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The Real Deal on Collaborative Learning

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Abstract Does collaborative learning embody principles of mechanistic vertical division of labor? Using a personal case study, the author attempts to deconstruct, scrutinize, and critically discuss the multi-dimensions of collaborative learning. The author looks to the future exploring the practical implications for the burgeoning field of instructional design.

Keywords Collaborative Learning, Division of Labor, Instructional Design, Cooperati Ve Learning, Educational Games

1. Introduction

Collaborative learning−cooperative learning− competitive learning. these three distinct pedagogies characterize the field of instructional design. Collaborative learning emerged as an important teaching and learning pedagogy in higher education (Bruffee, 2000), secondary, and elementary education (Slavin, 1990) during the late 1980s (Goodsell, Maher & Tinto, 1992). Collaborative learning can be broadly described as a situation in which two or more learn or attempt to learn something together. Collaborative learning is different from cooperative learning and competitive learning. The former denotes sharing, networking, communication among individuals belonging to similar levels of subjective expertise to solve common problems, and reach mutual goals. Collaborative learning generates better and faster knowledge comprehension, knowledge acquisition, and application leading to superior academic performance (Kirschner, Paas & Kirschner, 2009). It restructures the traditional teacher-centered classroom dividing the class into small groups and teams requiring intensive and extensive interaction between students and faculty (Brufee, 2000, p. 20). Through constant interaction, and completion of group projects learners are able to engage in reflection (Slavin, Karweith & Madden, 1989), build on personal experiences and learn actively (p. 20).Thus, collaborative learning environments have emerged as the contemporary student-centered teaching method, which focuses on the generation and development of meaningful activity and performance. Collaborative learning environments have become an increasing common teaching method to involve, engage students to actively learn and improve knowledge and skills. According to Schroeder (1994), "collaborative learning is fostered by commonality and consistency of purpose, shared values, and transcendent themes" (p. 171). But, a major downside of collaborative learning is that it can lead to division of labor. When this happens, all notions of sharing and healthy rapport disappear to be replaced by competition, isolation, apathy, and mass customization of the educational activity (Friedman, 2006).

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2. Objectives

Written from an instructional design perspective, this research paper attempts to explain the concepts and dimensions of collaborative learning. Divided into four sections, the paper argues that collaborative learning harbors principles of mechanistic division of labor. In her first section, the author builds her argument with theory and empirical evidence. In the second section, the author elaborates on her argument with a personal example. This is followed by a critical and reflective discussion. In her conclusion the author focuses the entire paper on the implications for instructional design. The concluding section focuses on the implications for the field of instructional design. Hence, this is a position paper whereby the author argues for a certain perspective providing a personal case study as empirical evidence.

Aims in Brief:

a) Explain concept and dimension of collaborative learning

b) Contrast and compare collaborative and cooperative learning

c) Equate and discuss collaborative learning as a form of division of labor

d) Reflect on practical implications for instructional designers

3. Literature Review: Exploring Collaborative Learning

There are two distinctive views describing collaborative

learning. The former is the prescriptive perspective, which argues that two or more people come together to learn a task with a mutual common objective efficiently. The latter descriptive perspective holds that collaborative learning is a mechanism, wherein two or more people get together to learn knowledge, skills, or attitudes and accomplish a common goal (Dillenbourg, 1999, p. 4). In his research investigation on two undergraduate classes at a Midwestern university, Dillenbourg (1999) found that faculty followed the descriptive approach of observation and implementation (p. 4). His study showed that faculty members were more prone to using collaborative learning in their course activities if it had proved a successful learning mechanism in earlier classes. He further elaborates that peers or groups do not learn by simple being together. Rather, it is the interaction, explanation, disagreement, reflection, and mutual comprehension which lead to learning. He also states that collaborative learning is a kind of "social contract" where the rules are explicitly laid out, and mutual goals are set (Dillenbourg, 1999, p. 4). This means that two or more individuals enter into a verbal agreement to share knowledge and information to accomplish common objectives. It is described as being social in nature as collaborative learning occurs in social situations where there is a high level of interaction.

