Enhancing collaborative argumentation in an online environment

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ENHANCING COLLABORATIVE ARGUMENTATION IN AN ONLINE ENVIRONMENT

by

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ABSTRACT

Enhancing Collaborative Argumentation in an Online Environment

by

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Studies indicate that collaborative argumentation can aid students’ understanding and improve their problem-solving skills. This study used the online environment WebCT to explore the improvement of argumentation through goal instruction. In previous studies of collaborative argumentation using WebCT, small groups of students discussed controversial questions. Some groups were given a general goal to persuade, but others were given an elaborated goal to generate reasons and evidence. The effect that the elaborated goal had compared to the general goal was analyzed. This study replicated those previous studies, with some alterations. The goal was to evaluate two interventions designed to increase argument balance and development.

Elaborating the question did enhance balance and argument development, especially for low-knowledge students. The reason condition had some effectiveness with some knowledge interactions. Also, asking students to complete a survey and declare their position before engaging in discussion tended to reduce balance.
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CHAPTER 1

INTRODUCTION

What is Argumentation?

Before discussing historical and modern approaches to argumentative pedagogy, we must define argumentation. Argumentation must be distinguished from argument. "Argument" and "argumentation" may both refer to debate. However, a more restrictive definition of "argument" is "reason advanced," and a more restrictive definition of "argumentation" is a "line of reasoning." Therefore, argumentation refers to a series of arguments that support one another, tied together by a common theme, "materialized" as a text or dialogue (Andriessen, Baker, & Suthers, 2003).

Andriessen et al. (2003) distill the "variety of understandings of argumentation" into three categories: justification, rhetoric/dialectic, and logic. Justification is "giving reasons;" rhetoric/dialectic is "trying to persuade or convince;" logic is "demonstrating a point of view." Each of these formulations is by itself inadequate for argumentation in the context of education. "Justification" is incomplete because argumentation is not only about "giving reasons," but also about examining the consistency between various reasons. "Rhetoric/dialectic" is incomplete because people sometimes argue without any expectation of persuading their opponent. Rather, they argue merely to show that their
point of view has some merit. "Logic" is incomplete because not all arguments are
strictly logical (Andriessen et al., 2003). Furthermore, logic gives no account of how
arguments are constructed.

In 1958, Stephen Toulmin recognized the inadequacy of argumentation models
founded on formal logic alone (Tindale, 1999). Toulmin thought the syllogism, the
foundation of traditional models of argumentation, was oversimplified and
unrepresentative of real-life argumentation. Furthermore, although Toulmin recognized a
field-independent aspect of arguments (many have similar components), he also
recognized a large field-dependent component, because what counts as "backing" (i.e.,
evidence) varies from field to field. Therefore, arguments in different fields cannot be
meaningfully assessed by the same procedure and by the same standards (Tindale, 1999).
Arguments belong to the same field, according to Toulmin, when the evidence and
conclusions are of the same type (Herrick, 2001). Arguments that use deductive
reasoning are different from those that use inductive reasoning. Likewise, a scientific
argument differs from a legal or aesthetic argument. Notably, arguments within a certain
discipline may belong to different fields. For example, in law, an argument that applies a
certain law to a certain fact pattern may belong to a different field than an equity
argument a judge might make to justify his judicial opinion (Herrick, 2001). The latter
would involve warrants of a more moral nature, and therefore different types and amount
of backing.
Many have called Toulmin an “informal logician” for his rejection of the use of formal validity as an appropriate criterion for judging arguments (Tindale, 1999). This point of view is useful for examining argumentation in the educational context. Just as Toulmin recognized that different argument fields require varying standards, we might assert that different argument contexts call for different models of dialectical arguments (the social process where arguments are created). For example, the law uses a very adversarial model, whereas mathematicians engage more in demonstrations and critique of formal models. Counselors and clients construct arguments more through discussion, exploration, and introspection. What model of dialectical argumentation is most useful in education, as articulated by recent theorists? With respect to argumentative learning, a useful definition is proposed by Cho and Jonassen (2002), who describe argumentation as a fundamental type of informal reasoning that is essential to problem-solving, decision-and judgment-making, and idea and belief formulation, which requires the identification of alternative perspectives and ultimately the development and selection of a reasonable, evidence-supported point of view.

Veerman (2003) describes argumentation similarly, as an interactive process wherein multiple participants express at least some doubt or disagreement. These points of doubt or disagreement become starting points for “elaborated discussions” and “constructive contributions.”

These definitions suggest a type of co-constructive argumentation, which, according to Pilkington & Walker (2003), is a process of confronting cognitions, of deliberating between arguers’ diverse positions and their reasons for believing them. Koschmann
(2003) notes that co-constructive talk (or collaborative argumentation) is a dialog that involves conflict but where students work together to construct, critique, and reconstruct arguments (see also Mercer, 1996; Nussbaum, 2002). This social conflict is a stimulus for conceptual change and development, according to sociocognitive theory.

Framed slightly differently, argumentation in a learning setting may be thought of as joint inquiry or a group discovery process (Koschmann, 2003). This is perhaps the formulation of argumentation most appropriate in the pedagogical context. This description evokes a classroom setting where students collectively argue, pooling their collective knowledge and analyzing their collaborative ideas utilizing group creativity and intellect, in order to reach a consensus truth. It differs from an “adversarial” model where students are trying to win points, and therefore may shy away (or deflect) reasons that weaken their positions. In collaborative argumentation, students are willing to consider alternative points of view (and to make concessions on points to other students) in order to explore and understand issues and concepts more thoroughly (Nussbaum, 2002). In collaborative argumentation, additional and contrary reasons are welcomed.
CHAPTER 2

REVIEW OF RELATED LITERATURE

The Origins of Argumentation in Pedagogy

Argumentation has a long history in education, beginning in ancient Greece with the Sophists and Socrates. The Sophists were teachers of rhetoric, the art of persuasive speaking, which was essentially argumentation and oratory combined. Dialectic was the primary method of education; students were required to argue for and against a given proposition and were thereby exposed to both sides of an argument. Socrates' famous method (as explicated by Plato in his dialogues) involved the teacher more directly in the argumentation process—he asked his students questions that tested what they knew (or rather what they thought they knew) until truth was reached, or rather, until truth's true form was approached as near as possible (Herrick, 2001).

Socratic and Sophistic argumentation concepts are both inadequate for the purposes of arguing to learn, though both offer something to the task that is uniquely useful as well. Sophistic argumentation is inadequate partly for the criticism leveled by Socrates: It often emphasized style over substance (Herrick, 2001). Such is clearly not the goal of argumentation in the educational context, where for reasons that will be fully described later, substance should be the primary concern. For Sophist teachers and their students,
developing argumentative skill was ultimately pretext for social advancement. Because effective public speaking was essential to what limited social advancement existed at the time, the Sophists taught citizens how to argue well to get ahead. Somewhat of an elitist, Socrates disagreed with the social advancement goal of Sophistic rhetoric. Moreover, he preferred a kind of living, dynamic debate called dialectic (Herrick, 2001). This seems a valid stance when the goal of argumentation is learning in general rather than learning argumentation for its own sake or for its potential pragmatic rewards. To Socrates, truth, in the absolute sense, could be discovered (or at least approached) through dialectic (Herrick, 2001). But Socrates' definition of “capital-T truth” and the range of argumentative techniques that he considered valid are too narrow for today's educational context. Specifically, his dismissal of the Sophistic technique of arguing both sides ignores the value of exploring diverse points of view. Additionally, his belief in one absolute truth is at odds with more contemporary views of truth in science, wherein knowledge is the result of a continuous and dynamic process of seeking warranted belief (Philips & Barbules, 2000).

In his *Rhetoric*, Plato's student Aristotle, recognizing some limitations in his teacher's view, attempted to bridge the gap between Sophistic and Platonic Rhetoric (Herrick, 2001). His belief that truth is approached through honest rhetoric, which in turn flows from students who have received proper moral and intellectual training. Aristotle conceived of “honest” rhetoric as not only a means to persuade, but also as a means to explore ideas. He also recognized the value of honest, informal discussions between individuals with different ideas and values, a process he termed “dialectics” and which
would supplement rhetoric. Aristotle was probably the classical educational philosopher with views most analogous to our modern views of pedagogy.

The Roman Empire assimilated and transformed the Greek concept of rhetoric, and made it the basis of all upper-level education. The goal of Roman rhetorical education was the union of eloquence and wisdom in the giving of speeches. In *De Inventione*, famous Roman rhetorician Cicero outlined the five “canons” of rhetoric: invention, arrangement, expression, memory, and delivery. Most of *De Inventione* is devoted to invention, the generating of ideas necessary before a speech can be given. This is also arguably the only canon that is closely relevant to collaborative argumentation (which involves the exploration of multiple reasons). Expression (language choice), delivery, and memory focus on the parts of rhetoric that are concerned with the spectacle of public speaking. Those canons do not accord with our working definition of collaborative classroom argumentation, which is not concerned with individual displays of oratorical prowess, but rather with the development of ideas that happen to be expressed orally or in written form.

To Quintilian, the preeminent Ancient Roman educator, rhetoric was a subject so vital, not just to the individual but also to society in general, that it should be taught to students almost from birth (Gwynn, 1964). In fact, he recommended that even a child’s nurse should speak proper Latin. The ideal Roman society was one where rhetoric flourished, as the ideal citizen was eloquent, a good citizen speaking well (Gwynn, 1964).

Although eloquence was the ultimate goal of rhetorical training, Quintilian’s educational philosophy was not so different from ours today with respect to the value
placed on argumentation. Quintilian realized that one could not be eloquent without learning and thoroughly researching the topic about which he was going to speak (Horner & Leff, 1995). Nevertheless, the ultimate goal was making eloquent speeches. Furthermore, even though Roman rhetoricians emphasized the importance of inventing arguments, style became increasingly significant in Roman oratory. By 50 B.C.E., Rome had entered what is referred to as “the Second Sophistic,” where display oratory, the epitome of style-over-substance argumentation, came into fashion (Horner & Leff, 1995). During this time, at games and at international festivals, orators would dazzle crowds with amazing feats of memorization and dramatic pronunciation (Herrick, 2001). In truth, this was not really argumentation (or rhetoric), but this period is crucial in understanding an important priority shift in ancient Roman rhetoric. In many ways, these priorities would not be questioned until the Renaissance (Herrick, 2001).

As stated, these simplified comments about the forms and transitions of argumentation in ancient pedagogy are less important as history than as a starting point to discuss the merits of various methods of argumentative learning. For instance, it seems clear that for our purposes, argumentation should not be about display as it was with the Romans or Sophists. It also should not be about discovering absolute truth, as it was with Plato. The goal of argumentative learning should only indirectly involve skill in public speaking. There are, after all, separate courses for that. Similarly, any competitiveness should arise only indirectly and naturally from the argumentative learning process. With these broad priorities in mind, we may examine contemporary classroom argumentation.
Argumentation in Modern Education

Before it is possible to discuss how argumentation is used in modern education, we must distinguish between the three typical manifestations of classroom debate: learning \textit{from} the debate, learning \textit{about} the debate, and learning \textit{to} debate (Andriessen et al., 2003). Learning from the debate is when students deepen their understanding of the topic of debate. If debating what made the dinosaurs extinct, for example, students might learn about geology of the prehistoric Earth, climate change, or the biology of different dinosaurs.

For our purposes, learning \textit{from} the debate (or a collaborative discussion) is the ultimate goal of educational argumentation, but it cannot be achieved without first learning \textit{about} the debate. Learning about the debate is the process of discovering the full diversity of viewpoints associated with a particular topic. Returning to the dinosaur extinction example, students might learn \textit{about} the debate by familiarizing themselves with the various theories of what killed the dinosaurs, such as the meteorite theory and the climate shift theory. Learning \textit{about} the debate is a necessary step in the process of learning through argumentation. Indeed, it may be considered an inseparable part of learning \textit{from} the debate.

