

2006-2243: IMPLEMENTATION OF VIRTUAL STUDY GROUP AND ACTION RESEARCH IN ONLINE CONSTRUCTION MANAGEMENT COURSES

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Implementation of Virtual Study Group and Action Research in Online Construction Management Courses

Abstract

Distance learning is now an alternative to traditional correspondence education method used in the construction management courses to allow students more flexibility in their class and work schedules. But without meeting daily in classrooms, students do not have someone with whom to share impressions, problems, and projects around the studies, which can diminish the desire for learning. To resolve the problem of lacking instant feedback from teaching staff or other students, collaborative work and discussion are often encouraged in online-learning context. For construction management courses, helping students to improve their communication skills is especially important. But the virtual study groups need to be carefully designed so that communication between group members can help each other to get considerable amount of support and reach their study goals efficiently. The paper proposed to implement Action Research (AR) in virtual study group to cultivate the communication in Internet-based construction management courses. The AR theory was implemented in the Construction Administration class taught by the author. By regularly talking with the students, instructors could find out if the students understand the knowledge well or if they do the homework by themselves. Case studies were done to observe and analysis students' study in that class. The case studies in this paper would show that through using AR process, instructors can promote broad participation and support action leading to a more satisfying situation. By implementing AR theory in virtual study groups in construction management courses, collaboration and the quality of the learning context are improved. In a broad sense, by learning the communication and collaboration skills, students could build together social interactions and co-operative networks that will benefit them in their university life.

1. Introduction

Although the traditional programs of education provide students with new knowledge and information of techniques, they fail to satisfy the needs of some students because these students couldn't find the right courses in a nearby school or because of time confliction between the school schedule and the students' schedules. Now many schools are providing courses online and Distance Learning is becoming one of the most popular ways to gaining the desired knowledge. There are several options to execute Distance Learning: mail courses, voice (telephone, audio conferencing, tapes and radio), video (slides, videotapes, films, one- or two-way video with two-way audio) and computers (software programs, Internet), etc.¹ As Bobendrier pointed: the lack of quality control, inappropriate courses for the Web, unqualified distance class instructors, and lack of interaction are the drawbacks to Internet-based education¹. Some students simply cannot succeed without consistent feedback and discussion with instructors and fellow students.

From the online-teaching experience, the author realized that lacking every day's feedback or contact with other students and teaching staff, student's motivation level can decrease substantially. In the online learning environment, students feel hard to find other persons to share

impressions, difficulties, and projects around the studies. But students need a considerable amount of support. They need aid with the understanding of study goals, clarification of doubts, ideas of problem resolution, evaluation activities, so that they can motivate themselves. Based on the author's observation, virtual study groups can help students to achieve the interaction between the group members. Virtual study groups also provide a way for the students to resolve their puzzles more conveniently. They do not need to wait for the answers from the instructor. Sometimes, right after they post their questions on the virtual discussion board, answers or suggestions will be provided by the students who know the answers and happen to be online and read the questions. Ideal virtual study groups should have cooperative learning, which requires discussion among group members.

This paper proposed to implement Action Research to cultivate the discussion in virtual study groups in Internet-based education. By regularly talk with the students, instructors can find out if the students understand the knowledge or if they do the homework by themselves. In 1998, Greenwood and Levin wrote that Action Research (AR) could be used as a powerful scientific approach to social research, which is "carried out by a team encompassing a professional action researcher and members of an organization or community seeking to improve their situation"⁵. Using AR can promote broad participation and support action leading to a more just or satisfying situation for the students. Briefly, the process of AR can be described as the professional researcher and the stakeholders jointly defining the problems to be examined and settled them together. They co-generate relevant knowledge about the commonly identified problems through discussion, learn and execute social research techniques, take actions, and interpret the results of actions based on what they have learned. In virtual study groups, professional researcher and stakeholders can be the instructor and the students. If possible, some external experts could be invited in discussions. By implementing Action Research in virtual study groups, students can work together both for their own learning and the learning of others students as well. Students give support and advice to each other will increase the degree of involvement in sharing knowledge and expertise. This involvement or collaborative work can help students build together a new reality that will surround them along their studies. This support will allow the construction of social interactions and co-operative networks that will benefit them in their university life.

In this paper, the author presents using Action Research in virtual study groups in construction administration class. In the virtual study groups, the students were encouraged to improve the collaboration in virtual spaces of communication. The main goal of this paper is to describe the idea of using AR in virtual study groups in online study. In the virtual study teams, the students can gather together with the shared objective and help each other to find the resolutions of a problem.

2. Literature Review

Action Research was introduced into the United States by sociologist Kurt Lewin⁶. After that, many teachers use the AR process in reforming teaching and classroom. They want to change practice with collaborative support by doing research and taking action. This way of teaching has a track record for successfully supporting change and is very different from the traditional ways⁹.

