How do students really feel about working in small groups? The role of student attitudes and behaviours in cooperative classroom settings

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Abstract

Based on the volumes of research demonstrating the cognitive and affective benefits of cooperation, small group strategies are increasingly being implemented in classrooms. However, in order for learning to be enhanced in the small group environment, there has to be clearer understanding of the complex dynamics that operate when students work together. The purpose of this study was to investigate how student attitudes toward small group learning and group behaviours influence learning. A main goal of this study was to validate the Student Attitudes toward Group Environments (SAGE) questionnaire that tapped areas of small group learning not addressed by other inventories. The findings indicated that the SAGE questionnaire is a valuable instrument for it serves both as a diagnostic measure and as a predictive measure. There were two significant predictors that explained 13.3% of the variance in student final grades; the attitudinal factor quality of product and process and the behavioural factor seeking content information. Overall, high school and junior college students had positive attitudes toward learning with fellow classmates. However, students wanted the freedom to select their group members, and group evaluation and division of task elicited diverse views. This information is critical for small group researchers and educators who are interested in knowing the underlying processes that influence academic achievement and success in cooperative groups.
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Overview and Statement of the Problem

Educational reforms are presently taking place in North American schools that emphasize active learning through interpersonal interaction (Veenman, Denessen, van den Akker, and van der Rijt, 2005). Many aspects of the new school reforms require a constructivist approach to learning in which learning is viewed as a process and students as the main contributors in the process. In the province of Québec, the Ministère de l'Éducation has recently implemented a major reform of the curriculum (the Québec Education Program) which enables students to have a more active role in their own learning (Ministère de l'Éducation du Québec, 2000). School board officials are increasingly viewing small group learning as an educational innovation that can transform students’ learning experiences (Blumenfeld, Marx, Soloway, & Krajcik, 1996).

Cooperative learning is viewed as a valuable instructional strategy that strengthens active learning at school and promotes the cognitive and social development of students (Krol, Veenman, & Voeten, 2002). Cooperative learning is a collection of instructional strategies that encourage students working in small groups to contribute their skills and abilities to achieve a group goal (Johnson & Johnson, 2000). Cooperative learning activities are structured in such a way that each member of the group is not only accountable for their own learning but also for the learning of the other members. Some factors that make cooperative learning desirable in the classroom include: the method’s capacity to accommodate individual differences, the focus on social and academic outcomes, its compatibility with social constructivism, and its advocacy by respected
researchers in education (Antil, Jenkins, Wayne, & Vadasy, 1998). Johnson, Johnson, and Stanne (2000) claim that cooperative learning should enter the mainstream of educational practice for the following reasons: (a) cooperative learning is based on a variety of theoretical perspectives; (b) many studies have shown the effectiveness of the method for promoting student learning and social relations in relation to whole class methods of instruction; and (c) a variety of cooperative learning methods are available for teacher use.

Educators are frequently required to update their learning methods and practices and implement strategies in their classrooms that have been proven to be beneficial for student learning. However, smooth transitional change from existing classroom practices to the incorporation of innovative methods that have been documented in educational research as being effective is not always an easy process. The effective implementation of cooperative learning strategies in classrooms where the teacher traditionally lectures the students and the students are actively listening, rather than actively interacting, is often times fraught with obstacles. Students’ perceptions, views, attitudes, and behaviours play an instrumental role as to whether a teaching method will be successful in the classroom.

Various group dynamics operate that undermine the effectiveness of the cooperative approach, such as negative attitudes toward group work and student behaviours that are counter-productive to group success. Researchers concur that student attitudes, beliefs, values, and behaviours are influenced by natural peer contexts (Parr & Townsend, 2002). Thus, it can be argued that student attitudes and behaviours will also be influenced by cooperative group environments. Gillies and Ashman (1998) claim that only a few studies have attempted to identify the variables that mediate the relationship
between group experiences and learning outcomes. Students’ views on learning have increasingly become a focus of interest in recent years. Research has shown that students’ perceptions of learning are related to their methods of learning, as well as to the quality of their educational outcomes (Dart, Burnett, Purdie, Boulton-Lewis, Campbell, & Smith, 2000).

**Importance of Student Attitudes**

Student attitudes toward small group learning are an important component of the educational process for at least two reasons. First, student attitudes are hypothesized to reflect the quality of a student’s learning experience. Consequently, knowing student attitudes toward small group work can facilitate the implementation of cooperative learning in classrooms. The way in which cooperative or small group learning is being implemented and the degree to which teachers persevere with this pedagogical approach may be enhanced by understanding the impact of student attitudes in this process.

A second reason why attitudes are important to the educational process is that student attitudes are hypothesized to influence learning behaviours. It is possible that negative attitudes toward group work may jeopardize group interactions and relationships, as well as student learning. Attitudes, once formed, influence how students think, feel, and behave. “Attitudes and beliefs are a subset of a group of constructs that name, define, and describe the structure and content of mental states that are thought to drive a person’s actions” (Richardson, 1996, p. 102, as cited in Rimm-Kaufman & Sawyer, 2004). The measurement of these student attitudes may yield important insights about how these attitudes enhance or hinder learning. Furthermore, student attitudes
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toward small group learning can be used to examine relationships between the nature of the small group environment and student cognitive and affective outcomes.

Purpose

The purpose of this research is to examine how student attitudes toward cooperative and small group learning impinge upon the effectiveness of this promising instructional approach. The aim of this research is to garner a better understanding of small group learning via two data sources; an instrument assessing student attitudes toward small group learning and an observation instrument capturing group behaviours and interactions. One main goal is to further refine and validate an attitude instrument, the Student Attitudes toward Group Environments (SAGE) questionnaire, which was designed was to capture the essence of cooperative group work from the learner’s perspective. What students like and do not like about cooperative group work needs to be systematically captured so that educators will persevere with cooperative group learning in their classrooms.

Typically, teachers have anecdotal information as to which aspects of small group learning elicit strong student attitudes, however, there are few available instruments that systematically capture this type of data. Modifications and improvements made to small group learning based on student perceptions of the method rarely go beyond the single classroom environment. Therefore, the intent of the SAGE questionnaire is threefold: First, to reliably tap areas of small group learning that include student views and concerns, group dynamics theory, and existing classroom climate inventories. Second, to explore how attitudes are related to behavioural and learning outcomes. Finally, the study
is designed to highlight problematic areas of small group learning, in which general recommendations can be made across grade levels, content areas, and contexts.

**Operational Definition of Small Group Work**

Terms such as small group learning and cooperative learning are used interchangeably in this research, thus, not making distinctions between cooperative and unstructured small group practices. The reason for this was twofold: First, evidence suggested that although educators may have been using cooperative learning it may have been “watered-down” thus resembling group work (Antil et al., 1998; & Springer, Stanne, & Donovan, 1999). Conversely, in other classrooms common group work may have been highly structured but not be labelled as cooperative learning. Second, a broad definition allowed for the SAGE questionnaire to be administered in a wide range of group environments and contexts. Small group work is defined in this study as 2 to 6 students working together: to learn new material, to review material, and to complete assignments that are part of a course. Students may or may not have been assigned a group grade based on group work.

**Research Questions**

As research evidence indicates that the classroom environment influences and explains student learning (Dorman & Ferguson, 2004; Fraser, Giddings, & McRobbie, 1992; Quek, Wong, & Fraser, 2002), it is of interest to ask whether responses to the SAGE questionnaire are related to student learning in small groups. The fundamental question of this research pertains to the utility and validity of the SAGE measure. Is the SAGE questionnaire a useful, reliable, and valid instrument that can be used in educational research?
Does the SAGE questionnaire serve as a diagnostic measure in which new insights are provided as to how students perceive the cooperative group environment? What aspects of small group learning elicit strong positive and negative attitudes from the participants? Are student responses stable over time (test-retest reliability)? Do student attitudes toward working in groups become more positive or negative over time? Can the criterion-related validity of the SAGE measures, specifically predictive validity, be established? That is, can responses from the SAGE questionnaire be used to predict academic achievement? Finally, what relationship exists between student attitudes on the SAGE questionnaire, student behaviours exhibited during group work, and final course grades?

Methodology

Participants and Procedures

Participants (N = 1066) came from four high schools and one junior college from North America. College students (N = 51) enrolled in two biology classes were administered the SAGE questionnaire twice (6 weeks later). In the following fall semester, college students (N = 77) enrolled in two biology courses were administered the SAGE measure twice (13 weeks later). High school students (N = 938) from grades 7-11 from various schools were administered the SAGE questionnaire twice (6 weeks later).