Learning \textit{to} debate may be less essential than learning \textit{about} or from the debate, since children as young as three have an intuitive grasp of argumentation (Andriessen et al., 2003). Nevertheless, learning the technical aspects of argumentation, or receiving instructor guidance in those technical aspects, \textit{may} be helpful in generating counterarguments and providing supporting evidence—parts of argumentation often
overlooked by students (Ferretti, MacArthur, & Dowdy, 2000; Nussbaum & Kardash, 2005).

As stated, though, learning through argumentation is the main focus at present. The main idea, perhaps, behind using argumentation in education is the principle that "learners must be active agents in their own learning" (Chinn, Anderson, & Waggoner, 2001). Much of a student’s education is passive, but argumentation may be an alternative to that commonality. Put another way, “learning is achieved when we are presented with conflicts, and manage through negotiation (alone or in a group) to produce a solution” (Veerman & Treasure-Jones, 1999).

Andriessen et al. (2003) identify the following mechanisms by which students might learn from argumentative situations: 1) Producing arguments and counterarguments in an interactive environment, 2) creating arguments with a mind toward modifying currently held views, and 3) co-constructing new meaning and understanding through group interaction. The goal of number three most closely resembles the ultimate goal of collaborative argumentation (since the first two are in a practical sense subsumed by it).

There is interesting research exploring these argumentative situations, especially in the context of collaborative argumentation. In Brown and Renshaw’s (2000) “collective argumentation” students were given a topic and instructed to discuss it as a group. Aided by their instructors, they would eventually arrive at a kind of group truth.

A typical model for collaborative argumentation is described by Brown and Renshaw (2000). First, students propose ideas. Brown and Renshaw refer to this as the “generalizability principle” because it requires students to state their ideas in such a way
that their classmates may make determinations regarding idea relevance. Second, the
"objectivity principle" allows valid ideas to be kept by the group only if they cannot be
denied through reference to personal experience or logic. Third, the "consistency
principle" provides that contradictory ideas that have not been denied must be debated
and decided upon by the group.

There has been some suggestion that this process might be aided if preliminary
brainstorming is done not as a group but individually before a collective argumentation
session. This is due to the somewhat controversial belief that group brainstorming
sessions produce something called "production blocking," where the group can only
develop one thought at a time and therefore operates inefficiently, as well diminished
participation as the result of the social anxiety of speaking before a group, and also the
relatively low standards for face-to-face group work (Kerr & Tindale, 2004). However,
recent research shows that these concerns can be minimized and that face-to-face
brainstorming is valuable to the collaborative argumentation process (Kerr & Tindale,
2004).

Such concerns can also be mitigated through the use of online software (Kerr &
Tindale, 2004). Such online software is set up as a board where students can post
messages to one another, working from the comfort of their own homes and taking as
much time as they like to come up with ideas and responses to share. Because electronic
brainstorming allows individuals to type messages without interruption from other
speakers, there is no production blocking resulting from unstructured group talk (Kerr &
Tindale, 2004; Michinov & Primois, 2004) and therefore brainstorming can be an
effective element of collaborative argumentation (assuming ideas are critiqued once they are generated).

Although there is much recent research on collaborative argumentation (e.g., Anderson et al., 2001; Bell, 1998; Mercer, 1996; Nussbaum, 2002, 2005; Suthers, 2003; Veerman & Treasure-Jones, 1999), this method seems to combine aspects of educational argumentation that date back to ancient times. With the Socratic method, for instance, the interlocutor challenges his “opponent” to defend and justify his beliefs against rigorous, critical questioning (Herrick, 2000). The object is, at least in theory, for the questioner or the questioned to gain a firmer grasp of the world or his own knowledge thereof. However, there is something that is new here as well. According to Mercer (1996), student dialogue is increasingly seen as “more than a means for sharing thoughts: it is a social mode of thinking, a tool for the joint construction of knowledge by teachers and learners.” Such knowledge is embodied in the construction of a joint argument.

As implied by Mercer, the instructor has an active role in collective argumentation, aiding students to develop their ideas, facilitating participation, and mediating disagreements that may arise from the process. For reasons that will become clearer in subsequent sections, it is important that the instructor set “ground rules” and take many more specific steps in order to shape student dialogue into what will become useful argumentation (Mercer, 1996).

Nevertheless, with collective argumentation, the focus is on student ideas. Collaborative argumentation may be valuable to a student’s education as it is said to facilitate the development of general reasoning skills (Brown & Renshaw, 2000) and
shown to develop problem solving skills (Fernández, et al., 2001; Mercer 1996; Wegerif, et al., 1999). Also, there is some evidence connecting deep, complex classroom argument to deep subject matter understanding (Bell & Linn, 2000; Alexopolou & Driver, 1996), conceptual change in science (Baker, 2003), and conceptual development in math (Schwarz, Newman, & Biezuner, 2000). Classroom collaborative argumentation may also tend to improve writing (Reznitskaya et al., 2001), and may produce deeper understanding than unstructured group discussion (Mercer, 1996).

Some of the benefit in collaborative argumentation is that, if implemented correctly, it engenders greater participation and thereby draws from a greater knowledge pool. Nussbaum (2002) found that collaborative argumentation appealed more to introverts and less assertive students (see also Nussbaum & Bendixen, 2003). In addition, Anderson et al. (2001) observed in a study of 67 fifth- and sixth-graders a phenomenon that they refer to as the “snowball effect.” Split into small-group discussions, students were more likely to participate and more likely to appropriate the successful argumentative strategies of their peers.

Appropriating another’s argumentation strategy may be a successful way to participate in argumentation, but it may not yield the same cognitive benefits as ideal collaborative argumentation. Ideally, one’s argument should lead to one’s strategy rather than the other way around. For instance, when a student asks for a justification of another student’s assertion, his doing so should be motivated by a genuine desire to understand that other student’s point of view—not because he has heard others using this strategy and he wants to participate and/or stump the other student.
Arguing to Learn vs. Arguing to Win

In short, the benefits of using argumentation in the classroom described briefly above do not come automatically. It is therefore important to distinguish between collaborative argumentation and adversarial argumentation, because the former is potentially very beneficial for students and may aid the learning process, and the latter may actually impede deeper learning (Mallin & Anderson, 2000).

Collaborative argumentation is a co-constructive and co-critical interactive learning process where the object is to reach consensus and deeper mutual understanding. Arguers are “critical consumers of public discourse” (Tindell, 1999; Mallin & Anderson, 2000). However, this is quite different from the common understanding of argumentation. “Argumentation often is characterized,” write Mallin & Anderson (2000), “as an adversarial activity governed by war metaphors and infused with a win-lose ideology.” Adversarial argumentation is what many people think of when they hear the word “argument.” Arguers are opponents, arguers attempt to win (Nussbaum, 2002; Mallin & Anderson, 2000). Mercer refers to adversarial argumentation as “disputational talk” (1996). Disputational talk is characterized by disagreement and individualized decision making. Disputational talkers make few attempts to pool resources or offer constructive criticism or suggestions. Further, in disputational talk “the relationship is competitive; information is flaunted rather than shared, differences of opinion are opposed rather than resolved, and the general orientation is defensive” (Mercer, 1996).

Collaborative argumentation is the more practically useful skill because in real-life situations that call for dialogue, most individuals find that they need to “bridge opposition
and negotiate for solutions to shared problems” (Mallin & Anderson, 2000) rather than “win” an argument against an opponent. In addition, research shows that collaborative argumentation is more productive than adversarial argumentation in an interactive learning environment for the following reasons: students are more likely to participate (Nussbaum, 2002); students’ exploration of the problem is likely to be richer (Keefer, Zeitz, & Resnick, 2000; Nussbaum & Kardash, 2005); and students learn more problem solving skills (Mercer, 1996).

Critical social discussion is an important skill in and of itself, but classroom argumentation is also useful because it encourages students to explain and elaborate their reasoning and identify holes within it. Participation in small group discussion is positively correlated with achievement (Nussbaum, 2002). Simply listening to others argue is not a substitution for the valuable cognitive exercise of actually engaging in argumentation. Thus it is important when utilizing argumentation in the classroom to encourage as much active participation as possible. This can be a difficult task, as some students are naturally more introverted than others, and are often excluded by the more extraverted students who tend to dominate adversarial arguments (Nussbaum, 2002; Nussbaum, 2003). Introverts are not disinterested in argumentation. On the contrary, because introverts focus on internal stimuli, they may enjoy the intellectual stimulation of argumentation. However, relative to extraverts, introverted students are less likely to participate in adversarial argument, where the object is to win and to defeat one’s opponent in front of others. Introverted students may feel more anxious than extraverted students when placed in such competitive social circumstances. Thus these students may

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not be able to benefit fully from the use of classroom argumentation of the adversarial variety.

Fortunately, there is a more inclusive option. Research has shown that collaborative argumentation can yield significant cognitive benefits, but unlike adversarial argumentation it does not exclude reluctant debaters (Nussbaum, 2002). Research shows that introverts practice a more co-constructive style of argumentation, employing more design claims (claims that seek compromises and creative solutions) and fewer contradictions and counterexamples than extraverts (Nussbaum, 2002). In a study of sixth graders (and replicated on college students), introverts in small group discussions were more likely than extraverts to try to resolve conflicting views. Overall, introverted students were less likely to participate during more adversarial classroom discussions as compared to the more co-constructive small group discussions (Nussbaum, 2002; see also Nussbaum & Bendixen, 2003). These findings are important in making classroom argumentation useful for all students.

Collaborative argumentation is preferable in the classroom to adversarial argumentation not only because it engenders broader student participation, but because it seems to encourage a richer, more genuine exploration of the issue subject to argumentation. In adversarial argumentation, or eristic discussion, the object is to defend one's own view and dispute the competing views of one's opponent (Keefer et al., 2000). Exploration of the issue over which the opponents argue is secondary to "winning" the argument. Notably, the eristic functions of language—"to express, to captivate, to argue, even to injure"—as well as the familiar negative connotations, have been recognized.
since the time of Homer (Herrick, 2001). Keefer et al. (2000) observed the potential negative consequences associated with adversarial argument (with respect to the development of the issue discussed). Keefer et al. (2000) studied fourth graders' mediated group discussions about an animal allegory that they had read. The researchers observed that at times, eristic hurdles associated with adversarial argumentation prevented students from developing potential lines of arguments, and subsequently from understanding more deeply the literary text that they read. Of course, effective persuasion (a goal in adversarial argumentation) requires a student to understand her opponent's point of view in order to dispute it. However, noted the researchers, "skillful argumentation can come at the cost of developing a more substantial line of reasoning" (Keefer et al., 2000).

This is best illustrated with a specific example. The students read a story about a dog named Dominic who finds a fortune based on a tip from an alligator witch. The dog is philanthropic with his fortune, helping other animals that he meets later in the story. Students were asked whether or not the dog handled his money wisely. Earl argued that Dominic did not because none of the animals did anything for the dog. Implicitly accepting Earl's argument that one should only aid those who have performed a valuable service, Tony disagreed, stating that Dominic was aided by each animal to whom he gave money, and thus the dog's philanthropy was justified. Tony challenged the tenability of Earl's premises by asking whether or not the dog should have compensated the alligator witch. Because Dominic would not have found his fortune without the alligator witch's insight, it seems clear that Earl must concede that she deserves some of the fortune (based
on his stated premises). However, Earl is adept at adversarial argumentation, and rebuts Tony’s challenge by saying first that the dog could not have given the witch money because he did not have it at the time she gave him advice, and then that after he found the fortune that to return to her location to repay her would be too much “out of the way” for Dominic. Students allow this as a valid response to Tony’s challenge.

What is problematic is that Earl’s rebuttal is effective in staving off the challenge but not helpful for achieving the educational goal—deeper understanding of the studied text. Earl’s argumentative skill allows him to avoid the substance of Tony’s challenge, and thus precludes the exploration of an important literary issue. Clearly, this is a case where Earl’s ability to argue disallowed a richer understanding of the studied text and the big idea of moral responsibility (instead, less important details of the story are focused on).

