Learners' Heterogeneity and Knowledge Sharing in Cooperative e-Learning

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ABSTRACT

The conversion in the curricular offering of an academic management program from a mixed to a fully online mode also shifted knowledge sharing in a face-to-face group activity to cooperative e-learning. The experiences in the online and distance teaching-learning process using the cooperative e-learning approach in two R&D management courses offered in different semesters were documented and synthesized. The apprehension for cooperative e-learning was premised to the heterogeneity among learners and the diminishing role of the teacher in the cooperative e-learning. Although difficulties in group dynamics were experienced by the e-learners, heterogeneity in their background including the geographical and temporal distance among them enriched knowledge sharing in cooperative e-learning. The transition to online mode also posed demands for innovations from both teacher and learner, particularly on: a) monitoring knowledge sharing in virtual classroom discussion forums and off-course portal chat session; and b) individual and group performance.

INTRODUCTION

In any on-campus, residential and face-to-face degree and non-degree management course, cooperative learning by small group of learners (students and participants) is the most common teaching-learning method employed. Group activity is inevitable in a management course considering the intrinsic and inherent nature of management as a concept and practice. The epistemology of management both as an art and science necessitates working together as a group in mobilizing resources to achieve a common goal. A manager is not who s/he is without two or more people to supervise or to interact with in the exchange of resources in accomplishing tasks to attain the objectives.

OBJECTIVE OF PAPER

The phasing out of the terminal internship course/field study in an academic program, and later, the removal of face-to-face monthly tutorial session as a result of the shift from mixed mode to purely online program offering, tested the creativity among the faculty as instructional designers to factor in group activity in the management courses. Hence, this paper aims to:

(1) describe the transition from face-to-face group work to fully online activity utilizing different methodologies;

(2) discuss the initial difficulties and group dynamics in knowledge sharing among learners with heterogeneous background using cooperative learning approach in online and distance mode; and

(3) synthesize the responses and suggestions of online and distance learners in polishing the cooperative learning approach.

Conceptual and Theoretical Premises

Many in-depth studies on interactive learning theories including cooperative learning had been conducted to grade or high school students in a classroom environment by constructivists (Driscoll, 2004; Johnson and Johnson,1994; Kagan,1993; Slavin, 1995) with advance application on virtual collaborative learning in distance education (Daradoumis, et al, 2000; Lynch,2010) . Depending on structure and content (Kagan and Kagan, 2009), cooperative learning can be formal and informal (Johnson and Johnson, 1994; Johnson, et al., 1988). The *structure* includes teacher intervention and grouping method while *content* deals with the specific task objectives.

In the literature, synoptic concepts appear in the characterization of the elements and principles of cooperative learning, such as positive interdependence, accountability, and interpersonal skills (Johnson and Johnson, 1991; Biehler and Snowman, 1997; Kagan, 2009; Green, nd; Jacobs, nd.; Stahl, nd.). Principles also vary in number and the set may include group processing, equal participation, simultaneous interaction, promotive interaction, equal opportunities for success, access to must-learn information, face-to-face interaction, and heterogeneity.

In open and distance e-learning (ODEL), face-to-face interaction is substituted with virtual connectivity. From previous studies (Johnson, Johnson, and Holubec, 2009; Kagan, 1993; Stahl and VanSickle 1992), heterogeneity pertains to the aptitude/skills and ethnic origin of the learners who were homogeneous in age and grade level. Heterogeneity in ODEL is more encompassing with the differences in racial, demographic characteristics and geographical locations as well as educational backgrounds, professions, motivations to learn, and even nationalities.

This paper focuses more on the empirical and experiential accounts on cooperative learning and knowledge sharing among graduate students in an open and distance education learning environment rather than delve in detail the epistemology of cooperative learning as an interactive modality of learning. Operationally, cooperative learning in adult online education is viewed as a method and process. As a method, it requires the voluntary participation of the learner in group activity. As a process, the learner plays a

role with corresponding responsibility attached to the role, and contributes to the completion of the group tasks and achievement of the activity's set of objectives.

Knowledge sharing which is difficult to measure tangibly in online mode of delivery entails not only the virtual exchanges (transmittal and receipt) of information from multiple sources, but it entails the cognitive interpretation which could lead to either internalization, modification, objection, or further reification of the said information.

Method of Inquiry

The data were taken from archival documents (i.e., student information sheets) of the Diploma in Research and Development Management (DR&DM) Program from first semester SY 1996-97 to first semester SY 2011-2012; online student postings in the discussion forums and chat sessions via MyPortal@UPOU (using Modular Objective-Oriented Dynamic Dynamic Learning Environment or MOODLE as a course management system); valedictory addresses of DR&DM graduates during their commencement exercise, and responses to the open-ended questions uploaded in the DR&DM alumni e-group and Facebook as well as those sent via email to the author. As an ex post documentation, the postings/exchanges in the former learning management system (LMS) via Integrated Virtual Learning Environment (IVLE) were not captured since the portal no longer exists.

