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Goal Setting within Collaborative Small Group Discussions

Introduction

The use of goals and goal setting in education has been well researched, with the conclusion that striving to meet a goal can benefit academic performance (Cheung, 2004). Furthermore, self-selecting goals can increase student motivation and sense of autonomy, both of which are critical for positive educational outcomes (Deci & Ryan, 2000). However, relatively little exploration has focused on what happens when elementary school students are asked to set their own goals for participation in collaborative learning experiences. To our knowledge, no research has considered the ways in which students of this age set goals, nor on how they later reflect on their progress toward goal completion.

Without this understanding, research cannot help teachers develop best-practices for structuring student goal setting, nor can we truly understand the role of autonomous goal setting in key achievement outcomes. This paper seeks to begin to remedy this gap by exploring the goals set by fifth-grade students within a small-group, collaborative learning intervention called Collaborative Social Reasoning (CSR). We also analyze students' reflections on their goals in order to determine what kinds of goals students set, how they reflect on their goal completion, and the relationships between goals, reflections, and student self-efficacy. Because of the importance of self-efficacy for students' learning outcomes (Multon, Brown, & Lent, 1991), understanding this relationship is critical for furthering our understanding of how to use goal setting and reflection to enhance students' argumentation and enrich their collaborative learning experiences.

Theoretical Framework

Collaborative learning.

Collaborative learning, also often called cooperative learning, has been defined in a number of ways across time and disciplines, meaning everything from individuals simply working together to highly specified types of group activities (Dillenbourg, 1999). Our focus is on small-group (4-6 member) collaborative learning focusing on positive interdependence, which indicates activities structured so that the success of the group is reliant upon all members' contributions; an individual cannot successfully complete the task alone. This interdependent structure has been found to have positive impacts across ages, disciplines, and even personal success measures, including achievement, motivation, and personal development (Gillies, 2016).

The theoretical frameworks used to justify the success of collaborative learning are as varied as the definitions given to the term (Dillenbourg, 1999). This study structures the collaborative learning environment according to self-determination theory, which is described in more detail below. While cognitive considerations are certainly significant to collaborative learning, for understanding student-set goal and subsequent reflections, it is more relevant to structure the learning environment in a way that optimizes student motivation for the task in order to ensure ongoing engagement. It is for this reason that we focus on students' motivation through the lens of self-determination theory.

Group size and composition is important in collaborative learning; in this study, groups were formed heterogeneously with regard to gender, ethnicity, academic ability, and social competence. Webb (2000) reports that mixed gender groups are beneficial to overall student achievement, as are mixed race and mixed ability level groups. This heterogeneity prevents one high-status subgroup from dominating or excluding other group members. In this study, in which the collaborative task focuses on complex social issues, it was also important to ensure that

students had diverse social experiences in order to increase the collective knowledge base in each group and ensure that each group member is able to make a unique and valuable contribution. This creates the aforementioned positive interdependence; because each individual holds unique experiences and knowledge, each individual is essential for the learning of the group.

Self-determination theory.

Self-determination theory posits that individuals are motivated by three basic needs: competence, relatedness, and autonomy. When individuals feel competent in the task they are completing, belonging with the people around them, and that they are in control of their own fate, they are motivated to achieve at optimum levels (Ryan & Deci, 2000). Autonomy and peer relationships (relatedness) are particularly important for young adolescents (Roseth, Johnson, & Johnson, 2008), which makes fifth grade an optimal focus for this study. An emphasis on the beginning of adolescence is particularly important, given that positive interpersonal effects of collaborative learning at this age have been found even years later (Gillies, 2002). By focusing on autonomy and relatedness as a way to increase competence, this intervention is developmentally and motivationally ideal for enhancing collaborative learning in young adolescents.

