Problems With Different Interests of Learners in an Informal CSCL Setting

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Abstract: Interest drives engagement in learning and supports learners' spontaneous participation in CSCL settings. However, few studies have investigated how interest development is supported or hindered during learning activities. This microethnographic study explores how a learner's interest decreased during collaborative design activities in a summer camp for elementary-level students. The analysis shows that problems surrounding learners' different interests and facilitators' directed intervention could hinder interest development.

Keywords: Interest-driven learning, design thinking, informal environments, CSCL

Introduction

Recent scholars have emphasized the need to support interest-driven learning in learning environments (Evans, Won, & Drape, 2014), however, few studies have empirically considered the role of interest. Thus, conducting microanalysis, to see how interest is supported, decreased, or driving learning, may provide particular benefits for researchers in Computer-Supported Collaborative Learning. In collaborative learning settings, different individuals having their own potential interests interact with each other. This means there exists the possibility of a variety of interests interconnected to learners' experiences and the likelihood that not all of these interests would be supported. This begs the question, what happens during collaboration when different interests converge or diverge? In this paper, we conduct microanalyses of children (grades 3-6) working on a collaborative design project in a summer camp. We examine what happens when different interests are articulated and how the differences influence collaborative activity and interest development.

Conceptual framework

Interests in informal settings

Interest has been defined as a state of positive feelings attracting people's attention and cognitive engagement to particular tasks or objects (Ainley, 2006). Interest-driven learning, where learners' own interests can empower learning process, has a potential to be self-sustained, thus it is important to support and incorporate learners' interests into educational activities (Barron, 2006).

Informal settings, having plentiful resources, spontaneous participation, and active interactions among learners and environments, can afford learning based on interest and enjoyment (Lemke, Lecusay, Cole, & Michalchik, 2014). To realize interest-driven learning, recent studies have applied different activities, such as design activities, in informal settings (e.g., Evans et al., 2014). In collaborative learning environments, however, each learner may have different interests; but how different interests are supported or whether they contribute to a shared learning task is not certain. Few studies have investigated how differing interests impact collaborative interactions and collaborative learning: specifically how they are synthesized and used by the group. Therefore, it is necessary to conduct in-depth analyses on how learners' different interests influence collaborative learning tasks and vice versa.

Affective as well as cognitive consideration in CSCL

Interest is an affective state resulting from interaction with a physical or cognitive object (Ainley, 2006). You can help students develop interest by triggering opportunities for positive affect with external stimulus from learning environments or by designing learning tasks to match with learners' existing interests (Ainley, 2006; Hidi & Renninger, 2006). Thus, interest can be newly emerged or extended from existing interest. Either way, the important part in interest-driven learning is to support the continuous interest of learners so they can spontaneously engage with learning tasks. This is especially important in CSCL settings where multiple people can impact learning experiences and create opportunities or obstacles for the development of shared interest. When individual interests are ignored by other learners, it could present the potential for negative affect, as people react emotionally to such behaviors or reflect negatively about the collaborative experience (Ortony, Norman, & Revelle, 2005).

Many studies in CSCL have investigated how collaborative learning activities involve learners' cognitive development and interaction (i.e., Borge, Ong, & Rose, 2015), but affective aspects of learning cannot be detached from cognitive enhancement. Particularly, collaboration always involves social interaction between individuals, which naturally come along with emotional exchange. The affective aspect, getting a sense of pleasure from a collaborative experience, is one important motivational factor in collaborative learning (Jones & Issroff, 2005). Thus, when it comes to learning in CSCL environments, both cognitive and affective aspects should be equally considered. From this perspective, we explore learners' different interests during collaborative design projects by considering both affective and cognitive aspects. Accordingly, our research question is: What problems emerge when learners' differing interests intersect during collaborative activity, and how do these episodes impact collaborative design activities?

Methods

This qualitative study uses a microethnographic approach (Spradely, 1980), by exploring learners' interactions including talks and behaviors, to see what patterns within those exchanges influenced learners' interests.