Brief Background on the Academic Program

The Diploma in Research and Development (R&D) Management (DR&DM) is designed to enhance knowledge and skills in planning R&D programs, developing and promoting technologies for utilization, and managing human and organizational relations in R&D systems. It is primarily directed toward managerial leadership development. It prepares students to be professional managers of organizations/systems engaged in R&D and technology development and utilization. Applicants must have a Bachelor of Science degree, research experience and/or a supervisory position.

The DR&DM was offered by two UP constituent units in 1996 with the residential mode under the Research Management Center of the College of Economics and Management at UP Los Baños, and the distance mode by the UP Open University (UPOU). The residential mode was phased out due to enrolment concerns while the distance mode has a range of 60 to 90 local and off-shore applicants per school year with more than 250 graduates. Some had attended or completed a post graduate degree (DVM, MS, PhD or MD) prior their application to UPOU.

The DR&DM is one of the pioneer distance education courses offered by the UPOU. The original proposal was for a Master of Professional Studies in R&D Management, but it was offered as a 30-unit diploma course including the six-unit field study or internship course. The DR&DM program was the only one with internship course in the history of UPOU. After a review of the UPOU courses, for standardization, the six-unit internship course was removed in SY2003-2004 so that all diploma and master programs would have a minimum of 24 units of course work, but the latter would have additional six units for field study or thesis.

The UPOU has been maximizing the use of ICT in ODEL. Beginning from the first semester of 2003-2004, DR&DM migrated to blended or mixed mode where students availed of either face-to-face or online modes. Starting first semester of SY2005-2006, the courses were offered completely online first using the IVLE and later MOODLE. The DR&DM, is again, one of the pioneer programmes which went fully online.

Learners' Profile

In general, the DR&DM students were single, female, about 30 years old, worked in the private/ manufacturing and industry sector (e.g., food, semi-conductor, ICT, pharmaceutical), and graduates of biological, physical and engineering sciences. Some students came from the medical, military service and development (i.e., NGO) organizations. A number of students also owned their company, consultancy office, or clinic/hospital. Since 1996, DR&DM students self-financed their education at UPOU.

From the 204 student information sheets, the average age was 32 years old, when enrolled in the course, the youngest age was 25 and the oldest was 68. Majority (96 %) were employed in industries (43%), government agencies (37%), academia (17%) and NGOs/ international organizations (5%). The female to male ratio was 9:5.

As for the highest educational attainment, majority of students were graduates of bachelor degrees (78 %), and the others earned their masters (19 %) and doctorate (3%) prior to DR&DM.
Slightly more than half (52%) of the students came from technical courses (e.g., engineering, biology/genetics, food technology, medicine, fisheries and agriculture, chemistry/ biochemistry, pharmacology, computer science), and the rest (46%) were graduates of degree programs in social sciences (e.g., management/business administration, education, psychology, sociology, economics)

Looking at their current jobs at the time of their enrolment in the course, most of them had technical/ research positions (47 %), followed by administrative posts with supervisory functions (30%). Only 18 percent of the students occupied positions research management positions. The rest (5%) were into military service, business and self-employed.

To illustrate the heterogeneity of a class of DR&DM learners, the first semester SY 2001-2002 class was randomly picked. The class was composed of 17 learners: 10 female and seven male students whose age was 33 years old on the average or an age range between 24-51 years. Nine (53%) were in technical professions (e.g., information system analyst, microbiologist, food technologist, biochemist, biologist, quality assurance officer, agricultural engineer, mechanical engineer, biochemist, biologist) and the rest were in social sciences (e.g., management economics, business administration, commerce, development communication). Four (23%) had master degree holders, and four had managerial positions. All of them were employed: ten in industry (59%), five in government (29%), and one each from the academe and international organization.

Cooperative Learning: From Face-to-Face (F2F) to Online Learning

In initial years of the DR&DM courses, the author handled four monthly face-to-face (F2F) tutorial or study sessions each semester. The first session included the orientation of learners to distance education and the course itself besides submission of assignments and discussion of the modules covered. For the second and third tutorial sessions, group activities such as game-simulation, analysis of management case study (in print and video presentation) supplement the further explanation of the modules. Recapitulation and synthesis of all modules wrapped up the last study session. All assignments were individually-done.

The students were assigned in groups for the terminal course which was a two-week internship to a R&D organization (R&DO). Grouping into small teams considered heterogeneity in composition and interdisciplinary representations among team members. This course gave students whose fields were not in R&D or who were not working in R&DO, an exposure and personal experience on the dynamics of management in a real R&D. Likewise, in the immersion, they were treated as company staff and not as on-the-job trainees.

