

# Learning Cubes: A Model for Online Education

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**Abstract:** This paper describes how a faculty development project was designed for the World Wide Web. The paper also describes interactions that took place between faculty to illustrate how collaborative learning and problem solving can be facilitated and implemented by the web. The project assignment content focused on instructors (students) being immersed in an authentic learning environment. The students actually experienced a form of technology based learning while undertaking specific tasks. The paper concludes with some pedagogical discussion about the use of cooperative learning as a teaching strategy for online education.

## Introduction

Online learning is a relatively youthful field, which is still being classified as a discipline. As Administration and faculty members struggle with decisions about how to structure online courses for collaborative, cooperative learning, faculty perspectives of successful strategies can provide valuable insights for decision-making. Few studies have been conducted that examine the impact of the collaborative teaching/learning strategies in the distance-education setting (Hardwick, 2000). This paper presents general research findings pertaining to collaboration in online learning along with personal insights into what makes a project-based online assignment successful as a collaborative learning experience.

While online learning offers administrators, faculty, and students many advantages over traditional campus-based learning, problems do exist. Attrition is one such problem for online learners. Attrition is brought about in large part by a sense of isolation (Adelskold, Aleklett, Axelsson, & Blomgren, 1999). One teaching/learning strategy, which can improve this sense of isolation, is cooperative or collaborative learning. Collaborative learning involves students in social communication, as groups work together to discover knowledge, think critically, communicate effectively, reflect, and solve problems. Social interaction among learners plays an important part in the learning process, in fact, it can have a significant impact on learning outcomes. (Jonassen, et. al. 1995, Eastmond and Ziegahn 1995, Berge 1995). Students in online education programs, though separated spatially, can gain a sense of community as they distribute and simplify ideas, actively contribute to a team, and cooperatively solve problems (Cecce-Kecmanovic & Webb, 2000).

With progress in telecommunications and computer technologies, it is now possible to offer collaborative learning experiences in a cost-effective way. In the past, collaborative approaches to distance learning were limited by the cost and sophistication of the technology. Recent advances in technology coincide with a general shift in educational theory to a collaborative origin of learning, which recognizes the learner's need to share control and assume responsibility for problem solving in the context of a peer group (Anderson & Garrison, 1998). Collaborative learning is an outcome of cooperative learning, in that students must develop cooperative learning skills in order to use them in self-directed, high-performing teams. These collaborative groups conduct free investigation and members jointly discover and solve problems. Success in cooperative learning is grounded in the skills students develop within the context of the academic organization provided by the facilitator/instructor. More importantly, in distance learning, students must possess or develop the technical skills necessary for online communication, as well as acquire and practice social skills necessary for collaboration (Kemery, 2000). Cooperative learning involves requiring individuals be accountable so that each participant does a fair share. It involves effective cooperative social skills, effective and appropriate communication skills to bring the task to completion. Research shows that such cooperative learning practices lead to more efficient and effective processing, increased achievement, positive relationships among students, and efficient exchange of information (Johnson, Johnson & Smith, 1997).

## Overview of the Model

Since collaborative learning is an outcome of cooperative learning, learning cubes is a product of both teaching strategies. Learning cubes is another name for peer learning and teaching, peer tutoring or team learning. The major difference between these learning strategies and leaning cubes is who is delivering and the amount of information delivered to the student at one time. With learning cubes one student will take responsibility for a certain prescribed amount of information and teach it to a small assigned group of students. This prescribed amount of Information disseminated by the group will be small, challenging, and productive. Prescribed information can be layered assignment to assignment allowing connections of previous taught material to be made while threading new ideas or skills to be learned from the group. Group size for the learning cube is usually small between two or three students. This size increases effective interaction between students while extending the learning process. Some positive interdependence is built in to the experience so that members need one another to accomplish common goals of constructing knowledge. Learning cube, team learning, and peer tutoring works best for some students and it may not work well for all but in most cases students increase learning while not hindering the learning of others (McKeachie, 2002, Larson, 1984). Students become active partners in the learning process and may learn effectively from interacting with their peers. Instructors may need to spend more of their time in the role of facilitator, organizing students, managing students, and helping students work together effectively.

Within a faculty development classroom, nine newly hired McLennan Community College (MCC) educators participated in an online collaborative project-based assignment. This faculty development was mandatory for all newly hired instructors. The educators taught in various fields of study (nursing, construction, music, business, art, psychology, English, science, and math). All educators were given two preliminary workshops using Blackboard, the e-learning course management system software. The workshops provided basic knowledge of navigation skills needed to effectively complete the assignment. After completion of the workshops, the teachers (students) were randomly assigned into groups of three making a total of three groups.