Roschelle and Teasley (1995) define collaborative learning as "a coordinated, synchronous activity that is the result of a continued attempt to construct and maintain a shared conception of a problem" (p. 70). According to this definition collaborative learning can only occur in the presence of four factors. These include common mutual goals, interaction to construct common knowledge schema, symmetry of knowledge, and the coordinated situation which allows a group to get together (p. 70)

a) Common Mutual Goals-Collaborative learning involves "achievement of a mutually shared goal..." (Roschelle & Teasley, in press). Their study on schoolchildren concluded that collaborative learning can only take place if the group works towards the accomplishment of a single mutual goal. Roschelle and colleague (in press) state that group has to set its own boundaries and arrive at a mutually acceptable goal. Situation where boundaries or work limits, including goals that have already been established for instance by a teacher in a classroom who says, "children sitting on the first bench will work together and locate equatorial regions on the globe" is not engaging in a collaborative work activity. The teacher is dividing the class into groups, and stating a goal to be achieved by that team.

b) Interaction to construct common schema-Roschelle et al. (in press) hold that collaborative learning is a learning method where two or more individuals share knowledge through interaction to construct common knowledge schema (Roschelle & Teasley, in press). Their opine, based on their research investigation that minimal or no interaction amongst team members will not result in learning, knowledge acquisition, and accomplishment of goal. It is crucial for group members to interact and engage in verbal explanations, arguments, critical reflection, and abstract conceptualization to be able to apply shared knowledge to the problem or activity at hand. Interaction leads to knowledge synthesis and transfer of learning (Roschelle & Teasley, in press).

c) Symmetry of knowledge: In his pioneering research, Dillenbourg (1999) argues that group members need to possess symmetry of knowledge and skills (p. 7). Roschelle et al. (in press) build on his hypothesis and claim that group members have to be at the same academic level to be communicate and coordinate their problem solving efforts. Collaborative learning cannot occur if the group members are on an unequal foundation, for instance a teacher and a student group of three. Miyake (1986) explains that the teacher is an authority figure with more subject expertise, skill and experience. Thus, the teacher is superior to the students. This means that there is no symmetry of knowledge and skills. The same situation occurs in peer tutoring where the expert student holds superior knowledge and skill to the novice student (p. 58).

d) The Situation-Dillenbourg (1999) argues that a group and activity make a situation collaborative, and not the other way round (p. 5). A situation is not collaborative. It is the individuals who work in coordination to interact and communicate for the achievement of a goal, who make a collaborative learning situation, or environment (p. 5). In a study involving freshman college students working in collaborative learning environments, Krammer and van Merrienboer (1989) stated that collaborative learning environments are a function of symmetry and synchronicity (p. 7). Results showed that Group A which comprised of students belonging to the same class, was able to achieve their goal faster. In contrast Group B where the members belonged to different academic levels reported minimal communication and a lack of motivation. This shows that Group A was able to create a collaborative learning environment and coordinate their efforts to achieve their goal. The group possessed symmetry of knowledge, skills, attitudes, and action, combined with similar motivation to regularly interact, and synchronize their efforts. On the other hand members of Group B lacked symmetry of knowledge, skills and attitudes to display a constant state of motivation and interactivity to collaboratively and accomplish their goal (p. 7).

Brufee (1995) believed that the members of Group B were displaying cooperative learning (p. 14). He stated that collaborative learning can be easily confused with cooperative learning. The basic difference, he pointed, is the absence of symmetry. Group members engaging in cooperative learning had different levels of expertise, and consequently did not share, or coordinate their work efforts. Cooperative learning group members were prone to completing sub-tasks individually and then fitting their task into the whole (p. 15). Brody and Davidson stated that cooperative learning is task-centered where the work boundaries, and goals are established by a third party (Brody & Davidson, 1988). In their seminal study, Johnson and colleagues conceived of the cooperative learning paradigm. Based on their observation of a class in progress in a public school, they said that groups

may begin with the approach of collaborative learning, but it soon changes to that of cooperative learning when the person in charge starts dictating rules, goals, and terms of working (Johnson, Johnson & Smith, 1991). Panitz (1995) clarified the differences between collaborative and cooperative learning (p. 1). The former, he argued was teacher centered with an emphasis on surface learning (p. 2). Cooperative learning was dependent on extrinsic motivation, where the group member does his/her task to get a tangible return. Cooperative work groups were highly structured with roles rigidly classified (Lee, 1997). Slavin (1980) cites the examples of educational games which are structured with rigid roles, and asymmetry of action, knowledge and skills (p. 318). In his research involving school children, Slavin found that children engaged in classifications when playing an educational game. Slavin explained that in a group situation with a common goal, individuals organize themselves into different hierarchical roles to perform various functions to achieve the goal. Such groups are characterized by reward interdependence, task interdependence, individual accountability, teacher imposed structure, and a hierarchical division of labor (322). Slavin (1980) cited the example of the Jigsaw educational game, wherein group members showed high levels of individual accountability meaning that individual learners were only concerned with personal performance and achievement (p. 323). Similarly in other educational games of TGT (Teams-Games-Tournaments), STAD (Student-Teams-Achievement-Divisions), and small group teaching were teacher oriented (p. 323). Slavin concluded that educational games were structured and rigid built on the lines of vertical division of labor (p. 337). On the other hand, collaborative learning was described as an unstructured, loose and fluid group, where the group members were in-charge (Lee, 1997). Collaborative work groups were stu dent-oriented, and intrinsically motivated. They engaged in deep learning which eventually led the group to conceptualize in abstract terms, transfer learning, and solve their problem (Lee, 1997).