Teachers provide knowledge to students, and see “if that knowledge is sufficiently flexible and deep to enable teachers to analyze the strengths and the weaknesses in their students’ thinking”⁹. But some teachers and trainers have come to realize that in order to change their teaching to better facilitate students, they need to change their beliefs about the nature of learning⁹. These are:

- Instead of passive learners, students and learners are intellectually generative, they need to have opportunities to confront the limitations of their extant conceptions; they must be given time to work through their confusion in order to construct new, more inclusive conceptions that take account of initially information that can not be assimilated.
- Students can pose their own questions and find solutions to the questions.

Internet-based learning has many differences from classroom learning. Students register to Internet-based courses and learn new knowledge without having to leave their home or working locations. Internet-based learning sometimes is referred as virtual school and the following are just a few of its characteristics.

- First, students don’t need to cope with school time schedule.
- Secondly, virtual schools still operate with a formalized calendar: the great majority of them on the basis of a curriculum to be taught and learned additively in a given number of years, sub-divided into smaller periods of working months, weeks, days, till lessons.
- Thirdly, notions of truth and falsity are arrived at through exam evidence.

This paper proposes a new model to improve the Internet-based course programs through following an action research process in the virtual classroom. Thus, the author can cultivate democracy and dynamic learning and communication groups in Internet-based courses to improve the actual abilities of students. The training process will be developed by participation, collaboration, and communication in a democratic environment. The students with experience in the construction industry (including workers, engineers, and managers etc.) will teach the other students, and at the same time gain the information of new machines, tools and techniques from others. This is a mutual learning method. Each one in the community can learn from others as well as teach others or express his or her thoughts. The teachers, the experts, the action researchers and other “outside” people can contribute to the training process⁵. Through this way and the aid of modern Information Techniques, instructors can resolve problems, construct theories, learn continuously in a lifelong spiral of improving and deepen practice⁹.

3. Context

The university used WebCT as course management software for the entire campus. The University’s Scholarly Technology and Resources (STaR) office provide necessary training and support to the faculty on how to use WebCT. For each class offered on campus, a shell is populated for it in every semester. After students have registered for classes, the names of the students enrolled will be loaded into the course shells.

In the beginning of the Construction Administration class, The instructor asks students to introduce themselves on the WebCT Discussion Board. Students should introduce their names, the reasons why they take the course, whether or not they have construction experience and how many years of experience, what kinds of projects they have done, and anything they want to

share with their classmates. The instructor also asked the students to read syllabus and watch the presentation of syllabus. Besides that, students should spend time to get themselves familiar with the class WebCT webpage, bookmark the WebCT login page, learn to use the WebCT tools, such as discussion board, email, assignment drop box, quizzes, exams, etc. Students should also be able to use MS Word, Excel, and PowerPoint. Students accessed class presentations with audio and PowerPoint slides, class notes outlines, and detailed instructions on book pages to read. The objectives of the Construction Administration class were:

- To develop an understanding for the responsibilities of a project manager.
- To develop an understanding of the importance of documentation, attention to detail and follow-up in construction.
- To develop an understanding of expediting purposes and procedures.
- To develop an understanding of payment application procedures.
- To develop an understanding of the importance of close-out documents and to learn how and what to document.
- To develop an understanding of subcontractor relations in the field.

There were 21 students registered the Construction Administration class in Fall 2005. After the first month, 1 student dropped from the class and the class maintained 20 students till the end of the semester. The characteristics of the students were:

- The students were freshmen or junior students and the virtual study group is new for them.
- Some of them did not know the implications of studying in a virtual environment, and did not know how to use its resources.
- They never met before. At first, interaction and collaboration level was really low.
- Students did not have study plans for virtual work.

The class was reading intensive. Reading assignments were structured to allow students' knowledge of the construction administration process to develop from a solid foundation of the basic fundamentals and formats of the construction process. Grades were determined by the quantity of points earned. There were 100 points available, in which, two exams were 30 points total, discussion participation was 10 points, lab assignments and homework were 35 points, final project was 20 points and quizzes were 5 points.

4. Method Design

This study investigated the feasibility that by using an Action Research process in the virtual study groups of Construction Administration course, instructors can activate the interest of the students to join in the program and learn new knowledge and techniques in a democratic and dynamic way. Additionally, through applying an AR process, the author wants to bring democracy into the construction courses, to develop cooperation between different kinds of students, as well as let the people inside and outside (i.e. the families of the students) of the industry know their value, that is, they can collaborate together. One way to recreate relationships to build cooperation is to let the experienced ones and the neophytes know each other's value in the learning process, then, communicate with each other and learn from each other. Through collaboration, they can create an ongoing changing process, "one which involves constructing an ever-evolving outcome from within an ever-changing matrix"². Here, matrix refers to the whole society.