As students, the instructors were given two weeks to complete the assignment. As learners via the web, the instructors could interact with one another from different geographical locations either in synchronous (real time) or asynchronous (delayed) mode via text-based communication for the purpose of dialogue. They also had the option of working as a group within a classroom setting to implement the tasks of the assignment. Each group elected a person who would become the teacher for the group. Each activity covered small amounts of content, which could be covered successfully within a few minutes. All members of the group had to complete the activities assigned. For assessment purposes, students were required to demonstrate newly learned skills in two pieces of work:

1. after learning how to create a web page from a Word document, each student must create a HTML document reflecting the pros and cons of cooperative learning, and
2. another HTML document reflecting upon items given on their pre-survey.

## Model Structure

Within Blackboard the interface structure was designed for ease of use. There were eight categories of interactive buttons designed on the left side of each web page. The categories were in the following order:

- **Announcements** – this category welcomed students online, reinforced what the emphasis of the activity is about, gave minor reminders about the use of Blackboard and the assignment, allowed students to take a pre-survey, and gave day and times the assignment help desk could be accessed for technical support.
- **Course Information** – this category gave clear and precise responsibilities for the groups teachers and students
- **Course Documents** – this category gave clear and precise instructions for downloading a digital streamed video movie. Students had the option of printing the instructions or reading them from the website.
- **Assignments** – this category allowed students to take a pre-survey, study a streamed movie, apply new knowledge learned to a simple activity, and teach this new knowledge to the group
- **Books** – this category gave references as books and websites about cooperative, collaborative, and team learning

- **Communication** – the communication category gave students access to e-mail or a real time virtual chat room
- **Virtual Chat** – this category allowed students to browse the archives for a previous virtual chat room sessions as well as access to the virtual chat room
- **External Links** – finally, this category allowed students to access educational data bases like ERIC.

As users opened up Blackboard they would automatically find themselves at the announcement web page. Carefully designed instructions would direct users to the pre-activity assessment, course information, course documents, and then the assignment web pages. At the assignments web page users would be prompted (if they have not done so) to complete the pre-activity assessment. The assignment page instructs the users to select one group member to be the instructor. The instructor of the group has the responsibility to demonstrate to the other members what he or she learned from watching a streamed movie file. The streamed movie was a very short video tutorial about how to make a web page using a Word document. The goal was clearly stated, after the instructor viewed the movie file, he or she would decide how best to instruct their group members how to make a web page using Microsoft Word.

As group members mastered making a web page using Word, each member of the group had to demonstrate new knowledge by completing their own HTML documents. Completed assignments were then forwarded to an email address on the assignments web page.

### **Pre-Activity Assessment**

For feedback purposes, each member of the group was asked to participate anonymously in a pre-activity assessment. The survey was designed to stimulate thoughts concerning the topics of cooperative learning. All survey questions were designed using Blackboards management system. At the end of the required assignment, this survey will be used as a reflective evaluation. The following questions are from this pre-activity assessment:

1. Do you feel that high quality learning can take place without going to a traditional educational facility? Why or why not?
2. Do you like the idea of sharing your work, life and educational experiences as part of the learning process? If your answer is yes or no explain why?
3. Do you think it is possible for increased learning to take place when work/knowledge/life experiences are shared with peers? Why or why not?
4. Do you accept the value of facilitated learning as an advantage over the more traditional lecture based learning process? Why?
5. Have you incorporated cooperative learning into instructional methods? If so, how?

Notification of the survey was linked in two general web pages, within the announcements page and within the assignments web page. Both notifications had a brief introduction and informed individuals about directions. Instructors were requested to complete the survey and that confidentiality was assured. After each survey was taken, access to it again was denied. This operated as a check against respondents filling out the survey more than once.

### **Faculty Interaction: Pre-Activity Assessment**

To question one, do you feel that high quality learning can take place without going to a traditional educational facility? All except two instructors said yes to this question. Most faculty members felt that high quality learning outside the traditional educational facility happens all the time such as people learning at the work place, reading/learning at home, or people learning about a new sport. Many instructors still feel that there is distinct value in face-to-face communication with students and teachers. Some instructors felt that only technology literate students could benefit from online learning. While others said, “it seems that online learning can be a very viable option for people to receive quality education.” One instructor said, “the more options people have the better the opportunity to learn.” Another faculty member responded, “I think it depends on two

things, 1. the motivational level of the student, and 2. the learning style of the student.” Finally, one faculty member said the answer could be yes and no, “while yes, some individuals are capable of learning in a untraditional manner it is difficult to define high quality learning in a context that would apply to every student. And no, because traditional facilities offer a variety of qualified instructors plus allowing greater interaction between students.”