Deep learning is defined as the comprehension, evaluation, critical reflection of the information presented to propel the learner in search for "truth" – "material is embraced and digested in search of learning" (Garrison & Cleveland-Innes, 2010, p. 136). They further elaborated that deep learning is a function of collaborative learning environments. Garrison et al. (2010) hold that in collaborative learning environments, group members were able to interact, argue, criticize, question assumptions, construct knowledge, and search for truth. They described deep learning as active learning which results in scaffolding and guiding group members into the zone of proximal development (p. 138). They said that interaction enabled group members to scaffold and assist each other to develop similar conceptions. In their research investigation spanning a year on four graduate courses involving 75 participants, Garrison and colleague found that students seemed to engage in critical reflection and higher-order thinking in collaborative learning environments (p. 139).

Blaye described the difference in terms of structure and function (1988). He stated that collaborative learning resulted in horizontal division of labor, whereas cooperative learning led to vertical division of labor. Panitz (1995) explained that the former happened as group members shared symmetry and worked in coordination to accomplish a goal mutually established by them (17). Horizontal division of labor meant that everybody remained on the same level, and divisions and classifications existed for logistical purposes (Legge, 1995). No group member was superior to the other. All members interacted with each other on an equal basis (Legge, 1995). Vertical division of labor meant hierarchy of roles and functions. This kind of division of labor happened when a task was divided among group members who each did their individual sub-tasks (Legge, 1995). The group member was a "cog in a machine" where the machine was the task at hand (p.142).

This was similar to managerial vertical division of labor (Legge, 1995). Worker A finished his task to only emerge at the end of entire task completion to get his tangible reward. This situation iwa akin to group work, where activities were designed to be collaborative, but become hierarchical and rigid in structure (Johnson & Johnson, 1991). Friedman stated that this happened as contemporary society expected and demanded effective and efficient learning. And collaboration among group members usually meant time and effort (Friedman, 2006). Contemporary society wanted things to be achieved on a mass scale quickly leading to mass customization of education (Friedman, 2006). In such a scenario, authority figures set the boundaries, goals and dictate terms and conditions of learning. There is a leader who demarcates roles, and all members fall into this vertical hierarchy. Goals are achieved on a mass scale efficiently and effectively (Friedman, 2006). Research investigations into collaborative learning groups in engineering, sociology, and math courses found that initially students reacted well to collaborative learning with increased quality class discussion participation, and superior academic performances (Mourtas, 1997, Rinehart, 1999 & Johnson, 1990).But, collaboration soon gave way to cooperation and vertical division of labor when team members found that constant communication was actually proving a hindrance to quick and efficient functioning (Mourtas, 1997). According to Rinehart (1999), students preferred collaborating in class discussions, but wanted to work individually for projects and assignments.

Anderson and colleague stated that collaborative learning was influenced by dimensions of race and gender (Anderson & Adams, 1992). Based on their research they concluded that White Caucasian learners were apt to collaborate and learn together as a cohesive unit (p. 22). In contrast, minorities partticularly Asians preferred a teacher-centered classroom, and deviated away from collaborative learning activities (p. 23). Further, female learners, irrespective of culture and race, were more receptive to collaborative learning (Moch, 1995). In his qualitative study in a private female Midweatern university, Moch (1995) found that women learners were more inclined to interact and collaborate only with other female learners (p. 23). Moch (1995) argued that

this occurred as all women learners possessed feminine traits of empathy, interaction, and collaboration, trust, and problem-solving through mutual agreement (p. 23).