It seems then that in order to make the most of classroom argumentation, the instructor should design a system whereby non-substantial and avoidant adversarial techniques such as Earl’s are discouraged. Such a system would necessarily focus more upon the collaborative rather than the adversarial.

In addition to provoking greater participation and facilitating a richer exploration of the problem space, collaborative argumentation actually helps learners develop generalizable problem solving skills. For instance, Mercer observed that a classroom of nine- and ten-year-olds were able to apply the collaborative argumentation skills they developed during a particular exercise to other, similar collaborative exercises. Students in groups of three worked together to play an educational computer game, a historical simulation that required players to assume the role of Viking invaders raiding English
towns. Students had to make decisions regarding where to raid, what resources to take, what strategies to use, and so on, by answering a series of onscreen questions. Mercer (1996) observed that months later in the school year, these same students were able to apply what they had honed on the *Viking England* software to non-computer-based contexts.

Of course, there was extensive student and instructor preparation in this case. As Mercer explains thoroughly, one cannot simply allow students to talk during an assignment and expect to reap the benefits of collaborative argumentation. As Mercer (1996) argues, “not all kinds of talk and collaboration are of equal educational value.”

Mercer presents two requisites of useful collaborative talk. First, ideas must be presented clearly and explicitly to allow meaningful joint (or group) evaluation. Second, the group must reason together, rather than taking cues from one dominant group member. That is, if a more knowledgeable (or simply more confident) and subsequently more dominant group member makes most of the decisions and does most of the work based on her own problem-solving skills, the less dominant group members’ opportunities to improve their problem-solving skills are hindered (Mercer, 1996).

Mercer notes as well certain conditions amenable to effective collaborative talk. First, talk must be necessary for the completion of the assigned task; there is no benefit if talk is merely incidental to some group task. Such talk will rarely result in a deeper understanding of the material or improvement of general problem-solving skills. Second, Mercer notes that participants must understand the goal of the activity. Perhaps most importantly, however, the instructor must encourage cooperation rather than competition.
Mercer describes one exercise where pairs of ten-year-olds played another educational computer game, the object of which was to find an elephant by entering coordinates. Rather than working together as a team, students tended to treat the program as a competition. They took turns instead of working together, to find the elephant, and although the students talked extensively to one another and were enthusiastic about the task, the dialogue between the two was not particularly constructive. Although students tended to question and rebut, there was very little "real collaboration." That is, there was minimal "sharing of ideas, joint evaluation of information, hypothesizing and decision-making, or even taking any advice offered" (Mercer, 1996). So we see again how competitive argumentation is bereft of the benefits of collaborative argumentation.

By sharing, explaining, and justifying their opinions, those who participate in collaborative argumentation may be able to develop better problem-solving skills (Mercer, 1996). When arguers share ideas and are partners rather than combatants, they may develop a more generalizable and principled understanding of the subjects they study (Mallin & Anderson, 2000).

This is not to say, however, that the presence of challenges, contradictions, or counterexamples in student dialogue indicates the absence of possible benefit. Quite the opposite, collaborative argumentation that is effective and superior to adversarial argumentation requires an element of deconstruction, of constructive criticism. Early feminist criticism of argumentation and rhetoric found violence, oppression, and immorality in persuasion. Attempting to change someone's mind was simply wrong. Naturally, proponents of such views rejected adversarial argumentation wholesale.
(Mallin & Anderson, 2000). However, modern argumentation theory (of invitational rhetoric, constructive/collaborative argument) does not favor drawing a strict dichotomy between "persuasive"/"patriarchal" and "empathic"/"feminist" communication as did the earlier criticism (Mallin & Anderson, 2000). On the contrary, many researchers believe that "the interpersonal and interactive pressures imposed by the necessity to deal with conflicting points of view are particularly conducive to collaborative sense-making" (Baker, 2003). Thus, simply working together without conflict is not the ideal and it does not constitute effective collaborative argumentation.

Mercer (1996) identifies two types of group talk—cumulative and exploratory—both of which are characterized by a supportive group structure where common knowledge is constructed. Both cumulative and exploratory talk contrast with disputational talk (adversarial argumentation), which is characterized by individual thought, disagreement, and competition. However, only exploratory talk constitutes effective collaborative argumentation, because cumulative talk is missing essential elements that might be called (with careful qualification) "conflict."

With cumulative talk, "speakers build positively but uncritically on what the other has said" (Mercer, 1996). Common knowledge is built through an accumulation of repetitions, confirmations, and elaborations. For example, Mercer describes a classroom activity where pairs of ten-year-old students worked with publishing software to create a class newspaper. The students genuinely worked together to co-construct a text and an understanding of what that text should be. However, no challenges were issued, and thus the students did not need to justify their opinions or explain their reasons to one another.
Insomuch as producing justifications and reasons in response to challenges is a valuable cognitive exercise and thus an important part of effective collaborative argumentation, cumulative talk does not make particularly good use of student dialogue. Indeed, it does not quite qualify as "argumentation" as we have thus far described it. Cumulative talk is noteworthy, however, because it demonstrates that effective collaborative argumentation (even though it is not "adversarial" as we have defined it) is not without a measure of "conflict." Indeed, some contend that "constructive" interaction is dialogue that promotes conflict (Koschmann, 2003; Veerman, 2003).

With exploratory talk, in which group members engage with each other’s ideas critically but constructively, there is an element of conflict (Mercer, 1996). When statements are offered for group considerations, frequent challenges and counter-challenges arise, but these challenges are justified in the sense that they are made with the genuine intention of furthering individual or group knowledge. The key difference, according to Mercer, between this type of talk and the other two, is that with exploratory talk, "knowledge is made more publicly accountable and reasoning is more visible" (1996). It is this type of talk that leads to the intellectual progress previously described. The *Viking England* group project engendered exploratory talk, and as a result likely led to the development of students’ generalizable problem solving skills, as explained by Mercer.

This is important, as utility in problem solving is the hallmark of "good" collaborative argument. In modern argumentation theory, advocates of invitational rhetoric believe,
"constructive argument happens not when a rhetor prevails, but when a problem is solved."

In summary, when one’s goal is to use argumentation in the classroom to deepen understanding of the course material or to develop generalizable problem solving skills, and to do so in a way that is inclusive of all students, a collaborative system must be employed (Mallin & Anderson, 2000).

The Instructor’s Role in Collaborative Argumentation

As Mercer (1996) notes, “research does not support the idea that talk and collaboration are inevitably useful, or that learners left to their own devices necessarily know how to make the best use of their opportunities.”

Unsurprisingly, it was by careful design that abundant exploratory talk occurred in the Viking England study. In part, the richness of exploratory talk was due to the selection of the computer program. Recall one of the conditions that encourages useful student group dialogue: The task must require group participation, rather than just make it possible. Students had to collaborate to determine which was the best course to take. Unlike the earlier described elephant finding game, where pairs of students tended to treat the game as a competition and their dialogue was adversarial and rather unproductive, here groups running through the Viking simulation could not simply take turns trying to find a single right answer. Students had to make a series of decisions that would lead to the ultimate success or failure of their unified Viking group. Additionally, the Viking program was more conducive to exploratory talk than the student newspaper program because while the latter required group participation (given that one paper was to be
created by two students), but preference of one idea over another in that particular task seemed to be based more on aesthetic values that cannot be rationally supported as easily. This is not to say that group members would never argue over aesthetics, of course. While partners in an assigned group might argue over aesthetics, a creative endeavor for which is highly subjective cannot engender the same sort of justified rational debate as a task that has more objective measures of success and failure.

Of course, the selection of the program alone is not enough to facilitate fruitful collaborative argumentation. Much of the success of the collaborative argumentation program depends upon extensive preparation work of the instructor (Mercer, 1996).

To make collaborative argumentation useful, instructors must prepare their students. Extensive preparation preceded the Viking England study, and likely resulted in much of that program’s success. Frustrated by lackluster quality of talk in previous student group projects, teachers and researchers decided to plan activities to raise awareness of talk and collaborative activity. Before students used the Viking England program, instructors and researchers discussed the possible ground rules to encourage during these sessions. Teachers eventually decided to stress the importance of the following: sharing relevant information and ideas, justifying opinions and ideas, requesting reasons when appropriate, reaching agreement when possible, and accepting that the group as a whole rather than individual group members separately are responsible for the group’s successes and failures (Mercer, 1996). These ground rules were imparted through a series of extensive classroom discussions and group exercises.
Goal Instructions and Counterarguments

One of the prerequisites to optimizing the benefits of collaborative argumentation in the classroom is maximizing students' ability to argue effectively ("effectively" in this sense implies ability to explore and solve problems, not to defeat an opposing view). This is necessary, as numerous studies have found that student writing ranging from elementary school to university is poorly reasoned (Nussbaum & Kardash, 2005).

Instructors have attempted to find ways to improve the effectiveness of students' argumentative reasoning through goal instructions. For instance, Ferretti, MacArthur, and Dowdy (2000) studied the argumentative writing of fourth- and sixth-graders. In the study, 62 participants were learning-disabled students, 62 were not. Both sixth-graders and fourth-graders wrote argumentative essays on homework and television violence. Before they wrote, some students were given a general goal, simply "to persuade." Others were given the specific goal of generating reasons, counterarguments, and rebuttals. The sixth-graders, both those with learning disability and those without, benefited from receiving the specific goal. As compared to those who received only the general goal, those who received the specific goal wrote essays that were more persuasive and contained more of the standard elements of argumentation. This study suggested that students could generate more complete arguments during writing if given specific goals related to the elements of argumentation.

Instructors may want to give special focus to encouraging counterargument, an important part of persuasive argumentation and unfortunately a part of student
argumentation that is noteworthy for its relative paucity in student essays (Ferretti, et al., 2000; Nussbaum & Kardash, 2005).

There are several reasons proposed for the relative lack of counterargument in student writing. Often, students see the inclusion of counterargument as tantamount to a concession, assuming that if they explore and attempt to rebut the opposition's arguments, they will have revealed a weakness in their own argument (Nussbaum & Kardash, 2005). Thus, many students mistakenly believe that rebutting the opposition's counterargument actually makes their own argument less persuasive. Also, sometimes students simply do not see the point in making rebuttals to counterarguments (Nussbaum & Jacobson, 2004). Sometimes they lack requisite knowledge of the specific counterarguments the opposition would make, or perhaps because they are not adequately familiar with the topic of debate, and thus they naturally fail to include alternative perspectives which may not be so obvious (Nussbaum & Jacobson, 2004).

One approach to improving the exploration of counterargument is to prompt students to come up with counterarguments before writing (Ferretti, et al., 2000; Nussbaum & Kardash, 2005). This may make students take a less polarized view of the issue from the beginning, although the effect is weak (Nussbaum, 2005; Nussbaum & Kardash, 2005). There are two other limitations to this finding. First, having strong prior opinions on a topic may reduce the effectiveness of counterargument goal instructions that encourage more exploratory views (Nussbaum & Kardash, 2005). Second, while asking students to generate counterarguments was found by Nussbaum (2005) to be effective during essay writing, it was not very effective during interactive (Web-based) discussions; when
having a conversation, it is just not that natural to present counterarguments to a position that one just presented, unless done in the context of well-developed collaborative argumentation. Nevertheless, this research shows that it is possible to manipulate students’ goals somewhat (although other types of goal instructions may be needed to engender collaborative reasoning).

Mastery Goals vs. Performance Goals

Given the importance given to goals here, research on students’ goal-orientations may be relevant. As discussed, arguing to win does not yield the same results as arguing to learn. Though confirmed empirically with research, this concept may be rooted at least partially in the principles of achievement goal theory. According to achievement goal theory, people need to feel a sense of achievement. Some theorize that there are different types of achievement motivation, including mastery and performance goals.

