to acquire knowledge and application of that knowledge than the traditional lecture at the College. The results support Peek et al (1995) who surmise that cooperative learning is not applicable to all types of content or subject matter.

Possible causes for this deviation from the previously cited literature could have arisen as a consequence of varying factors such as: the quantity of information to be disseminated, students' familiarity with the lecturer, students previous exposure to both teaching methods, students' preparedness to learn in a cooperative classroom, students' educational cultural context, students' past experience with the rudiments of motivation, and the nature of the subject content. Another legitimate explanation for the findings could be that the traditional lecture is a more effective way of teaching when a large quantity of information is to be disseminated Miller (2003) and Peek et al (1995). As a lecturer striving for excellence, I previously taught these same students two different courses using a variety of methods, thus, the concept of familiarity as well as students' exposure to different teaching methods prior to this research could be contributing factors to the findings. The question needs to be asked: What would the findings have been if the student population was new?

In the survey conducted after the sessions only 9% of the lecture format class and 16% of the cooperative class strongly agreed that the time allotted for learning was adequate. This suggests that the sessions were overloaded with content, which may have contributed to the findings. The duration of the sessions was three hours and the findings suggest that this is too long. Another scenario to consider is if the findings would have been different if the research had only focused on a sub-topic of motivation.

The acoustics of the classroom at the College do not facilitate cooperative learning as the interactions amongst students tend to distract students in adjacent classrooms. This factor could have limited the amount of and confidence in the interaction amongst students in the cooperative classroom resulting in the findings. As Johnson and Johnson (1990) state, the conditions for cooperative learning are positive interdependence, face-to-face interaction, individual and group accountability, interpersonal and small-group skills, and group processing, these conditions may have been lacking in the cooperative classroom at the College because of its infrastructure.

Although the lecture was planned to be a broadcast, where the lecturer delivered the content uninterrupted, it was not a total broadcast as some students sought clarification during the lecture, even though the lecturer did not encourage interaction, he responded to the queries raised during the lecture. This interaction which was very limited could be aligned with constructivism and can be a factor towards the findings. The development of appropriate teaching material for use in the traditional lecture format (Cardoso et al (2009)) could have helped the teacher keep the attention of students.

At the College, lecturers must consider all inputs in the learning process to achieve effective teaching and learning. In reflecting on their practice and the findings of this study the use of Brookfield's (2006) critical incident questionnaire at the end of each face-to-face class session is recommended as espoused by Glowacki and Barnett (2007). The responses from that questionnaire when analysed will inform practice with a view of finding the most appropriate methodology for each class session based on the diversity of the student population. Age, previous educational attainment, time elapsed since attending structured classes, and the particular content are factors for consideration in

determining an appropriate teaching method. Future studies focusing on these factors may present findings that significantly differ from this study.

## Conclusion

The findings of this study infer that there is no silver bullet for teaching and learning. Literature only provides a guide to educators, but since teaching and learning takes place in diverse learning environments with diverse learners the approaches to teaching should be based on the context of both factors. The results of this study infer that there is no significant difference in learning as a consequence of different teaching methods with regard to knowledge and application in a project management course at the College.

The disconnect that exists between the literature and the findings suggest that educators at the College must consider all factors of effective teaching: the learner, the learning process, the content (subject matter), the learning environment, time constraints for learning, and the lecturer. The findings suggest that the learning environment must be suitable and accommodating to the variety of approaches to teaching and that the time allotted for a particular session must be appropriate for effective learning to take place. In addition, the lecturer must be able to use a variety of teaching methods to cater to his diverse students' needs.

There may be factors, such as, age, prior academic level attainment, and educational culture that may have contributed to the findings. Future research on these factors may contribute towards finding a teaching method that facilitates effective learning at the College. Additionally, this study can be replicated using a first-year/first-semester course to determine whether familiarity with the lecturer and his approaches to teaching may have contributed to the findings.

## References

- Allison, B. N., & Rehm, M. L. (2007). Teaching strategies for diverse learners in FCS classroom. *Journal of family and Consumer Sciences*, 99(2), 8-10.
- Ashcraft, P. G. (2005). A comparison of student understanding of seasons using inquiry and didactic teaching methods. *AIP Conference Proceedings*, 85-88.
- Atkins, J. (2010). Creating Collaboration. *English Journal*, 99(5), 12-13.
- Bloom B. S. (Ed.), Engelhart, M. D., Furst, E.J., Hill, W. H. & Kratwohl, D. R. (1956). *Taxonomy of Educational Objectives, Handbook I: The Cognitive Domain*. New York: David McKay Co Inc.
- Brookfield, S. D. (2006). *The skillful teacher: On techniques, trust and responsiveness in the classroom*. CA: Jossey-Bass.
- Cardoso, D. C., Cristiano, M. P. & Arent, C. O. (2009). Development of new didactic materials for teaching science and biology: The importance of new education practices. *OnLine Journal of Biological Sciences*, 9(1), 1-5.
- Chanchalor, S., & Somchitchob, S. (2007). A study of the utilisations on cooperative learning technology of short course students towards basic blouse making course. *The International Journal of Learning*, 14(7), 57-63.
- Christison, M. A. (1990). Cooperative learning in the EFL classroom. *English Teaching Forum*, 28(4), 139-147.
- Doucet, M. D., Purdy, R. A., Kaufman, D. M. & Langille, D. B. (1998). Comparison of problem-based learning and lecture format in continuing medical education on headache and management. *Medical Education*, 32(6) 590-596.
- Glowacki\_Dudka, M. & Barnett, N. (2007). Connecting critical reflection and group development in online adult education classrooms. *International Journal of Teaching and Learning in Higher Education*, 19(1), 43-52.