SAGE Questionnaire

The SAGE questionnaire consists of 54 attitude statements (e.g., When I work in a group I am able to share my ideas) and 5 background questions (e.g., gender). Students indicated their responses on a five-point Likert scale ranging from strongly agree to strongly disagree (see Appendix A).
The SAGE measure is comprised of items generated from twelve existing classroom climate measures, such as, the Learning Environment Inventory (Fraser, Anderson, & Walberg, 1982); Classroom Environment Scale (Moos & Trickett, 1987); and Classroom Life Instrument (Johnson, Johnson, & Anderson, 1983). As well as, student comments generated from informal interviews, observations of group work, and a questionnaire where students were asked to list positive and negative aspects of small group work. In order to get many perspectives on item relevancy to small group work, the initial item pool (575 statements) were rated by three sets of judges: students ($N = 378$), teachers ($N = 55$), and cooperative learning trainers/consultants ($N = 122$). Ultimately, 54 items that received high ratings were selected to be included in the measure. Relevant items were ones that affected how students learned, how much students learned, or how much students enjoyed learning in groups.

**Observations**

Real time observations of small group work were conducted on 154 junior college enrolled in biology classes and high school students via time-sampling. Observations were conducted: (a) on 47 college students during a period of six weeks; (b) on 66 college students during a period of 13 weeks; and (c) on 41 high school students in three grade 11 Economics classrooms. For reliability purposes two observers conducted the observations. Cohen's kappa reliability coefficients ranged from 0.70 to 0.88.

Based on the group dynamics literature (Napier & Gershenfeld, 2004) and the observational research conducted in cooperative learning settings (Gillies, 2002; Hertz-Lazarowitz, 1993; Kouros, d’Apollonia, Abrami, Poulsen, & Howe, 1993; Webb, 1989; Webb & Farivar, 1993), the following 18 behaviours were selected for observation during
cooperative group work: Task behaviours: asks for help (QS), is asked for help (QT), gives information (GI), receives information (RI), gives elaboration (details of how to solve the problem) (GE), receives elaboration (RE), checking understanding (CH), group procedure information (GP), progress and evaluation (EV), actively listening (LI), on-task (non-verbal) (ON), and reading text (RD). Maintenance or social behaviours: harmonizing (HA), encouraging (EN), and joking (JK). Self-oriented behaviours: off-task (verbal and non-verbal) (OF), putdowns (PD), and withdrawing (WD).

The observation scheme was developed to capture the selected behaviours at 10 second intervals (see Appendix B). That is, every 10 seconds the observers observed a targeted student and recorded on the scheme the behaviours that the student engaged in. For example, if student 1 was reading his lab manual, and then he gave a short answer, and then wrote it on his worksheet, the behaviours were recorded as RD (reading text), GI (giving information), and ON (on-task). After 10 seconds passed, the observers focused on the next target group member and recorded the behaviours that the student engaged in.

**Student Grades**

The final course grade for the college biology students ($N=122$) was used for achievement data. Compilation mark of: (a) five lab quizzes (total 20%); (b) two lab exams (10% each); (c) two unit tests (15% each); and (d) final exam (30%).

**Results**

**Data Screening**

Missing data on the 54 attitude items were replaced by the respondent’s own mean for these items. In order to facilitate analysis 23 negatively phrased items were
reverse coded (items 2, 4, 5, 6, 11, 15, 18, 20, 21, 24, 26, 27, 28, 30, 32, 33, 39, 43, 44, 46, 50, 53, and 54). Descriptive statistics revealed that although some means were high (e.g., $M = 4.36$) there was a good range in the variability of responses (range SDs: 0.76 to 1.27).

Sample and Setting Descriptions

Of the 1066 students that responded to the SAGE questionnaire, 938 were high school students while the remaining 128 students were college level. Fifty-two percent of the total set of respondents were female ($N = 553$). Sixty-nine percent of the high school students filled out the questionnaire while they were in their class learning languages (English or French). The high school students were almost evenly distributed according to grade level, with the majority of respondents being grade 10 students (24.2%). Finally, 58% of the respondents reported that they received a final grade last year of 80 or over. Fifty-six percent of the students reported that they expected a final grade of 80 or over this year.

Descriptive SAGE Questionnaire Data

The means and standard deviations for the SAGE questionnaire items are listed in Table 1, as well as, the frequency data (agree and strongly agree responses combined, disagree and strongly disagree responses combined, and undecided).

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Insert Table 1 about here

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Correlations of the SAGE Items with Student Grades

Correlational analyses were performed on the SAGE items and student final grades. The results indicated that student attitudes and student academic achievement were not highly correlated as evidenced by the fact that no correlation was higher than .30. Positive correlations (2-tailed) were found among student final grades and item 4, “When I work in a group I want to be with my friends” ($r = .24$) and item 54, “I prefer to choose the students I work with” ($r = .26$). Other significant positive correlations were between student grades and item 27, “I do not like the students I am assigned to work with” ($r = .18$), item 33, “I have to work with students who are not as smart as I am” ($r = .18$), item 9, “I become friends with my group members” ($r = .19$), item 49, “I also learn when I teach the material to my group members” ($r = .17$), and item 53, “When I work with other students we spend too much time talking about other things” ($r = .18$).

All remaining correlations were under 0.10. However, bearing in mind that the attitude literature shows that attitude-behaviour correlations, although significant, typically tend to be small (Kraus, 1995), the relationships reported in these findings may be viewed as being adequate.

Factor Structure and Reliability of SAGE

Exploratory factor analysis was conducted on the 53 SAGE attitude items. Bartlett’s test of sphericity, which is a measure of multivariate normality of the set of distributions, revealed that the data were approximately multivariate normal and acceptable for factor analysis ($\chi^2 (1378) = 24336.45, p < .000$). In addition, the Kaiser-Meyer-Olkin, which is a measure of sampling adequacy, indicated that it was appropriate

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1 Item 51 was eliminated because it was an identical item (same as question 31) used to flag students’ unreliable responding.
to proceed with factor analysis (KMO = .948). Based on the scree plot and on the decision to extract eigenvalues that are 2.0 or greater, (Reise, Waller, & Comrey, 2000) it was concluded that a 4-factor solution best represented the data in this study.

The four factors extracted with principal components analysis (with varimax rotation) accounted for 46.10% of the total variance in the data (eigenvalues ranged from 13.90 to 2.04). Items that failed to load .40 or higher were deleted, as well as, items that loaded on more than one factor. Ultimately, 11 items were eliminated from the SAGE questionnaire (items 2, 3, 15, 18, 21, 22, 24, 35, 39, 42, and 51). See Table 2 for the four factor loadings of the 43 remaining SAGE items.

The four factors that comprise the SAGE measure are: quality of product and process, peer support, student interdependence, and frustrations with group members.

Items on the quality of product and process factor pertain to the perceived academic benefits of working with other students, as expressed by the quality of work produced, ease and enjoyment of material, liking to help others, and more improved learning (e.g., "When I work in a group I do better quality work"). The peer support factor pertains to the personal support students give and receive when working in groups. The degree of student support as expressed by respecting each others’ opinions, feeling liked and involved with the group activities, and feeling valued as group members (e.g., "When I work in a group I am able to share my ideas"). The third factor student interdependence
is the degree to which students contribute to the group process and product, there is equal participation, and evaluation depends on the grades of other members (e.g., "Everyone’s ideas are needed if we are going to be successful"). The final factor frustrations with group members deals with the frustrations experienced when working with less academically competent members, disliking the assigned group members, and wanting to work with friends (e.g., "I prefer to choose the students I work with").

Cronbach alpha reliabilities for each of the four factors ranged from 0.93 to 0.69. Factor 1 had a Cronbach’s alpha of 0.93 (15 items) with Corrected Item-Total Correlations ranging from 0.82 to 0.48 ($M = 51.42, SD = 11.45$). Factor 2 had a Cronbach’s alpha of 0.85 (eight items) with Corrected Item-Total Correlations ranging from 0.63 to 0.50 ($M = 31.03, SD = 5.06$). Factor 3 had a Cronbach’s alpha of 0.78 (12 items) with Corrected Item-Total Correlations ranging from 0.55 to 0.32 ($M = 43.94, SD = 6.39$). Factor 4 had a Cronbach’s alpha of 0.69 (eight items) with Corrected Item-Total Correlations ranging from 0.48 to 0.22 ($M = 21.21, SD = 4.65$). Cronbach’s alpha reliability for the 43 items in total was 0.93. Overall, due to the relatively high alpha coefficients of the subscales of the SAGE questionnaire, it may be deemed that the questionnaire meets the reliability standards. Furthermore, the results of split half-reliability for the 43 items of the SAGE questionnaire were $\alpha = 0.89$ for part 1 (27 items) and $\alpha = 0.88$ for part 2 (26 items). Correlation between forms was $r = 0.87$.