To question two, do you like the idea of sharing your work, life and educational experiences as part of the learning process, most instructors commented positively? All instructors felt that their rich learning experiences should be shared with their students. One faculty commented, “yes, I think that part of my teaching style is to bring a part of myself to the classroom and the material I teach.” Another faculty member said, “yes, because I have had what I feel is such a rich set of learning experiences, I hope that the people I’m around could share that as well.” One faculty member succinctly stated, “whatever it takes.” A few faculty commented, “sometimes, it depends on my knowledge-base in the area of study,” also, “not completely, everyone has a certain comfort level and if forced to go beyond that people will withdraw and cease to learn.”

Question three asked, do you think it is possible for increased learning to take place when work/knowledge/life experiences are shared with peers? All respondents had positive statements about this question. “If the right framework is established, and the group is trained to use the experience in particular ways, the sharing with peers can be rich,” said one respondent.” Another respondent stated, “yes, increased learning in this instance may relate to the real world.” Another said, “certainly, my knowledge has grown just listening to others and their experiences.” Finally, a faculty member stated, “yes, work/knowledge/life experiences are part of the learning process.”

Question four inquired, do you accept the value of facilitated learning as an advantage over the more traditional lecture based learning process? The comments for this question was mixed. For the most part, many instructors felt that it would depend on the circumstances. One respondent stated, “it really depends on the student. Some are simply not grounded enough or confident enough to be self-motivated.” Another faculty member said, “I know of many students who are not self-motivated, this style of teaching will not work, but some students may need more assistance in the facilitated learning environment.” One respondent said, “what is facilitated learning (sorry - I’m a musician)? I believe lecture holds a valued place in higher ed.” Lastly, a respondent stated, “The individual becomes engrossed in the learning process by sharing his or her own ideas. This integrates the individual into the instructor and the learner at the same time.”

The last pre-assessment question asked, have you incorporated cooperative learning into instructional methods? This question also got mixed responses. Five instructors answered positively saying that they have used this teaching strategy before. One faculty member stated, “I teach writing which pedagogically and practically means students interacting with others.” Another responded, “Yes, I have assigned students into pairs to work on assignments. I have also asked for group presentations.” One respondent explained, “yes, in my prior duties I had one class that was 90 to 95% group learning.” Some faculty used cooperative learning a little, while others did not use it all for instruction. These respondents stated, “not too often. The nature of my courses thus far have not been very conducive for cooperative learning methods,” “to some degree. I had to set up labs for students to work together and may have used cooperative learning in a limited way.” Two faculty members flatly stated, “no,” and “not sure.”

### **Faculty Interaction: Post Survey**

At the end of the two weeks, all instructors involved in the project-based assignment were given a simple post survey. The post survey primary contained open-ended questions about the direct impact this assignment had on the users as teachers. The questions were:

1. How were you actively engaged?
2. What aspect of the project-based assignment will you immediate incorporate into your teaching?
3. What was missing that would make this project-based assignment more valuable to you?

Most instructors completed the online collaborative project-based assignment within two weeks. Instructors who had experience using computers or the software program Blackboard had finished the assignment early. Faculty who had limited computer experience took the full two weeks to complete. Although the participants did not choose their own group members their post survey answers indicated that they were actively engaged in the project-based assignment. This was primarily because of the pre-activity assessment,

the watching of the streamed tutorial movie, and the engagement of making a HTML document from within a Word document. Positive comments stated, "I was actively engaged using the presentation," "I enjoyed the movie. This was a well organized and executed demonstration and course set-up," "I was actively engaged by creating my own web page," "with cooperation from colleagues, I created a web page," "I learned more about my ability to use Blackboard." Some faculty did not feel actively engaged and commented, "not user friendly," "just confused about how to get in," "the topic was not something I understood," "I had to cooperate . . . I think."

Instructors also commented on what aspect of the project-based assignment would they immediately incorporate into their teaching. Most commented positively. One faculty group member stated, "I now know what it is like to be a student of an online class. I think I will focus on preparing supplemental materials for my online site to accommodate my students," another instructor said, "I hope to begin using the web to post my musical rehearsal assignments, etc," "I will attempt to use more cooperative learning," "in class, I would like to try more group searches for information, maybe using my own web page," "I'm currently working on a Blackboard presentation." From the instructor comments it was clear that not all perceived working in learning cubes to be valuable. Some inexperienced users did not have enough time to work with the software program Blackboard. While other groups did not have enough members experienced to work with technology. One instructor commented, "I just couldn't figure it out to immediately incorporate it into my teaching." Others stated that they would not attempt to incorporate this assignment into their teaching methods.

Instructors also commented on what was missing that would make this project-based assignment more valuable to them. One instructor commented, "perhaps a little more detail on the value of cooperative and its integration to be used in web pages." Two instructors said, "I would have liked to learn this from a traditional classroom setting." While most instructors commented that nothing really stood out, a few still had problems following directions or working with the methodology. These instructors commented, "a little hard following instructions," "this was very time consuming," finally, "it was too hard to get into this."