A mastery goal is focused on the "development of competence through task mastery" (Elliot & McGregor, 2001). In other words, a mastery goal is a "desire to achieve competence by acquiring additional knowledge or mastering new skills" (Ormrod, 2004). By contrast, a performance goal is focused on the "demonstration of competence relative to others" (Elliot & McGregor, 2001). It is possible for those who are motivated by either goal to achieve the same end result, educationally (Pintrich, 2000). For example, two students may study and get A's in a class, though the student with mastery motivation would do so for different reasons than the student with performance motivation. So for the student motivated by performance, the end result, the grade, is what is desired. Learning the material is just a means to that end. On the other hand, for the mastery
student, the means of achieving the grade-deep understanding of the course material—is reward enough by itself. The grade is incidental.

In reality, of course, many learners are motivated by both intrinsic and extrinsic factors. Students rarely ever study for the sake of studying with no regard for their ultimate grade. Similarly, primarily grade-motivated students often want to increase their knowledge, sometimes finding learning interesting in spite of themselves. Nevertheless, the distinction between mastery and achievement goals is important in understanding why collaborative argumentation is more beneficial to learners than adversarial argumentation. These terms are related to "arguing to learn" and "arguing to win," since the former focuses on arguing for intrinsic reasons (mastering the topic of discussion, advancing one's knowledge for its own sake) and the latter focuses on arguing for extrinsic reasons (out-performing one's opponent, winning the competition). Therefore, generally an instructor using (or a researcher studying) collaborative argumentation will want to seek ways of encouraging mastery goals and discouraging performance goals. Of course, this is less of an issue in a study where performance relative to one's peers does not affect one's course grade, but to the extent that such performance affects one's self-image, it is relevant.

Technology and Collaborative Learning

As stated, learning how to argue is an important part of collaborative argumentation. Traditionally, this has occurred through direct instruction. Some research has shown that direct instruction improves argumentation skills (Ferretti, MacArthur, & Dowdy, 2000; Nussbaum & Kardash, 2005), but other studies have observed no significant effect.
Veerman, 2003). Thus, findings have been inconsistent (Cho et al., 2002). Further testing the effectiveness of such instruction is therefore necessary.

A different way to shape students’ argumentation skills is to use an online learning tools such as Computer-Supported Collaborative Argumentation (CSCA) software (Cho et al., 2002) or Computer-Supported Collaborative Learning (CSCL) environments (Baker, 2003). These innovative online learning environments perform some of the work for the student, alter the difficulty of the work, or change the nature of a certain task in order to allow the learner to complete the task (Cho et al., 2002). Online environments “enable task sequences and interpersonal communication media to be structured in ways that favor the co-elaboration of knowledge” (Baker, 2003). Students are prompted when they should check another student’s facts, employ counterarguments, and so on. However, this method is evidently only a temporary ways to improve student argumentative performance (Cho et al., 2002). Once the program is no longer providing the appropriate prompts, the student reverts to a less well-developed argumentation strategy (Cho et al., 2002).

Pilkington (2003) carried out a similar study, setting up a computer-based chat program for children age 10-15 to use as an interactive argumentation environment. The chat program ran concurrently with a face-to-face writing class. Like an electronic version of collaborative argumentation, the students engaged in, among other activities, group brain-storming, group reflection on generated ideas, and synthesis of those ideas. Overall, the chat program led to an increased ability to express focused opinions.
regarding the topics discussed, enhanced awareness of context, and an increased responsiveness to the arguments others posed.

Baker (2003) recognized that argumentation can be the vehicle of collaborative learning, and designed an online study, using the CONNECT interface, accordingly. According to Veerman (2003), the purpose of students completing collaborative discussion tasks is so they can reflect on arguments including explaining and comparing alternative views. When collaborative argumentation is done effectively, a focus and information is shared until students can all agree on a solution. Baker (2003) suggests that argumentative interaction is a sort of “dialectical game” associated with negotiated meaning-making. In Baker’s (2003) study, the students debated science topics. Similar to other studies, they brainstormed privately before collaborating. Afterward came a period of group reflection, similar to other online argumentation studies. Overall, the students seemed to think more carefully about the topic and understand it more deeply.

In Nussbaum’s (2005) study on the effect of goal instructions on students’ reasoning and argumentation in Web-based environment, he noted that deeper arguments were generated when the students were given certain goals (i.e. “Provide as many reasons as you can to justify your position, and try to provide evidence that supports your reasons” or “Persuade others of your view”). However, other goals did not generate such an in-depth understanding. In particular, a goal designed to foster exploratory talk (i.e., “Try to explore this issue in-depth to increase your understanding of it”) had little effect other than to make students lose focus. On the other hand, the goal to generate as many reasons as possible was successful in encouraging more exploratory and balanced
discourse. This was a highly significant finding for two reasons. First, it presented a mechanism for fostering exploratory talk without any investment of time in developing ground rules or norms (although the latter could supplement goal instructions). Second, it was not anticipated that this goal would necessarily produce more balanced reasoning (one might predict that students would just generate reasons on their favored side). Students, however, delayed more in committing to a side; they explored more before committing. Students displayed collaborative behavior and therefore probably had some prior experience engaging in collaborative activities.

Nussbaum theorized that the “reason” goal instruction activated a collaborative argumentation frame rather than an adversarial frame. An argumentation frame reflects students’ conception of the goals of an activity and how they should be related to one another; in short, it instructs students how they should argue (Chinn et al., 2001; Nussbaum, 2005). In Nussbaum’s theory, students possess both a collaborative and adversarial argumentation frame (both frames may be more or less well developed, depending on the norms and technical knowledge of argumentation that the student has internalized). Some goal instructions activate adversarial frames (e.g., persuade others of your point of view—Nussbaum, 2005; Nussbaum & Kardash, 2005) whereas others may activate a more collaborative frame. Asking students to generate reasons might activate a collaborative frame because students (or at least some students) interpret it as an instruction to (or permission to) explore rather than debate. Also, although the reason goal instruction is different from brainstorming (because it is embedded in an on-going conversation, not list making), it has some associations with brainstorming, which is
usually conducted in a collaborative environment. These might explain why the reason goal instruction has these effects.

But can this effect be replicated? It was not an hypothesized effect in the Nussbaum (2005) study, which makes it more likely that it could be a Type 1 error (occurring by chance). Even if a real effect in that study, it might just be a function of the associations made by the particular students in that study, so that the reason goal instruction effect on exploratory talk might not occur in exactly the same way with another group of students. How robust is the effect? The goal of this master thesis is to partially address this question.

Study Focus

Nussbaum (2005) found that the goal instruction “Provide as many reasons as you can to justify your position, and try to provide evidence that supports your reasons” had a positive effect on the depth of student argumentation. This study seeks to replicate that effect. My hypothesis is that the specific goal instruction to generate reasons and provide evidence will engender more collaborative talk between students, thereby leading to more balanced and deeper arguments. This study also explores the role of prior attitudes in determining the balance of student argumentation. Previously, Nussbaum and Kardash (2005) found that students with strong prior attitudes did not argue in a balanced way. It is likely, therefore, that students’ strong prior attitudes will mitigate the effect of the elaborated goal instruction. The study will also examine the question of whether a performance-goal orientation will affect collaboration patterns. If students need to prove that they are smarter than other students, they might be less likely to be collaborative.
Goal instructions promoting collaboration might, however, mitigate this effect.

Conclusion

Teachers have long recognized the educational benefits of argumentation. Theories about how and why we learn have developed, and so too has argumentation in education. Collaborative argumentation is a promising, relatively recent development.

Although some researchers may define it differently, I define collaborative argumentation as a co-constructive and co-critical interactive learning process, the object of which is to reach consensus and deeper mutual understanding. Collaborative argumentation has proven beneficial in various educational contexts, but it is important to note that not all forms of group discussion are beneficial to learners. In particular, adversarial argumentation does not yield the same greater participation, deeper understanding, and generalizable problem solving skills. But while arguing to win does not help, neither does arguing without conflict, which is similarly lacking benefit. This is why collaborative argumentation must be both co-constructive and co-critical.

While identifying this goal is relatively simple, achieving the correct balance between the constructive and the deconstructive is much more complicated. Research indicates that goal instructions (to generate as many reasons as possible) may help students find this balance in group discussion. Students become more balanced in the arguments they make (i.e., less committed to one side of the issue, more willing to explore multiple sides) and therefore also more willing to have their ideas critiqued by one another, to change positions flexibly, to make concessions, and to explore new points of view. These are all
key elements of collaboration. However, more research is necessary to confirm these relationships. This proposed research, since it seeks to explore the connections between successful group discussion and goal instruction, is therefore important for refining collaborative argumentation as an educational tool.
CHAPTER 3

METHODOLOGY

Participants

Participants consisted of 141 undergraduates enrolled in different sections of an educational course and an assessment course designed for preservice teachers. The participants were drawn from the UNLV Educational Psychology’s Department’s subject pool; they participated to satisfy a course requirement (participation was graded credit/no-credit). Some participants did not complete all elements of the study correctly and were eliminated from the study, leaving a final sample of 131. The characteristics of the final sample were as follows: The students were primarily juniors (49%), but 24% were sophomores, 24% were seniors, 2% were freshman. Of the participants, 85% were women and 66% were Caucasian; the remainder were Hispanic (8%) or African American (5%). Ages ranged from 18 to 52 (mean age was 25.44). Most of the participants were majoring in elementary education (43 %), secondary education (20 %), or some other type of education program (37 %).

Materials

Participants discussed a question about either a school accountability system or school uniforms on an electronic discussion board (WebCT). Elaborated and
unelaborated versions of the questions were used to determine whether or not an elaborated question (which includes some of the opposing side's main arguments) affects the depth and completeness of student arguments. This variable is included because Nussbaum and Kardash (2005) found that provision of a text outlining possible arguments and counterarguments had these effects. We did not know, however, how question elaboration might affect the style of argument (collaborative vs. adversarial) and how it might interact with the goal instruction, and so question elaboration was also examined. Appendix I provides the elaborated and unelaborated versions of the questions that were used.

Prior attitudes were measured using a survey wherein participants indicated the extent of their agreement with, certainty of, knowledge about, or interest in a series of statements or questions. The survey contained 6 items that were adapted from a published survey of attitudes on a controversial issue (Alexander, Sperl, & Buehl, 2001); the items were rated on a variation of a Likert scale ranging from 0 to 100. For example, the agreement statements will be rated on a scale ranging from 0 (strongly disagree) to 100 (strongly agree). Appendices II and III present the full survey.

Goal orientation was measured by having participants indicate their opinions about how the statements relate to them as a student. The survey contains 11 items taken from a published Patterns of Adopted Learning Scales manual measuring goal orientation (Midgley et al., 2000); the items were rated on a 5-point Likert scale ranging from 1 (not at all true) to 5 (very true). Appendix IV presents the full survey.
Each survey was given to half of the students in each condition, before and after the discussions. The other half of the students completed the surveys after the discussions. By giving a “pretest” (i.e., initial survey) to only half the students, the existence of possible pretest-treatment interactions could be examined and potentially ruled out. Checking for this interaction is important because declaring one’s position on the issue before a discussion might have made students more adversarial. Students not administered a pretest were excluded from the analysis of prior attitudes, which is a cost of checking for pretest-treatment interactions.

Design and Procedure

Participants completed an informed consent form and some first (and/or last) completed a short demographic survey, accountability and school uniform attitude surveys, and a goal orientation survey. Participants were placed in randomly assigned groups of three to discuss the questions in private forums. Only other members of the discussion group (and the researcher) could view the notes. The researcher posted the elaborated or unelaborated questions as notes to the electronic bulletin board for each group, along with additional instructions (which varied by goal condition). The additional instructions were: "Provide as many reasons as you can to justify your position, and try to provide evidence to support your reasons." Groups were given three days to discuss each question—each student was required to post at least two notes on different days, but was allowed to post more.

The design was a randomized experiment (the groups were randomly assigned to condition). The experiment used a $2 \times 2$ crossed design, with a reason goal condition
(versus no goal) as one factor and an elaborated question (versus an unelaborated question) as the other (see Table 1). The primary independent variable is the presence or absence of the reasons goal instruction. A second independent variable is question elaboration. (Other independent variables are prior attitudes and goal orientations). The control group did not receive any goal instructions. (However, all students were instructed to discuss the questions, and told that the purpose of the study was to examine how students converse over WebCT.)