**Attitude Stability and Change**

Test-retest reliability for the SAGE measure was examined via the correlations for each item for time 1 and time 2 ($N = 710$). Overall, the correlations were positive and ranged from 0.63 to 0.36. The highest correlations between time 1 and time 2 were for
the following items: item 1, “When I work in a group I do better quality work” \((r = .61)\), item 12, “The material is easier to understand when I work with other students” \((r = .62)\), item 30, “I feel working in groups is a waste of time” \((r = .63)\), item 35, “When I work with other students the work is divided equally” \(r = .60\), item 40, “The material is more interesting when I work with other students” \((r = .60)\), and item 47, “I learn more information when I work with other students” \((r = .60)\). The lowest correlation for an item between the first and second administering of the SAGE measure was for item 38, “I help my group members with what I am good at” \((r = .36)\).

In order to examine if student attitudes toward working in groups changed over time dependent \(t\) tests (paired-samples) were conducted on the student’s responses on the SAGE factors from time 1 and time 2. The results indicated that there were no significant differences in student attitudes between the first and second time the SAGE questionnaire was administered. That is, student responses were stable over time.

However, when the SAGE items were examined separately there was change over time for 14 SAGE items (Time 1 versus Time 2). In order to examine overall attitude change all items were included. Fewer students reported that they did better quality work in groups after having worked in groups for a period of time, \((time\ 1\ M = 3.39,\ time\ 2\ M = 3.32)\). Students reported that they wanted to work with their friends less after having worked in groups \((time\ 1\ M = 1.61,\ time\ 2\ M = 1.72,\ reverse \ coded)\). Over time students reported that they enjoyed the material less when working in groups \((time\ 1\ M = 3.63,\ time\ 2\ M = 3.56)\). Fewer students agreed that their group members explained the material to them when they did not understand \((time\ 1\ M = 3.84,\ time\ 2\ M = 3.71)\). There was a
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decrease in sentiment that the material was easier to understand when working with other students (time 1 $M = 3.66$, time 2 $M = 3.57$).

Fewer students felt that their group members made them feel that they were not as smart (time 1 $M = 3.96$, time 2 $M = 3.89$). Fewer students felt that that their work was better organized when they worked in a group (time 1 $M = 3.25$, time 2 $M = 3.10$). There was also a decrease in feelings that group members liked to help them learn the material (time 1 $M = 3.44$, time 2 $M = 3.32$). Fewer students reported that it was difficult to get together outside of class the second time the SAGE questionnaire was administered (time 1 $M = 2.57$, time 2 $M = 2.39$). More students reported that they learned with students who were different from themselves after having spent time in groups (time 1 $M = 3.55$, time 2 $M = 3.65$). Fewer students felt that working in groups was a waste of time (time 1 $M = 3.83$, time 2 $M = 3.75$). There was a decrease in student’s reporting that they had to work with students who were not as smart as they were (time 1 $M = 3.29$, time 2 $M = 3.20$). Fewer students felt that their work habits improved when working in groups (time 1 $M = 3.33$, time 2 $M = 3.22$). More students indicated that it takes less time to complete the assignment when working with others (time 1 $M = 3.25$, time 2 $M = 3.40$).

Although there was significant change for some items between time 1 and time 2, the change was not extreme. For example, student attitudes did not change from one extreme to another, extremely positive to extremely negative. The biggest change was for item 24, “It is difficult to get together outside of class” ($M$ change 0.18).
Student Attitudes Predictive of Grades

Multiple regression analysis was used to investigate the relationship between student grades and student attitudes toward working in groups. The composite scores for the four factors quality of product and process, peer support, student interdependence, and frustrations with group members were entered as predictors via stepwise selection. The results were significant, $F(1, 120) = 8.21, p < .01$. Overall, there was one significant predictor that explained 6.4% proportion of the variance in student final grades (see Table 3). The only predictor of student grades was Factor 1 quality of product and process ($\beta = -.25$).

Surprisingly, the quality of product and process factor was negatively related to course achievement. The essence of this factor pertained to student perceptions that when students worked in a group they did better quality work, the material was easier and more interesting, etc. It would be assumed that the more students perceived that their learning improved, that their subsequent grades in the course would also improve, which was not the case.

One reason for this result may be, that the more students perceived that group learning was beneficial to their learning, the less they felt that they had to produce at the individual level, thus influencing their academic achievement. That is, the more students felt that the other group members would contribute to the group process, the less they

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2 While 1066 students filled out the SAGE questionnaire, achievement data (final course grade) was permitted to be collected on the college students only ($N = 122$).
themselves were required to do on their own. Therefore, the depth that the material was covered by the individual student, work intensity, and perseverance with the subject matter may have been influenced. An alternative explanation may be, that although students perceived that the quality of their learning was enhanced, students may not have been engaging in behaviours that were necessary for effective student learning. That is, the attitude-achievement relationship may be incomplete without examining the behavioural aspects of small group learning. For instance, did students ask for assistance when they needed it? Did their members provide information that was timely, elaborated, and most importantly correct? While one of the aims of this research was to examine how group behaviours were related with student attitudes and grades, the time-sampling method used to collect observational data did not address these types of questions.

Relationships among Behaviours and Grades

Correlational analyses were performed on the student behaviours exhibited during group work and student final grades. Cronbach alpha reliability for the observational data was 0.78. Significant positive relationships were found between student grades and asking a question (QS), \( r = .65 \) and being asked a question (QT), \( r = .65 \). Giving information (GI) to group members was related to grades, \( r = .81 \), as was receiving information (RI), \( r = .71 \). Interestingly, giving elaborations (GE) and receiving elaborations (RE) were not as highly correlated with grades \( r = .44, r = .25 \), respectively. Nonverbal on-task behaviours (ON) were correlated with student grades, \( r = .78 \), as was reading text (RD), \( r = .73 \). Group procedures (GP) information was related with grades, \( r = .49 \). Listening to a third-party conversation (LI) was correlated
to achievement, \( r = .70 \), as was checking one's own understanding (CH) \( r = .56 \). Surprisingly off-task behaviours (OF) were also positively correlated with grades, \( r = .55 \). Finally, joking among group members (JK) was related to student grades, \( r = .56 \). Consistent with the work of Hertz-Lazarowitz (1993), Webb (1991; 1989), and Webb and Mastergeorge (2003), asking questions, being asked questions, giving and receiving information, and generally remaining on-task until the task was completed were related to student grades.

**Factor Analysis**

Exploratory factor analysis was conducted on the 14 behaviour categories in order to reduce the data and create composite scores for the observational data. Due to the fact that four of the 18 behaviours occurred infrequently they were dropped from further analyses: the *progress and evaluation* (EV), *harmonizing* (HA), *encouraging* (EN), and *putdowns* (PD) categories. Bartlett’s test of sphericity revealed that the data were approximately multivariate normal and acceptable for factor analysis, \( \chi^2 (91) = 11705.42, p < .000 \). The Kaiser-Meyer-Olkin (KMO = .901) also indicated that it was appropriate to proceed with factor analysis.

Based on the scree plot two factors were requested to be extracted via principal components analysis and varimax rotation. The total amount of variance accounted for was 64.12\%. The first factor alone accounted for 52.46\% of the total variance (eigenvalues ranged from 7.34 to 1.63). The first factor labelled *seeking content knowledge*, contains categories that pertain to student interactions as they try to learn information by asking questions (QS), giving information (GI), giving elaborations (GE), receiving information (RI), receiving elaborations (RE), checking one’s own
understanding (CH), and group procedure information (GP). The second factor, labelled solitary/off-task, contains both verbal and nonverbal behaviours that students engage in that are not part of the verbal exchanges exhibited during group work. These behaviours include on-task activity (ON) (nonverbal), off-task activity (OF), being asked questions (QT), reading text (RD), withdrawing (WD), joking (JK) (verbal), and listening (LI).

The first factor, seeking content information, had a Cronbach alpha of 0.76 (seven behaviours) with Corrected Item-Total Correlations ranging from 0.97 to 0.51 ($M = 0.99, SD = 3.61$). Factor 2, solitary/off-task, had a Cronbach alpha of 0.71 (seven behaviours) with Corrected Item-Total Correlations ranging from 0.84 to 0.48 ($M = 1.63, SD = 5.25$). Due to the overall high alpha for the observational categories and for high alpha coefficients for the two factors, it can be deemed that the observational data are reliable.

**Group Behaviours Predictive of Grades**

Multiple regression was used to investigate the relationship between student grades and behaviours exhibited when working in groups. Composite scores for the two behavioural factors were entered as predictors via stepwise selection. Table 4 shows the results of the multiple regression.

| Insert Table 4 about here |

The results were significant, $F (1, 120) = 8.22, p < .01$. Overall, there was one significant predictor that explained 6.4% of the variance in student final grades. That is, Factor 1 seeking content information predicted student academic achievement ($\beta = +.25$).
That is, group interactions, that included asking questions, giving and receiving information and elaborations, checking one's own understanding, and providing group procedural information, were positively related to course achievement.