A lot of courses viewed the students as empty vessels and learning by being told what to do and how to do. The courses placed too much accent on the content of books and ignored the knowledge and experiences of the learners. That is one reason why, on the average, the younger learners got higher scores, because the younger ones have greater advantage in remembering. In addition, the courses lacked communication in class. How to build the opportunities to elicit prior knowledge and build further background knowledge so as to build construction conversation in courses is one of the problems of this paper. Constructive conversations should be shared and reciprocal. They should not be directed or initiated solely by the teacher or any one member. The teacher's role should be to ask authentic questions, seeking to know as a naïve fellow investigator and follow from behind the students' conceptual thinking rather than leading thinking⁹.

In the beginning of Fall 2005 semester, the instructor asked the students to participate the discussion on Discussion Board, which was already set up in WebCT. At that time, students were not familiar with each other. So the instructor asked them to introduce themselves. The online content in the virtual classroom was mainly about the basic knowledge of construction administration. The final project had not started. At that time, the students used the Discussion Board to discuss some lab or homework questions. The instructor noticed that there were 4 students who were very active on online discussion. The rest of the class did not participate so often in discussion.

For practical purposes, the instructor defined the virtual study groups in the class. Each group had 5 students and there were 4 groups total. The instructor grouped the students by assigning each of them a random number, and then based on the numbers divided them into 4 groups. This way, all groups were generated randomly. Each group had a reserved space in the Discussion Board, where they could communicate between themselves and swap doubts, solutions, advises, recommendations, suggestions, notes, etc. But this discussion or communication was only inside the group, other groups couldn't post, read, or reply at that discussion space. In this learning environment, students had the possibility to work together even if they didn't meet at the same space or time. Besides the allocated space on the Discussion Board, each group also had reserved disk space in the class WebCT server. In that reserved disk space, each group could upload, download, edit, revise, delete, and do other file management tasks.

In the end of second month of the class, the final project started. The final project asked the students to utilize an example scenario, or create scenarios unique for each team. Students should make the scenarios interesting and be creative. The purpose was to demonstrate the collective knowledge of the students about roles, responsibilities, lines of communication, and contractual relationships. Students needed to complete scenario outline, list of all documents that would be used, write an essay, and complete virtual binder of all the documents showing the scenario. It is essential to clarify the goals and the level of commitment in order to establish good collaboration practices. There is need for putting in place the correct strategies from the very beginning. This allows students to realise their strong or weak points, and build a positive attitude towards their role in the new virtual study group. In this work, the instructor gave an example scenario which included 5 different construction participants: Project Manager, Project Superintendent, Estimator, Supplier, and Designer. Each of the roles needed to finish a certain set of documents

to illustrate the scenario. For example, the Owner issues the Notice to Proceed for the construction of the Construction Management Building on the campus of the university. The Owner requests the Designer to add 4 pass-thru windows to the Project. The Contractor submits Form 1.5A Subcontractors and Major Material Suppliers List. In this example, Project Manager needs to prepare Form 1.5A and memorandum. Designer needs to prepare Notice to Proceed and Proposal Request.

With the start of the final project, the Discussion Board was used a lot by all the groups. The instructor identified the broad structure of the content of the project and provided an initial set of readings and other sources of information. Students became aware of their roles in the learning process and the instructor's expectations of them. By using Discussion Board, the instructor was not in charge but paid attention to the thinking of the students. When the instructor noticed a common confusion in all the groups, the instructor would make announcement about it. Sometimes, the instructor posted on a group's Discussion Board to lead the discussion.

5. Discussion

The very nature of teaching implies resolving problems, construction theory, learning continuously in a lifelong spiral of improving and deepening practice. Action Research is an evolving discipline, a form of professional inquiry in which the action researchers are recognized as key to identifying and creating improvement: Those responsible for changing practice and doing the research³. The definition of action research used here is a systematic inquiry by collaborative, self-critical communities of teachers and students, which takes place in schools. It is pursued out of a desire of need to improve educational knowledge and practices. It is accomplished through a recursive cycle of (1) identifying a problem area, (2) studying it by gathering data, and (3) reflecting on the data in order to make teaching decisions grounded in evidence rather than in hunches. Taking action is a moral imperative for the action researcher and an integral part of the research.

Teachers are action researchers in classrooms. At first, teachers participate in study groups, institutes, and collaborative teams that others led or coordinated. Later they are facilitators of action research collaborative. Certain elements for supporting success are non-negotiable. These have evolved into a theory that teachers use to create contexts for collaborative action research to support ongoing improvement and change of practice. The seven components of the action research theory are:

- Action research takes place within a collaborative context.
- It is carried out by those having a common vision and/or domain of interest.
- Participants are committed to share cultural norms.
- Data are gathered to focus inquiry and analysis.
- Structured conversations are used to facilitate reflection, documentation, and description.
- Participants utilize knowledge in their own practice.
- Participants share what they have learned in more public ways—outside the group—to make a difference to the larger community.