- Hanson, J. M., & Sinclair, K. E. (2008). Social constructivist teaching methods in Australian universities-reported uptake and perceived learning effects: a survey of lecturers. *Higher Education Research & Development*, 27(3), 169-186.
- Herreid, C. F. (2009). The wisdom of groups. *Journal of College Science Teaching*, 39(2), 62-64.
- Hrepic, Z., Zollman, D. A., & Rebello, S. N. (2007). Comparing students and experts' understanding of the content of a lecture. *Journal of Science and Educational Technology*, 16(3), 213-224.
- Huss, J. A. (2006). Gifted education and cooperative learning: A miss or a match. *Gifted Child Today*, 29(4), 19-23.
- Hwang, N.C. R. & Tong, G. L. (2008). Cooperative learning in a passive learning environment: A replication and extension. *Issues in Accounting Education*, 23(1), 67-75.
- Johnson, D. W., & Johnson, R. T. (1990). Social skill for successful group work. *Educational Leadership*, 47(4), 29-33.
- Koutselini, M. (2008). Teacher misconceptions and understanding of cooperative learning: An intervention study. *The Journal of Classroom Interaction*, 43(2), 34-44.
- Lancaster, K. A., & Strand, C. A. (2001). Using the team learning model in a managerial accounting class: An experiment in cooperative learning. *Issues in Accounting Education*, 16(4), 549-566.
- Miller, S. K. (2003). A comparison of student outcomes following problem based learning instruction versus traditional lecture learning in a graduate pharmacology course. *Journal of the American Academy of Nurse Practitioners*, 15(12), 550-556.
- Mills, B. J. (2009). Becoming an effective teacher using cooperative learning. *Peer Review*, 2(2), 17-21.
- Peek, L. E., Winking, C., & Peek, G. S. (1995). Cooperative learning activities: Managerial accounting. *Issues in Accounting Education*, 10(1), 111-125.
- PMI. (2008). Project management body of knowledge (Fourth ed.). PA: *Project Management Institute*.
- Powell, K. C., & Kalina, C. J. (2009). Cognitive and social constructivism: developing tools for an effective classroom. *Education*, 130(2), 241-250.
- Slavin, R. E. (1989). Research on cooperative learning: Consensus and controversy. *Educational Leadership*, 47(4), 52-54.
- Slavin, R. E. (1998). Cooperative learning and student achievement. *Educational Leadership*, 46(2), 31-33.

## Appendix 1. Marking scheme for pre- and post-test

Q: Describe the contemporary approaches to motivation that are available to the project manager.

A: Motivation refers to the internal drives within a person that causes that person to willingly devote extra effort in a specific, goal directed manner. A theory is a system of ideas explaining something based on general principles. Contemporary motivational theories are grouped into three categories; content, process and reinforcement.

Content theories attempt to determine the link between intrinsic factors and certain behaviour. The recognised content theories of motivation are:

- Hierarchy of needs theory: Maslow suggested that within every human being exist a hierarchy of five types of needs; physiological, safety and security, social, esteem and self actualisation.
- ERG needs theory: A theory based on the concept that the individual has three sets of basic needs: existence, relatedness and growth.
- Two-Factor (Motivator/Hygiene) theory: This theory stresses that some job factors lead to satisfaction whereas others can only prevent dissatisfaction. The hygiene factors relate to work environment and if provided prevent dissatisfaction, whilst, if not provided create dissatisfaction. Motivators increase job satisfaction and are more permanent.
- Acquired Needs theory: This theory suggest that there is a correlation between achievement, power and affiliation motives and the overall motivation and performance achieved in a project. **(any 3 content theories x 2 = 6 marks)**

Process theories attempt to explain how employees select behaviours with which to meet their needs and determine if their choices were successful. Employees analyse how personal and intrinsic factors interact and influence each other to produce certain types of behaviour. The well known process theories of motivation are:

- Equity Theory: This theory focuses on individuals' perception of how fairly they are treated relative to others. People evaluate equity by a ratio of inputs to outcomes. Inputs include education, experience, effort and ability. Outcomes include, pay, recognition, benefits and promotions. When the ratio is compared to another person in the work group and the ratio is perceived to be equal the employee believes his treatment is fair and equitable and that equity exists. When the ratios are not equal inequity exists. When there are inequities employees change input, change outputs, distort perceptions or leave the job.
- Goal setting theory: This theory proposes that specific, challenging goals increase motivation and performance when the goals are accepted by subordinates who receive feedback to indicate progress toward goal achievement. Goal-setting theory includes four key components.
  - a. Goal specificity—the degrees to which goals are concrete and unambiguous.
  - b. Goal difficulty—the notion that hard goals are more motivating than easy ones.
  - c. Goal acceptance—employees must “buy into” the goals and be committed to them.
  - d. Feedback—people get information about how well they are doing in progressing toward goal achievement.

Expectancy theory: This theory suggests that motivation depends on individuals' expectations about their ability to perform tasks and receive desired rewards. The focus is on the thinking process of individuals to get rewards. This assumes that people think seriously about how much effort that they should put into a task before doing it and that motivation takes place if the expectation is favourable. **(any 2 process theories x 2 = 4 marks)**

Reinforcement theory looks at the relationship between behaviour and its consequences with the focus on changing or modifying behaviour on the job through immediate rewards and punishment. Reinforcement is defined as anything that causes certain behaviour to be repeated or inhibited. **(1 theory x 2= 2 marks).**

Q. Suggest how the project manager can motivate project team members.

A: Suggestions to motivate team members include:

1. The use of reinforcement theories.
  - a. Positive reinforcement is the application of a pleasant and rewarding consequence following a desired behaviour. Praise for a job well done increases the likelihood the excellent work behaviour will occur again. Studies show that positive reinforcement improves performance.
  - b. Avoidance learning is the removal of an unpleasant consequence following a desired behaviour, sometimes called negative reinforcement. Employees learn to do the right thing by avoiding unpleasant situations. An example would be when a supervisor stops criticizing an employee once the incorrect behaviour has stopped.
  - c. Punishment is the application of unpleasant consequences following undesirable behaviour. The use of punishment in organizations is controversial because it fails to indicate the correct behaviour. Almost all managers find the need to impose punishment occasionally, from reprimands to employee suspensions or firings.
  - d. Extinction is the withdrawal of a positive reward following undesirable behaviour. Extinction involves withholding pay raises, praise, and other positive outcomes with the idea in mind that behaviours that are not positively reinforced will be less likely to occur in the future. **( any 3 x 2 =6 marks)**
  
2. In addition the project manager can adopt the following:
  - Establish goals using a participative style of management
  - Ensures goals are realistic and attainable
  - Ensures that tasks assigned are interesting, varied, and involve some challenge, responsibility and learning opportunities.
  - Emphasise that everyone’s contribution is important to the project.
  - Provide enough information, support and authority to do the job.
  - Recognise individual differences
  - Individualise rewards
  - Link rewards to performance
  - Check the system for equity
  - Don’t ignore the importance of money **(Any 6 = 6 marks)**

**Appendix 2. Lecturer Evaluation Form**

**The College**

Lecturer Evaluation Form

Lecturer: ..... Teaching Method: ..... Date: .....

Rate each item by ticking the appropriate box using the scales below.

**4 – Very good, 3 – Good, 2 – Satisfactory and 1 – Unsatisfactory.**

**About the lecturer**

<b>To what extent did the lecturer:</b>		4	3	2	1
1.	Prepare adequately for the workshop				
2.	Display sound knowledge of the subject				
3.	Was approachable for discussing problems				
4.	Was open to opposing points of view				
5.	Was helpful in developing your self confidence in the session topic				

<b>How effectively did the lecturer:</b>		4	3	2	1
6.	Structure the presentations				
7.	Explain material covered				
8.	Create a comfortable learning environment				

<b>General:</b>		4	3	2	1
9.	Your overall rating of the class session:				
<p><b>Please answer (10-19) using the scale below.</b>  <b>4 – Strongly agree, 3 – Agree, 2 – Disagree, 1 – Strongly Disagree</b></p>					
10.	The lecture learning outcomes: (Understanding) Explain what is motivation Describe the categories (content and process) of motivational theories were clearly defined and articulated				
11.	The teaching method was appropriate for the learning outcome of understanding				
12.	The lecture learning outcome of understanding motivation was achieved				
13.	He time allotted for learning the understanding of the topic was adequate				
14.	The pre test was aligned to the learning outcomes				
15.	The learning outcome: (Application) Apply these theories towards project task was clearly defined and articulated				
16.	The teaching method was appropriate for the learning outcome of application				
17.	The lecture learning outcome of application was achieved				
18.	He time allotted for learning the application of the topic was adequate				
19.	The post-test was aligned to the learning outcomes				

Please respond to the question in the spaces provided.  
 Compare the teaching method used in this session to another teaching method.

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