*Predictive Adequacy of Attitudes and Behaviours Combined*

Multiple regression (stepwise) was used to investigate the relationship between student grades and student attitudes (via the SAGE questionnaire) and behaviours (via observations) exhibited when working in groups. Table 5 shows the results of the multiple regression.

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Insert Table 5 about here

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The results were significant, $F(2, 119) = 9.14, p < .001$. Overall, there were two significant predictors that explained 13.3% of the variance in student final grades. The behavioural factor, *seeking content information*, positively predicted student academic achievement, while the *quality of product and process* factor of the SAGE questionnaire was a negative predictor of grades.

*Correlations among Attitudes and Behaviours and Grades*

Correlational analyses were performed to examine if attitudes toward small group learning and group behaviours were related. Composite scores of the four factors of the SAGE measure and composite scores of the two factors of the behavioural data were used. See Table 6 for the correlations among attitudes, behaviours, and grades.
The results indicated that the highest correlation was between Factor 4 
frustrations with group members (attitudes) and Factor 2 solitary/off-task (behaviours) 
\( r = +.25 \). The SAGE factor labelled frustrations with group members consisted of items 
that assessed the frustrations that students experienced when working with others (e.g., "I 
do not like the students I am assigned to work with"). The solitary/off-task category 
consisted of mainly non-interactive behaviours (e.g., withdrawing). Therefore, the more 
students reported that they were frustrated with their group members, the more 
solitary/off-task behaviours were exhibited during group work. This finding can be 
viewed as either: (a) the higher the frustration level with group work, the more students 
engaged in solitary tasks, such as, reading text and other on-task nonverbal behaviours 
(students learning on their own); or (b) the higher the frustration level with group 
members, the more uncooperative members became, as evidenced by withdrawing or 
exhibiting off-task behaviours. Thus, it can be concluded that student frustration with 
group members leads to more individual learning and/or a decreased level of cooperation 
in the group.

A significant positive correlation was found between the behavioural factor 
seeking content knowledge and student grades (\( r = +.25 \)). Consistent with the cooperative 
learning literature, behaviours, such as, giving information and receiving information, 
were positively related with final course grades. That is, the more students asked for and
received help (simple and elaborated answers), checked their own understanding, and discussed group procedures, the more student learning was enhanced.

Consistent with the results of the regression analysis, the SAGE factor quality of product and process was negatively related with student grades ($r = -.25$). As previously discussed, this finding is unexpected, since it would be anticipated that the more students reported that their learning improved in a group, their grades in the course would also improve. The perception that the quality of work is enhanced in a group environment, may lead to decreased input from the individual. Students may erroneously conclude that by having other students to rely on to do the work translates as less work to be done on their part. Consequently, members who are academically stronger may also decrease their involvement if they feel others are relying heavily on their contributions. Salomon and Globerson (1989) refer to these phenomena respectively as the "free rider" and the "sucker" effects. They also suggest that the "ganging up on the task" effect often occurs during group work, in which, students pretend to look busy and go through the motions of working without making major contributions to the group. Thus, decreased student involvement may negatively influence student learning and performance.

Hancock's (2004) research provides an alternative insight as to why student perceptions pertaining to the quality of their group learning negatively influenced course grades. His findings suggested that students often supported and reinforced misunderstanding of the material rather than challenging and correcting misconceptions. Analysis of videotapes indicated that students made erroneous comments, and that the other group members did not have a thorough understanding of the material to realize that the information was incorrect. Therefore, there may be a mismatch between a student's
perception that learning is enhanced in a group situation and proper learning of course content.

Discussion and Conclusions

By measuring student attitudes toward small group learning and observing group behaviours that occur in actual classrooms will provide insights that will ultimately strengthen the cooperative learning approach. As researchers it is important to develop measures that inform us not only of the success of a pedagogical approach but also the reasons for the success. The SAGE questionnaire has several potential uses as: (a) a diagnostic measure to help identify areas in which students have strong positive and negative attitudes; (b) a guide for implementing small group learning strategies effectively; (c) a pre-post attitude measure in which attitude change can be measured; (d) an evaluation tool to assess the effectiveness of the cooperative approach; and (e) a predictive measure in which academic and behavioural outcomes can be identified.

In order for a measure to be useful in educational research the psychometric properties must be evaluated. The findings from this research attest to the adequacy of the reliability and validity properties of the SAGE instrument. One of the main strengths of the SAGE questionnaire was the steps taken during the course of development to enhance content validity. Several steps were undertaken in order to generate items that came from various sources that assessed a multitude of aspects of small group learning. Due to the fact that student views were incorporated into the development of the SAGE questionnaire, many of the items that comprise these factors are unique and are not represented in other measures. The SAGE questionnaire provided new insights that may help improve cooperative learning implementations. It is important to acknowledge that
students are often the best sources of relaying what actually happens in a cooperative learning environment.

Furthermore, not only did the SAGE questionnaire prove to be useful in capturing new dimensions, it also proved to be a reliable measure. The overall Cronbach alpha reliability for the measure was 0.93 and the alphas for the four factors ranged from .93 to .69, thus attesting that the questionnaire is indeed reliable. Test-retest reliability was conducted by examining the correlations of item responses between the first and second administering of the SAGE questionnaire. The examination of SAGE attitude means revealed that overall the student responses were quite stable. Although, there was significant change for 14 of the SAGE items (as evidenced by the dependent t tests) the change was not very drastic. Surprisingly, student attitudes were less positive over time. These results contradict the meta-analysis results of Springer et al. (1999) that indicate that the longer students spend learning in groups the more positive their attitudes become.

Examination of student responses revealed that fewer students agreed that: (a) they did better quality work in groups; (b) they enjoyed the material more in a group; (c) the material was easier to understand; (d) their work was better organized when working in a group; (e) their group members explained the material to them; and (f) their work habits improved. On a positive note, fewer students reported that their group members made them feel that they were not as smart as the other students. Fewer students felt that they had to work with students that were not as smart as they were. More students agreed that they learn to work with students who are different from themselves.

In order to determine the underlying factor structure of the attitude items and to determine composite scores of each factor to be subsequently used to predict academic
achievement, exploratory factor analysis was performed. The results of the factor analysis revealed that the SAGE questionnaire is comprised of four factors: *quality of product and process, peer support, student interdependence,* and *frustrations with group members.* Overall, the *quality of product and process* factor of the SAGE questionnaire explained 6.4% of the variance in student final grades. While the variance accounted for may not seem large at first, the results are consistent with findings of the meta-analysis performed by Kraus (1995) that indicated that attitudes account for only 14% of the variance in behaviour. While attitudes are useful as a construct in terms of explaining phenomena, their predictive ability may not be very high.

The results of this study indicated that student attitudes toward small group learning and group behaviours predicted the same amount of variance in student academic achievement. Attitudes (*quality of product and process* factor) and behaviours (*solitary/off-task* factor) each predicted 6.4% of the variance in student grades. When the composite scores were entered for student attitudes and group behaviours combined the amount of variance in grades explained was 13.3%, thus, suggesting that group behaviours, in conjunction with attitudinal data, are useful in explaining academic achievement.

*Implications for Educators*

Based on the ongoing changes presently taking place in the educational system, and in the business sector as well, there is an increased demand for cooperative skills. Students are required to work together on group tasks and projects, to communicate, and to problem solve effectively. Learning to work efficiently in a team is crucial for future success. However, cooperation in educational settings is not without inherent problems.
Many educators are faced with student resistance when trying to implement small group learning strategies in the classroom, especially when students are used to whole-class frontal teaching. The SAGE questionnaire provided insights as to the aspects of small group learning that elicit positive and negative student attitudes. Therefore, the SAGE questionnaire can be used as a "troubleshooting" guide by teachers, in terms as to how to assign students to groups, evaluate group projects, structure the task for equal participation, and how to improve student interactions. Based on the results of this study the following recommendations can be made.

First, students need to feel that they have a choice in their learning environment (Hancock, 2004). On many occasions, students are informed by their teachers that participation in a cooperative group is mandatory and that working alone on a task is not an option. Some students may be reluctant to work with others due to their perception that they have relatively less academic ability than their peers or lower peer status. This can be a difficult situation for introverted students who feel uncomfortable publicly expressing their views and ideas. Higher ability students may also feel that they are being held back due to the fact that they have to help their group members learn the material.

Interestingly, one area of high student agreement is group assignment. The manner in which students are assigned to work in groups evoked strong student attitudes. This was evidenced by the fact that 89% of the students stated, “When I work in a group I want to be with my friends”. There was a very strong sentiment toward working with friends, even more so than fairness of evaluation and work division. This finding may be explained by the research of Wentzel, McNamara-Barry, and Caldwell (2004) who report that friendships play a role in students’ social and academic adjustment in school. During
adolescence students are psychologically invested in the peer group and need their friends for support. They report that student friendships promote prosocial behaviour “because prosocial behaviour is inherently social and interactive, a friends’ behaviour will provide straightforward cues concerning what is appropriate and desirable, as well as, provide a positive experience for the recipient” (p. 201).

