Argumentation Vee Diagrams (AVDs) Enrich Online Discussions

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Abstract: With online Argumentation Vee Diagrams (AVDs), students compose arguments on both sides of a controversial issue and then develop an integrated conclusion. In this study, students used AVDs prior to composing discussion notes, and—at the end of each discussion—jointly created a group AVD. AVDs significantly enhanced the number of arguments/counterarguments and compromises in students' discussion notes, and promoted opinion change. However, for AVDs to be effective, students also needed instruction on evaluating argument strength.

Introduction

A frequent problem with online discussions is that students often superficially agree with one another rather than exploring alternative views (Koschmann, 2003). Although interventions exist that promote disagreement (Baker, 2003), that is only half the problem. Students also need to critically evaluate both sides of controversial issue and to "put the pieces together" in formulating a final conclusion.

Nussbaum and Schraw (in press) termed this process *argument/counterargument integration*. Rooted in contemporary models of argument (Walton, 1996), integration can involve refuting arguments on one side ("refutation strategy"), finding a compromise/creative solution between two sides ("synthesis strategy"), or weighing advantages/disadvantages of the two sides ("weighing strategy"). Nussbaum (2006) found that students use weighing strategies the least because of the number of separate elements that must be coordinated in working memory. The most common strategy was *pseudo-integration,* where students simply picked an argument they "felt" was strongest but did not respond to counterarguments.

Nussbaum (2006) also assessed the effect of "Argumentation Vee Diagrams" (AVDs) on argument/counterargument integration, but in the context of writing opinion essays. The present study explores the effect of AVDs in online discussions. AVDs involve students listing arguments on both sides of an issue (specifically on different sides of a large "V"), but then, at the bottom of the figure, developing an integrated conclusion, which is subsequently used to compose a discussion note. Two questions were included at the base of the V to scaffold students' thinking: (a) "Which side is stronger, and why?" (weighing strategy) and (b) "Is there a compromise or creative solution?" (synthesis strategy).

AVDs were provided to student in two ways. First, students received blank AVDs (in WORD) and individually completed them before their discussions. (Schwarz & Glassner, 2003, found individual brainstorming before group discussion improved discussion quality by facilitating a greater variety of ideas.) After composing their initial notes, students were required to post additional notes indicating points of agreement and disagreement with others. Discussion groups contained three students each. Then, at the conclusion of their discussion, students used *Wiki's* to compose a joint AVD and summary note. (*Wiki*'s are a Web-page that anyone in the group can edit.) Students learn more from discussions when they summarize the various points made (Schwarz & Glassner, 2003). In addition, because group roles can facilitate participation (Webb & Palincsar, 1996), we assigned three different roles: (a) Composer, who completed the initial group AVD, summarizing the discussion, (b) Elaborator, who added clarification, and (c) Integrator, who used the group AVD to compose a summary discussion note. This study investigated whether AVDs improved the quality of online discussions, as measured by numbers of arguments/counterargument, and extent of argument/counterargument integration.

Method

The study was a design experiment, which recognizes that complex interventions may need to be modified during implementation. To provide rigor, we also conducted the study as a quasi-experiment. The

study used 87 participants enrolled in two sections of a distance course on educational assessment. Both sections were taught the same way and used identical materials. Students were required to post a minimum of two notes per discussion, and one student also had to write a note summarizing the discussion.

There were three discussions, each lasting one week. The discussion topics were: (a) Should students be graded on class participation, effort, and homework completion? (b) Should ability grouping be used to teach reading? and (c) Should states be required to have accountability systems for evaluating student performance? For the first discussion (experimental group), we developed several worked examples on how to complete the AVDs, presented to students using Macromedia *Captivate.* Similar to live lectures, *Captivate* provides a series of written instructions in real time and demonstrates filling in the form. The examples were also presented in Web-pages to which students could later refer.

After each of the first two discussions, the instructor (first author) reviewed the summary notes/group AVDs, and gave each student short, written feedback. The purpose was to discourage "pseudo-integration" where students—in forming their final opinion—just picked the arguments they liked best and ignored counterarguments. Thus students were typically encouraged to "think deeper about the other side" and "not to ignore any important counterargument when performing your integration."

