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EXAMINING A LEARNER-DRIVEN RELATIONSHIP OF INQUIRY: DISCERNING EMOTIONAL PRESENCE IN ONLINE MATH COACHING

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Abstract

This study explores emotional presence in a student-student online coaching setting. In this learner-driven, online exchange, students enrolled in a teaching program assist K-12 math students using an online relationship of inquiry model. Adapted from the online community of inquiry model, one-to-one online interaction is studied for multiple types of online presence and, in particular, the existence and possible effect of emotional presence. Preliminary findings identify that emotional presence exists as a separate experience in the online coaching exchange, but scores lower than other types of presence.

Introduction

The online community of inquiry model argues that students and instructors create a valuable educational experience online through social, cognitive and teaching presence [1, 2]. Hundreds of studies have verified the model, leading to agreement that it represents an effective online learning environment [3]. A community of inquiry survey instrument is now available, measuring the dimensions of social, teaching and cognitive presence [4, 5]. More recently, a more prevalent position for emotional presence was proposed and assessed [6].

In a previous paper, we adapted this online community of inquiry instrument to an online one-to-one coaching setting, which we referred to as a relationship of inquiry [7]. The value of one-on-one instructional time is well-documented in the learning literature [8, 9]. The adapted model was used to gain a better understanding of the practice of online coaching by exploring the extent to which cognitive, social and teaching presence exist. In this paper, we extend this work by exploring the possibility of a role for emotional presence in online coaching.

This descriptive case study measures indicators of emotional presence in a relationship of inquiry in a project called Math Coach. Math Coach offers K-12 students help with their mathematics homework by coaches that are available online via Instant Messaging. In an earlier paper we used the term student-student online coaching to describe this type of learning situation, defined as "an online service where a student gets support on a specific subject matter from a more experienced student" [10]. This study is guided by the following research questions:

1. Does the concept of emotional presence, as identified in an online community of inquiry, apply in an online relationship of inquiry?
2. To what extent does emotional presence emerge in this case of online math coaching?
3. How does emotional presence correlate with the characteristics of coaches?
4. How can emotional presence be addressed in online math coaching?

Background information

As the Math Coach project requires that instructional interaction be learner-centered [11] and learner-driven, coaches are encouraged to use inquiry-based, guided exploration rather than just providing answers to challenging questions as identified by the coachees. Coaches are to walk coachees through a discovery process toward answers to questions. Fostering the internal guidance available to coachees and providing guided exploration are the keystones of instruction in this relationship of inquiry. This process has the potential to develop from and be influenced by a position of emotion (anxiety, frustration) on the part of the coachee; an emotional tenor that may, if it exists, influence learning in the relationship of inquiry.

Our interest in the relationship between learning and emotion rests on the following assumptions. First, as emotions exist in the general human experience [12] they cannot be considered separate from the experience of...
any learning environment [13, 14]. Second, the relationship between emotion and learning has been generally neglected in education research [15, 16, 17, 18]. Third, resting on the work of Brookfield [13] and Dirkx [17] we suggest that emotion is often mistaken as a deterrent to effective teaching and learning which should be ignored or deflected. Finally, we believe emotion plays a far more dynamic role in learning than merely inhibiting rational thought and reason; learning activities "require appropriate facilitating (of) emotions if successful actions or reason at all are to be achieved" [19, p. 1].

To guide this exploration of emotion in an online learning environment, we use the following definition of emotional presence: Emotional presence is the outward expression of emotion, affect and feeling, by individuals engaged in a relationship of inquiry, as they relate to and interact with the learning technology, course content, and each other (adapted from Cleveland-Innes & Campbell [6]). This presence will emerge as part of the experience of trying to get one’s educational needs met in an online learning environment, and in the learning experience itself. While using new technologies are expected to make a valuable contribution to education, it will involve a necessary development of new competencies [20]. For Birch [20], these new competencies are not yet clear; implementation of new technology for learners has sped well ahead of our understanding of necessary competencies. This creates two problems which we are exploring here. One is that teachers and learners are left to create their own understanding and develop skill to succeed in this technologically mediated environment; we make the assumption that this situation has the potential to elicit emotion when working online. Second is that the impact of the emotion created by dealing with this new environment on learning is still in discovery and that, in the case of Math Coach, experiencing a problem understanding one’s homework may be an emotional experience. The emotion which emerges, if any, requires that we review the coach-coachee interaction to consider the existence of emotional presence and the possible impact of emotion on learning [13, 21].