Responses on the SAGE questionnaire also revealed that students prefer to choose their group members. Typically, teacher-assigned groups are recommended, in order for students to have the exposure of working with students who are different from themselves and for classroom management problems to be minimized. However, students may be given control over group assignment, and the teacher may intervene and change group assignment if the need arises. While some student socializing is expected, educators should monitor the group functioning so that off-task social discussions do not detract the group from achieving their group goals. The fact that students reported that they wanted to choose their fellow group members, may hint at something deeper. Perhaps, students have an underlying need to feel a sense of control over their learning environment. Possibly, students need to feel that they have a "voice" and a "choice" when it pertains to their academic learning. Students are not passive recipients of learning in classrooms; they may deem it necessary to influence decisions that affect the quality of their learning. Kinchin (2004) states that the role of the student voice in the curriculum is now starting to be acknowledged.

Group evaluation is usually an issue of contention with students. Student responses on the SAGE measure indicated that student views were varied. Approximately half of the students felt that group members received a good grade even if they did not do
their share of the work. Only one third of the students felt that a group grade was fair. Students often fear that their grades will suffer when they work with others or that the other students will unfairly benefit from their efforts. According to Phipps, Phipps, Kask, and Higgins (2001), students are resentful when they have to share grades with other students, more so with tests than with projects. One recommendation is that group grades not be assigned, but rather some other form of recognition or tangible reward be given. If group evaluation is necessary, then perhaps a small percentage of the final course grade should be based on group work. While group grades are one method of creating positive interdependence in a cooperative situation, there runs the risk of negative feelings being promoted rather than a sense of cohesion. Slavin (1995) contends that grades should only reflect the individual performance of the student receiving that grade.

Unequal contribution and unequal division of labour are frequently cited problems of small group learning. Fewer than half of the respondents on the SAGE questionnaire felt that the work was divided equally. Over 66% of the students felt that group members forget to do the work. This issue can be addressed by periodically changing group membership or by increasing individual accountability (Pfaff & Huddleston, 2003). Other options include assigning roles to group members or dividing necessary resources among members so that each member must contribute if the group is to be successful. Educators must stress that everyone is obligated to participate, and also, find ways to accurately determine that every member is accountable for doing their share of their work. Peer evaluations can also be used to evaluate individual contributions and group processes (De Hoyos & Resta, 2005). However, when peer evaluations are used, teachers should probe further to determine if students are being truthful in their evaluations and not protecting
the noncontributing member. That is, a student may feel uncomfortable to expose a friend, or reluctant to be truthful because of repercussions.

The SAGE questionnaire is a valuable tool to educators, for it can be used as a springboard for open communication with students. The SAGE questionnaire can be used to gauge the cooperative climate of the classroom, as well as, any conflicts among members that the teacher may not be aware of. For various reasons, students may be reluctant to express their concerns and frustrations with their group members. The SAGE questionnaire provides a less intimidating forum for the student to express his or her views. For instance, student perceptions that their ideas are being belittled, or that others are benefiting unfairly from their efforts can be revealed and subsequently dealt with. Alleviating student conflicts is a must, especially in today's multicultural classrooms, where students come from various ethnic and cultural backgrounds.

The SAGE questionnaire can also provide important information on the effectiveness of small group learning as an instructional strategy in a particular classroom. Teachers can evaluate their own philosophy, understanding, and efficacy with the cooperative learning or small group learning method. Student responses can reveal, for example, the need to change group membership or to redefine group roles and responsibilities. Educators may also discover that more content delivery is needed before students are prepared to share their understanding of the material with group members. As Hancock's (2004) research suggests, placing unprepared students in a group in order to master new content and to share their knowledge with their fellow group members, may lead to incomplete and faulty learning.
Conclusion

Several strengths of the SAGE questionnaire include: First, it provides quick, convenient, and reliable information to teachers. The SAGE questionnaire, due to its comprehensive nature, captures a host of issues pertaining to small group learning. Second, student responses can reveal negative attitudes toward group members and group learning, thus, teachers can monitor group progress and intervene when groups encounter problems or become stagnant. Third, teachers can use the SAGE questionnaire as a pre-post measure to examine attitude change. For example, do student attitudes become less positive over time? And if so, teachers can explore further to examine the causes. Finally, the SAGE questionnaire can be used in conjunction with other measures, such as student evaluations, classroom climate measures, and observation checklists, to capture a more complete picture of the cooperative learning environment.

Understanding areas of small group learning that students harbor negative attitudes toward may help educators implement cooperative activities that are productive and enjoyable for the students. Positive experiences may reduce the chance of interpersonal conflict within groups and create a more conducive learning environment. This will enable students to focus on the group task rather than interpersonal dynamics (Pfaff & Huddleston, 2003). The SAGE measure can be used as a catalyst for open dialogue with students, thus eliminating potential problems and reducing student frustration with small group learning. Kinchin (2004) states "establishing an effective dialogue between teacher and student should be a priority before implementing future innovations to ensure identification of the curriculum as experienced and as internalized, and subsequently achieve alignment with the needs of the consumers" (p. 302). During an
era of educational reforms being broadly implemented in classrooms, that are stressing active student learning, teachers need to hear and acknowledge the student voice, so that the new reforms are indeed beneficial to student learning.

Limitations

One limitation of this study was the imposed need to employ an all encompassing definition of small group learning due to the fact that very few educators were using “pure” cooperative learning in their classrooms. Although the participants came from three separate school boards and one junior college, educators did not use a specific cooperative learning method in their classrooms. This was the case even though several high school principals stated that many of their teachers had received “some form” of training on cooperative learning in the past. What was considered “cooperative learning” and how it was implemented in the classroom added a complicating element to the phenomena under investigation.

Another limitation of this research was the adequacy of the achievement data. The achievement data used in this study were student final grades in two biology courses. As stated previously, access to student grades was only allowed for the junior college students. Therefore, achievement data were only collected on approximately 10% of the respondents (for 122 out of the 1066 students). In addition, the psychometric properties of the achievement data are not known, since the lab tests, unit tests and final exam were teacher made. No standardized achievement test was used. However, multiple questioning formats were used in evaluating content understanding, which is optimal when designing teacher-made tests, such as true-false, short answer, and multiple choice.
questions. Furthermore, an expert instructor evaluated the quality of the biology tests and deemed them to be valid measures.

Future Research

While the SAGE questionnaire was useful in conveying student attitudes towards several aspects of small group learning and in predicting student course grades, more research should be conducted in order to investigate the psychometric properties of the instrument. First, does the SAGE measure predict academic achievement when a standardized achievement test is used? Second, achievement data should be collected on a larger sample of students, thus perhaps increasing the predictive ability of the SAGE measure. Once the predictive ability of the SAGE questionnaire is established, in terms of academic achievement, can responses from the SAGE questionnaire be used to predict other outcome measures such as student motivation to learn? It would also be useful to examine how the SAGE questionnaire compares to other measures that may have been recently developed. Finally, more small group observations should be conducted in classrooms where students work cooperatively in various contexts so that new dimensions can be added to the SAGE instrument. As most learning environment researchers realize, the measures developed are consistently refined and improved upon, with new items and factors included, thus improving the generalizability of the findings.
References


Attitudes toward Small Group Learning


Table 1

Student Attitudes toward Group Environments Questionnaire (SAGE): Means and Standard Deviations and Percentages of Agreement, Disagreement, and Undecided

