

Article

Socially Challenged Collaborative Learning of Secondary School Students in Singapore

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Abstract: Using a grounded theory research design, this paper examined the collaborative learning experiences of secondary school students in Singapore. The core phenomenon that emerged was the need for social interactions in collaborative learning, both in classroom and online settings. Educators often take for granted that effective collaborative learning will occur naturally once students are assigned to work in groups. In examining students' dissatisfaction when working in groups, this study highlighted the importance of surfacing these hidden assumptions for careful scrutiny. The key factors identified were centered on the need to address social challenges within collaborative learning. These included a pragmatic, results-oriented approach with limited interpersonal engagement used by students that can compromise collaborative learning outcomes. Having a deeper understanding of the challenges that resulted from limited social interactions provides educators with insights when designing classroom and online learning activities. This paper contributes to the understanding of groups' active learning to inform pedagogical practices for educators engaged in designing better collaborative learning experiences. Educators and curriculum designers need to be aware of the social drawbacks in collaborative learning in order to design a more socially engaging learning environment.

Keywords: collaborative learning; computer-supported collaborative learning; social interaction; social interactivity; grounded theory

1. Introduction

Collaborative learning has become increasingly important for contemporary learning environments [1] and it is widely researched for the purpose of achieving better pedagogical outcomes. For instance, Dillenbourg [2] and Trimbur [3] have investigated the learning gains from collaborative learning, while Terenzini, Cabrera, Colbeck, Parente, and Bjorklund [4] interrogated the dichotomy between collaborative learning and traditional lecture discussion. Bossche, Segers, and Kirschner [5], and Soller [6] examined the social interactions that drove teamwork in collaborative learning environments. Tan [7] examined how cogenerative dialogues involving teachers and students, might facilitate the development of teachers' epistemic agency. Retnowati, Ayres, and Sweller [8] found that various forms of collaborative strategies which involved students working together had significant academic, social, and psychological benefits over students who worked individually. While, scholars maintained that collaboration involved a coordinated attempt of peer learning to achieve a shared understanding of goals [1,5,9], which was distinct from the sheer division of labor. The extent where educators can truly validate the benefits of collaborative learning still remains at large. Jarvenoja and Jarvela [10] and Wang [11] surmise that successful collaboration does not always occur.

Collaboration can create positive social emotions and support active learning [12], these situations can also evoke negative emotions and create novel interaction challenges for students in group work [13]. Furthermore, collaboration processes such as levels of teamwork, multiple cognitive perspectives, or a lack of common ground in shared conversations may also create learning obstacles. Students have reported that the challenges of collaborative learning are (1) teamwork, (2) communication, (3) personal priorities, and (4) external constraints [10]. Teamwork, being the most frequently reported challenge, has led to questions on the effectiveness of collaborative learning as a pedagogy in the classroom [10].

Although studies have explored knowledge creation processes in collaborative learning [14–17] and factors contributing to their success [18–20], questions still remain as to whether collaborative learning can systematically enhance students' learning. Hobbaugh [21] stresses the need to focus on the social and social psychological aspects of collaborative learning; he accentuates the social dynamics amongst group members as a major cause of ineffective group work. Similarly, Gunawardena [22] maintains that social interactions are a complex and crucial factor necessary to mediate group activity in a text-based environment. Social interactions and dialogues, as empirical evidence has shown, are crucial for learners to achieve deep learning and information retention [23].

The advent of digital technologies has asynchronously allowed a shift to distributed learning groups utilizing computer-supported collaborative learning (CSCL) environments [24]. CSCL has become a successful agent in driving the quality of group interaction processes. Underpinning such a change is a belief that the role of computer mediated tools can contribute to students' curiosity and confidence [8]. Although these environments can support communication and collaboration, they fail to address whether collaborative learning methods are necessarily better. Consequently, enlisting students in groups or assigning a group project to students do not translate to effective learning [6]. Therefore, more research is needed to provide insights on collaborative learning with a focus on students' social interactions and their use of ICT in order to better understand students' processes in collaborative learning. This leads to the research questions for this paper. What are the factors that promote or impede collaborative learning as experienced by students? Why do students express dissatisfaction with collaborative learning?