On the other hand, White Caucasian preferred traditional teacher-oriented classroom structures when given a choice between mixed teams and lecture formats (p. 22). Moch (1995) stated that this was due to the fact that men hold themselves to be superior to women. In addition, masculine traits of authoritarianism, and rigidity (Hofstede, 1986) were more suited to hierarchical team structures (p. 22). Moch further argued that white men favored interaction with white males (p. 22). Vogt (1997) concluded that people belonging to equal status, and function preferred to collaborate together (p. 24).

So, what does all this mean for instructional designers? The following two sections explore, and discuss how a collaborative learning group failed, to be replaced by cooperative learning and vertical division of labor. The concluding section reflects on the various practical implications for the science, and practice of instructional design.

4. Method & Results: A Student Speaks

The course in question is a core Instructional Design and Development course, offered online in the summer semester of 2011. Being a short semester, the course is very intensive requiring a lot of hard work, coordinated team effort, active class participation, and collaborative learning. The class is designed around weekly short assignments, quizzes, class discussions, and collaborative learning teams. The online class met every Wednesday when all assignments were to be submitted unless otherwise specified.

This summer semester of 2012, the course had a class population of 20 students including myself. Right from start, the class was divided into four teams of five respectively. Each team had to develop a comprehensive group project, due at the end of the semester. The teams also had to work together to complete several short assignments. As a result, each team had to communicate and interact extensively scaffolding each other to achieve symmetry of knowledge.

Initially, at the start of the semester, things were fine. My team had two male members and three female. Both male members were White Caucasian with one female Afro-American and one white female learner. I was the sole Asian female member of the team.I met my team members online, we exchanged emails, and even coordinated responses for a class discussion. It was natural for me to assume that this feeling of camaraderie and collaboration would spill over into our final project. I was wrong! I didn't know what was happening. Despite my continuous emails, and persistent efforts of volunteering information, opinions and thoughts, no response was forthcoming from any of my team members. I am enclosing a few of my emails, and the subsequent reply I received at the end.

"Hi,

How about we meet face-to-face and discuss how we intend to go about doing our project? I think we should do a project on Case studies? What do you think? I am usually prompt in answering my emails."

"Are we meeting somewhere? I have made some notes on all project topics to discuss. Maybe we should set up an instant messenger system to communicate with each other"

And after three weeks of delay, I received a short and concise reply which left me in doubt about my role.

"The project topic is going to be TGT. You have to come up with a detailed literature review on the effectiveness of TGT. Send it to me when finished."

I assumed that the team member who had emailed me was the team leader, but how and when? I had no idea even though I was a part of the collaborative learning team. I duly went about my task, and completed the literature review and emailed it to the team leader. I also emailed the entire team the following message

"Hi,

I finished the lit. review and have sent it. What do we do next? Is there going to be a presentation? Please keep me in the loop"

I got no response, and was in the dark about my collaborative learning team project till the end of the semester, when I received my final grade for the course. I got an A grade, but didn't feel as though I had contributed, shared, discussed, and been a part of a collaborative learning team. But I had got my reward for my labor – I had got the A grade for my literature review, and the grade mattered.

The next section is a detailed discussion of what happened, and why it had happened. The discussion opens and scrutinizes many critical and thought-provoking issues.

5. A Discussion: What Happened

What had started out, at the beginning of the semester as a collaborative learning team effort, dwindled down to cooperative learning, and vertical division of labor. I was no longer a member of a collaborative team, but a member of a cooperative learning team engaging in vertical division of labor. This is similar to Rinehart's belief that collaborative learning teams function well when students have to collaborate on class discussions. But, the collaborative learning team seems to collapse when students have to engage in assignments and projects. Why does this happen?

Going back to the literature review, it is imperative to remember the four primary features of collaborative learning. The first condition was that the learners develop their own group and establish their own conditions. When a third party organizes the collaborative learning group, it does not work. In the above case, the instructor physically divided the entire class into teams setting up guidelines and goals. This sort of restricted learner freedom to explore and choose group members. Further, the establishment of a common goal to be accomplished within a time frame severely limited learner ability to experiment, reflect, disagree, conceptualize the issue at hand. The goal had to be achieved efficiently and

effectively. This sort of opens up the team to become a co-operative learning team built on the lines of vertical division of labor. The team becomes a structured machine, where roles, duties, and functions of each team member are clearly defined. It can also be stated that the collaborative learning team becomes a hierarchical team structure, where each team member is only concerned with the completion of his/her sub task.