Research setting and method

The research setting of this study is the Math Coach project (www.mattecoach.se). This project is a service where students receive math help from a teacher-student (the coach), outside of school hours, via instant messaging. The project aim is to assist K-12 students with their math study, contribute to an increased ability among teacher-students to work as a teacher online and to develop methods for tutoring online. In the coaching process, the K-12 student (the coachee) is in the center; the learners are the drivers here! The coach session is initiated by the K-12 student by entering the website and starting a conversation. The coachee is steering the session and decides the scope and aim for the session while the teacher-student acts as a coach. The most common reason for starting a conversation is that the coachee needs help with a specific problem followed by help with an area/topic [10]. There are no formal connections between the coaches and coachees. If a coachee chooses, he/she can be anonymous. Coaches are often having multiple sessions at the same time with several K-12 students but each session is one-to-one. Transcripts from approximately 9800 conversations, from 2009 and beyond, are archived for analysis.

This case study tests the use of an adapted theoretical model of interaction in online teaching and learning. The case involves an instructional opportunity for students who require just-in-time assistance completing their math homework, as assigned by their own math teacher at their own school. The instrument used in this study was an online questionnaire responded to by teacher students working as coaches and analysis of transcripts from conversations in the Math Coach project. A major strength of the case study method is the possibility of using several sources of evidence [22, 23]. We used a survey in order to get an overview of patterns of emotional presence and content analysis of electronic logs in order to get a more thorough understanding of how emotional presence is articulated in online math coaching.

A relationship of inquiry survey instrument reformulated from the community of inquiry survey instrument [4, 5] to a one-to-one environment has been developed, which measure the dimensions of social, teaching and cognitive presence. We revised the emotional presence measure [6], in order to explore the role of emotional presence in online coaching and included it in the survey. The survey was distributed to all teacher students working in the Math Coach project in spring 2012 in order to collect data describing the respondents and their perceptions of cognitive, social, teaching and emotional presence in online coaching. All coaches completed the survey \(N = 41\). The coaches were almost equal in gender with 49% females and 51% males. They were working at three different locations: Karlstad (17%), Linköping (39%) and Stockholm (44%). Their student target group varies between two stages of compulsory school, years 1-6 (17%) and years 7-9 (22%) while the majority is studying to
become an upper secondary school teacher (44%). Coaches had an average of 120 hours of experience from working as a math coach and had completed 70% of their teacher training on average.

Conversation transcripts were selected from the 1832 chats in spring term 2012. First we did a random selection of 18 chats (1% of the total). Then we searched electronically among all chats for words that indicated that it contained strong emotion (emotion words, emoticons, use of strong words etc.) and selected another 18 chats. These logs were then analyzed manually looking for emotional presence as described in this paper; some parts of conversations were handpicked as illustrative examples of emotional presence.

Results

The respondents answered the questionnaire in a five-point Likert scale (1 = Strongly disagree and 5 = Strongly agree). The measure of emotional presence included five items in the survey and achieved a high level of reliability (Cronbach’s alpha = 0.74). All items of emotional presence are presented in table 2. The items of the instrument covering cognitive, social and teaching presence has been analyzed and presented in a separate paper [7].

Emotional presence

In table 1, means and standard deviations are displayed for the emotional presence element. A Friedman test revealed that there is a significant difference between responses to the questions $\chi^2(4, N = 40) = 60.78, p < 0.01$. While the mean was high for the item “Emotion is expressed by students during coaching” ($M = 4.17$) it was significantly lower for the item “I find myself responding emotionally about problems or issues that come up during coaching” ($M = 2.78$). Thus, in the practice of online math coaching, the coachees are often expressing emotions, while the coaches themselves feel that they do not do this very often.

<table>
<thead>
<tr>
<th>Item</th>
<th>N</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotion is expressed by students during coaching.</td>
<td>41</td>
<td>4.17</td>
<td>0.92</td>
</tr>
<tr>
<td>Expressing emotion in relation to math coaching is acceptable.</td>
<td>40</td>
<td>3.75</td>
<td>0.95</td>
</tr>
<tr>
<td>I acknowledged emotion expressed by students during coaching.</td>
<td>41</td>
<td>3.73</td>
<td>0.87</td>
</tr>
<tr>
<td>In my role as coach, I demonstrate emotion online during coaching.</td>
<td>41</td>
<td>3.05</td>
<td>0.95</td>
</tr>
<tr>
<td>I find myself responding emotionally about problems or issues that come up during coaching.</td>
<td>41</td>
<td>2.78</td>
<td>1.06</td>
</tr>
</tbody>
</table>

Emotional presence compared to Cognitive, Teaching and Social presence

The mean and standard deviation for each presence of the relationship of inquiry survey instrument was examined: Cognitive Presence ($M = 3.83, SD = 0.79$), Social Presence ($M = 3.91, SD = 0.82$), Teaching Presence ($M = 4.00, SD = 0.79$) and Emotional Presence ($M = 3.50, SD = 1.07$). A Friedman test showed a significant difference between the elements $\chi^2(3, N = 192) = 34.89, p < 0.01$. Teaching presence is rated highest and emotional presence was rated lowest. The standard deviation of emotional presence was higher than for the other presences.