This study contributes to ongoing research in active learning pedagogy through a grounded theory approach examining students' collaborative learning experiences. It contributes to the understanding of group active learning pedagogies and informs pedagogical practices for educators engaged in designing better collaborative learning experiences.

2. Materials and Methods

2.1. Participants

The participants in the study were 18 students (ages 14 to 15) from a mainstream secondary school in Singapore. The first group was made up of 8 students while the second group was made up of 10 students. The students had experienced group learning both in a formal classroom and an informal after-school setting. The learning environment supported both self-directed and collaborative learning with and without the use of technology.

2.2. Measures

Group interviews were used to collect data in this qualitative study [25]. Two group interviews involving two groups of students were conducted. The group interview approach was an informal conversation to allow the opportunity for each participant to share their experiences openly [26]. The conversational group interview approach allowed spontaneous generation of questions with natural interaction [27]. The approach also served to minimize power structures between the students and interviewer; this helped to put each interviewee on a common standing. Data pertaining to the key research questions were elicited through the conversation as a group (refer to Appendix A for group interview questions).

3. Procedure and Analysis

A systematic design for a grounded theory approach by Strauss and Corbin [28] was adopted to enable a comprehensive and thorough analysis. Grounded theory approach was used to understand the core phenomenon stemming from the possible sources of students' dissatisfaction underpinning collaborative learning [25]. Using this approach, the conceptualization of the central phenomenon was derived based on patterns of events, activities, actions, and interactions between multiple individuals in various collaborative learning processes [29]. Given the variations and subjectivity attached to collaborative learning, the rigor of grounded theory approach is appropriate for this study's theory development as it allows for theoretical sensitivity [30]. Moreover, the researchers have ensured not to impose a theory from another study onto the data to avoid premeditated theoretical constructs. This rigor was aligned with Corbin and Strauss and Corbin's [28] two key principles drawn from grounded theory. The first principle pertains to comparing phenomena and context while the second principle rejects determinism. As a result, this study was firmly anchored in the participants' interview data to strengthen theoretical insights from the phenomenon of students' collaborative learning as experienced within the settings of Singapore's meritocratic schooling system. Open coding and axial coding were utilized, and a central phenomenon was subsequently derived [30]. Firstly, open coding was used to formulate initial categories of information about the possible phenomenon; the information was segmented in the process, to provide a broad categorization with specific categories, properties, and dimensionalized examples [31]. Subsequently, axial coding was performed in which a core phenomenon (category) was identified. Strauss and Corbin's [28] six criteria for the selection of core phenomenon was used.

Recordings of the group interviews were transcribed and analyzed rigorously. Concepts and themes with similar properties were grouped. A zig-zag process of analysis, which involved the process of straddling between data collection from interviews and analysis, to improve data quality, was used to achieve saturation of categories [31]. In addition, a constant-comparative procedure was used to refine the categories by eliminating duplications and redundancies to develop evidence for the categories.

Using the axial coding paradigm, the core phenomenon selected, and the following key indicators were identified during the process of axial coding: (a) causal conditions affecting the core category, (b) context, (c) intervening conditions, (d) strategies or specific actions/interactions that result from the core phenomenon, and (e) consequences of using the strategies.

4. Results

4.1. Findings

The following categories emerged during open coding: (1) group processes, (2) group dynamics, (3) group challenges, (4) social challenges, (5) ICT supported teaching and learning, and (6) independent learning. Table 1 shows the categories, properties, and dimensions of one of the categories, 'social challenges'. The complete table for all the above categories can be found in the Appendix B of this paper.

The first category, 'group processes', referred to how members in the group organized themselves to tackle problems and develop solutions. The dimensions of students' problem-solving processes could be characterized as students attempting the given task with a 'step-by-step' approach. Once an issue was identified and goals were determined, groups would distribute the roles accordingly. Some *in vivo* codes included "brainstorm to get ideas" and then "argue" to decide the "the best idea". This suggested that students had prior experience working in groups, and they exhibited a normative group process that was highly structured and sequential.