<table>
<thead>
<tr>
<th>Item</th>
<th>Item Stem</th>
<th>M</th>
<th>SD</th>
<th>A+SA¹</th>
<th>U²</th>
<th>D+SD³</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>When I work in a group I do better quality work.</td>
<td>3.36</td>
<td>1.06</td>
<td>59.2</td>
<td>15.1</td>
<td>25.7</td>
</tr>
<tr>
<td>2</td>
<td>When I work in a group I end up doing most of the work.</td>
<td>3.13</td>
<td>1.07</td>
<td>44.9</td>
<td>23.9</td>
<td>31.1</td>
</tr>
<tr>
<td></td>
<td><em>(I do not end up doing most of the work)</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>When I work with other students I am able to work at my own pace.</td>
<td>3.06</td>
<td>1.10</td>
<td>44.7</td>
<td>17.7</td>
<td>37.6</td>
</tr>
<tr>
<td>4</td>
<td>When I work in a group I want to be with my friends.</td>
<td>1.63</td>
<td>.86</td>
<td>5.1</td>
<td>6.1</td>
<td>88.7</td>
</tr>
<tr>
<td></td>
<td><em>(When I work in a group I do not want to be with my friends)</em></td>
<td></td>
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</tr>
<tr>
<td>5</td>
<td>The work takes longer to complete when I work with other students.</td>
<td>3.14</td>
<td>1.17</td>
<td>44.7</td>
<td>20.5</td>
<td>34.7</td>
</tr>
<tr>
<td></td>
<td><em>(The work does not take longer to complete when I work with other students)</em></td>
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<tr>
<td>6</td>
<td>My group members do not respect my opinions.</td>
<td>3.89</td>
<td>.89</td>
<td>75.0</td>
<td>17.5</td>
<td>7.4</td>
</tr>
<tr>
<td></td>
<td><em>(My group members respect my opinions)</em></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>7</td>
<td>I enjoy the material more when I work with other students.</td>
<td>3.64</td>
<td>1.01</td>
<td>65.9</td>
<td>16.9</td>
<td>17.2</td>
</tr>
<tr>
<td>8</td>
<td>My group members help explain things that I do not understand.</td>
<td>3.84</td>
<td>.94</td>
<td>77.5</td>
<td>11.4</td>
<td>11.2</td>
</tr>
<tr>
<td>9</td>
<td>I become friends with my group members.</td>
<td>3.52</td>
<td>.96</td>
<td>57.2</td>
<td>28.6</td>
<td>14.3</td>
</tr>
<tr>
<td>10</td>
<td>When I work in a group I am able to share my ideas.</td>
<td>3.91</td>
<td>.81</td>
<td>81.4</td>
<td>12.0</td>
<td>6.6</td>
</tr>
<tr>
<td>11</td>
<td>My group members make me feel that I am not as smart as they are.</td>
<td>3.92</td>
<td>1.00</td>
<td>76.0</td>
<td>14.3</td>
<td>9.7</td>
</tr>
<tr>
<td></td>
<td><em>(My group members do not make me feel that I am not as smart as they are)</em></td>
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</tr>
<tr>
<td>12</td>
<td>The material is easier to understand when I work with other students.</td>
<td>3.65</td>
<td>1.00</td>
<td>67.4</td>
<td>15.9</td>
<td>16.6</td>
</tr>
<tr>
<td>13</td>
<td>My work is better organized when I am in a group.</td>
<td>3.20</td>
<td>1.11</td>
<td>49.3</td>
<td>20.8</td>
<td>29.8</td>
</tr>
<tr>
<td>14</td>
<td>My group members like to help me learn the material.</td>
<td>3.40</td>
<td>.91</td>
<td>56.3</td>
<td>43.7</td>
<td>17.4</td>
</tr>
<tr>
<td>15</td>
<td>My group members get a good grade even if they do not do much work.</td>
<td>2.60</td>
<td>1.04</td>
<td>22.5</td>
<td>25.8</td>
<td>51.7</td>
</tr>
<tr>
<td></td>
<td><em>(My group members do not get a good grade if they do not do much work)</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>16</td>
<td>The workload is usually less when I work with</td>
<td>3.63</td>
<td>1.08</td>
<td>65.7</td>
<td>14.9</td>
<td>19.4</td>
</tr>
<tr>
<td></td>
<td>Statement</td>
<td>Mean</td>
<td>Standard Deviation</td>
<td>t-statistic</td>
<td>p-value</td>
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</tr>
<tr>
<td>17</td>
<td>I feel I am part of what is going on in the group.</td>
<td>3.94</td>
<td>0.82</td>
<td>82.4</td>
<td>17.6</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>One student usually makes the decisions in the group.</td>
<td>3.21</td>
<td>1.13</td>
<td>47.2</td>
<td>22.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>(One student does not make the decisions in the group)</em></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>19</td>
<td>Our job is not done until everyone has finished the assignment.</td>
<td>3.80</td>
<td>1.01</td>
<td>73.8</td>
<td>12.9</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>I find it hard to express my thoughts when I work in a group.</td>
<td>3.69</td>
<td>1.02</td>
<td>68.5</td>
<td>15.9</td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>(I do not find it hard to express my thoughts when I work in a group)</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>I do not think a group grade is fair.</td>
<td>2.90</td>
<td>1.27</td>
<td>35.5</td>
<td>23.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>(I think a group grade is fair)</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>I try to make sure my group members learn the material.</td>
<td>3.68</td>
<td>0.86</td>
<td>71.7</td>
<td>17.3</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>My grade depends on how much we all learn.</td>
<td>3.02</td>
<td>1.08</td>
<td>37.1</td>
<td>29.3</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>It is difficult to get together outside of class.</td>
<td>2.54</td>
<td>1.20</td>
<td>25.9</td>
<td>15.9</td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>(It is not difficult to get together outside of class)</em></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>25</td>
<td>I learn to work with students who are different from me.</td>
<td>3.55</td>
<td>0.96</td>
<td>64.7</td>
<td>20.6</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>My group members do not care about my feelings.</td>
<td>3.78</td>
<td>1.01</td>
<td>69.4</td>
<td>19.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>(My group members care about my feelings)</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>I do not like the students I am assigned to work with.</td>
<td>3.41</td>
<td>0.95</td>
<td>45.7</td>
<td>42.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>(I like the students I am assigned to work with)</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>I let the other students do most of the work.</td>
<td>4.06</td>
<td>0.95</td>
<td>80.4</td>
<td>11.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>(I do not let the other students to do most of the work)</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>I get to know my group members well.</td>
<td>3.45</td>
<td>1.00</td>
<td>55.8</td>
<td>24.3</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>I feel working in groups is a waste of time.</td>
<td>3.82</td>
<td>1.15</td>
<td>70.4</td>
<td>14.3</td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>(I do not feel working in groups is a waste of time)</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>When I work in a group I get the grade I deserve.</td>
<td>3.14</td>
<td>1.05</td>
<td>40.6</td>
<td>30.7</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>My group members do not like me.</td>
<td>4.01</td>
<td>0.88</td>
<td>76.2</td>
<td>19.6</td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>(My group members like me)</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>33</td>
<td>I have to work with students who are not as smart as I am.</td>
<td>3.29</td>
<td>1.13</td>
<td>47.6</td>
<td>27.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>(I have to work with students who are as smart as I am)</em></td>
<td></td>
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<td>34</td>
<td>When I work in a group there are opportunities to express your opinions.</td>
<td>3.88</td>
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<td>79.2</td>
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<tr>
<td>35</td>
<td>When I work with other students the work is divided equally.</td>
<td>3.11</td>
<td>1.17</td>
<td>46.6</td>
<td>17.9</td>
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<tr>
<td>36</td>
<td>We cannot complete the assignment unless everyone contributes.</td>
<td>3.46</td>
<td>1.15</td>
<td>61.2</td>
<td>11.9</td>
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<tr>
<td>37</td>
<td>My marks improve when I work with other</td>
<td>3.03</td>
<td>1.07</td>
<td>34.6</td>
<td>34.7</td>
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</table>
### Attitudes toward Small Group Learning