Table 1

<table>
<thead>
<tr>
<th>Reason goal</th>
<th>No reason goal</th>
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</thead>
<tbody>
<tr>
<td>Unelaborated question</td>
<td></td>
</tr>
<tr>
<td>Elaborated question</td>
<td></td>
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</tbody>
</table>

The dependent variables were the extent of argument development, balanced exploration, and collaborative interaction, using some of the measures from the Nussbaum (2005) study. One marker of balanced reasoning in that study was the presence of contingent, “it depends” responses. In addition to using this measure, this study also developed a rubric to measure the relative collaborativeness vs. adversarialness of the discourse (See Appendix V). The rubric was altered after scoring a sample of 10-20 responses, which also were used to develop descriptions of each point on the rubric.
Scores were analyzed using Analysis of Covariance (ANCOVA) and by testing for interactions between the covariates (prior attitudes, goal orientations) and the treatment conditions. Again using random assignment, subjects discussed one of the two discussion questions, so that question type became another variable in the study.

As noted previously, it was anticipated that telling students to generate as many reasons as possible would result in both more balanced individual reasoning and more exploratory, collaborative argumentation. It was theorized that the particular elaborated goal that was used would activate a more collaborative argumentation frame, leading to deeper and more balanced discussion and ultimately better arguments. It was further anticipated that strong prior opinion would mitigate the effect of goal instruction, as students who have strong opinions on the discussion topics will be less likely to interpret the goal instruction as an instruction to collaborate rather than debate. Although the extent of this effect was not known, it is theorized that prior opinion may be a significant hurdle toward deeper, more balanced student argumentation and the benefits theorized to accompany such argumentation. In addition, question elaboration should not necessarily affect whether students are adversarial or collaborative, because students can generate more complete arguments and counterarguments in either fashion. However, question elaboration was included as a variable to test this hypothesis and strengthen the generalizability of the findings over question type. Finally, it was hypothesized that students’ learning goal orientation may affect collaboration patterns, with performance-goal oriented students less likely to be collaborative than mastery-oriented students, at least in the absence of the reason goal instruction.
Coding

The discussion notes were coded in the following three categories: argumentation mechanics, balance, and collaborative group interaction. Below, coding method is discussed for each category. More general remarks pertaining to coding follow.

There are two types of conceptual models for analyzing argumentation mechanics (Inch and Warnick, 2002). The first type is the “standard model,” which analyzes how claims are structured to create arguments, counterarguments, and rebuttals (Beardsely, 1950). The second type is the “Toulmin model” (1958), which further categorizes supporting claims, including implicit claims, into grounds and warrants (which link grounds and claims). Because the Toulmin model is more analytically complex than is necessary given the goals of this study (Fulkerson, 1996a, 1996b), coding here is based on the standard model.

Generally, we coded the discussion notes using a system that built on Nussbaum (2005), Nussbaum and Kardash (2005), and Ferretti et al. (2000). We used a 6-point scale for argumentation development, reflecting the number of arguments made, support and elaboration of those arguments, and originality of those arguments. These authors distinguished between claims and supporting reasons; furthermore, Nussbaum (2005) coded for “depth” of reasoning by measuring reasons supporting reasons. The present study built on these ideas by assessing both “lines of reasoning” (an assertion comprised of at least one reason) and reasons that elaborated, supported, and extended a particular line. A level 6 score was given to those who used 5 to 6 lines of argumentation, most of which were original and supported/elaborated. A level 5 score was given to those who
used 5 to 6 lines of argumentation\(^1\), of which 3 were original and half were supported/elaborated. A level 4 score was given to those who used 3 to 4 lines of argumentation, of which 3 were original and half were supported/elaborated. A level 3 score was given to those who used 3 to 4 lines of argumentation, 1 of which was original and 1 of which was supported/elaborated. A level 2 score was given to those who used 1 to 2 lines of argumentation, none of which were original and one or two of which were supported/elaborated. A level 1 score was given to those who used 1 to 2 lines of argumentation, all unclear. See Appendix VII for an example.

During trial coding of argumentation mechanics, we attempted to rank order the notes. A higher score corresponded to greater support/elaboration and number of reasons given. The notes of four groups (12 participants) were scored in this way. From this exercise, we developed a 6-point scale to accommodate a greater than anticipated number of reasons (lines of argumentation) present in participant writing.

Coding for argumentation balance is based on the methods used in Nussbaum (2005), Nussbaum and Kardashian (2005), Nussbaum and Schraw (2005). The broader theoretical basis is rooted in Mercer (1996). More specifically, Nussbaum (2005) provided the theoretical basis for scoring those responses that propose solutions and "it depends" arguments as the most balanced.

For the category of balance, the notes were coded on a 5-point scale, with the highest score (5) reflecting a balanced response that proposed solutions and "it depends" arguments. Those responses that proposed small solutions/"it depends" arguments, or

\(^1\) A "line of reasoning" is an assertion comprised of at least one reason.
explored both sides of the issue, or where there was a shift in perspective, were scored as a 4. Those that made some concessions and built upon others’ ideas were scored as a 3. On the relatively unbalanced side of the scale, those that rebutted the opposing side only were scored as a 2, and those that were not balanced or showed no consideration of the opposing side were scored as a 1. See Appendix VIII for an example.

In trial coding, balance was coded on a 5-point scale. As with the final version of the balance rubric, the most balanced responses were those that addressed multiple sides of the issue in a balanced way, contained contingent “it depends” arguments, and proposed creative solutions. The only significant substantive difference in the trial rubric for balance is that it did not contain a concrete method for coding responses where a participant’s point of view shifted during the discussion. As stated above, such shifts were scored as a 4 to recognize that a perspective shift might show a balanced reevaluation of the topic. However, perspective shifts did not receive the highest score for balance (5) because one can see how such a response might reflect an initial lack of knowledge on the topic or a reaction to a particularly persuasive group member rather than balance. At any rate, a shift does not reflect as much balance as the proposal of contingent arguments and solutions, which integrate different sides into an overall conclusion (see Nussbaum & Schraw, 2005).

The rubric for group collaborative interaction is based on Mercer’s (1996) concept of group talk. According to Mercer, group talk may be characterized as exploratory, cumulative, or disputational. The most valuable group talk is that which is exploratory. With exploratory talk, group members engage with each other’s ideas critically but
constructively. Exploratory talk is for our purposes the functional equivalent of collaborative argumentation. By contrast, group members engaged in cumulative talk build upon each other's ideas, but do so uncritically. Disputational talk is most like adversarial argumentation, where the focus is on winning or proving one's point rather than exploring the topic fully. Whereas cumulative talk is building with no conflict, disputational talk is conflict with no building.

For group collaborative interaction, the notes were coded on a 3-point scale reflecting group exploration. Groups were rated a 3 if all three group members were exploratory (critical and flexible). Groups were rated a 2.5 if two of three group members were exploratory. Groups were rated a 2.25 if one of three group members were exploratory. Groups were rated a 2.0 if group members either were all cumulative (all agreed/built on each other's ideas) or disputational (all opposed each other's ideas). Groups were rated a 1 if their ideas were repetitive. The 2.5 and 2.25 levels were included after trial coding. See Appendix IX for an example.

The following remarks apply to the entire 3-part evaluation rubric. Scores were analyzed using hierarchical linear modeling, with "student" as Level 1 and "group" as Level 2. Because the scales were ordinal, analysis was performed on rank scores.

All scoring was conducted blind to condition. The researcher’s electronic notes containing the goal instruction were deleted from each transcript prior to coding so that there was no evidence of what condition was scored.

All notes were scored by two raters and disagreements were resolved through discussion. The interrater agreement before discussion was 62% on argument
development, 74% on balance, and 77% on collaboration; these figures, however, are only lower bounds on reliability. Because all transcripts were double scored and discussed until consensus was reached, the actual degree of reliability in our data was higher.
CHAPTER 4

RESULTS

Analysis of Data

Because a large number of statistical tests were conducted, we decided to set our threshold for statistical significant results at $\alpha = 0.01$. This in particular helped avoid over-interpreting chance interactions. Model fitting proceeded as follows. First, for each individual difference variable, a full factorial model was fitted with all possible terms and interactions. Second, insignificant terms were dropped one at a time, starting with the least significant term (always dropping higher order terms first); this produced a reduced model. Finally, the remaining terms for the individual difference variables were all placed in the same model, to control for possible confounding between these variables. This procedure was used to keep manageable the number of terms included in the model at any one time.

Analysis revealed interactions in the following two broad categories: Survey Effects and Individual Difference Interactions. Survey Effects describes the effects of taking the survey prior to group discussion\(^2\), or what is sometimes called “pretest” effects.

\(^2\) In particular, *Survey Effects* describes the survey’s effect on balance and argument development (mechanics).
Individual Difference Interactions describes interactions between the outcome variables\textsuperscript{3}, the conditions\textsuperscript{4}, and individual difference variables\textsuperscript{5}.

Survey Effects

Analysis revealed the following two survey effects.

First, when the attitude survey was completed before discussion, responses were less balanced ($B = -2.922, t(126) = -4.71, p = 0.006$).

Second, the reason goal tended to help argument development ($B = 1.468, t(125) = 2.51, p = 0.015$), but only if the attitude survey was not completed before the discussion ($B = -2.138, t(125) = -2.89, p = 0.005$). In addition, the combination of completing the survey before discussion and having the reason goal was slightly negative (see Figure 1). The elaborated question did not have this effect if the survey was completed.

\textsuperscript{3} Including balance, argument development (mechanics), and exploratory group talk.

\textsuperscript{4} Including reason goal and elaborated question.

\textsuperscript{5} Including attitude, certainty, knowledge, and interest.
Individual Differences Interactions

The remaining analysis is for only the half of the sample completing the survey prior to discussion. It was hypothesized that students’ strong prior attitudes would likely mitigate the effect of the treatments. Surprisingly, prior opinion had no significant effects or interactions.

However, when knowledge was included in the model, both conditions had some effects as well as interactions with the individual difference variables.

Reason Condition

When knowledge was included in the model, the reason condition resulted in a trend of more collaborative, exploratory talk, for students high in knowledge ($B = 0.02, t(60) = 2.25, p = 0.028$). In contrast, low-knowledge participants in the reason condition engaged in less exploratory talk and more cumulative talk ($B = 0.02, t(56) = 2.0, p = 0.05$).
Question elaboration condition

In regards to the other treatment, question elaboration, this had a positive effect on balance for the uniform topic ($B = 3.63$, $t(56) = 2.88$, $p = 0.006$), but this effect was weaker for the accountability topic, showing only a positive trend. The results are shown in Figure 2 and Table 2.

Figure 2. Question Elaboration and Question Topics (Accountability and Uniforms).
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<td>0.11</td>
<td>0.04</td>
<td>3.09**</td>
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</table>

Note. N=56.

⁴Dummy variable (uniforms=1, accountability=0).

*p ≤ 0.05  **p ≤ 0.01  ***p ≤ 0.001
However, the elaborated question condition slightly decreased exploratory talk within groups ($B = -0.85, t(56) = 2.44, p = 0.01$). The results are shown in Figure 3 and Table 3.

*Figure 3. Question Elaboration and Exploratory Talk*
Table 3

*Exploratory Talk: Main Effects and Interactions Among Conditions and Individual Difference Variables*

<table>
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<tr>
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<td>2.00*</td>
</tr>
<tr>
<td>Topic (U)*</td>
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<td>0.02</td>
</tr>
<tr>
<td>Interactions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R x K</td>
<td>0.02</td>
<td>0.01</td>
<td>2.00*</td>
</tr>
<tr>
<td>E x U</td>
<td>1.13</td>
<td>0.49</td>
<td>2.29*</td>
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</table>

*Note.* Group level. N=56.