The second category, 'group dynamics', denoted the distinct behavioral patterns found in a group setting. Peer assertion was noted with students enacting judgement of peer behaviors to ascertain credibility "through his or her character and behavior in class". This affected the group's functioning in accepting or rejecting a member's contributions. Other properties included leader dominance and informal interactivity. Students were seemingly receptive to the distribution of authority and value the importance of fun when working in groups.

The third category, ‘group challenges’, outlined numerous factors that impeded teams and group work. The properties—group formation and consensus, distractions and fear of freeloading, could be viewed collectively as common barriers experienced by students’ groups. Students also stated the group’s “relationship will be good” if they could choose their group members as it minimized having to work with freeloading members who were “slack” or “don’t bother to contribute”. Students also reported having to “quarrel and quarrel and quarrel” when groups could not achieve consensus amicably. While students acknowledged the usefulness of using computers, they worried about possible distractions when surfing the internet or using computers for “play” and difficulty in communication when members were “not online in chat”.

The fourth category, ‘social challenges’, captured the unintended, unrecognized conditions that had a negative impact on social interaction within student groups. A key property was limited social interaction. Student groups tended to “cooperate” rather than “collaborate”. Its dimensions were often hidden or latent and were inferred by the absence of richer, more engaged social interactions. Students also had group norms expressed in expecting all members to “contribute ideas” to the group’s identified goals. When members were “uncooperative”, it led to students “disliking group work”. Another prominent property was the emergence of gender specific issues. Stereotypical gender perceptions of boys being “playful” and girls being “shy” pointed to oversimplification in accounting for a group member’s performance. Reliance on ICT tools for research and communication could also be problematic as it was often used as a replacement for social interaction. One student resolved this conundrum by declaring “I actually ban myself from using the computer on (weekdays) and only use it on (weekends).”

The fifth category, ‘ICT supported teaching and learning’, represented the use of ICT by teachers and students to support teaching and learning in-and-beyond the classroom. The concept of tools for teaching was highly representative of how teachers used ICT as students reported this instrumentalized view that teachers often used the “visualizer” and “Powerpoint” to replace “reading from the textbook”. ICT was also used for group engagement and interaction to facilitate group discussion and communication. The use of ICT was prevalent for secondary students in Singapore, and students commonly used ICT both in and outside of the formal school setting.

The final category was ‘independent learning’, which described the learning tasks and activities that encouraged students to learn on their own. The properties that surfaced were generally associated with the pedagogical practice of independent learning, where students set learning goals to learn at their pace and time outside the formal school setting. However, the dimensions presented a less rosy view of individual goal setting. Some students did not see the need to set learning goals and preferred to “sleep”, or goals were set only when “my mother asked me to” or triggered by “when I fail” a subject. There was also the positive practice of revising goals as it was “like games when I can level up and set higher goals”. The teacher’s role in facilitating independent learning was deemed to be influential as students would complete learning if the “teacher said it was important”.

Table 1. Excerpt from open coding on social challenges.

| Category | Properties | Dimensional Examples | |
|-------------------|----------------------------|---|---|
| Social Challenges | Limited Social Interaction | Cooperated rather than collaborated resulting in low quality social participation and communication | Interactions did not lead to better interpersonal relationships |
| | Social Norm Conformance | Members expected to contribute to group work and discussion | Accepting and passive mentality, awaiting for tasks to be assigned |
| | Gender Bias | Stereotypical perceptions of gender (boys ‘playful’, girls ‘shy’) | Social interaction lacking between genders |
| | Authoritative Distribution | Teacher-led and leader-led group work | Work distribution based on tasks and results often by assignment not discussion |
| | Pragmatic Orientation | Brainstorming to choose the ‘best’ idea with focus to ‘get the work done’ | Work division based on ability to complete tasks |
| | ICT Reliance | ICT used became a social distraction to team goals | ICT used did not promote social interactivity and communication |

