

The effect of computer-supported independent and interdependent collaboration on information sharing

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Abstract: As a way to look at how activity in the group influences individual cognition, this paper reviewed three literature on the effect of interdependence and independent work in computer-supported collaborative learning. Three literatures show the positive effect of interdependent collaboration on information sharing as the opposite results of previous research.

The effect of interdependent collaboration on information sharing

Previous research has identified two counterintuitive findings for collaboration work. First, individuals remember less when recalling in groups, which is a well-known effect called collaborative inhibition (Hinsz, Tindale, & Vollrath, 1997). Second, in a form of interdependent collaboration, group members mentioned more pieces of common (shared) information than unique (unshared) information, which is called hidden-profile methods (Lu et al, 2012). These two startling finding for group work clearly suggest that group work would not be as effective as working individually. Therefore, the effects of working in groups must be qualified or moderated in order for instructional designers to optimize collaborative learning for all members when they design collaborative learning.

Engleman and Hesse (2010) investigated interdependence and independent work in computer-supported collaborative learning. All the members were randomly assigned to the Interdependent and Independent conditions and required to create a collaborative concept map regarding problem-solving task using CmapTool. The Interdependent group on average spent more time on creating a fully elaborated concept map before shifting focus to solving the problem, while the Independent group spent less times on elaborating their map before focusing on solving the problem. Analysis of the content and structure of the group maps showed that the Interdependent group maps were larger and more fully elaborated relative to the Independent group maps. These findings for the Interdependent group are notable since it is the opposite pattern of previous research regarding common and unique information that group discussion tends to focus on common information than unique information (Stasser & Titus, 1985; Lu et al, 2012).

The following two studies (offline & online collaboration) were desired to measure the flow of information elicited as concept maps before (Premap), during (Group map), and after (Postmap) collaboration in order to explain or reconcile this positive pattern (Clariana et al, 2012). First investigation (called as CAS 250) was conducted in a face-to-face section of a large public University. Working alone as homework (Pre-maps), participants in the Independent condition were asked to read and map all of Chapter, while participants in the Interdependent condition were asked to read all of chapter but map only the first or last half of the chapter. After that, all members were required to create group map of the chapter (Group maps). When done, they individually completed a post assessment that consisted of creating from memory a concept map of the Chapter content (Postmaps).

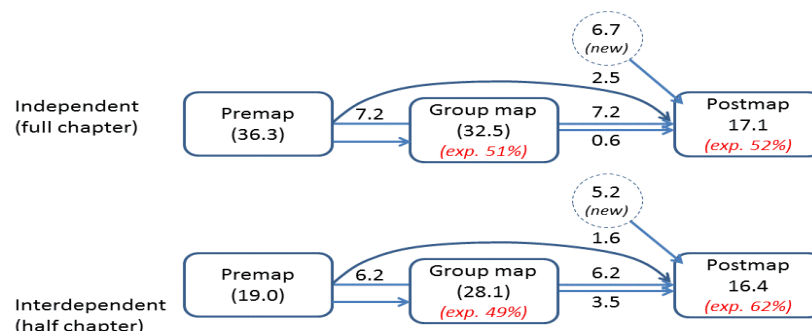


Figure 1. The average flow of Posttest concepts for each condition across Premaps, Group maps, and Postmaps.

As showed, for the Premaps, not surprisingly map sizes were on average about half as large for the Interdependent condition. This is consistent with mapping half of the chapter versus mapping the whole chapter. Group maps were approximately equivalent in terms of quality and size. Interdependent group agreement with the expert was 49% compared to 51% for the Independent group maps. Regarding Postmaps, average Postmaps

for each condition were approximately equivalent in terms of size but not in terms of quality, the Interdependent agreement with the expert was 62% compares to 52% for the Independent group maps. These findings indicate that interdependent group work does lead to unique (and quality) information sharing because they must have learned the other half of the chapter that they had not studied through the group collaboration. In addition, what they learned in the group tended to be of higher quality.

Another remarkable finding is the fact that 21% (0.6 terms) of the terms in the Interdependent postmaps came exclusively from their Group maps while only 4% (3.5 terms) of the Independent postmaps came exclusively from their Group maps. This suggests that the Independent group members paid less attention to their group's map. In other word, independent Postmap was more dependent on their Premap and their own unique knowledge than on their Group map. These finding suggests that collaboration more strongly influence the learning in interdependent condition than in independent condition.

Armed with information from this investigation, a related follow-up study (called as IST 110) underway now will replicate this approach (Preamp-Groupmap-Postmap) online and include video analysis of the group collaboration in order to describe the collaborative group process. In this study, all members were individually required to complete Post Lesson Quiz that consists of 20 fact-related items in order to more clearly identify the effect of information sharing in collaboration. This investigation showed the effect of interdependent group work on information sharing. Bellow figure 2 shows the result.

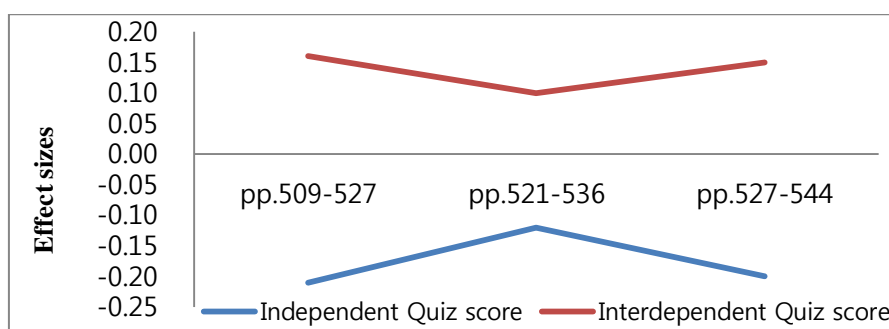


Figure 2. Quiz score of both interdependent and independent members.

Given the results from three investigations, our current conclusion is that interdependent collaboration work (1) may be an effective way to share unique information, and (2) collaboration strongly influences the learning in interdependent collaboration condition than in independent collaboration.

Next step

The latter two investigations (CAS 250 & IST 110) are our beginning step to understand the flow of information pieces (as structural knowledge) in group collaboration as a way to look at how activity in the group influences individual cognition. As a next step, IST 110 study will further investigate the relational and associational knowledge beyond the extent of knowledge in computer-supported collaborative problem-solving task. The main premise underlying this research is that different collaboration strategies, whether independent or interdependent, may influence different knowledge structure, which in turn engenders different performance. At this time, our expectation is that independent collaboration strategy may be effective way for knowledge convergence, while interdependent collaboration strategy may be effective for information sharing as proven by the research reviewed in this article.

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