*Dummy variable (uniforms = 1, accountability = 0).

*p ≤ 0.05  **p ≤ 0.01

There were also some interactions between the elaborated question condition and knowledge. The elaborated question benefited low knowledge participants, specifically on argument development (B = 4.549, t(58) = 2.95, p = 0.005). Also, the elaborated question condition had a more positive effect on balance when participants had low knowledge of the topic (B = -0.070, t(56) = -2.54, p = 0.014), but only if not combined with the reason condition. Surprisingly, when the two treatment conditions were
combined, there was a negative effect on balance ($B = -7.30, t(56) = -3.47, p = 0.001$).

Furthermore, there was a positive trend that the elaborated question benefited participants in balance ($B = 3.622, t(58) = 2.32, p = 0.024$).

Other Findings

Combining the elaborated question and the reason condition was not useful for low knowledge students; it created unbalanced arguments ($B = -6.990, t(58) = -3.24, p = .002$). In regards to the last survey variable, certainty had a positive effect on balance ($B = 0.04, t(56) = 2.69, p = 0.009$). However, certainty had a negative effect on balance if the subject was not interested in the topic.

There were no significant findings related to performance-goal orientation affecting collaboration patterns.
CHAPTER 5

SUMMARY, DISCUSSION, AND CONCLUSION

Summary of Results

The goal of this study was to evaluate two interventions designed to enhance more balanced argumentation, where students consider various sides of an issue, as well as argument development. Elaborating the question with brief mention of arguments and counterarguments ("elaborated question condition") did enhance balance and argument development, especially for low-knowledge students. Asking students to generate as many reasons as possible ("reason condition") had more limited effectiveness, again with some interactions with knowledge. On the other hand, merely asking students to complete the survey and declare their position before engaging in discussion tended to reduce balance. These survey effects are taken up first in this discussion.

Survey Effects

The interaction between the attitude survey and balance is interesting (where taking the survey is the "pretest"), because while opinion strength apparently did not affect balance, the administration of the survey prior to discussion did affect balance. The effect implies that when one states one’s opinion on a topic in advance, one is less likely to engage in balanced dialogue. Perhaps when one is asked to state one’s opinion prior to
participating in group discussion, one is more likely to select and stick to only one "side" of the argument. That is, perhaps completing the survey could have activated prior attitudes. Alternatively, maybe when participants responded to certain questions on the survey, they felt that they should not or could not change sides. If either of these explanations are correct, the implication is that researchers and teachers must be cautious about giving opinion surveys to students in advance; it can skew the results.

A more mundane explanation for why participants' arguments were less balanced after they completed the survey is that perhaps participants simply spent less time completing the discussion after they had completed the attitudes survey. Participants received one research credit hour for their participation in this study. Those who were asked to complete the survey before discussion also had to complete the survey a second time after. Participants knew this before they signed up for this study. Therefore, perhaps those who were required to complete what could be seen as "more work" for the same research credit put less thought and effort into their posts, and this resulted in less balanced arguments.

Perhaps the time issue also explains the interaction between the attitude survey, the reason goal, and argument development. As stated, the reason goal tended to help argument development, but only if the attitude survey was not completed before the discussion. Perhaps participants who were given the survey twice were unable to take advantage of the reason goal because they spent less time completing the discussion, and were therefore less likely to absorb the specific instruction to "generate reasons." More generally, perhaps those participants who were more likely to exert the minimum amount
of effort required to receive credit were also less likely to follow specific instructions (such as the reason goal). A number of assumptions must be adopted to make sense of any explanation regarding either of these effects. It is also possible that these effects are the result of complex interactions that were not measured for those students not completing the survey (prior to discussion).

Elaborated Question Interactions

More straightforward is the positive effect that question elaboration had on balance and argument development for those with low knowledge. Since the elaborated questions contained arguments on both sides of each issue, students could improve their development and balance scores by appropriating and building on the given arguments (and arguments were provided on both sides). If students decided to recite parts of the elaborated question on both sides of the issue, they would improve their balance scores.

Those with high knowledge may have benefited less from the elaborated question condition for several reasons. First, perhaps they were simply less likely to read the elaborated question, feeling confident in their understanding of the issue without any additional information. Second, discussion members who reported high knowledge may have already been aware of the arguments contained in the elaborated question.

Nevertheless, it is not clear why the elaborated question resulted in a decrease in exploratory talk. The elaborated questions contained example “for” and “against” arguments, and perhaps the inclusion of for and against arguments somehow caused participants to adopt a more adversarial or cumulative frame rather than an exploratory
one (which combines the two). This effect should be researched more before any definitive conclusions are drawn.

Reason Condition Interactions

Another stark difference between those who reported high and low knowledge was that for those with high knowledge, the reasons goal led to more exploratory talk, whereas just the opposite was true for those with low knowledge. It makes sense that the reason condition would be more effective for participants with high knowledge, because they would be more able to generate more reasons. That is, knowledge appeared necessary for students to think of as many reasons as possible, which enabled them to build on one another’s ideas in a critical way. Likewise, asking students to generate more reasons and using elaborated questions had a positive effect on balance if knowledge was high.

When the elaboration and reasons conditions were combined, it resulted in unbalanced arguments when knowledge was low. The combination could have caused cognitive overload in low-knowledge participants because of the amount of information given, the fact that the information was new (and some participants may have had lower working memory span), and that participants were being asked to think deeper. Cognitive overload is postulated to be one reason students have difficulty thinking about both sides of an issue (Nussbaum & Kardash, 2005).

The Lack of Findings with Respect to Goal Orientation

Recall that according to achievement goal theory, individuals desire a sense of achievement, but that what “achievement” signifies varies between individuals. Broadly,
individuals' motivation to achieve may be oriented toward mastery or performance. (Elliot & McGregor, 2001).

A mastery goal is a "desire to achieve competence by acquiring additional knowledge or mastering new skills" (Ormrod, 2004). By contrast, a performance goal is focused on the "demonstration of competence relative to others" (Elliot & McGregor, 2001).

This study examined the effect of goal orientation on collaboration patterns. We hypothesized that those participants who reported having a mastery goal orientation would be more collaborative. By corollary, we thought that those who reported having a performance goal orientation would be less collaborative. However, we thought that goal instructions promoting collaboration might mitigate this effect. Notably, we found that there were no significant findings related to performance-goal orientation affecting collaboration patterns. While this result was unexpected, it is not inexplicable.

As stated, it is possible for those who are motivated by either performance or mastery to nevertheless achieve similarly (see Pintrich, 2000). For example, two students may receive the same grade even though one student is motivated by a desire to learn and the other is motivated by a desire to earn a high grade. Perhaps this is what happened in the present study, given the nature of the online group discussion.

Alternatively, perhaps the individuals who reported as performance goal oriented were mostly motivated by grades, and since this was an ungraded assignment, they were not motivated to engaged in more disputational talk. A performance goal oriented individual wishes to show competence relative to others. This desire may manifest itself in various ways. Perhaps some performance goal oriented individuals are only
performance goal oriented with respect to grade. Since there was no grade here, a participant essentially fulfilled the requirements for participation by posting twice in the discussion group. Perhaps some performance goal oriented individuals thought this was enough, that they had showed their competence by completing the task and doing nothing more.

At first glance, this does not seem to explain why the results would not reflect that some performance goal oriented individuals desired to show competence relative to others. One would expect this type of a performance goal to manifest itself in group discussion even without grades. The fact is, however, that our analysis did not separate "grade-focused" performance goal oriented individuals from other performance goal oriented individuals. A participant was coded as performance goal oriented if she reported certain answers to questions that addressed both classroom (i.e., graded) performance as well as more general peer-relative performance. (See Appendix IV.)

Insomuch as there may be a significant difference between these two groups (grade-focused and peer-relative performance goal oriented individuals), there should perhaps be a distinction made in the analysis. Thus, future researchers might want to separate performance goal into the two proposed groups to more fully explore whether or not goal orientation affects group talk.

Alternatively, it could be that mastery goals pertain only to the learning of formal content and that students in the experiment did not view this as a learning experience. Another explanation is that even if students attempted to learn, that in and of itself does not guarantee that they would process information in a balanced manner. For example,
(Nussbaum, 2005) did not find that student who enjoyed thinking (as measured by Need for Cognition) created more balanced arguments, although the arguments did have more depth.

Finally, it may simply be that the nature of the group discussion (i.e., the use of controversial question topics) accommodated a more disputational style of group talk, and that therefore all individuals were induced to interact as one would expect of performance goal oriented individuals.

Technology and Collaborative Learning

As stated, learning how to argue is an important part of collaborative argumentation. This may be achieved through the use of online learning environments (See Cho et al., 2002; Baker, 2003). These learning environments perform some of the work for the student, alter the difficulty of the work, or change the nature of a certain task in order to allow the learner to complete the task (Cho et al., 2002). Online environments allow for a structure that favors "the co-elaboration of knowledge" (Baker, 2003).

In Nussbaum’s theory, students possess both a collaborative and adversarial argumentation frame. Some goal instructions activate an adversarial frame whereas others may activate a more collaborative frame. (Nussbaum, 2005; Nussbaum & Kardash, 2005). In Nussbaum’s (2005) study on the effect of goal instructions on students’ reasoning and argumentation in Web-based environment, he noted that deeper arguments were generated when the students were given certain goals. The goal to generate as many reasons as possible encouraged more exploratory and balanced discourse.
In the present study, WebCT was to be used to present participants with a reason goal and to activate a more collaborative frame. As the results indicated, this may have occurred with for high-knowledge students. Exploratory talk was generally high, despite the nature of the task itself (discussing controversial questions), which might be conducive to more disputational talk.

Educational Implications

Perhaps the most important finding with respect to practical classroom value is the importance of knowledge. The amount of knowledge a participant had affected whether or not the "reason" goal worked. However, the elaborated question was more effective on low knowledge participants. This might be because the elaborated question included ideas from both sides of the arguments of the topic. What this suggests is that teachers should make sure students have background knowledge in a topic before having their students discuss it collaboratively in a group discussion.

Another important lesson about collaborative argumentation that teachers should be aware of is that according to Mercer (1996), "not all kinds of talk and collaboration are of equal educational value." Mercer's two requisites of useful collaborative talk are that: First, ideas must be presented clearly and explicitly to allow meaningful joint (or group) evaluation. Second, the group must reason together, rather than taking cues from one dominant group member. That is, if a more knowledgeable (or simply more confident) and subsequently more dominant group member makes most of the decisions and does most of the work based on her own problem-solving skills, the less dominant group members' opportunities to improve their problem-solving skills are hindered (Mercer,
Teachers need to be active facilitators of group discussion. Students need to be observed, at least at first, while they are supposed to be collaborating on a topic, so one dominant member does not take over the group discussion. Even in this study, there sometimes was a dominant group member and the other group members would sometimes just agree with all the arguments that that member made. A helpful way for teachers to make groups might be to have students with the same knowledge background on a topic in the same group or give each student in the group a specific role to play.

Additionally, teachers need to be aware that collaborative frames need to be activated. In Nussbaum's theory, students possess both a collaborative and adversarial argumentation frame. Some goal instructions activate adversarial frames (e.g., persuade others of your point of view--Nussbaum, 2005; Nussbaum & Kardash, 2005) whereas others may activate a more collaborative frame. Asking students to generate reasons might activate a collaborative frame because students could interpret it as an instruction to (or permission to) explore rather than debate. When giving group assignments, teachers who agree with the benefits of collaborative argumentation should give students directions to generate reasons for their point of view and not to persuade others of their point of view.

Limitations of Study

As with any research, time was one of the difficult obstacles in this study. If the participants were able to spend more time on group discussion or would have had time to discuss more than one topic it might have helped. The number of participants was another obstacle. I would have liked to have a much larger sample size, especially after
the groups were split up by pre- and post-survey and the conditions applied to them.
Additionally, there were limitations inherent in the online environment WebCT. Because of the time issue, I could only use participants that were familiar with WebCT. If the participants had more time, I would have first held a training session for WebCT and then asked students to sign up for my study. Some participants had difficulty posting in their discussion groups.

