

Correlational Research Review

Brewer, S., & Klein, J. (2006). Type of positive interdependence and affiliation motive in an asynchronous, collaborative learning environment. *Educational Technology Research & Development*, 54(4), 331-354.

Deborah L. Wise

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This study investigated the effect of type of positive interdependence (roles, rewards, roles-plus-rewards, or no structure) and affiliation motives (high vs. low) in an asynchronous, collaborative learning environment. College reentry students worked together in small, fully online discussion groups that lasted for seven days. Results indicated that participants in groups given roles plus rewards interacted with their teammates significantly more than those given rewards only or no-structured-interdependence conditions. A significant positive correlation suggested that participants with higher numbers of interactions attained higher posttest scores. However, no significant differences were found in achievement by type of interdependence or by affiliation motive. Results also revealed that type of interdependence and affiliation motive had a significant impact on student attitudes. Implications for integrating small group work in online higher education settings are discussed.

While the study was very well thought out and executed, with conservative measures taken to ensure validity and reliability, one can not help but wonder if the study was designed with an inherent bias, given the nature of the study (small group interdependence) and the population chosen for the study (a predominantly white population at a “private degree completion university for adult learners.” In addition, female participants (who might be more inclined to collaboration) far outnumbered males in the study, 185 to 104, respectively.

In this study, research questions revolved around how achievement and attitude might be effected by different conditions of positive interdependence (Role, Reward, Role plus Reward or No Interdependence) and Affiliation (being part of a group, being valued by others, etc.). Data instruments measured attitude, affiliation motive and achievement but what the achievement

instrument actually measured is somewhat vague; the internal consistency reliability was only .65. Group sizes were very small (3 per group) which may not reflect group sizes in most asynchronous learning environments. Results of the study might have been different if the population under consideration was larger, covered an entire term as opposed to 7 days, was from a state-funded institution, and crossed disciplines.

Despite possible flaws, the study highlighted aspects of distance learning that should be of interest to anyone researching asynchronous learning; strong curriculum with clear objectives, along with training in how to use software, how to submit assignments, and methods to resolve conflict in small groups results in greater student success regardless of condition and whether or not there is a high motivation for affiliation. Of greater interest to researchers should be the perceptions of the students themselves, on how small groups influence participation and achievement compared to individual work. Regardless of affiliation motive and condition, all groups were more interested in the success of other team members, benefiting from positive interdependence.

Critical Review

Human action contains an element of mutual reciprocity; learning takes place when individuals can communicate and share ideas (Browne, 2003). This study supports the cognitive benefits of positive interdependence but is vague as to the quality of learning that has taken place.

Problem

The title of the article gave a clear indication of the authors' research interest. In a collegiate setting with returning adult learners, how does an institution that offers asynchronous distance learning encourage learners to collaborate in small groups, when they may not be

intrinsically inclined to participate? If positive interdependence (cooperation) results when students promote and facilitate each other's efforts to learn (Brewer & Klein, 2006), are there methods by which an increased level of interdependence can be achieved, leading to increased interaction and greater achievement?

As more adult learners return to school to seek degrees, many of them might choose online programs as a method of convenience and a way to balance family and professional responsibilities. Also, as high-speed Internet becomes more available and affordable, students may find that obtaining degrees online enables them to have an anytime, anywhere ability that may not otherwise exist (de Bruyn, 2004). Whether or not small groups are essential to student achievement remains mixed; research on college populations is scarce.

The framework was explained well, and the reader was aware of what the researchers hoped to accomplish. What was not as clear until much further into the paper was which aspects of the study were considered dependent variables (achievement and attitude), and which were considered independent (positive interdependence condition and affiliation). Knowing this from the outset would have made the study easier to follow.

Related Literature

Research into the effects of online learning is creating a discipline known as Cyber-ethnography, which examines immersion in virtual culture and communities (Browne, 2003). This is an emerging field that needs further research to bring it to full academic acceptability, which is why existing research is limited. De Bruyn (2004) places the responsibility for knowledge acquisition in online environments in the hands of students, enabling them to develop competencies in information literacy, self-directed learning, and solving "real-world" problems. Both authors mention the importance of a level playing field in terms of preparedness, in level of

Internet access and also in knowledge of how to use the required software, in order to maximize student success.