Correlations

A correlation test was done using Spearman correlation coefficient to examine correlations between the four elements of presence for comparison to the coaches’ descriptive data. Some significant correlations were found. There are no correlations between emotional presence and the factors gender, university hub, student target group, work experience or completed part of teacher training. These characteristics did not affect the perception of emotional presence. However, coaches that were studying to become teachers in upper secondary school were more likely to experience cognitive and teaching presence, and, to some extent, social presence.
**Transcripts analysis**

We have conducted an initial open analysis of the conversation transcripts. Four types of emotional presence were identified. Two types of positive emotional presence are identified in a Math Coach chat. One, positive emotion from the coachee when ending a conversation about the issue that brought the coachee to the session after it is solved and two, emotion showed by the coach during problem solving. The two typical negative types of emotional presence are both showed by the coachee. The first one is related to the problem solving process at hand and the second one is related to forthcoming task, such as exams and homework.

In the end of a conversation positive emotion is often expressed by the coachee. The emotion is showed in terms of appreciation and thankfulness of the coach for helping them out and delight, happiness and, at times, pride in combination with surprise for solving a math problem. This is an example from February 8 regarding how many liters a box of 0.24 m² contains.

(18:17) Coachee: Is it 0.24*1000=240 L?
(18:17) Coach: exactly! :-)
(18:17) Coachee: WHAT? :-O Ohh, so good! :-) THANKS!
(18:18) Coachee: Wait ... so the box contains 240 L?
(18:19) Coach: Yes :-) 
(18:20) Coachee: OK!

During the actual problem solving coachees typically show negative emotions in terms of frustration, disappointment and unhappiness about their own ability and skill in math. There are some examples where coachees also show humor and irony/sarcasm in this situation. The following example from February 20 is about exponents.

(18:57) Coachee: Write in one exponent: 2’6 x 2 (2 with the exponent 6 times 2)
(19:00) Coach: So 2²⁶⁻⁶?  
(19:01) Coach: Then you should use a rule for math with exponentials that says  
(19:01) Coach: 2⁴¹ ²ª¹ = 2⁻¹⁺¹ = 2⁻² = 4  
(19:02) Coachee: Oh, I’m so confused, fuck math C is so hard. The answer should be 2⁻⁷. Where did the 4 came from? :-S  
(19:06) Coach: That was just an example. 2⁻² is the same as 2⁻² which is equal to 4.

The other typical negative emotion is related to exams and homework. It is shown by the coachee as fear and frustration but also sometimes with hopefulness that passing the test will be achievable. The following is an example from May 9 when emotion occurs suddenly during a conversation about logarithms and geometry.

(17:55) Coachee: Eh, can’t you just subtract?  
(17:56) Coach: Yep!. Of course you can  
(17:58) Coachee: Ah damn, it’s a test tomorrow on chapter 4 and 5. ie analytic geo and shithole statistics! :-S :-S :-S :-S :-S  
(17:58) Coach: Ouch. Is it analytic geometry?  
(18:00) Coachee: Yee  
(18:00) Coach: OK

During conversations, especially when a coachee is showing negative emotions, the coach shows positive emotions like hope, empathy, enjoyment and cheerfulness in order to encourage the coachee to move on with the work. Coaches seem to use lots of emoticons together with few word sentences in this typical sort of emotion. Here are some examples of posts from different conversations.

(2012-03-06 18:34) Coach: Yes, exactly! :-)  
(2012-03-27 19:40) Coach: thumbs up  
(2012-05-22 19:05) Coach: Perfect! :-) then we can solve it using the pq-formula  
(2012-04-17 18:19) Coach: Very good :D  
Discussion

Our assumption that emotion would exist in this online Math Coach project proved to be correct. Emotional presence was verified by coaches, and demonstrated in transcripts by both coaches and coachees, although in varying amounts. It does not appear that emotion centered around the technology, but rather in relation to the content, the lack of understanding that led them to contact Math Coach and as a response to the coaching process.