There also may have been limitations due to the nature of participant selection and researcher expectations for participation. While participants chose to take part in this study, they were given course credit for their participation in a research project of their choosing. However, participants who chose to take part in my study may have done so because they thought that alternative methods of receiving the same credit (i.e., writing article summaries) required more effort. Thus, while participants could have chosen an alternative method of receiving the same credit, ultimately they still participated in my study for credit. As such, there may have been a tendency for some participants to exert the lowest possible effort while still meeting the minimum acceptable requirements for adequate completion of the study. For example, participants were required to post at least two notes. Many posted only the minimum number. While it is possible that participants had only two posts worth of argument to contribute to the group discussion, it is likely that many participants abandoned the study once they had made their two posts. If this occurred, then participants would not have had the benefit of reading all of their group members' posts, and would not have received the same benefits of a true group discussion. Eliminating this problem might be difficult. Perhaps the researcher should
require participants to read all posts even after they have fulfilled their posting obligation. One might do this by simply including an instruction to do so. Participants might not follow this instruction, but a more effective solution (for example, requiring completion of a post-discussion survey which asks substantive questions about other group members' perspectives and the general character of the completed discussion) might cause more problems than it solves.

A related posting issue is that while the two post requirement should encourage group talk, it did not always work. In at least in one case, a participant wrote both of his posts after the other two group members had already completed their discussion. This was partially due to technical issues related to using WebCT.

Perhaps a more significant limitation to this study is that participants did not need to engage in exploratory talk to complete the given task. Mercer (1996) argues that for group talk to be most effective, collaboration must be necessary. Here, the participants' given task was simply to engage in a group discussion. They did not need to come to a consensus. Thus, in this way, exploratory talk was not encouraged. In fact, it may be that disputational talk was encouraged, given that the discussion topics were controversial. Additionally, the character of the group discussion may have changed according to chance combinations of participants with alike or dissimilar views on the given topics. That is, if the three (or two) members happened to agree on the given topic, they would more likely engage in cumulative talk, and if the members disagreed, they would more likely engage in disputational talk.
Conclusions and Suggestions for Future Research

Overall, an elaborated question probably was an effective treatment if participants elaborated rather than just repeated. Since the elaborated question included more details about the topic, including arguments for both sides of each issue, it is possible that participants copied those arguments and used them in their posts. However, it is also possible that participants would have determined based on the elaborated question that they should look at both sides of the issue, elaborated themselves on the arguments, and thought of new ones. Further research is needed on this topic.

This study highlights the importance of “knowledge” in considering how goal instructions affect students’ argumentation. Nussbaum (2005) found that a “reason” goal instruction had a positive effect on the depth of student argumentation. The results of the present study confirmed those findings, but only for high-knowledge participants. These results may be reconcilable. The previous study used a different question (TV violence), and, overall, perhaps students had greater knowledge of that topic. There may also be other variables that we did not measure that may be confounded with knowledge. In any event, it is important to continue to conduct research on individual characteristics that may impact how students respond to different goal instructions.

Recent research confirms the old belief that argumentation has considerable value in the educational setting. However, not all argumentation is of equal value. Deep, collaborative argumentation is the most beneficial. Thus, research exploring methods of making student argumentation more collaborative is of significant value to educators who wish to use argumentation as a learning aid. Similarly, because effective goal instruction
may help students write deeper arguments, determining how to maximize the effectiveness of goal instructions is valuable and justifies further research.

Future researchers in the area of collaborative argumentation in an online environment might use topics of which students are more knowledgeable, or might try to give the students background knowledge before the group discussion occurs. Since knowledge seemed to be important in this study, researchers might be interested in providing students with a deeper knowledge-based assessment before participation in any discussion. Researchers might try to make heterogeneous groups by combining high, medium, and low knowledge students or make homogeneous groups of exclusively high, medium, or low knowledge students.
APPENDIX I

DISCUSSION QUESTIONS

Unelaborated Versions

1) The Federal government mandates that every state have an accountability system by which schools are given greater or fewer funds based on overall student performance on standardized tests. Additionally, this program allows some students in "underperforming" schools to transfer. Is such an accountability system a good idea?

2) Should public school students be required to wear uniforms?

Elaborated Versions

1) The Federal government mandates that every state have an accountability system by which schools are held accountable based on how their students perform. For example, schools may be given greater or fewer funds based on overall student performance on standardized tests. Also, some students in "underperforming schools" may be allowed to transfer. Advocates argue that accountability systems gives schools an incentive to improve, may encourage or require more services and options to be provided to at-risk students, and provides parents and policy
makers with information on year-to-year growth. Critics argue that accountability systems tend to narrow the curriculum, may punish schools that need the most help (in cases where funding is reduced), and may use indicators that are not totally valid.

In your opinion, should states be required to have an accountability system by which schools are held accountable based on how their students perform?

2) Some people argue that public school students should be required to wear uniforms to school. Mandatory school uniform proponents argue that clothing is often a source of conflict in school, perhaps inciting theft and gang violence and also maintaining or widening the gap between those who can afford more expensive wardrobes and those who can’t. Requiring students to wear uniforms, they argue, not only removes this source of conflict, but engenders a healthy attitude toward authority and may make students take their education more seriously. Opponents of mandatory school uniform policies argue that school uniforms do not effectively deal with socioeconomic or cultural conflicts associated with clothing, and that uniform policies discourage individuality and suppress freedom of expression.

In your opinion, should public school students be required to wear uniforms?

---

6 The goal instruction condition (Provide as many reasons as you can to support your opinion, and try to provide evidence to support your reasons) will be randomly assigned to elaborated and unelaborated versions.
APPENDIX II

ACCOUNTABILITY SURVEY

Please indicate in the blank beside each statement the extent of your agreement to the statement, using the scale shown below.

0 10 20 30 40 50 60 70 80 90 100
strongly disagree
strongly agree

1. An accountability system, where schools are given funding based on overall student standardized test performance, should be in place.

Please indicate in the blank beside each statement the extent of your certainty to the statement, using the scale shown below.

0 10 20 30 40 50 60 70 80 90 100
very uncertain
very certain

2. How certain are you of your opinion regarding an accountability system, where schools are given funding based on overall student standardized test performance?
Please indicate in the blank beside each statement the extent of your knowledge to the statement, using the scale shown below.

0 10 20 30 40 50 60 70 80 90 100
relatively a great
nothing deal

3. How much do you know about the issue of accountability systems, where schools are given funding based on overall student standardized test performance?

Please indicate in the blank beside each statement the extent of your interest to the statement, using the scale shown below.

0 10 20 30 40 50 60 70 80 90 100
very very
very
disinterested interested

4. How interested are you in this issue (specifically, whether there should be accountability system where schools are given funding based on overall student standardized test performance)?
APPENDIX III

SCHOOL UNIFORMS’ SURVEY

Please indicate in the blank beside each statement the extent of your agreement to the statement, using the scale shown below.

0 10 20 30 40 50 60 70 80 90 100
strongly disagree   strongly agree

1. Students should be required to wear uniforms.

Please indicate in the blank beside each statement the extent of your certainty to the statement, using the scale shown below.

0 10 20 30 40 50 60 70 80 90 100
very uncertain   very certain

2. How certain are you of your opinion about students being required to wear school uniforms?
Please indicate in the blank beside each statement the extent of your knowledge to the statement, using the scale shown below.

0 10 20 30 40 50 60 70 80 90 100
relatively  a great
nothing     deal

3. How much do you know about the issue of school uniform implementation?

Please indicate in the blank beside each statement the extent of your interest to the statement, using the scale shown below.

0 10 20 30 40 50 60 70 80 90 100
very  very
disinterested  interested

4. How interested are you in the issue of school uniform implementation?
APPENDIX IV

PATTERNS OF ADAPTIVE LEARNING SCALES (PALS)^7

Here are some questions about yourself as a student. Please circle the number that best describes what you think.

1. I like class work that I'll learn from even if I make a lot of mistakes.
   
   1   2   3   4   5
   NOT AT ALL TRUE   SOMEWHAT TRUE   VERY TRUE

2. An important reason why I do my class work is because I like to learn new things.
   
   1   2   3   4   5
   NOT AT ALL TRUE   SOMEWHAT TRUE   VERY TRUE

3. I like class work best when it really makes me think.
   
   1   2   3   4   5
   NOT AT ALL TRUE   SOMEWHAT TRUE   VERY TRUE

4. An important reason why I do my class work is because I want to get better at it.
   
   1   2   3   4   5
   NOT AT ALL TRUE   SOMEWHAT TRUE   VERY TRUE

5. An important reason why I do my class work is because I enjoy it.

   1 2 3 4 5
NOT AT ALL TRUE SOMEWHAT TRUE VERY TRUE

6. I do my class work because I'm interested in it.

   1 2 3 4 5
NOT AT ALL TRUE SOMEWHAT TRUE VERY TRUE

7. I would feel really good if I were the only one who could answer the teacher's questions in class.

   1 2 3 4 5
NOT AT ALL TRUE SOMEWHAT TRUE VERY TRUE

8. I want to do better than other students in my class.

   1 2 3 4 5
NOT AT ALL TRUE SOMEWHAT TRUE VERY TRUE

9. I would feel successful in class if I did better than most of the other students.

   1 2 3 4 5
NOT AT ALL TRUE SOMEWHAT TRUE VERY TRUE

10. I'd like to show my teacher that I'm smarter than the other students in my class.

    1 2 3 4 5
NOT AT ALL TRUE SOMEWHAT TRUE VERY TRUE

11. Doing better than other students in class is important to me.

    1 2 3 4 5
NOT AT ALL TRUE SOMEWHAT TRUE VERY TRUE
APPENDIX V

SCORING RUBRIC

Date: ___________   Group #_________

I. Individual Assessment (based on participant’s overall posts)

A. Argumentation Mechanics

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B. Balance

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II. Group Assessment

3 Exploratory
(Critical and Flexible)
2.5 (two of three exploratory)

2a Cumulative
(All agree/build ideas)

2b Disputational
(All oppose)

1 Repetitive
APPENDIX VI

EXAMPLE CODING FOR INDIVIDUAL ARGUMENT DEVELOPMENT (MECHANICS)

High (6 out of 6 points)

Post# 1 by 308

I think that students should be required to wear uniforms. I think that this will help eliminate some of the conflicts in the school (Argument #1, original) and focus more the student's time on their education (Argument #2, original). Students will still have plenty of opportunity to show their individuality through schoolwork and the many other things that happen daily in the school settings. (Argument #3, original) Students that cannot afford the uniform should be helped out. (Argument #4, original) Perhaps having a program that is similar to the “free and reduced lunch program.” (Elaboration of Argument #4)

Post# 2 by 308

Wow. That is a very powerful statement “Uniforms = Uniform Thinking = Uniform Personality = Lack of Creativity = Boring.” I tend to disagree with your statement. I don't think that wearing a uniform will make you a boring person. I have also been to schools in Los Angeles and here in Henderson where uniforms were required. The students at these schools also did not mind wearing the uniforms. Students are still able to express their personalities and be creative in different ways other than by their clothes. (Elaboration of Argument #3) I also think that in the areas where gangs are prevalent uniforms could be helpful on school grounds. (Elaboration of Argument #1)

Post# 3 by 308

I am still a firm believer that in some areas.schools, school uniforms could be beneficial. (Argument #5, original). By no means am I going to compare a prisoner or a military soldier to any of our school children, which to me seems a bit far-fetched. My idea of a school uniform is nice pants and a nice shirt, with colors that don’t have hidden agendas.
You are also right in saying that this issue (gang violence) has been addressed. But, I feel that is still bears mentioning. Gang activities is still a growing problem in many areas of this country, I don’t feel that it should be pushed aside. It has also been shown that violence and theft crimes have dramatically lowered since uniform policies have been in place. (Elaboration of Argument #1 & #5) You are correct in saying that schools do employ a dress code, in recent years I feel from seeing suggestive shirt in hallways and reveling tops on young ladies the dress codes in place are either being forgotten or ignored. Another benefit for uniforms would be reducing these “distractions” and it also lets teachers teach and not wasting their time on clothing issues. (Argument #6, original). In high schools uniforms could also be a deterrent for rival schools from entering their campus and causing problems (this was a huge issue where I went to school). Thus, reducing the chance for rivalry fighting on campus. I think that in some areas uniforms can make the environment safer thus, a better place for learning. Finally, I think that school uniform could help unite the school. For example, those students that cannot afford to buy the newest and greatest trend of the moment. Which could lead to being perceived as “un-cool” by their peers. This alone has alienated many of the lower income students and the direct effect is lower self-esteem. School uniforms could help unite the school and again that would lead to a positive learning environment. (Elaboration of Argument #1, #2, &5)

Raters Notes: There were six original lines of argumentation. All lines of argumentation were elaborated.