With the revision of the DR&DM and the phasing out of the internship course, came the blended mode of DE delivery where students chose between online and F2F. Because of transportation cost, work and personal-related reasons, attendance to F2F sessions dwindled and students requested that if they could be assisted online.

Using the IVLE, student activities included mainly discussion forum corresponding to the module or unit, and individually-done assignments. When DR&DM courses migrated to fully online offering, group assignment was introduced in the courses the author handled in order to simulate the F2F group activities and the group dynamics in the former internship course.

The students had the option to work individually or with a group. Positive reinforcement of bonus points and extended deadline for submission was given for those working in groups. Grouping was based on the preference of students who they would like to work with.

In summer of 2003, the UPOU conducted an intensive training course on Online Teaching and Learning (OTEL) for its faculty where the WebQuest (Dodge, 1995) was introduced as one of the constructivist methods which could foster cooperative learning and knowledge sharing. It is an inquiry-oriented, web-based group lesson/activity format where learners assume a role to play or specific area to research.

Since it requires web designing skills to develop a "Quest" for students to do online, the author modified the method by combining subject sampler with WebQuest *structure* in the group assignment, and varying the *content*. The structure includes the introduction, task, process, information resources, evaluation, and conclusion. The *Introduction* is the overview of the assignment in relation to the course and the specific modules. Specific questions which the students should be able to answer after the assignment (corresponding to the objectives of the assignment) are explained under the *Task*. In the Process, specific instructions on the role each member of the group will play and detailing of the task are clarified. To equip the students in their "Quest", web-based *Information Resources* as "Hot List" are provided. The *Evaluation* contains the assessment rubrics of students' performance vis-à-vis task completion. The important

lessons learned from the "Quest" are incorporated in the *Conclusion.* To provide the heterogeneity, the students were grouped by the teacher so that the fields of specialization vary.

The shift from IVLE to MOODLE was a welcome change since the latter provided more and better features for online activities (such as choice, wiki, glossary), however, chat session was done using the Yahoo!Messenger© or Skype© due to the portal's bandwidth limitation. The students also preferred to send email messages to discuss their assignment and exchange of web-based information resources than the specific forum to their group created in the course site. They find email more convenient than logging in the course site for this purpose. Hence, monitoring of groups' /students' performance and the management of email inbox messages became the challenges of the teacher.

Dynamics in Knowledge Sharing in Cooperative e- Learning: Learners' Responses

From November 2011 to January 2012, a mini-survey/open-ended question on group activity/assignment particularly with the WebQuest was posted in the DR&DM alumni e-group and FaceBook© accounts. Since only 13 alumni responded in the online survey, contextual analysis was done using the students' discussion forums in the MyPortal@UPOU and the valedictory addresses of DR&DM graduates.

Learners' Responses to WebQuest

The respondents unanimously said that WebQuest was better done as a group because one can learn better through interaction, information exchange, and experience sharing among group members. The approach is "*more inter-disciplinary, more heads are able to share their experiences and opinions with the group"*. Difficult topic can be explained further through group exchanges. Group work can correct wrong perception on the lesson through brainstorming, and understanding of the topic is deepened.

Although it is a good cooperative learning process, "*patience is needed when some members do not understand their role well"*, and "*when different perspectives collide"*. The group activity also "*needs more time* (from members) *to interact with each other"*, and according to one alumna, "*as for us when we do WebQuest we require to communicate almost every day"*.

The "Hot List" of information resources in the WebQuest was considered very useful by the respondents, since they "*provided up-to-date topics and examples as well as serving as guide on tackling the subject"*. As opined one respondent, the students should be reminded not to limit themselves with the references in the "Hot List" since students *have tendency to be dependent on them rather than use it as a guide*.

Role playing was seen as a "*good learning method and beneficial for additional group inputs*, *encouraging full group discussion and participation, and broadening perspectives of group members*". The difficulty of playing the role, however, is that *it requires research to intensively get the perspective of the position being played*.

Respondents provided the following suggestions to improve the use of Webquest in online group activity:

- Provide more topics to choose from, if not, let the students suggest some topics that might be of interest to them.
- A lifetime support for the Webquest to update newer topics for references.
- Improve links because some links cannot be opened. The modules should be provided online so it would be easier for students to follow links rather than copying the links from an age-long book-bound module.
- The use of more video conferencing.
- One compulsory assignment requiring group work should be given since this forces interaction among students even if with hectic schedule.
- Group assignments should be done on early stages of the lessons since there will be less lessons to tackle or readings as well as no preparation for the exams.

Learners' Responses to Cooperative e-Learning

During 10th UPOU Commencement Exercises, a valedictory address was delivered by a DR&DM graduate who related his experience that despite absence of physical contact, he was able to get support from his group mates for their assignment (Pastor, 2006).