4.2. Axial Coding

The central phenomenon identified in this research was socially challenged collaborative learning of secondary students in Singapore as shown in Figure 1. While there was a strong belief in the benefits of collaborative learning among the students, the strength of their dissatisfaction suggested a socially challenging learning environment. Their narratives pointed to insufficient attention to social–emotional aspects or assumptions that social interactions would naturally occur. Numerous researchers had highlighted that when groups failed, the failures were often at the social rather than the technical level [22–24]. The “social challenges in collaborative learning” phenomenon could, therefore, likely be explained by the unconscious, unquestioned acceptance that collaborative learning automatically would lead to better pedagogical outcomes.

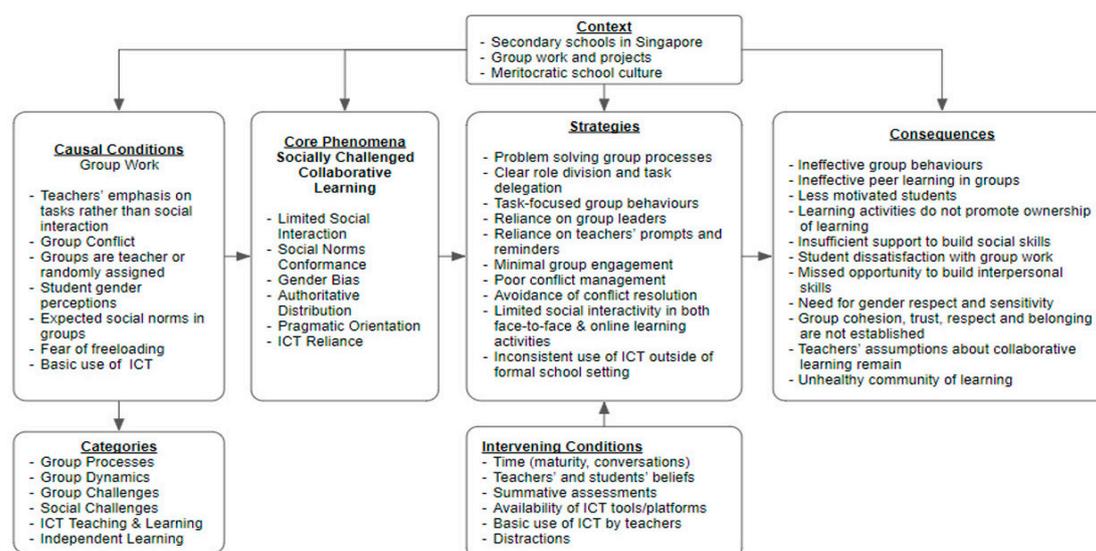


Figure 1. Axial coding.

5. Discussion

The study sought to uncover the factors that might promote or impede collaborative learning. The results suggested that there is value in probing the centrality of social interactions for collaborative learning, particularly for secondary school students. Socially challenged groups devalued the benefits of collaborative learning for both online and offline learning. It could help explain why collaborative learning failed and why online learning activities needed social interactivity.

The study also sought to probe why students expressed dissatisfaction with collaborative learning. When asked to reflect on their collaborative learning experiences, students shared a disturbing concern that members were “uncooperative” or “lame”, and that they would rather “get it over and done with”. The emphasis of cooperation over collaborative learning by students showed an inability to build social competence when students chose to avoid or blame rather than to engage another team member. The term, “cooperation” brought forth a related concept that students engaged in “cooperative learning” and not “collaborative learning.” Panitz [32] viewed collaboration as a philosophy of interaction and cooperation as a structure of interaction designed to facilitate the accomplishment of a goal. This perspective was further supported by Roschelle and Teasley [33] who stated that: “Cooperation is accomplished by the division of labour among participants, as an activity where each person is responsible for a portion of the problem-solving . . . ” while collaborative learning involved the “ . . . mutual engagement of participants in a coordinated effort to solve the problem together” [33] (p. 70). Students gave priority to group processes and the associated roles and tasks by the deadline and members’ strengths. There was less emphasis on nurturing social relationships as students used more efficient modes of achieving their goals as they “argued with each other” to “get the best idea” or

assign tasks to “make the job faster.” In collaborative learning, promotive interdependence is a vital component where students engage in promotive interactions by helping each other through support, help, and encouragement [34]. There was little evidence of students attempting to address increased dissatisfaction. The absence of this quality thus attributed to dysfunctional groups.