Gillies (2016) summarizes the existing literature on cooperative learning to identify five key factors that make the learning environment successful. When considered through the lens of self-determination theory, these factors are not surprising. First, students need to be aware of the positive interdependence embedded within the task; they must know that each group member's success is dependent upon the other members. When well-implemented, this enhances the relatedness within the group. Because each individual's success is dependent upon the others, all group members are equally important within the group. Second, group members must help one

another to reach goals; this may include sharing resources, providing feedback, or challenging each other's thinking. This meets student needs for both competence and relatedness; students are becoming increasingly competent through their relationships and collaboration with peers.

The third necessary factor for successful collaborative learning is individual accountability. Each individual must be accountable for their unique contribution to the group. In other words, each student has autonomy for their own role within the group and ensuring that role is fulfilled. Fourth, teaching or scaffolding needed social skills is imperative for the group to work successfully. This involves another type of competence; interpersonal competence. Unless students feel competent to successfully navigate the social environment of the group, they will be unable to interact positively and are unlikely to achieve a sense of relatedness within the group, or competence within the academic task. Finally, group processing involves the group reviewing their work, both academically and with regard to the working relationships within the group. This, of course, corresponds both to students' relatedness within the group and competence to complete the task collaboratively, but also to autonomy. Because students are reviewing their work and relationships, they have responsibility for and autonomy within their own learning and the relationships being built within the group. This intervention utilizes all five critical factors (Gillies, 2016) in order to enhance student motivation and achievement.

Collaborative Social Reasoning.

The specific type of collaborative learning that was the setting for this study is Collaborative Social Reasoning (CSR). This intervention was based on the collaborative reasoning work done by Chinn, Anderson, and Waggoner (2001). Students read short stories focusing on complex issues of social exclusion alone or with a partner. Then, students gathered in small, heterogenous groups to discuss "The Big Question," an ambiguous question about

which students engage in a self-led discussion. The objective is to understand all aspects of the question in order for each individual to come to an independent conclusion, not to reach group consensus.

Explaining ideas and engaging in argumentation, the process of providing evidence to support an idea, has been found to be beneficial for student learning (Webb et al., 2009). In this study, students are asked to reason about a complex social issue for which there is no “right” answer; it is up to each student to weigh the evidence and make a decision for themselves. This enhances student autonomy and makes it important not only for students to explain and support their own ideas, but to listen critically to the ideas of their peers. This fulfills Gillies’ (2016) description of the need for positive interdependence; because students are to explore all possible sides of the question, each individual’s input is needed for the group to successfully consider all options.

The type of argumentation promoted in this intervention can be classified as “collaborative argumentation”. This style of argumentation focuses on students building understanding together and has been found to be associated with deeper arguments than in argumentation in which students are trying to persuade their peers (Nussbaum, 2008). This also meets Gillies’ (2016) second and third factors in successful collaborative learning; because students are encouraged to explore ideas together instead of competing to be “right”, they are incentivized to help each other and share ideas and resources openly. Because of the emphasis on deepening understanding and viewing the problem from all perspectives, each individuals’ opinion and ideas are necessary to maximize the learning of the group. This makes each individual responsible for their personal contribution. Students were also encouraged to help one another explore their ideas and ensure that all group members understood the story and elements

of the discussion. This kind of focus on providing help to group members is another way to be accountable for the group's learning and has been found to be positively related to the quality of collaborative learning experiences (Hijzen, Boekaerts, & Vedder, 2006).

It was expected that students in this study would need instruction on how to interact in a group in productive manner. In order to ensure that this occurred, students participated in an initial CSR norm-setting session in which appropriate methods of interaction were discussed. Goals for participation were set by each group prior to each discussion as well, and were debriefed afterwards. Teachers were also trained to scaffold their support of the conversation; in the early weeks of the intervention, they modeled intervening to ask for more information, ask a challenging question, or invite a quiet group member to talk. Over time, however, this responsibility was released to the students as they became increasingly independent in handling their collaboration. How teachers encourage students to explain their thinking has been linked to student achievement (Webb et al., 2008) and, more specifically, gradually reducing the provided support has been found to support students becoming able to independently process information as a group (Webb, 2009). This relates to Gillies' (2016) fourth requirement for effective group work. The fifth was met when students debriefed after their discussion to determine what aspects of their collaboration were effective and which still need work. The teachers initially led this debriefing session, with students taking more and more responsibility as the intervention elapsed.