As posted by an alumna (Class 2006) in the DR&DM alumni e-group, *the academic culture that we had for two years in the UPOU though we had our own way of coping up has been well said. ….The web portal (IVLE) and YahooGroup!(e-group portal) engineered by(Mr. S) is perfect to connect us to one another despite of having met physically once during our graduation. …..What matters most is that we all keep in touch regardless of where we are across the globe."*

Another alumna from Class 2007 also recalled their difficulty in group activity especially when they came from different Visayan provinces and one of their group mates was in the late 50's who was clueless on online chatting so they communicated through their mobile phones. Likewise, another came from a place where internet café closed at 8:00 PM.

In the latter batches of DR&DM, with faster and more accessible internet connectivity, *physical distance* among learners in group activity was replaced with *online presence* on a common time among group members. The students were all working and the difficulty was on "*difficulty experienced by most students is on coordination on group works and assignments"* (RDM 251 student, 1st semester 2010). Another student found the course was

"…. *was interactive (teacher and student part) .. (I) get (ting) to know more of my classmates….. that's why I appreciate a lot of having a group discussion although difficult since we have different schedules*…" (RDM 252 student, 1st semester 2010)

Despite the difficulty, a student found "*chat sessions and group works makes (my) distance learning more in "at school" environment--the pressure, fun and surprise is there…(I) enjoyed it all, and (I think) it's effective in distance learning*" (RDM 252 student, 2nd semester 2010). The course was also an enjoyable journey besides introducing the student to her "firsts": first to chat online with my e-learning classmates,

first to do a technology evaluation using the rapid TE approach, first to do an open book exam in UPOU, first to do a webquest
(RDM 251 student, 1st semester 2009).

Students appreciated different online learning activities in tandem with group work as attested by the following students:

> *"The course used various learning methodologies which I enjoyed. Aside from the usual discussion forum, we were able to experience online real-time forum (my only class which used this aside from RDM251 with same FIC), choices, wiki concepts, and group assignments. The lessons are well-presented in the module and very digestible…"* (RDM252 student, 1st semester 2010).

> *"Aside from the very well-designed course and the use of different approaches to*
> *stimulate thought and discussion e.g., case analysis, reaction paper, webquest, chats, group work and new reading materials, what really gave life in terms of encouraging learning in this course was the involvement and active participation of Ma'am (teacher). It really helped to have a facilitator who was committed to actively participate in/facilitate the team's learning process. Response, feedback in the form of stimulating inputs and challenging questions were regularly given which made me feel the personal touch of the teacher, and therefore enhanced everyone's learning*…." (RDM 252 student, 1st semester 2010).

CONCLUSION

Building the Community of Learners Through Cooperative e-Learning

From the responses of DRDM alumni and the postings of RDM students, group activity (e.g. WebQuest) was difficult due to physical distance or online presence but the learners gained group cohesion and in-depth understanding of the lessons from their interaction, sharing of experiences, and information exchange which constitute cooperative learning. In developing a culture in the learning community, according to Siemens (2004) encouragement and support are priority expectations.

When asked if WebQuest is appropriate in building knowledge in community of learners, the respondents perceived that it was a good method to perceive things for problem solving, a good exercise to encourage participation, encourages research and build up of knowledge, and beneficial for web based learning. As one DR&DM alumnus said "*since not everyone in the group is of the same field, it's good to know how each member of the group perceive things and what possible if not the best solution on the problem being tackled…it is also a good exercise on how members participated in group discussion for they tend to do that in their respective jobs"*.

Besides the group assignment, other online activities such as choice, chat session, and discussion forum are also incorporated in the DR&DM courses. Heterogeneity in group work and multiple online activities along with group collaboration can provide increased interaction and simulation reinforcing learning experiences (ADEC, 2003)

The role of the teacher as a facilitator in group activity was also cited by the respondents not to intervene in the group dynamics but as a guide and support to consensus in cases of divergent perspectives. According to Driscoll (2005, p. 182), the instructor's role is to "*help learners value participation in a community of practice*". In collaborative learning, the content and structure should always go together, where the teacher can be both as a co-learner in the content and as a guide in the structure so that students will be clarified in the role they have to play and to keep track of their group task performance. Heterogeneity among the learners enriches cooperative learning as it reinforces the exchanges of management experiences across age, technical background, organizational affiliation, and geographical distance.

Building and nurturing a learning community requires connectivity for knowledge sharing in cooperative learning beyond the classroom. Hence, in the DR&DM, with social networking system and ICT, interaction and collaboration as support-learning community is expanded not only among students but with the alumni as well.

Cooperative learning and knowledge sharing also call for openness to novel learning technologies to open and distance e-learning administrators, teachers and students considering that in building a community of learners; resistance to change becomes the knowledge if not digital divide to learning.

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