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>Undecided</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>38</td>
<td>I help my group members with what I am good at.</td>
<td>4.03</td>
<td>.76</td>
<td>85.4</td>
<td>9.8</td>
<td>6.0</td>
</tr>
<tr>
<td>39</td>
<td>My group members compete to see who does better work.</td>
<td>3.72</td>
<td>1.00</td>
<td>67.6</td>
<td>19.4</td>
<td>12.9</td>
</tr>
<tr>
<td></td>
<td><em>(My group members do not compete to see who does better work)</em></td>
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<tr>
<td>40</td>
<td>The material is more interesting when I work with other students.</td>
<td>3.62</td>
<td>1.05</td>
<td>66.0</td>
<td>15.2</td>
<td>18.8</td>
</tr>
<tr>
<td>41</td>
<td>When I work in a group my work habits improve.</td>
<td>3.28</td>
<td>1.06</td>
<td>54.0</td>
<td>19.3</td>
<td>26.6</td>
</tr>
<tr>
<td>42</td>
<td>I like to help my group members learn the material.</td>
<td>3.67</td>
<td>.83</td>
<td>72.2</td>
<td>16.5</td>
<td>11.4</td>
</tr>
<tr>
<td>43</td>
<td>Some group members forget to do the work.</td>
<td>2.35</td>
<td>1.01</td>
<td>15.9</td>
<td>18.1</td>
<td>66.0</td>
</tr>
<tr>
<td></td>
<td><em>(Group members remember to do the work)</em></td>
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</tr>
<tr>
<td>44</td>
<td>I do not care if my group members get good grades.</td>
<td>3.28</td>
<td>1.16</td>
<td>51.9</td>
<td>20.2</td>
<td>28.0</td>
</tr>
<tr>
<td></td>
<td><em>(I care if group members get good grades)</em></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>45</td>
<td>It is important to me that my group gets the work done on time.</td>
<td>4.23</td>
<td>.83</td>
<td>81.9</td>
<td>7.4</td>
<td>4.7</td>
</tr>
<tr>
<td>46</td>
<td>I am forced to work with students I do not like.</td>
<td>3.28</td>
<td>1.09</td>
<td>47.5</td>
<td>30.2</td>
<td>22.3</td>
</tr>
<tr>
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<td><em>(I am not forced to work with students I do not like)</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>47</td>
<td>I learn more information when I work with other students.</td>
<td>3.36</td>
<td>1.06</td>
<td>55.1</td>
<td>21.0</td>
<td>23.8</td>
</tr>
<tr>
<td>48</td>
<td>It takes less time to complete the assignment when I work with others.</td>
<td>3.28</td>
<td>1.16</td>
<td>55.3</td>
<td>12.7</td>
<td>32.0</td>
</tr>
<tr>
<td>49</td>
<td>I also learn when I teach the material to my group members.</td>
<td>3.66</td>
<td>.90</td>
<td>67.8</td>
<td>20.3</td>
<td>12.0</td>
</tr>
<tr>
<td>50</td>
<td>I become frustrated when my group members do not understand the material.</td>
<td>3.11</td>
<td>1.13</td>
<td>43.2</td>
<td>25.0</td>
<td>31.9</td>
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<tr>
<td></td>
<td><em>(I do not become frustrated when my group members do not understand the material)</em></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>52</td>
<td>Everyone’s ideas are needed if we are going to be successful.</td>
<td>3.87</td>
<td>1.00</td>
<td>75.7</td>
<td>12.0</td>
<td>12.3</td>
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<tr>
<td>53</td>
<td>When I work with other students we spend too much time talking about other things.*</td>
<td>2.47</td>
<td>1.13</td>
<td>21.0</td>
<td>24.2</td>
<td>54.9</td>
</tr>
<tr>
<td></td>
<td><em>(When I work with other students we do not spend too much time talking about other things)</em></td>
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<tr>
<td>54</td>
<td>I prefer to choose the students I work with.</td>
<td>1.67</td>
<td>.93</td>
<td>6.0</td>
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<td>85.1</td>
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<tr>
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<td><em>(I do not prefer to choose the students I work with)</em></td>
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</tbody>
</table>

**Note:** 1. A + SA = Agree and Strongly Agree, 2. U = Undecided, 3. D + SD = Disagree and Strongly Disagree, *Items negatively worded on the SAGE questionnaire. Reverse-coded for all analyses.
Table 2

Four Factor Loadings of the SAGE Questionnaire

<table>
<thead>
<tr>
<th>Item no.</th>
<th>Quality of product and process</th>
<th>Peer Support</th>
<th>Student interdependence</th>
<th>Frustrations with group members</th>
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<td>.44</td>
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</table>
Atitudes toward Small Group Learning

33

.43
Table 3

Results of Multiple Regression Analysis of Student Final Grade on the Four SAGE Factors

<table>
<thead>
<tr>
<th>Factor</th>
<th>Standardized β</th>
<th>t ratio</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td></td>
<td>15.20</td>
<td>p &lt; 0.01</td>
</tr>
<tr>
<td>Factor 1: Quality of product and process</td>
<td>-0.25</td>
<td>-2.87</td>
<td>p &lt; 0.01</td>
</tr>
</tbody>
</table>

Table 4

Results of Multiple Regression Analysis of Student Final Grade on the Two Factors (Behavioral Categories)

<table>
<thead>
<tr>
<th>Factor</th>
<th>Standardized β</th>
<th>t ratio</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td></td>
<td>+35.35</td>
<td>P &lt; 0.001</td>
</tr>
<tr>
<td>Factor 1: Seeking content information</td>
<td>+0.25</td>
<td>+14.81</td>
<td>P = 0.01</td>
</tr>
</tbody>
</table>

Table 5

Results of Multiple Regression Analysis of Student Final Grade on the Behavioural Factors (behavioural categories) and the Attitudinal Factors (SAGE)

<table>
<thead>
<tr>
<th>Factor</th>
<th>Standardized β</th>
<th>t ratio</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
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<td>+14.69</td>
<td>p &lt; 0.001</td>
</tr>
<tr>
<td>Factor 1: Seeking content information (Behaviour)</td>
<td>+0.26</td>
<td>+3.08</td>
<td>p = 0.001</td>
</tr>
<tr>
<td>Factor 1: Quality of product and process (SAGE)</td>
<td>-0.26</td>
<td>-3.08</td>
<td>p = 0.001</td>
</tr>
</tbody>
</table>
Table 6

Correlations among Student Attitudes, Behaviours, and Grades

<table>
<thead>
<tr>
<th></th>
<th>Factor 1 (^1) (SAGE)</th>
<th>Factor 2 (^2) (SAGE)</th>
<th>Factor 3 (^3) (SAGE)</th>
<th>Factor 4 (^4) (SAGE)</th>
<th>Factor 1 (^5) Behaviours</th>
<th>Factor 2 (^6) Behaviours</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factor 1</td>
<td>-</td>
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<td></td>
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<td>Factor 2</td>
<td>+.61**</td>
<td>-</td>
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<td>Factor 3</td>
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<td>+.70**</td>
<td>-</td>
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<tr>
<td>Factor 4</td>
<td>+.34**</td>
<td>+.38**</td>
<td>+.35**</td>
<td>-</td>
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<td></td>
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<tr>
<td>Grade</td>
<td>-.25**</td>
<td>-.06</td>
<td>-.09</td>
<td>-.12</td>
<td>+.25**</td>
<td>+.31**</td>
<td>-.02</td>
</tr>
</tbody>
</table>

\(^1\) Factor 1: Quality of product and process  
\(^2\) Factor 2: Peer support  
\(^3\) Factor 3: Student interdependence  
\(^4\) Factor 4: Frustrations with group members  
\(^5\) Factor 1: Seeking content information  
\(^6\) Factor 2: Solitary/Off-task  
** p < 0.05 (two-tailed)  
N = 122.
APPENDIX A
Student Attitudes toward Group Environments (SAGE) measure

School:_______________________________________________________
Student Name/ID number:_______________________________________
Date:________________________________________________________

SAGE
Student Attitudes toward Group Environments

This questionnaire is part of a study being conducted by the Centre for the Study of Learning and Performance, Concordia University in Montreal, Quebec, Canada. The purpose of this study is to assess student attitudes toward small group learning. We want to find out how you think, feel and behave when working with other students to learn.

The results from this research will be used to predict how student attitudes toward small group work influence student learning and motivation. Also, we expect information from this study will help teachers make small group learning a more productive and enjoyable experience.

Please be informed:
- This is not a test; there are no right or wrong answers.
- Your answers will be kept confidential.
- Your teacher will not see your responses to any of the questions.
- Your answers will not affect your grades in any way.
- You are free to discontinue at any time.

Please answer the items as honestly as possible. Your cooperation in completing this questionnaire is greatly appreciated. Thank you for your support.

Instructions

- Please use a pencil to fill out the questionnaire.
- Write your name/Id number and date on the questionnaire. If there are numbers on the line that states Student name/Id number do not write your name.
- Place your answers directly on this questionnaire.
- Fill in only one answer per question (i.e., do not circle two answers).
- Do not leave answers blank (if you are uncertain make your best guess).
- If you change your answer, please erase your previous answer completely.
Directions:
This questionnaire asks about your attitudes toward small group learning in this classroom. Use your experiences from this class to answer these statements.
Whenever there is a statement about group members, other students, etc., think of the students who have been in your group in this class. If you have been in several groups in this class, base your answers on the group that you were in most recently.
For each of the statements, circle the answer that most closely corresponds to how you think and feel about the statement.

Response Scale:
a) Strongly Disagree
b) Disagree
c) Undecided
d) Agree
e) Strongly Agree

If you strongly disagree with the statement, circle a; if you disagree with the statement, circle b; if you can not decide, or feel in between, choose c; if you agree with the statement, circle d; and if you strongly agree with the statement, circle e.