Self-regulated learning.

The conceptualization of self-regulation in this study is based on Schmitz and Wiese's (2006) model of self-regulated learning. This model proposes that self-regulated learning follows a three-part, cyclical model; in the first step, the learner sets goals in the "preaction" phase. This is followed by the "action" phase, in which the learner completes acts intended to meet the goal.

In the final phase, “postaction”, the action taken is evaluated with regard to successful completion of the goal. We focus primarily on the preaction and postaction phases, in which students set goals for their participation in the CSR discussion and then reflect on their performance. Because this model conceptualizes learning as a process, the self-reflection (postaction) completed in one cycle will influence the goal-setting that occurs during the next preaction cycle (Perels, Otto, Landmann, Hertel, & Schmitz, 2007; Schmitz & Wiese, 2006).

In his *Democracy and Education*, John Dewey (1916) conceptualizes education as an active process in which learners must associate experiences with meaning and use this meaning to guide future action. This has been conceptualized as metacognition; the process of thinking about one’s own thinking or learning (Denton, 2011). There are several metacognitive components that lead to more effective reflection, and these have been compiled and utilized to examine students’ written reflections on their goal progress.

Consideration of the process of self-regulated learning reveals the importance of considering progress on the goal; without consideration of what has been done, future steps cannot be planned (Perels, Otto, Landmann, Hertel, & Schmitz, 2007; Schmitz & Wiese, 2006). Exploration of these next steps is also key to self-regulated learning Lew and Schmidt (2011). demonstrate that critical review and exploration of strategy use are important components of self-reflection as well. Using these critical components, we were able to score students’ reflections according to the evidence of metacognition present. Research on self-reflection has been extensive in populations of older students (e.g. Kitsantas, Reiser, & Doster, 2004; Masui & Corte, 2005; Morisano, Hirsh, Peterson, Pihl, & Shore, 2010; Travers, Morisano, & Locke, 2015), but little has focused on how younger students use reflection, which makes this exploratory study necessary. This research gap is surprising, as increasing command of language

leads to growth in argumentation ability in this age group (Ferretti, MacArthur, & Dowdy, 2000), so this study aims to begin filling this gap in the literature.

Goal setting.

Research on collaborative argumentation has found certain goal instructions can effectively improve the quality of students' collaboration and argumentation (e.g., Nussbaum & Kardash, 2005; Mercer, 2008; Reznitskaya et al., 2009). For example, previous studies (Ferretti, MacArthur, & Dowdy, 2000; Nussbaum & Kardash, 2005) found that using specific goals, as opposed to general goals, can benefit collaborative argumentation, though the goals they examined were not self-generated by students. To our best knowledge, few studies have investigated how students set their own goals and evaluate those goals in collaborative argumentation. Understanding the content of goals that students generate is important because goal content has been found to be associated with increased learning and can reflect students' desired outcomes (Pretz & Zimmerman, 2009; Day and Tosey, 2011; Martin & Elliot, 2016). Because independently setting goals increases student feelings of autonomy (Day & Tosey, 2011), motivating students (Cheung, 2006), and inspiring them to work harder (Madden, 1997), it is important to understand the content of the goals that students set within a collaborative learning setting. Goal setting has been consistently found to improve outcomes (Morisano et al., 2010), but research on the self-set goals of elementary schools students in collaborative settings is lacking. Understanding the ways in which students use self-regulated learning through goal setting and reflection will enable future research to focus on using this process to improve student outcomes within argumentation.

In order to fill the literature gap regarding students' self-set goals and reflections within a collaborative learning environment, this study seeks to answer three research questions:

1. What are the topics and types of goals set by students prior to the CSR discussion?
2. How do students self-reflect on their goals and performance after the CSR discussion?
3. How do goals and reflections differ between high and low achieving classes?