Medium (3.5 out of 6 points)

Post# 1 by 907

I agree with 902 that if all of the schools had the same curriculum then it would give them a better chance of having similar test scores. I think this also goes hand in hand with giving them all the same amount of money, or giving the lower performing schools more money. (Argument #1, not original) I actually did a paper on this last semester. What happens a lot of times is that, like 901 said, the schools with the higher test scores get more money. It seems so obvious to me that what this does is widen the gap between the higher performing and lower performing schools. If the lower performing schools get even less money, then they will have less resources. (Elaboration of Argument #1) Also, when it comes to sending children in lower performing schools to higher performing schools, I don't agree that it is a wise decision. (Argument #2, original)

What we need to do is improve the performance of the school they are already at. What happens when we give kids the option to move is that usually the kids who probably have good grades anyway move. They are the ones who, even though they might be attending a lower performing school, their parents have the time to drive them a little further in the mornings, and their parents are their to help them with their homework at night. The students who usually have to stay in the lower performing schools are the ones whose
parents don't care enough to send them to the higher performing schools or they don't the option of getting them there or picking them up. It's sad to say, but when these lower performing schools are left with less funds, and many of their students have left, it's very hard to get back on its feet, and it may never happen. (Elaboration of Argument #2)

Post# 2 by 907

Exactly! If they are moving students and money out of the failing schools then the kids who move receive immediate benefit, but in the long run the school will continue to fail and overtime it can have a negative effect on the community. (Argument #3, original) I realize that it would take a lot more time and effort to try to bring the school up to "par" than just sending the students to better schools, but it would definitely be worth it when possible. Here in Clark County I know they offer extra incentives for the teachers that teach at Title 1/at risk schools. I wonder if this is helping bring in better teachers for these schools and if it's helping improve the quality of the schools. Is it even usually attributed to the quality of teachers when a school is "failing?" (Elaboration of Argument #3)

Raters Notes: There were three lines of argumentation (two original). All lines of argumentation were elaborated. Since there are three lines of argumentation and they are all elaborated, the participant should receive a score of a four. However, only two lines of argumentation were original instead of the required three. Therefore, the participant's score should be a three and a half.

Low (1.5 out of 6 points)

Post #1 by 1118

I think that the system is unfair. All schools should be treated equal. (Argument #1, not original, unclear on how specifically relates to accountability) Just because one school gets more money than another does not mean that the students will do better. For example, if a low scoring school gets brand new computers and brand new text books it will probably not affect their testing scores. It will just mean that they have better technology and updated books. The high scoring school will then probably continue with the same tools they have been previously using. I believe that the difference in scores varies due to location, teachers, society, and the children's' environment. (Elaboration of Argument #1)

Post #2 by 1118

I also think that there is a plus side to the system, too. If the lower scoring school had more money, they could use that money to get better or more teachers, provide additional help to low scoring students, and buy new innovative teaching tools/programs. Probably, this is was the government thinks the system will do, but like I said, I don't think that is the problem. (Elaboration of Argument #1)
**Raters Notes:** There was one line of argumentation and it was elaborated. Since there is one line of argumentation and it is elaborated, the participant should receive a score of a two. However, the line of argumentation is unclear about how it specifically relates to topic. Therefore, the participant's score should be a one and a half.
APPENDIX VII

EXAMPLE CODING FOR INDIVIDUAL BALANCE

High (5 out of 5 points)

Post #1 by 1109

I have always gone to public schools until my family and I moved to Guam my sophomore year of high school. When I lived there, I attended a private school, and we had to wear school uniforms. There were things that I liked about wearing uniforms, and there were also things that I did not like. I think that wearing a school uniform takes much of the social pressure off of students because you do not have a choice in what you wear to school. At this school, the boys uniforms were different from the girls. They were very strict as to what we could wear, but at the same time, we still had some choice in what we wanted to wear. For example, girls could wear navy blue pants, shorts, or A-line skirts, and the boys could either wear navy blue pants or shorts. The shorts and the skirts for the girls had to be fingertip length, and they checked every time. Also, the boys shorts and pants were not aloud to "sag." They were really strict with the dress code, but I also think that this strictness went hand in hand with the quality of education that we received. I went to a college preparatory academy where the curriculum was surrounded by the International Baccalaureate program, and therefore, the curriculum was already extremely rigid. I think that we were able to learn many more things because we were not distracted with the appearances of the students around us. In our dress code policy, there were rules that included everything from your head to your toes. There were rules designating how many piercings you were allowed to have and the type of shoes that we were allowed to wear. Also, we were only aloud to have our natural hair colors and natural makeup. Teachers actually checked to make sure that students were within in the dress code policy, and if you were not, you received detention. I think that implementing a uniform policy on public schools would be a great idea. It would take away a lot of the distractions that students deal with on a daily basis just with appearance. I also think that it would take away a lot of the pressure associated with style and the types of clothes that students could afford to have. One other things that I really liked about my school was that we still had "free dress days," where we could dress in whatever we wanted as long as it was within certain guidelines. (Solution #1) These days were set aside for different
clubs, grade levels, and programs as a way for fundraising. It cost 50 cents to wear "normal" clothes for the day. I thought that this allowed students to express themselves every once and a while. Overall, school uniforms are a good idea.

Post #2 by 1109

At my school, we had the choices of what we wore as bottoms. We also had the choice of what kinds of shoes and socks we wanted to wear. (Solution #2) Some of the socks that I had were crazy. It was a fun way to express yourself. Another way that we were able to express ourselves was when we had free dress days. I thought that being able to wear what we wanted when we had the chance helped with expressing ourselves.

Medium (3 out of 5 points)

Post #1 by 303

I believe that students should wear school uniforms. I think that when you are in a uniform everyone is equally important. I think that when students wear different clothing, that they are able to see who has money and who doesn't have money. There is enough things that get in the way when students go to school such as going to school and performing well academically. I also think that students are more respectful, when you are dressed up nicely you behave a different way. Although students are not able to express themselves in their dress, they are able to express themselves through other ways the words they say, their attitude, and other things can allow them to express themselves. For this reason I believe that students should wear uniforms.

Post #2 by 303

I agree, but I still don't think that little children will know who has money or not unless they see their parents cars or houses. I think that your point about how gang member colors won't be used is a good point. I really think that uniforms like you said would reinforce the dress code. I think it would be a good idea to get opinions from other students that wear uniforms before making another school wear uniforms. I think we need maybe give a survey to the parents and see what they think. (Building upon ideas & concessions)

Low (1 out of 5 points)

Post #1 by 1125
I think absolutely not, it not fair for children to have less money for performing low on tests, not all students do good on tests, but that does not mean that they should be given up on. All students deserve an equal chance and money is some of what helps a student do better because of the supplies it provides for them. Every child has their own gift and they should be given the same chance to succeed.

Post #2 by 1125

I think that schools are given to much pressure on these tests to do good so their schools get more money. The taxpayers are where the money is coming from or also known as the parents of the children. Their should not be an amount put on a child's education, and every school should get the same amount of money that way they all have an equal chance at learning what they need to know. (not balanced & not much interaction with other posts)
APPENDIX VIII

EXAMPLE CODING FOR GROUP EXPLORATION

High (3 out of 3 points)

Discussion Group 13

Post #1 by 506

I feel that uniforms in public schools are a good thing. It eliminates the cliques that sometimes form based on what you wear. Children that come from low-income families often feel that they don't have enough value or self-worth because of the clothes they have to wear. When they are required to wear uniforms they are then able to focus on what's important which is getting an education in school.

Post #1 by 503

Yes, I feel that public schools should require uniforms for several reasons. First of all, wearing uniforms will allow students to dress in a manner that is appropriate for school and learning. It takes the pressure off of the students who can not afford the fashionable expensive clothing and shoes. Uniforms will remove the element of students being attracted to one another because of the type of clothing they wear, hopefully allowing for more concentration on their studies. Some of the clothing students wear, quite often, identify or associate them with gangs, and/or other in appropriate activity. Secondly, I believe uniforms will provide a commonality between students, hopefully, building camaraderie instead of division because of the way a student dresses. Thirdly, it may be cheaper for parents to invest in uniforms as opposed to buying clothing that will be out of style the next week or month. In essence, students will be able to focus on schoolwork and not be distracted by what others are wearing. (Builds upon ideas of 506)

Post #1 by 509

As someone who works in an inner city high school, I have mixed emotions about uniforms in schools. On one hand, I see the students of low-income homes who struggle
to stay up to date and fashion, trying to wear the same types of clothes that their friends wear, and in this situation, I do agree with uniforms in schools. However, I also see that low-income families have a VERY hard time paying for these uniforms, as they are usually pretty pricey. So, in general, I think I would have to say that I do agree with student uniforms b/c they put students all on the same level (you don't have to worry about gang colors, staying in fashion, etc.). If only there were a way to help low income families with the cost of uniforms...(Acknowledges there should be a solution, but doesn't come up with one)

Post #2 by 506

I agree that the costs of uniforms are too high. I think this is very unfair if its required that they should not be as expensive, or find a way to have a reduced cost for families who are on a tighter budget, much like school lunch is now. (Solution #1 & builds upon ideas of 509)

Post #2 by 509

I have seen around town, drop off points for uniforms, but are those uniforms really getting to the students who really need them. Again, while I feel as though uniforms are good, there needs to be a better way of getting students outfitted in these expensive clothes. I agree with 506 - we now have free and reduced lunches, why not create some type of program with clothes. Another good way to help would be to have the seniors donate their uniforms at the end of the school year - as they will no longer be needing the uniforms. (Solution #1 and builds upon ideas of 506) On the other hand, it is hard to say how many families would actually accept the clothing, as some may have so much pride as to not accept the "hand-me-downs." Would you agree?

Post #2 by 503

I agree with both of you, uniforms can be costly. And also, there may be families who do not want to were "hand me downs," however, I still believe the uniforms are worth having. I wonder if the uniforms will be anymore expensive than the clothing most students wear now. My thoughts on alternatives are, instead of a formal uniform, perhaps the uniform could be a polo style shirt and black or blue pants (not necessarily uniform pants, maybe jeans that fit appropriately). (Solution #1) Or, maybe the school could provide clothing vouchers or work out a deal with the uniform vendor to price the uniform based on income status. (Solution #2) Or, have a moderate to a higher priced uniform that would provide affordable options. (Solution #3) I believe that parents will find a way to buy the uniforms, if the see the value in their child(ren) wearing them. (Builds upon ideas of 506 & 509)
Raters Notes:

All three participants were flexible with the ideas of about topic. Also, they each came up with at least one solution and expanded solutions based on other participants posts.
APPENDIX IX

DEMOGRAPHICS QUESTIONNAIRE

Please answer the following questions.

Age (in years) _____

Sex (F or M) _____

Major _____

GPA _____

Grade (1=freshman, 2=sophomore, 3=junior, 4=senior) _____

Ethnicity (1=american indian/alaskan native, 2=african american, 3=caucasian/white, 4=hispanic/latino/chicano, 5=other) _____
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