Effective collaborative learning was also hindered by other challenges and deficiencies arising from assuming that social interactions would occur naturally in technology-mediated learning environments. There was an absence of evidence that the use of ICT promoted group engagement beyond communication. Students’ narratives pointed to the ease of access ICT affords to get “information for your group” or when members were absent as they “never come to school”. There was a worrisome implication that social interactivity was also absent in technology-mediated learning activities. It would suggest that educators had taken for granted that social interactivity would occur as they would in face-to-face group interactions. The absence of any collaborativeness was more salient and critical in technology-mediated than in face-to-face settings, students learning in ICT need guidance and support online as well [35]. Educational researchers and technologists [36] recognize that students need practice, support, and guidance in learning essential social interaction skills.

In Singapore, the lack of social interactions can also be a result of existing school culture. A rather deterministic educational culture may inadvertently promote antisocial behaviors among students. Many educators address the fear of freeloading by conducting peer evaluations, assuming that this is adequate in accounting for uneven contribution [37]. This can lead to students adopting a pragmatic orientation that achieves results at the expense of relationships, required for effective collaborative learning.

6. Conclusion and Future Directions

There is much discussion in this paper on the social challenges of collaborative learning. The alleged challenges such as limited social interaction, social norms conformance, gender bias, ICT reliance, and authoritative distribution constitute a compelling reason for questioning the existential tenets of collaborative learning. This was supported by the interview data analyzed in this study, where the types of interactions explained the dismantling of the positive benefits of collaborative learning. Smit [18], Alavi [19], and Ottenbreit-Leftwich et al. [20] voice similar concerns that the process of collaborative learning must involve overcoming numerous social interaction obstacles in groups. As literature shows, overcoming these obstacles will contribute to the rigor of learning. The overarching challenge of collaborative learning is effective social interactions. Such forms of learning are often clouded by the assumption that succinct group processes will automatically occur with the pervasive environment of ICT tools. Close attention may need to be paid to the students’ everyday communicative practices, milieux, discourses, as well as the social structure of the class to create a premise for an appropriate culture of collaborative learning. Future research should, therefore, study the group processes that guide the developmental factors of effective social interactions and the design of the social collaborative environment through the ICT space. The former has the propensity of analyzing if social interactions did actually take place successfully during collaboration. The latter leads to Dillenbourg’s assertion that computer supported collaborative learning can facilitate interactions between learners for the acquisition of knowledge, skills, and attitudes, but this has yet to be fully investigated [2,38]. In both cases, this reflects an important gap that researchers should no longer treat collaborative learning as a ‘black box’ [2], but an existence of dialectical views. Educators and curriculum designers need to be aware of these social drawbacks of collaborative learning. This will help in designing more socially engaging learning environments for both classroom and online settings.

Notes:

1. Strauss and Corbin [29] identified the following six criteria for the selection of core phenomenon:
 - Central in all other related major categories

- Higher frequency of category appearance
- Natural and logical explanation of the relationship between core category with other related categories
- An appropriately abstract name to describe the core category
- An increase in depth and illumination of the theoretical concept in the refinement process
- A steadfast theoretical concept even though conditions may vary

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Conflicts of Interest: The authors declare no conflict of interest.

Appendix A. Group Interview Questions

1 Why does collaborative learning fail?

- Describe to me your experience of learning as a group?
- When you have different views about your group goals and your purpose, what do you usually do?
- How do you feel about your group processes?
- Do you come out with some common goals or aims in your group?
- Do you reflect on what happens when you work in a group and how you learn in a group?