Methods

Participants

Participants were 141 fifth-grade students in the Midwestern United States. They were part of six English language arts (ELA) classes taught by 5 teachers (one teacher taught two classes). These classes were part of two schools in two districts. Three classrooms were classified by their school as “low-achieving” and three classified as “high-achieving”. These designations were based on students’ scores on ELA state standardized scores in previous years. Teachers elected to be included in the study and the class(es) to be included were selected randomly from those taught by the teacher.

CSR.

Students participated in a five or six week intervention called Collaborative Social Reasoning (CSR). During each week, students would read a short story about social exclusion that was adapted from an age-appropriate novel. They would then participate in a small group discussion about the key social issue in the story, called “The Big Question”. These questions were designed to be ambiguous and complex, and students were encouraged to explore all possible angles of the question and then make a decision; no group consensus was required or encouraged. For more information on the CSR intervention, see (Lin et al., 2017).

Prior to each discussion, students completed a goal setting sheet in which they were asked to set an argumentation and participation goal for the week's discussion. What each of these types of goals are and examples of each were discussed with the class prior to the beginning of the intervention. While students were provided examples of goals, they were free to write any goal(s) they chose. Immediately prior to each discussion, each group also set goals for their collaboration and debriefed progress on these goals after the discussion. Teachers initially led these group goal setting and reflection sessions, though responsibility was relinquished to students as the intervention progressed. Students were asked to reflect on their personal goals in writing after each discussion. Five students were not included in the analysis because they completed fewer than three reflections over the course of the intervention.

Data Coding and Analysis.

Students completed one goal sheet for each week of the intervention, with each goal sheet containing two components. First, students set goals for their weekly discussion. After the discussion, they reflected on their performance. Students' written goals were broken down into individual goal units, in which each unit contained only one objective ("I want to have good eye contact and not interrupt" would be divided into two goal units, one for eye contact and one for not interrupting). Each goal unit was coded by topic and type. A total of 2166 goal units were identified and coded. These corresponded with a total of 650 reflections.

The goal topic coding scheme was derived from the data set (Table 1). One researcher closely examined each student's goals and created a category whenever a new goal topic was found, identifying 26 discrete goal topics. This approach maintained goal specificity while keeping a parsimonious list. Another researcher independently coded 20% of the goals from each classroom to ensure that coding was reliable (Cronbach's $\alpha=.90$).

Each goal topic was classified into a corresponding goal type: participation, argumentation, participation and argumentation (combination), logistical, affective, or unclear/unrelated. Participation goals are defined as goals related to student's participation with the group. Argumentation goals are related to the processes of argumentation in the discussion (e.g., "think of both sides of the issue"). Goals coded as "combination" have both participation and argumentation aspects. Affective goals are related to emotions or empathy within the discussion, while logistical goals are related to the mechanics of the discussion. Each goal topic was examined and assigned to a type; this information is included in Table 1. Because goal types were computer assigned based on an algorithm, reliability analysis was not completed for this variable.

Each goal topic was also assigned to a goal perspective. This enabled us to examine students' attention focus within the discussion, which is critical to understanding where student choose to use their cognitive, social, and logistical resources. We identified five possible areas of focus: self-participation, others' participation, self-cognition, others' cognition, and affect. Again, because goal types were computer assigned based on an algorithm, reliability analysis was not completed for this variable.

Self-reflections were coded to evaluate the depth of consideration that students gave their goal fulfillment. Each reflection was coded on five variables; goal specificity, goal attainment, goal reflection, identification of future steps, and reflection on action taken. Each variable was coded by one researcher and at least 20% of the data was double coded by another team member for reliability assessment. All reliability measures were acceptable (see alpha values related to each variable below). Units for double coding were chosen randomly by class to ensure representative sampling (20% of each class' data was double coded).

Goal specificity (Cronbach's $\alpha=.98$) was coded at the goal level (one code per goal unit) and portrays whether students mention the goal in their reflection (yes=1 or no=0). General statements such as "I met my goals" or "I did good" were not counted as goal specific because they do not indicate whether students actually reviewed and considered their individual goals and related performance. All other variables were coded at the reflection level (one code per weekly reflection).