Findings indicate the existence of emotional presence as identified by the coaches in response to survey items, and in the transcripts of text-based conversations found in the Math Coach project. This supports that the concept of emotional presence, as identified in an online community of inquiry, apply in an online relationship of inquiry. Evidence suggests there is an outward expression of emotion, particularly on the part of coachees, as they relate to and interact with the course content and during instruction. Emotional presence is identified as a separate entity in the testing of combined measures of each presence in reference to each other. The mean score of emotional presence is lower than the scores of teaching, cognitive and social presence. However, the mean of 3.5/5 is not a small measure and indicates a moderate level of agreement among the coaches that emotion is present. The correlation test between coaches’ characteristics and their view of emotional presence showed no correlation. This indicates that all coaches have a similar assessment of emotions during online coaching regardless of variation in the five characteristics tested.

Since there is a rather high standard deviation in the items of emotional presence it would be interesting to evaluate other characteristics such as age, digital literacy, language and social skills to identify the reason for this variation. A correlational test between coach and coachees characteristics and the use of emoticons in chat-logs may also be valuable. Results from the relationship of inquiry survey instrument indicate that coachees show more emotional presence than coaches. The preliminary results from analyzing transcripts highlight a more intense use of emotions by the coachees while coaches are more moderate in showing emotion. Coachees demonstrate both positive and negative emotions of different kinds but very few expressions of negative emotions by the coach could be found in the transcripts. Given that emotion is present, it is reasonable to expect coaches will acknowledge and, where necessary, address emotions being experienced by coachees.

The advantage of examining a small population is that emotional presence in online coaching could be examined in more depth by combining surveys and content analysis. However, limitations include that the results are based on a rather small population of surveyed coaches, although it should be noted that all active coaches responded to our survey, and a limited selection of chats. Our findings should be regarded as preliminary and need to be further explored.

In further studies of emotions in the student-student online coaching area it would be valuable to do a more detailed conversation analysis with statistical tests of how present the emotional element is compared to cognitive, social and teaching presence. This could also include a correlation test with more descriptive data of the coaches and coachees to investigate differences in when emotion is present and how it is shaped. The study could also be complemented with interviews of both K-12 and teacher student in order to collect qualitative data about emotions during coaching.

Conclusion

Emotion exists in an online relationship of inquiry. This exploration of emotional presence identifies that emotional presence exists as a separate experience in the online coaching exchange, but scores lower than other types of presence. Initial conclusions are the following: 1. There is an outward expression of emotion, particularly on the part of coachees, as they relate to and interact with the course content and the coaches. 2. Emotional presence exists as an individual element of an online relationship of inquiry, but is less salient than the other three presences. 3. No matter the age, gender or location, coaches express similar responses to emotional presence; this warrants further investigation, given the large standard deviation of emotional presence means. 4. It is reasonable to expect coaches will acknowledge and address emotions being experienced by coachees; further exploration of practice techniques is required.
References


Book of Abstract

This study explores emotional presence in a student-student online coaching setting. In this learner-driven, online exchange, students enrolled in a teaching program assist K-12 math students using an online relationship of inquiry model.

The online community of inquiry model argues that students and instructors create a valuable educational experience online through social, cognitive and teaching presence. In a previous paper, we adapted this online community of inquiry instrument to an online one-to-one coaching setting, which we referred to as a relationship of inquiry. The adapted model was used to gain a better understanding of the practice of online coaching by exploring the extent to which cognitive, social and teaching presence exist. In this paper, we extend this work by exploring the possibility of emotional presence in online coaching.

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Emotional presence was identified using the survey instrument but the mean score of emotional presence was lower than the scores of teaching, cognitive and social presence. The survey instrument also indicates that coachees are often expressing emotions, while the coaches do not do this very often. A correlation test was done to examine correlations between the four elements of presence for comparison to the coaches’ descriptive data. Some significant correlations were found. There were no correlations between emotional presence and coach characteristics, suggesting a uniform perception of emotional presence. In an initial open analysis of the conversation transcripts four typical types of emotional presence were identified. In the end of a conversation positive emotion is often expressed by the coachee. Coaches show negative emotion during problem solving about their own ability and skill in math and negative emotion related to exams and homework. Coaches show positive emotions to encourage the coachee to move on with the work.

In further studies of emotions in the student-student online coaching area it would be valuable to do a more detailed conversation analysis and compare this to statistical tests of the four presences. Limitations include the fact that results are based on a small population of coaches. Our findings should be regarded as preliminary and need further exploration.

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