It also became apparent, after the first discussion, that students needed additional criteria for judging why arguments on one side might be stronger than the other. For the second and third discussions, we added a series of additional questions at the bottom of the AVD but before the integration section. The questions simplified the integration process by having students identify the two most important arguments on each side, judge the extensiveness of any advantages/disadvantages, weigh the values involved, and then evaluate whether the other arguments might change their final opinion, if at all. One question also asked if "there was a way of designing a solution so that opposing values could be realized?"

We coded notes and AVDs on: (a) number of arguments/counterarguments raised, (b) mention of the most important arguments/counterarguments in an organized way (*Coverage/Organization),* (c) development of "it depends" final opinions that took into account both sides (*Compromises),* (d) generation of creative solutions that realized advantages while minimizing disadvantage (*Creative Solutions*). We also examined whether students changed their opinion at some point during the procedure (*Change*). We randomly selected 22 discussions to double score; reliabilities were satisfactory (r = .87 and up).

We used the group as our level of analysis, because individual scores in a group were not statistically independent. Except for the first outcome variable, the variables were nominal. There were two sets of scores: one for the discussion notes, and one for the group AVDs in the experimental group. At the end of the study, students completed a confidential survey on the usefulness of AVDs.

Results

Overall, the AVDs significantly improved the richness of students' discussion, as measured by the number of different arguments/counterargument raised. The mean in the experimental group was 8.61 arguments and 8.89 counterarguments per group discussion, compared to 2.11 arguments and 2.09 counterarguments for the control group ($t(23) = 6.07$, $p < .001$).

In addition, the discussion notes of the experimental group contained significantly more compromises ($t(24) = 4.81$, $p < .001$). About two-thirds of the groups in the experimental group engaged in compromises ($M = 0.67$), almost none in the control group did so ($M = .06$). There was not, however, a significant difference in regards to creative solution ($t(34) = 1.28$, $p = .21$). Importantly, there was more opinion change in the experimental group ($M = .39$, $t(17) = 3.29$, $p < .01$, $M = 0$ for control).

There was not a significant difference in regards to *coverage* ($t(33) = 1.76$, $p = .087$). However, when the final group AVD's were examined, there was steady improvement in coverage (see Table 1). This finding suggests that the discussion stage did not contain a comprehensive coverage of all the important arguments, but enough arguments and counterarguments were nevertheless considered to induce compromising. The group AVD's may have added an additional element of coverage because the composer and elaborator were directed to include all important arguments and counterarguments.

Table 1: Experimental group means over time.

Time	Coverage	Compromise	Opinion change
1	1.00	0.67	0.17
2	1.40	1.20	0.80
3	1.75	1.00	0.50

Table 1 also shows a jump from Time 1 to Time 2 for *compromises* and *opinion change*. These differences could be due to topic or to the introduction of the additional AVD prompts at Time 2. Student survey comments indicated that the prompts helped them focus on counterarguments and compare arguments, resulting in more compromises and, in turn, opinion changes. (Using logistic regression, compromises did predict opinion change, odds ratio 4.16, $p < .05$.) Instructor feedback about not ignoring any important counterarguments and providing a balanced view could also account for the jumps.

In regards to the student survey ($N = 19$), comments were substantially positive. Students noted that the AVDs helped them focus on and evaluate the other side of the issue, and that the group AVDs helped them organize and synthesize various points. Of the 19 respondents, 13 (68%) made uniformly positive comments, and 5 (26%) made partially positive comments. Of these five, the greatest reservations related to the individual AVDs. A few students did not possess enough knowledge to think about counterarguments. Most students found the individual AVDs a useful brainstorming activity.

Discussion

With AVDs, students made more arguments/counterarguments, and synthesized them through suggesting compromises. The process also resulted in more opinion change. However, argument/counterargument integration was weak the first time students used AVDs. Students must be discouraged from engaging in *pseudo-integration*, where—in filling out the integration box—they just pick the argument that they think is strongest but counterarguments are ignored. We dealt with this problem through feedback and by including additional prompts. One surprising finding was that AVDs had little effect on generating creative solutions, which is at odds with the results from Nussbaum's (2006) essay study; perhaps the additional prompts that we added to the on-line version did not focus strongly enough on creative solutions. Future research should examine how to modify and streamline the additional prompts. Overall, however, AVDs show great promise for enhancing students' critical thinking and discussion skills.

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