1. When I work in a group I do better quality work.
a) Strongly Disagree
b) Disagree
c) Undecided
d) Agree
e) Strongly Agree

2. When I work in a group I end up doing most of the work.
a) Strongly Disagree
b) Disagree
c) Undecided
d) Agree
e) Strongly Agree

3. When I work with other students I am able to work at my own pace.
a) Strongly Disagree
b) Disagree
c) Undecided
d) Agree
e) Strongly Agree

4. When I work in a group I want to be with my friends.
a) Strongly Disagree
b) Disagree
c) Undecided
d) Agree
5. **The work takes longer to complete when I work with other students.**
   a) Strongly Disagree
   b) Disagree
   c) Undecided
   d) Agree
   e) Strongly Agree

6. **My group members do not respect my opinions.**
   a) Strongly Disagree
   b) Disagree
   c) Undecided
   d) Agree
   e) Strongly Agree

7. **I enjoy the material more when I work with other students.**
   a) Strongly Disagree
   b) Disagree
   c) Undecided
   d) Agree
   e) Strongly Agree

8. **My group members help explain things that I do not understand.**
   a) Strongly Disagree
   b) Disagree
   c) Undecided
   d) Agree
   e) Strongly Agree

9. **I become friends with my group members.**
   a) Strongly Disagree
   b) Disagree
   c) Undecided
   d) Agree
   e) Strongly Agree

10. **When I work in a group I am able to share my ideas.**
    a) Strongly Disagree
    b) Disagree
    c) Undecided
    d) Agree
    e) Strongly Agree

11. **My group members make me feel that I am not as smart as they are.**
    a) Strongly Disagree
    b) Disagree
    c) Undecided
d) Agree  
e) Strongly Agree  
12. **The material is easier to understand when I work with other students.**  
a) Strongly Disagree  
b) Disagree  
c) Undecided  
d) Agree  
e) Strongly Agree  
13. **My work is better organized when I am in a group.**  
a) Strongly Disagree  
b) Disagree  
c) Undecided  
d) Agree  
e) Strongly Agree  
14. **My group members like to help me learn the material.**  
a) Strongly Disagree  
b) Disagree  
c) Undecided  
d) Agree  
e) Strongly Agree  
15. **My group members get a good grade even if they do not do much work.**  
a) Strongly Disagree  
b) Disagree  
c) Undecided  
d) Agree  
e) Strongly Agree  
16. **The workload is usually less when I work with other students.**  
a) Strongly Disagree  
b) Disagree  
c) Undecided  
d) Agree  
e) Strongly Agree  
17. **I feel I am part of what is going on in the group.**  
a) Strongly Disagree  
b) Disagree  
c) Undecided  
d) Agree  
e) Strongly Agree  
18. **One student usually makes the decisions in the group.**  
a) Strongly Disagree  
b) Disagree
19. Our job is not done until everyone has finished the assignment.
   a) Strongly Disagree
   b) Disagree
   c) Undecided
   d) Agree
   e) Strongly Agree

20. I find it hard to express my thoughts when I work in a group.
   a) Strongly Disagree
   b) Disagree
   c) Undecided
   d) Agree
   e) Strongly Agree

21. I do not think a group grade is fair.
   a) Strongly Disagree
   b) Disagree
   c) Undecided
   d) Agree
   e) Strongly Agree

22. I try to make sure my group members learn the material.
   a) Strongly Disagree
   b) Disagree
   c) Undecided
   d) Agree
   e) Strongly Agree

23. My grade depends on how much we all learn.
   a) Strongly Disagree
   b) Disagree
   c) Undecided
   d) Agree
   e) Strongly Agree

24. It is difficult to get together outside of class.
   a) Strongly Disagree
   b) Disagree
   c) Undecided
   d) Agree
   e) Strongly Agree

25. I learn to work with students who are different from me.
   a) Strongly Disagree
b) Disagree  
c) Undecided  
d) Agree  
e) Strongly Agree

26. My group members do not care about my feelings.  
a) Strongly Disagree  
b) Disagree  
c) Undecided  
d) Agree  
e) Strongly Agree

27. I do not like the students I am assigned to work with.  
a) Strongly Disagree  
b) Disagree  
c) Undecided  
d) Agree  
e) Strongly Agree

28. I let the other students do most of the work.  
a) Strongly Disagree  
b) Disagree  
c) Undecided  
d) Agree  
e) Strongly Agree

29. I get to know my group members well.  
a) Strongly Disagree  
b) Disagree  
c) Undecided  
d) Agree  
e) Strongly Agree

30. I feel working in groups is a waste of time.  
a) Strongly Disagree  
b) Disagree  
c) Undecided  
d) Agree  
e) Strongly Agree

31. When I work in a group I get the grade I deserve.  
a) Strongly Disagree  
b) Disagree  
c) Undecided  
d) Agree  
e) Strongly Agree

32. My group members do not like me.
Attitudes toward Small Group Learning

33. I have to work with students who are not as smart as I am.
   a) Strongly Disagree
   b) Disagree
   c) Undecided
   d) Agree
   e) Strongly Agree

34. When I work in a group, there are opportunities to express your opinions.
   a) Strongly Disagree
   b) Disagree
   c) Undecided
   d) Agree
   e) Strongly Agree

35. When I work with other students the work is divided equally.
   a) Strongly Disagree
   b) Disagree
   c) Undecided
   d) Agree
   e) Strongly Agree

36. We cannot complete the assignment unless everyone contributes.
   a) Strongly Disagree
   b) Disagree
   c) Undecided
   d) Agree
   e) Strongly Agree

37. My marks improve when I work with other students.
   a) Strongly Disagree
   b) Disagree
   c) Undecided
   d) Agree
   e) Strongly Agree

38. I help my group members with what I am good at.
   a) Strongly Disagree
   b) Disagree
   c) Undecided
   d) Agree
   e) Strongly Agree
39. My group members compete to see who does better work.
   a) Strongly Disagree
   b) Disagree
   c) Undecided
   d) Agree
   e) Strongly Agree

40. The material is more interesting when I work with other students.
   a) Strongly Disagree
   b) Disagree
   c) Undecided
   d) Agree
   e) Strongly Agree

41. When I work in a group my work habits improve.
   a) Strongly Disagree
   b) Disagree
   c) Undecided
   d) Agree
   e) Strongly Agree

42. I like to help my group members learn the material.
   a) Strongly Disagree
   b) Disagree
   c) Undecided
   d) Agree
   e) Strongly Agree

43. Some group members forget to do the work.
   a) Strongly Disagree
   b) Disagree
   c) Undecided
   d) Agree
   e) Strongly Agree

44. I do not care if my group members get good grades.
   a) Strongly Disagree
   b) Disagree
   c) Undecided
   d) Agree
   e) Strongly Agree

45. It is important to me that my group gets the work done on time.
   a) Strongly Disagree
   b) Disagree
   c) Undecided
   d) Agree
   e) Strongly Agree
46. I am forced to work with students I do not like.
   a) Strongly Disagree
   b) Disagree
   c) Undecided
   d) Agree
   e) Strongly Agree

47. I learn more information when I work with other students.
   a) Strongly Disagree
   b) Disagree
   c) Undecided
   d) Agree
   e) Strongly Agree

48. It takes less time to complete the assignment when I work with others.
   a) Strongly Disagree
   b) Disagree
   c) Undecided
   d) Agree
   e) Strongly Agree

49. I also learn when I teach the material to my group members.
   a) Strongly Disagree
   b) Disagree
   c) Undecided
   d) Agree
   e) Strongly Agree

50. I become frustrated when my group members do not understand the material.
   a) Strongly Disagree
   b) Disagree
   c) Undecided
   d) Agree
   e) Strongly Agree

51. When I work in a group I get the grade I deserve.
   a) Strongly Disagree
   b) Disagree
   c) Undecided
   d) Agree
   e) Strongly Agree

52. Everyone's ideas are needed if we are going to be successful.
   a) Strongly Disagree
   b) Disagree
   c) Undecided
   d) Agree
e) Strongly Agree

53. When I work with other students we spend too much time talking about other things.
a) Strongly Disagree
b) Disagree
c) Undecided
d) Agree
e) Strongly Agree

54. I prefer to choose the students I work with.
a) Strongly Disagree
b) Disagree
c) Undecided
d) Agree
e) Strongly Agree

55. Your sex.
a) Male
b) Female

56. Grade you are presently in.
a) 7-8
b) 9-10
c) 11
d) CEGEP 1st year
e) CEGEP 2nd year

57. Subject you learn in this class.
a) Languages (English, French, etc.)
b) Mathematics and Science
c) Social Studies (History, Geography, etc.)
d) Computers and Technology
e) Other

58. Average grade you expect this year (taking all your classes into consideration).
a) 90-99
b) 80-89
c) 70-79
d) 60-69
e) 59 and below

59. Average grade you received last year (taking all your classes into consideration).
a) 90-99
b) 80-89
c) 70-79
d) 60-69
e) 59 and below
APPENDIX B
Observation Scheme

Date: _________________________________________
School: _______________________________________
Student Name/ID: ______________________________
Student Name/ID: ______________________________
Student Name/ID: ______________________________
Student Name/ID: ______________________________

Asks for help **QS**  Is asked for help **QT**  Checking Understanding **CH**
Giving Information **GI**  Receiving Information **RI**  Giving Elaboration **GE**
Receiving Elaboration **RE**  Group Procedures **GP**  Evaluation **EV**
Actively Listening **LI**  On-task (non-verbal) **ON**  Harmonizer **HA**
Encourages **EN**  Reading **RD**  Off-task (verbal/nonverbal) **OF**
Put-downs **PD**  Withdrawing **WD**  Joking **JK**

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