Each Distance Learning group is balanced by experienced people and non-experienced people, furthermore, the people in the same group should have different kinds of work, experience and

education level. A collaborative context creates collegial nourishment for overly busy professional teachers and a safe haven⁸ for taking an honest look into deeper aspects of practice, including focusing on discrepancies between ideals and practice, hopes and outcomes, goals and implementation. It is in the collaborative context that critical analysis, insights, and knowledge of practice by colleagues can play a supportive role for forward momentum⁴. No one is simply an observer, and none are exempted because of their role as experts. This is an important point to keep the democracy inside the community.

The characteristics of the discussed Construction Administration course are as follows:

- Participants enter into dialogue under conditions of equal opportunity;
- Power relations are neutralized through an overriding aim to pursue truth;
- Participants have the same chance to raise issues, make proposals, call into question, sufficient to leave no assertion free from critical examination;
- Discussion is sufficiently free.

A common vision and/or domain of inquiry can be drawn on a wealth of professional resources, literature, research, theory, policy, and standards created by the community outside the collaborative. This outside knowledge informs and deepens the inside knowledge of the group. For example, group members can ask their coworkers or supervisors in their companies (who are outside persons) if they have questions related to those outside persons' work.

Some cultural norms we have used as starting points for negotiation with groups are:

- Respect each other as professional colleagues. Recognize that everyone has knowledge, strategies, resources, and practical experiences to share. Any member of the collaborative can invoke them to support the group in maintaining processes for safe inquiry and a comfortable and democratic context for working.
- Be patient. Don't expect an immediate response when post a message.
- Check spelling, punctuation, and grammar.
- Everyone should feel free to participate in class and online discussions. Discussion creates community. It takes time, and is worth it.
- Engage in inquiry: "I am curious about ..."; "I wonder...." Encourage specific, context-rich sharing.
- Avoid judgmental comments. Talk about other people—students, parents, and colleagues—as respectfully in the emails or posted questions.
- Reply to another's posting by referring to them by name at the beginning of the message.
- Do not use postings such as "I agree," "I don't know either," "Who cares," or "ditto," etc. They do not add to the discussion and take up space on the Discussions.
- Take an active role in supporting the efforts of your colleagues.
- Keep the content of the meetings confidential within the group, unless specifically negotiated for sharing outside the group.

It is important to make these norms explicit and to negotiate them within the group. These shared norms bring people into a research frame of mind by fostering inquiry, rather than encouraging the usual discourse of teacher meetings. Cultural norms surface assumptions, reduce misunderstandings, and increase commitment to fair group process. The information gathered by group members and shared at meetings illuminate thinking, create understanding, and ensure

success in implementation. The processes are systematic, and documentation is automatically made because of the emails and posts and shared among participants.

The author made the following observations during the teaching of the Construction Administration course in Fall 2005 semester:

- In the description of the final project, the instructor made it clear that even though it is a group project, each student would be graded based on his/her own performance and submissions. In the 5-person groups, usually there were 2 to 3 students who were active and the rest were not contributing too much.
- All of the 4 groups used their Discussion Board spaces and allocated disk spaces.
- Each of the 4 groups had at least 1 classroom or “real” meeting. They usually discussed online about the time and location to have the meeting and then brought their work together to discuss face-to-face. They found it more efficient to have a real meeting than using posts and replies to explain things.
- 90% to 95% of questions posted on group Discussion Board spaces were resolved by the group members themselves. The time used to find the solution to a question usually was less than 2 days.
- All groups agreed that the Discussion Board was very important in the final project.

6. Conclusion

Utilization of the knowledge constructed through action research into virtual study groups is the purpose for undertaking the study. Sharing in the group is an important way to increase the influence of a study, which creates not only applications but also new knowledge. Deciding on appropriate audiences and forms for sharing the knowledge is one of the ways action research becomes transformational. Neophytes of the educational group can gain qualifications for future life through this mutual study with experienced ones. Neophytes can speak out what their confusions are, and get help from others. At the same time, experienced ones can get new information from others, so that they can keep up with the social mobility. By using AR process into virtual study groups, the new role of teachers permits a view of practice from the insider’s perspective. Through research, teachers are able to share their view of their virtual classroom life with others. Teachers are in a position to carry out long-term studies of virtual classroom practice continuously⁷. The teachers engaged in the AR program will have the opportunity to post questions which are relevant to their practice, and can seek ways of understanding and improving own situation.

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