This might have happened to my team. The team had to achieve a goal within a set time limit. This could have hampered interaction, synchronicity and consistent coordination. The team had to perform under duress, and accomplish the target efficiently and effectively. The team had to engage in vertical division of labor. I became a cog in the team efficiency machine where I was called upon to do my sub-task, and contribute to the team effort. There was interdependence as without the literature review the team could not have completed the project. But collaboration is much more than just interdependence? Collaboration is sharing, making a concerted and coordinated effort to share conceptual space to solve problems and achieve targets. It is not only cooperation, but a blend of cooperation and interaction. It is interaction which brings about symmetry in the team. In this case, the team members did not have symmetry of knowledge, skills, or action. I did not have knowledge about the TGT project. Hence I was lacking in symmetry of knowledge. Further I did not know the process of the project. In other words I did not know what shape the project was going to take. I only had knowledge about the literature review, which I had done. This is akin to vertical division of labor.

Going back to Rinehart's observation, perhaps collaborative learning teams work well for class discussions as in those situations there is no immediate set goal. The team members can share, experiment, criticize, disagree, reflect and present different perspectives about the same issue. In fact, presentation of different perspectives can earn the team class points. But, the situation is reversed in a project. The goal has to be accomplished within an established time. There is no room for discussion, experimentation, and reflection. Team members have to do be assigned sub-tasks to do, and then these sub-tasks have to be combined to finish the project. In a nutshell, my team was like a pyramid where I was the front-line worker providing the foundation to the task.

Another factor could be my ethnicity and gender. Referring to the literature review, males of same gender and status collaborate more with each other. Both male team members were white, and so tended to interact more with each other. They assumed leadership assigning roles to all team members. This is in line with their masculine traits of authority, and rigidity. In contrast I interacted well with the other two female members of the team, as we all shared similar feminine traits. However I differed from them in terms of ethnicity and culture. Moreover, my Asian cultural orientation, perhaps unconsciously contributed to my half-hearted efforts to connect with my team members. When I realized that things were falling apart, why didn't I make an effort to meet them in person? I could have sought the help of my instructor, and fixed a meeting time. But I did not do so. Hence, it would seem that my cultural orientation heavily influenced my response and actions to the collaborative learning team.

But, this is only one student account of collaborative learning. Thus, my argument needs further empirical evidence from various academic disciplines, to be valid and reliable. But, my student account does compel reflective and critical thought, especially for instructional designers in higher education. Higher education is wrought with international students belonging to different culture. It becomes crucial for an instructional designer to keep this in mind. The next section focuses on the implications for the field of instructional design.

6. Discussion Continued: the Future for Instructional Design

Instructional designers need to be cautious about meaning, and usage of collaborative learning. It is not an encompassive term, but has a precise meaning and function. Instructional designers should not use the concept of collaborative learning as a mantra for academic success. They should refrain from applying it simply because of previous successes in other educational fields. Instructional designers should assess and evaluate the feasibility of using the collaborative learning method to improve academic performance. Will it truly foster deep learning, transfer of learning, or will it lead to vertical division of labor with no active knowledge acquisition and comprehension? Further, the learner context and style has to be considered. Is this method suitable for this particular learner population? Do cross-cultural collaborative learning teams function well? And most important of all, the instructional designer has to consider the primary objective of implementing collaborative learning. Is this method being used to achieve learning, or superior academic performance in terms of grades?

Another issue which crops up is the use of collaborative learning groups for online and face-to-face educational environments. Collaborative learning is definitely a positive and meaningful learning method, but its usefulness is a function of the reason of its implementation. Further, instructional designers have to consider cross-cultural issues when designing collaborative learning activities.

Research shows that gender, ethnicity, and resultant cultural orientation do play a defining role in the success of collaborative learning. What is an instructional designer supposed to do when confronted with cross-cultural teams, or mixed gender teams? It is imperative to have a contingency plan when implementing collaborative learning activities. Here, the instructional designer has to go back to the begening. The foundational instructional design model of ADDIE (Analyze, develop, design, implement, evaluate) needs to carefully studied and understood. There has to be an equal emphasis on the analysis i.e. knowing and under-

standing the learners, the performance, and learning context. A comprehensive analysis will lead to adequate development and design of feasible content. The instructionnal design has to be implemented, but the work of the instructional designer does not stop there.

There has to be formative and summative evaluations. This means that instructional designers have to constantly conduct suitability assessments to find out if their design is working. This is focal when it comes to collaborative learning due to the complex and multi-dimensional nature of the pedagogy. It is the responsibility of the instructional designer to remove the activity if it is not working. Hence the instructional designer always has to remember that the content or message should be the deciding factor in choosing a pedagogy, and not the other way round.

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