As people expand their personal networks to include Internet contacts, they will need to be able to interact and resolve problems cross-culturally on a global scale. Social network studies reveal that people who interact more frequently in their social networks enjoy a greater sense of belonging and are more excited about future work (Haythornewaite, 2000). These interactions can occur asynchronously, as they did in this study, or they can occur synchronously, through virtual worlds, instant messaging or web-based live chat rooms. Regardless of how the engagements occur, having some social “rules of engagement” such as a rubric is helpful in preparing students in advance (Rovai, 2007).

Hypothesis or Research Question to be Answered

The authors try to answer three research questions with this study: (a) What is the effect of type of positive interdependence on achievement, attitude and interaction behavior for adult students on an asynchronous collaborative learning environment. (b) What is the relationship between affiliation motive and achievement, attitude, and quantity of interaction when adult students use an asynchronous collaborative learning environment, and (c) Do positive interdependence and affiliation motive interact to affect achievement, attitude, and interaction behavior for adult students in an asynchronous collaborative learning environment?

The hypotheses stated by the authors should be obvious and were certainly in a position to be tested in this study: (a) students who received structured interdependence (knew their roles in the group) would perform better, (b) Students who received two types of interdependence (roles plus rewards) would perform better than those who received only one, and (c) students with a high need for affiliation would have more positive attitudes and interact more.

Sample

The population of interest was undergraduate business majors (104 males and 185 females) enrolled in a course in management, ranging in age from 20 to 62, with a median age of 35 and 34, respectively. The composition of the student body was 61% white, 18% Black and 11% Hispanic. The fact that the study took place at a private, degree completion university for adult learners should lend an observer to wonder if the results might have been different, had the study been conducted at a state-funded institution. This study appears to be homogeneous in its composition, and may have an inherent bias against minority participation (de Bruyn, 2004).

The study appeared to be open to anyone who chose to participate and if a student was uncomfortable with the activities of the group, they could submit an individual paper in lieu of group participation. It is important to remember the short duration of this study, and to consider a study over the course of an entire term for further research.

Variables

Independent variables in this study were the level of positive interdependence and affiliation motive. Given that, it is amazing how deeply buried this information was, and how little elaboration the conditions were given, compared to other aspects of the study. The four interdependence conditions were: (a) role interdependence, where each group of three participants was directed to designate the roles of facilitator, answer drafter and verifier, (b) reward interdependence, where each group of three participants was informed it would receive a 15% bonus toward the weeks assignments if all members of the group a score of 80% or more on assignment completion, (c) role-plus-reward interdependence, where each group of three participants was directed to designate roles, and was informed of the bonus points for all members of the group attaining a score of 80% or more, and (d) no structured interdependence,

where each group of three participants was informed only that they should discuss the readings and use the practice sets to prepare for the test.

Affiliation motive is described as being part of a group, being valued by others, relatedness, social adaptability, desiring communication, and extroversion. This was more painstakingly described as the affiliation scale of the Work Motivation Inventory, by Braskamp and Maehr (1987), which contains 14 items that determine the degree to which an individual is motivated to affiliate with others. Age norms for the Inventory were consistent with the group under study (35.6% in the 26-35 years range for the Inventory and a median age range of 34-35 years for the study), with an equal number of participants in high and low affiliation motive groups.

Dependent variables in this study were achievement and attitude. While the instrument for attitude was easy to understand, both from a question and scoring perspective, the instrument for achievement was not as clear to understand. Someone reading the study might want to know if the results of this study were in any way tied to the grade the student received in the class, or if this 7 day study done more as an observational exercise, where the results did not have a measurable impact on the final grade the student received. If the achievement instrument was tied to a grade, it would have been more helpful to know what proficiencies the instrument tried to measure, compared to the course objectives for the class. Based on what was described in the study, the dependent variable of achievement may have been a measure of completion, as well as a basic understanding of the topics presented.