Goal attainment (Cronbach's $\alpha=.80$) was coded based on students' overall assessment of their own performance. This was coded as 1 (met goals), 2 (met some goals), 3 (met no goals), or 4 (not mentioned). Goal reflection (Cronbach's $\alpha=.94$) was coded based on whether or not students mention their goal completion in their reflection (1=yes, 0=no). This is differentiated from the previous two variables because it does not compare the reflection to each individual goal and it is not reflective of students' self-evaluation. Instead, it simply reflects whether the reflection contains evidence that students considered their progress on their goals, regardless of whether or not they met those goals. Identification of future steps (Cronbach's $\alpha=.87$) was coded dichotomously based on whether students identify future actions to be taken in their reflection (1=yes, 0=no). Finally, reflection on action taken (Cronbach's $\alpha=.80$) was coded based on whether or not students considered their actions in their reflection (1=yes, 0=no). This enables us to examine whether or not students are considering the actions that align with their goals when reflecting. Consider the following example: "This week I took notes on the reading, so I met my goal of being more prepared". This example shows evidence of goal attainment ("I met my goal"), goal reflection (progress is mentioned), and reflection on action taken ("I took notes"). The reflection is goal specific ("my goal of being more prepared") but does not mention future steps for more progress. These last three codes were summed to give an overall reflection

quality score of 0-3, giving this reflection a score of 2 (goal attainment and actions taken, no future steps).

Results

To answer the first research question, we used a bottom-up coding scheme in which all goals were reviewed and each new topic was included as a code. This enabled us to identify all topics being considered by the students while still identifying trends. Using this approach, we identified 26 discrete goal topics (Table 1). Goal types were determined both theoretically and using the data set. Argumentation (9% of all goal units) and participation (50% of all goal units) are the subcomponents upon which CSR is built (Chinn, Anderson, & Waggoner, 2001; authors, in press), so these were initially utilized as goal types. However, review of the goal topics necessitated the addition of other types. Some goals included so many elements of both argumentation and participation that they could not be classified as either, so the “argumentation and participation” type was created (20% of all goal units). Other goals were related to practical group functioning or students’ emotions, neither of which can be accurately contained within argumentation or participation, so the “logistical” (6% of all goal units) and “affective” (14% of all goal units) categories were created. 127 goal units out of 2166 were not included in the analysis because they were unrelated to the intervention, were repeats of the same goal within the same week, or did not make sense.

Goal perspectives were similarly analyzed, with the following result. 46% of goal units were related to self-participation, while 28% were related to self-cognition. This indicates that, in the majority of goals, students are focusing resources on their own engagement in the discussion. By contrast, 13% of goal units related to others’ cognition, and only 7% related to others’ participation. Affect again represented 6% of goal units.

To answer the second research question, we examined students' written reflections. We found that, of 650 total reflections, 62% indicated favorable self-assessment or successful completion of all goals, 27% indicated some success or meeting of some (but not all) goals, 6% indicated negative self-assessment or meeting no goals, and 5% did not mention self-evaluation. 46% of reflections explicitly mention goal attainment, as opposed to simply evaluating performance ("I met all five of my goals" versus "I did good"). 12% of reflections provide steps for future improvement, and 80% consider actions that were taken during the learning experience. When examining the metacognitive level of the reflections (obtained by summing the elements present in a given reflection: mention of goal attainment, future steps, and actions taken), 10% of reflections were scored as a 0 (no elements present), 46% as a 1 (one element present), 42% as a level 2, and 3% as a level 3.