2 Why is social interaction important for collaborative learning?

- When you work together in a group and encounter different opinions, what do you do with those different opinions?
- Do you work together as a group to solve problems?
- How do you describe the relationship among the group members?
- How did you discuss with your friends when you work in groups?
- What other roles do you have besides the group leader or the group member?

3 How does the use of ICT affect collaborative learning?

- What role do computers play in supporting group-based learning in your class?
- What other ways do you use computers to help you to learn?
- Is there any other thing that you do with computers for your learning? Besides looking for information?

Appendix B. Open Coding

Table A1. Open coding categories, properties, and dimensionalized examples

| Categories | Properties | Dimensionalized Examples | |
|-----------------|--------------------|--|---|
| Group Processes | Problem Solving | Brainstorming and idea generation | Debate to refine ideas to arrive at solutions |
| | | Goal setting as a group | Shared group goal |
| | Group Organization | Delegation of roles | Division of labor and assignation of tasks |
| | | Contribution by individual group members | Consolidated and coordinated effort and outcome |

Table A1. Cont.

| Categories | Properties | Dimensionalized Examples | |
|--|---|---|--|
| Group Dynamics | Peer Assertion | Judgement of peer behavior in class to ascertain credibility | Acceptance or rejection of member's ideas |
| | Leader Dominance | Leader assertion of team | Acceptance without challenging ideas and goals |
| | Informal Interactivity | Informal social activity, e.g., play, first | Creative ideas generated through informal social activity |
| Group Challenges | Group Formation and Consensus | Perceived negative experiences with assigned groups | Difficulty in achieving agreement within group |
| | Distractions | Distraction while using the internet | Lack of focus and play |
| | Fear of Freeloading | Measures against freeloading | Dealing with limited or non-contributions by members |
| Social Challenges | Limited Social Interaction | Cooperates rather than collaborates resulting in low quality social participation and communication | Interactions do not lead to better interpersonal relationships |
| | Social Norms Conformance | Members expected to contribute to group work and discussion | Accepting and passive mentality, awaiting for tasks to be assigned |
| | Gender Bias | Stereotypical perceptions of gender (boys 'playful', girls 'shy') | Social interaction lacking between genders |
| | Authoritative Distribution | Teacher-led and leader-led group work | Work distribution based on tasks and results often by assignment, not discussion |
| | Pragmatic Orientation | Brainstorming to choose the 'best' idea with focus to 'get the work done' | Work division based on ability to complete tasks |
| | ICT Reliance | ICT use becomes a social distraction to team goals | ICT use do not promote social interactivity and communication |
| ICT Supported Teaching and Learning | Group Engagement and Interaction | Facilitate group discussion, e.g., MSN | Social communication, outside of group work |
| | | Contributory, positive and constructive sharing of ideas and views, e.g., through blogs | Negative and critical |
| | Self-Learning | Use of ICT for collaborative learning supports social interaction | Can lead to social isolation |
| | | Helps in independent learning | Tools become a distraction |
| | | Information seeking prior to class and with specific focus | Surfing aimlessly |
| Tools for Teaching | Increase classroom engagement and student participation | Irrelevant to students' learning | |
| | Experiential and engaging | Rote learning and memorization using tools | |
| Independent Learning | Individual Goal Setting | Coerced by parents | Student ownership |
| | | Set personal goal | Not to fail anymore |
| | Time Management | Bad time management; cannot manage time | Devise time management strategy and schedule |
| | | Reliance on teacher by students is high | Student is lost and lacks ownership |
| | Teacher's Role in Learning | Teacher giving encouragement through awards/prize | Motivated students |
| | | Directive and content-based | Facilitate student learning |
| | | Give formative tasks | Students 'they think there is no need to do this thing well'. |
| Learning Outside Formal School Setting | Perceive working harder to attain goals; focus on weaker subjects first | Lacks motivation and self-discipline | |

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