Setting and participants

Our summer camp program was a multi-iterative daily one-hour club, held for four weeks at an elementary charter school in Pennsylvania. The primary aim was to introduce young learners to collaborative design activities in order to help develop higher-order thinking processes associated with design. As a part of design-based research, activities in our program underlined interest-driven learning (Barron, 2006); provided diverse resources (e.g., paper and pencils, Legos, laptops, tablet PCs) to use; supported learners engage in design projects based on design thinking process (Dym, Agogino, Eris, Frey, & Feifer, 2005). During the second iteration, in summer 2015, among 10 students enrolled, only eight students attended regularly. They were divided into two teams. This study focuses on Team 2, whose members included, Carlos (age 8), Mary (age 8), Emma (age 9), Hadwin (age 10). We selected this team because unlike Team 1, Team 2 expressed distinctly different interests and included members who all spoke English fluently.

Early video analyses indicated that children expressed their existing interests in early sessions and Lego challenges produced rich, interactive discussion data. As such this study focuses on the first Lego challenge, held during the first week of the camp (4 sessions). Two adult facilitators guided children to participate in the activities and one researcher stayed to observe the camp. The learners carried out a design challenge described in video resources developed for the camp (see Figure 1). The challenge was to design a garden for Lego Fred, a virtual client. This challenge involved questioning what Fred's needs were, planning different designs based on Fred's needs, creating designs with Legos, and testing the designs by comparing final product to a client profile and checking to see how well students met client needs.

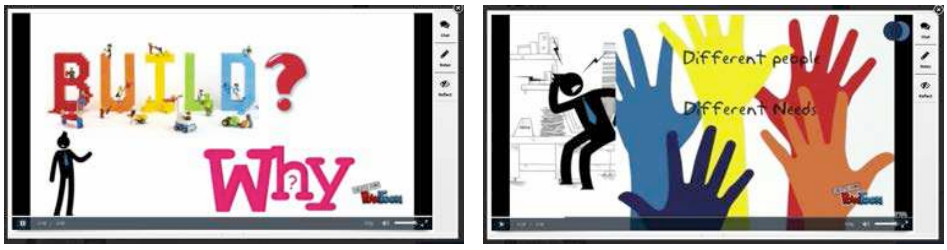

Figure 1. Screen shots of video resources and design challenges developed for the camp

Data collection and analysis

Data sources included student generated artifacts and video data. The artifacts included learners' drawings, about their own expertise and final reviews about what they liked among the activities and resources provided. Team 2's interactions were recorded with a video camera and audio recorder, resulting in 3 hours of video/audio data. Three coders reviewed the video data for the purpose of identifying episodes where learners' interests were expressed. Coders had to justify or argue against selections using evidence based on common indicators of interest, such as expression of pleasure, focused attention and engagement, and committed talk, as defined by Ainley (2006). Coders then made agreements on where interests were expressed. These episodes, including ones that followed, show increased or decreased indicators of interest, and they serve as the main sources of data for this study. The analysis focuses on Carlos' decreasing interests in the collaborative project during the activities.

Findings: Problems around different interests among learners

The video data showed how the strength of learners' existing interests could pose problems during collaborative design activities. For example, Carlos had experienced the first iteration of this program and returned to the camp for the summer. He showed high interest in future science or new scientific materials, such as 'carbon nanotube', as he continued to talk about new materials and strongly asserted to use them in their design. Meanwhile, such scientific materials were not familiar or interesting to other teammates. The team, to which Carlos belonged, was planning a garden for the client Fred as a part of the design challenge. For the garden design, Carlos kept explaining what a carbon nanotube is and searching related information, but other team members became visibly bored listening to him. As different interests and preferences were articulated, conflicts within the group emerged. Mary, in particular, actively expressed that she did not like Carlos' idea.

01	Mary:	So.. I think we wanna make sure his house is safe. So fence..
02	Carlos:	Ahhh..! ((with exclamation)) Carbon nanotubes are places where
03		detection systems are, [what] could be safer than that.
04	Mary:	I don't [know] what these are, I don't..
05	Carlos:	((cutting her off)) These are the detection systems so you can turn them off
06		during the daytime, but when he would be sleeping, [you can turn them on].
07	Mary:	I don't think..
08	Hadwin:	Why don't we just vote? Let's vote.
09	Carlos:	You just hate me!
10	((The team voted, but only Carlos' hand goes up. Hadwin was hesitating to put his hand up.))	
11	Carlos:	((aggressively)) Ok! If nobody wants me on the team, then I won't!!