To answer the third research question, we used the schools' classifications of classes as being either high or low achieving based on prior state test scores. Simple linear regression was completed using SPSS to compare data between the high and low achieving classes. First, percentage of goal type was calculated by dividing the number of goal units meeting a given criteria by the total goal units written by each student. Diversity of goals was examined by counting the number of goal types written by the students, with higher numbers indicating greater diversity. Students in high-achieving classes setting higher percentages of argumentation ($R^2=.101$, $F(1,135)=15.235$, $p<.001$) and logistical ($R^2=.038$, $F(1,135)=5.285$, $p=.023$) goals, and students in low-achieving classrooms writing higher percentages of participation ($R^2=.031$, $F(1,135)=4.362$, $p=.039$) and affective ($R^2=.060$, $F(1,135)=8.631$, $p=.004$) goals. There was no difference in the percentage of combination goals set by the classes ($R^2=.000$, $F(1,135)=.016$,

$p=.901$). Students in high-achieving classrooms also wrote more goal types than students in low-achieving classrooms ($R^2=.078$, $F(1,135)=11.390$, $p=.001$).

Reflections were also examined using simple linear regression. We found that students in high achieving classes tended to write more metacognitive reflections, defined here as reflections with a score of two or three ($R^2=.270$, $F(1,133)=49.262$, $p<.001$; $R^2=.063$, $F(1,133)=9.012$, $p=.003$, respectively). Students in the low achieving classrooms tended to write higher percentages of reflections with a score of zero or one ($R^2=.171$, $F(1,133)=27.444$, $p<.001$; $R^2=.096$, $F(1,133)=14.069$, $p<.001$, respectively). Students in high-achieving classrooms were also more likely to write reflections in which they indicated that they had met some, but not all, or their goals ($R^2=.060$, $F(1,133)=8.631$, $p=.004$). However, there was no difference in the percentage of reflections indicating all goals met, no goals met, or no mention of goal completion between the students in high and low achieving classrooms ($R^2=.012$, $F(1,135)=1.549$, $p=.215$; $R^2=.002$, $F(1,133)=.248$, $p=.619$; $R^2=.015$, $F(1,133)=1.999$, $p=.160$, respectively).

Results

The result that the majority of students' goals, particularly in low-achieving classrooms is significant, because it reveals that students, particularly those with lower prior academic achievement, tend to be focused primarily on surface-level features of the discussion, such as how many times they speak. While participation is certainly necessary for the success of the activity, remaining focused on these less cognitive aspects of the inquiry may prevent students from engaging in deeper elements of the story and discussion. The focus on logistic goals in more high achieving classrooms is also interesting, though not expected. However, due to the relatively small number of teachers in this study, it is possible that teacher effects may have

contributed to this finding, as the research team member assigned to one high-achieving classroom in particular reported that this teacher was very focused on verbiage, timing, and other logistic features and encouraged her students to follow suit. Future research should determine whether this is a trend or anomaly.

The result that students tended to write lower-level reflections is not surprising but can indicate areas in which teachers can work with students. Less than half of all reflections were specific to goal attainment, showing that this is an area in which teacher can work with students to help them become more metacognitive. Similarly, the findings reveal that students with historically lower academic achievement might need more scaffolding for metacognitive reflection, as these students tended to write lower level reflections and were less likely to report that they met some, but not all, of their goals. Given this result, teachers may consider helping students consider goal progress for each individual goal, report specific goal progress, and prompt them to consider what led them to either meet or not meet their goals.

These analyses enable us to see both the patterns in students' self-selected goals and reflections, and the trends behind student characteristics that predict certain types of goal selection and reflection. This provides a starting point for future research, as, in order to determine what prompts students to self-regulate their collaborative learning in specific ways, we must first determine what type of self-regulation are occurring. That is the void filled by this study; we provide a descriptive, exploratory report on what kinds of goals young adolescents choose and how they reflect on their goal performance in order to open the door for future intervention and causal analysis.

Limitations and Direction for Future Research

There are several limitations that should be noted in this study. First, the setting of this study was in public school classrooms, which yields high ecological validity but does not allow for true randomized design. Second, the data were collected in two different school years as part of pilot and full-scale studies, which is a confounding factor. Finally, this study is exploratory in nature and the design does not allow for causal claims. Future research should continue to explore this topic in order to move beyond descriptive and exploratory analysis. However, the severe lack of information regarding how elementary students self-select goals and then reflect on them make this study both a pioneer and a necessary starting point for future analysis.

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