## **Pedagogical Issues**

Cooperative or active learning methods may not be appropriate for every institutional setting (e.g., part time students working full time). For new teachers beginning to implement cooperative strategies, the idea of using students' as instructors teaching small amounts of information may be somewhat intimidating. If you are teaching specific content or cognitive processing, each session must facilitate an environment conducive to collaboration. For learning cubes, team learning, peer tutoring to work, the groups and the content delivered must be small and effective. Further, the team project or assignment must be challenging enough to insist teamwork. Groups need to feel that they are reliant upon one another in order to be successful. Members will be more likely to appreciate each other's unique contributions if reliance is a factor. Besides, challenging assignments replicate real world situations and help prepare students to be productive life-long learners.

To have effective group members, instructors should provide guidance for students on how to work successfully in collaborative teams. The social characteristic of successful teams should be clearly taught and not assumed. Successful teams will have certain member qualities. Among those sought-after qualities are an interest in other team members beyond the task at hand, the capacity to clarify and commit to goals, an open and honest evaluation of team performance, an understanding of others' perspectives, a wish to confront conflict positively, a commitment to make decisions inclusively, the valuing of individual differences, a willingness to freely contribute ideas and encourage that in other team members (Robbins & Finley, 1995). Teachers can only do so much to facilitate worthwhile collaborative rich learning experiences. In short, group members play an important part in the success of the assignment. From the group's perspective, clear and distinct roles for each member can aid in the groups communications. Among group members, a clear understanding of assignments and work responsibilities can make task management easier for each student. Assignment responsibilities are directly related according to each group member's role. Tasks and authority in the given areas of responsibility must be well defined. Individual team members may be given more decision-making authority in their various areas of expertise.

The key to collaboration is communication. The spirit of project-based, online collaborative learning is communication because positive group structure and learning occur through on-going discussion (Kemery, 2000). Asynchronous communications can be employed for much of the collaborative effort, through email with attachments and private forums. In addition, synchronous private chat rooms can be used successfully to

facilitate collaborative learning (Lai, 1999). Synchronous communications are critical for establishing team deadlines, responsibilities, roles, goals, and for deciding differences of opinion. Group chats are also important for structuring relationships, helping one another supporting momentum, and celebrating accomplishments.

As is true of all courses in education, begin each collaborative session with a clear understanding of course content and requirements. Clearly stated assignment requirements give group members a common starting point and provide a structure upon which to build. They also assist students with the preparation of collaborative work responsibilities. In planning your courseware design for online education the instructor must provided the following:

- Provide effective technology workshops for students if new hardware and software will be used in the session
- Provide a technology help desk with appropriate days and times users can receive help
- Provide students purposeful asynchronous and synchronous help sessions
- Use creative chat sessions for office hours with appropriate days and times.

Additionally, flexibility in meeting assignment requirements facilitates students to develop ownership of the assignment, aids in the development of critical thinking and problem solving skills, imparts room for originality, and encourages a sense of group individuality and unity. If subject matter is very large, the course instructor (teacher), by effective layering a task, assignment, or project can help group manage a challenging job. This can encourage groups to keep on schedule, and provide opportunities for important course instructor feedback during the online education process. This strategy may allow students to receive both individual and group feedback early in the term. Providing a plan for group formation is imperative for team success and cannot be underestimated. Helping students choose team members intelligently will aid in the formation of group member roles, allow members of the group to fill needed areas of expertise, and provide a solid foundation for shared esteem among group members.

In a collaborative group effort, certain individuals may be chosen as project manager for the purpose of setting task deadlines or resolving conflicts of opinion. Group members must also be convinced that the work can be completed in the allotted time. Once set, group members should hold each other responsible for meeting deadlines with weekly meetings and encouragement. In every group effort there will be differences of opinions. Group members must be reminded that conflicts concerning the assignment can be resolved by listening to all arguments, debating, and coming to an effective decision. Decisions must be based on ideas and not on personalities. In the rare cases where conflicts could be at an impasse, group members can put the issue to a vote.

## **Conclusion**

This paper has provided insights into the nature of cooperative learning as a teaching strategy for online education. Online collaborative project-based assignments can be a rewarding experience if certain factors are incorporated into the teaching strategy. A skillful facilitator, capable of balancing guidance with flexibility is one crucial factor. Another is a group with the skills, both technical and social, to truly collaborate the learning process. When those crucial factors as well as other pedagogical issues come together in a learning setting, collaborative online assignments can result in a product exceeding the expectations of the teacher. It is hoped that a useful model will be developed to enable instructors to use online software management systems like Blackboard. It is also hoped that the pedagogical issues of teaching online discussed throughout this paper will be used by educators. As higher education institutions seek to make decisions about how to structure online courses for collaborative, cooperative learning, it is hoped that administrators and faculty alike can gain valuable perspectives and insights for the decision process.

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