This episode shows how problems associated with different interests and areas of expertise can lead to collaborative process problems. Carlos had high interest and knowledge in emerging science materials and therefore wanted to incorporate this area into the project (turns 2, 5). Mary, on the other hand, had no interest or knowledge in this area and therefore did not want to include it (turns 4, 7). Hadwin, noticing Mary did not like the idea, proposed voting as a strategy to end the argument. Carlos, knowing they will vote against him, sees the strategy as a personal affront (turn 9). When the team refuses to consider or synthesize his interests not the project, he feels devalued by the team and threatens to leave (turns 9, 11).

The tension between Carlos and the others continued to escalate after the first episode, eventually attracting the attention of one adult facilitator, who tried to resolve the conflict. She asked Carlos to explain his idea and prompted him to search for more information to help teammates better understand carbon nanotubes. Carlos found one website stating that carbon nanotubes are conductive materials. Attempting to mediate the problem between Carlos and Mary, the facilitator questioned the logic of using conductive materials for a garden and pushed the group to make evidence-based arguments and reasoning, as shown below.

12	Facilitator:	I'm thinking about 'conductive'. If it is conductive, can electricity go with
13		these materials, if it is lightening?
14	Carlos:	It is safer to be conductive because it goes through, because it won't pass
15		the lightning, but it would go down to the ground.
16	Facilitator:	So I really wanna know, because Mary was talking about, she doesn't feel
17		comfortable with that. Can we listen to her for a while?
18	Mary:	Because.. I don't.. You just said safer? What you just said really made me
19		freak out, that's not safe. 'cus if something went wrong, it could be very
20		dangerous.
21	Facilitator:	So I am actually, I am not sure about when I was talking about conductive, I
22		am not sure if it is better to have conductive materials when you are
23		designing things, or better to have insulated.
24	((continuous arguing about carbon nanotubes' conductibility between Carlos and Mary))	
25	Facilitator:	Check online and see..
25	Carlos:	((cutting off, with anger)) Nobody wants my idea!!

At first, the facilitator tried to lead the team to recognize that conductive materials could be dangerous based on her own scientific reasoning, by giving lightening as one example (turns 12-13). She tried to resolve the conflict by pointing out a flaw in Carlos' reasoning rather than trying to find a way to incorporate Carlos' idea into the design and account for potential dangers (turns 21-23). Carlos then had a strong negative affective response (turn 25). Although the facilitator tried to actively engage with the students, her approach at 'solving' the problem instead of helping the team to synthesize ideas and interests further diminished Carlos' interest in the group project. After this episode, Carlos became further disengaged from the design activities. He ignored discussions, positioned himself away from the group, and began reading a book.

Discussions and implications

The results show how problems can emerge from diverse individual interests and how these problems can lead to decreased engagement of individuals in the group project. Our analyses indicate that strong existing individual interests and diverse areas of expertise within a group can create problems with joint understanding, which may lead members to dismiss the ideas of others. Our microanalyses also show how strategies that focuse on logical decision-making processes (i.e., voting or logical questioning) can lead to further problems for a group (i.e., splintering), aligning with previous studies (e.g., Ortony et al., 2005). What remains to be understood is how to merge different interests into a shared project and how this synthesis would increase collective interest and collective engagement. Thus more work needs to be done on exploring how different interests and ideas can be negotiated and synthesized during collaboration.

This work has implications for the design of CSCL environments with regard to how we design activities to support the development of collective interest and help students resolve conflicts stemming from diverse interests. When designing learning activities, it is important to have flexibility to match with learners' different interests (Ainley, 2006) and incorporate their own goals (Lemke et al., 2014). When it comes to design, moreover, considering different perspectives is critical (Dym et al., 2005). Thus, learning activities may need to support the development of learners' expertise by embracing different interests. We also found that the importance of facilitators' roles to mediate learners' problems. When problems emerge, facilitators might be tempted to interfere and solve the problems, but it may be more important to support learners' ability to think from diverse points of view, to incorporate different interests, and to facilitate community involvement (Garcia & Morrell, 2013). Thus, in future studies, we will examine how to design CSCL settings to account for these implications and identify productive roles for facilitators within informal CSCL settings.

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