Measurement

The authors were extremely thorough in describing how data collection instruments were measured. In addition to the affiliation scale mentioned earlier, online lectures, practice

exercises, instructor notes, a posttest, attitude measure, and an interaction checklist for categorizing group interaction were described. Internal consistency reliability measures were .65 for the posttest, and .75 for the attitude survey. Instructional materials were developed and pilot tested by the researchers, using the required course text. Assignments were described in detail and were consistent across conditions. Instructor notes described which assignments should be given on a particular day, with any additional instructions for facilitators.

The posttest developed by researchers was used to measure student achievement (and was reviewed by a subject matter expert for content validity). The test contained a total of 24 items related to concepts presented in assignments, as well as application items that were different than the assignments, but related to the same scenarios as those in the assignments. A 14-item survey was developed by the researchers to measure student attitude, using a 5 point Likert-type scale to respond to questions regarding preferences about the small group.

An interaction checklist qualitatively analyzed behaviors according to the three categories of (a) cognitive, (b) group process, and (c) off task. This checklist was adapted from instruments previously used to record observable group interactions in face-to-face settings. For this study, interactions were observed through the text transcripts of posts made by group participants.

In addition to the measurement descriptions, procedures used during the study were carefully delineated, leaving no question as to how the study was conducted or how data was collected. Despite this, there seems to be no mention of a rubric involved for determining how achievement is measured against course objectives, given the fact that the small group activities accounted for 30% of a student's grade (Rovai, 2007). In this study, interactions were measured according to behaviors and whether or not interactions were completed, not the quality of those

interactions. This could influence the groups under the rewards conditions, who were only to benefit if work was completed, not necessarily completed according to a standard.

Statistical Analysis and Interpretation of Findings

The researchers in this study appeared to be painstaking in reducing bias and making sure data was analyzed appropriately. Due to the number of groups and the multiple conditions being observed, analysis of variance (ANOVA) was used to analyze posttest scores and quantity of interactions. Correlation analysis was conducted to determine the relationship between the two. Multivariate analysis of variance (MANOVA) was conducted on data from the attitude survey. Samples of the learning teams were selected for analysis at random, from both high and low affiliation students. Primary and secondary raters were trained for this task, with inter-rater agreement at .91. Statistical findings were presented in tables, with interpretations of the data included that agreed with the data in the tables. Findings were reported with respect to furnishing evidence for each research question asked and every hypothesis posed. It was not clear how the posttest was scored or what the highest possible score might be. As a result, one can only measure the data as a comparison of one group to another, not the groups to an overall standard. Aside from that, all data was understandable and easy to interpret.

Summary, Conclusions, Recommendations

All conclusions are confined to the evidence at hand and at first glance, the results of the study are surprising. Regardless of condition or affiliation motive, all groups seemed to have high achievement measurements. The authors themselves offer a reasonable explanation for the scores, in that the attention to consistency across curriculum, along with thorough student preparation in how to navigate the software, where to find technical support, how to enter threads and submit assignments, and even how to resolve conflict in small groups, led to students who

were well prepared for small group work. What may not be as easily explained is why all groups, across all conditions and affiliation motives, felt it was important that each member of their group was successful and earned a high score, based on results from the attitude measure, which examined the social components of learning (Browne, 2003). Another interesting finding is the amount and types of interactions by the groups. The role-plus-reward group had more interactions as a group (as one might expect) but it did not result in significantly higher achievement. The next highest level of interaction was experienced by the group that had no conditions at all, whose interactions were largely reflective, related to course topics, asking or answering questions, and disputing others opinions (De Bruyn, 2004).

As mentioned earlier, while the researchers were very thorough in their measurements and processes, the setting and the group under study could lead to racial and demographic biases. Further research should look to replicate this study using multiple disciplines, state-funded schools with more diverse populations, and studies that observe interactions over an entire term.

References

- Browne, E. (2003). Conversations in cyberspace: A study of online learning. *Open Learning*, 18(3), 245-259.
- De Bruyn, L. L. (2004). Monitoring online communication: Can the development of convergence and social presence indicate an interactive learning environment? *Distance Education*, 25(1), 67-81.
- Haythornthwaite, C. (2000). Online personal networks: Size, composition and media use among distance learners. *New Media & Society*, 2(2), 195.
- Rovai, A. P. (2007). Facilitating online discussions effectively. *Internet & Higher Education*, 10(1), 77-88.