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Student-student online coaching: Conceptualizing an emerging learning activity

Abstract

The aim of this paper is to describe student-student online coaching, defined as “an online service where a student gets support on a specific subject matter from a more experienced student”. Student-student online coaching emphasizes learning a subject matter by giving a student the opportunity to get coached by a coach, i.e. a more experienced student. Online coaching is encouraged by an organization, but the control of learning is primarily in the hands of the student. An example of online coaching is described, i.e. math coaching by instant messaging. A key challenge for coaches is to interpret the students’ competence level, despite that they often do not know the students beforehand, in order to coach on a level that is within their zone of proximal development.

Keywords: Online coaching, online tutoring, math coaching, online learning.

1. Introduction

Researchers need to examine how technology can be used to support learning both inside and outside the classroom. Some research has explored how to learn outside the classroom, but typically focus on IRL activities, such as outdoor learning experiences or museums (Braund & Reiss, 2004; Waite, 2011). There has been limited research on the use of technology to support learning outside the classroom. Various online media, such as social media and instant messaging, have the potential to support learning outside the classroom (Bull et al., 2008; Contreras-Castillo et al., 2006; Na & Chia 2008).

Bloom (1984) found that the average students in an individual tutoring condition obtain test scores as high as the top 2% students in a classroom condition. It is also likely that individual tutoring holds great potential, when conducted in online settings (Denis et al., 2004; Kopp et al., 2012; Stickler & Hampel, 2007). Bloom argued that one-to-one tutoring is too costly for most societies to bear on a large scale. Therefore, together with his students, he searched for ways to enable improved learning among the majority of students under group instruction. However, an alternative approach could be to search for less costly ways of organizing one-to-one tutoring. One such approach is student-student online coaching, defined as “an online service where a student gets support on a specific subject matter from a more experienced student”.

The aim of this paper is to describe and conceptualize student-student online coaching. The online math coach project (www.mattecoach.se) will be used as an illustrative example. It offers K-12 students (year 6-12) help with their homework in mathematics by 4-6 coaches that are available in Windows Live Messenger, every evening between Monday and Thursday. The coaches are enrolled in higher education and are studying towards becoming math teachers. Moore (1989) defined three types of interaction: learner-learner, learner-instructor and learner-content. The type of interaction described in this paper is somewhere between learner-learner, as both the coach and the learner are students on different levels, and learner-instructor, as the coach takes on the role of an instructor as a guide towards learning.

Various concepts have been defined that emphasize interaction among students, such as learner-learner interaction (Moore, 1989), computer-supported collaborative learning (Koschmann, 1996), knowledge-building communities (Scardamelia & Bereiter, 1994) and learning communities (Palloff & Pratt, 1999). However, while these theoretical strands focus on interaction among members of a class or a group, the focus of student-student online coaching is on how a student can be coached by

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a more experienced student. In such circumstances, it is likely that high levels of intellectual development, as prescribed by the zone of proximal development theory (Vygotsky, 1978), which is discussed more thoroughly below, can be achieved.

In the next two sections, research on similar learning activities are reviewed and, then, the theoretical foundations for student-students online coaching are discussed. This is followed by an example; math coaching by instant messaging. Finally, the paper is concluded and suggestions for further research are put forth.

2. Student-student online coaching and related learning activities

In this section, research on teacher and peer coaching and tutoring are reviewed, and similarities and differences as compared with student-student online coaching are put forth.

2.1 Teacher and peer coaching

It has been recognized that staff development of teachers should support teachers' continuous learning (Barth, 1990). Peer coaching is one of the more popular techniques, where teachers observe one another and exchange support, companionship, feedback and assistance (Ackland 1991; Kohler et al., 1997; Topping 2005). Showers and Joyce (1996) define teacher peer coaching as “the traditional supervisory mode of pre-conference/observation/post-conference” (p. 3). The research findings have been promising. For example, a study conducted by Murray, Ma and Mazur (2009) reported that math teachers considered peer coaching a positive experience. Their study consisted of 14 teachers in six schools divided into experimental and control groups. The most perceived benefit was sharing ideas, techniques, and strategies. The most perceived barrier was scheduling. Lu (2010) reviewed eight studies between 1997 and 2007 to identify similarities and differences of peer coaching and to examine its feasibility and challenges in preservice teacher

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education. Lu found that peer coaching appeared to possess unique advantages and were perceived to have value for preservice teachers. Bowman and McCormich (2000) compared peer coaching versus traditional supervision effects in a study of 32 students as part of a teacher education program. Half of the students were assigned to an experimental group that employed peer coaching dyads while the other students received traditional university supervision. They found that students who were trained in peer coaching techniques outperformed those that received traditional university supervision on demonstrations and effectiveness of clarity skills and for pedagogical reasoning and actions. It is likely that the more consistent feedback in the control group helped the teacher students to integrate new strategies into their teaching repertoire.

The coaching concept has also been used to describe the teacher as a learning coach. For example, Bolton (1999) studied the role of the teacher as a learning coach during the teambuilding process in group work. She surveyed 76 faculty members and 199 undergraduate students in a business school and found that “student team projects constitute a valuable peer-centered learning experience only when instructors are active coaches, giving just-in-time feedback and providing focused and concrete guidance at strategic intervals during the semester” (p. 233).

2.2 Tutoring

Wood et al. (1976) described the tutorial process as “the means whereby an adult or ‘expert’ helps somebody who is less adult or less expert” (p. 89). The tutor typically “knows the answer” and “knows how”. As mentioned above, Bloom (1984) found that the average students in an individual tutoring condition obtain test scores as high as the top 2% students in a classroom condition. In a meta-analysis of findings from 65 evaluations of school tutoring programs, Cohen et al. (1982) showed that the programs had positive effects on academic performance and attitude to the subject matter of those receiving tutoring. They also found that the children who served as tutors had

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better understanding of and more positive attitudes to the subject matter. However, the tutoring program had little or no effect on the self-esteem of tutors and tutees.

Denis et al. (2004) reviewed literature on e-tutoring and defined the e-tutor as “someone who interacts directly with learners to support their learning process when they are separated from the tutor in time and place for some or all these direct interactions”. Kopp et al. (2012) surveyed 76 e-tutors from 17 European countries. Experienced e-tutors were defined as those that emphasized the importance of collaborative activities. They used specific cognitive activities to support online collaboration and were more familiar in detecting and intervening to avoid dysfunctional social behavior. Stickler and Hampel (2007) evaluated a German beginners’ course with dual tuition, i.e. face-to-face and synchronous audio-graphic software. They found that it was necessary to provide pedagogical training for tutors and e-tutors. In a previous paper, they presented a number of skills necessary for successful synchronous e-tutoring: “dealing with the technology and using its advantages, the social skills of community building, language teaching skills, and the skills to teach creatively and develop a personal teaching style in an online medium” (Hampel & Stickler, 2005, p. 311).

Another strand of e-tutoring research explores the use of computer tutors. Corbett (2001) showed that a computer tutor in programming supported as high student achievement as human tutors in three groups of college students. Graesser et al. (2003) reported that a computer tutor teaching technical computer topics supported deep learning in a group of 81 college students. Although research on tutor intelligent systems has been promising, the actual use of such systems in educational settings has been quite limited.

2.3 Summary

Horstinski, S. & Stenbom, S. (2013). Student-student online coaching: Conceptualizing an emerging learning activity. *The Internet and Higher Education*, 16(1), 66-69. DOI: [doi:10.1016/j.iheduc.2012.02.003](https://doi.org/10.1016/j.iheduc.2012.02.003)

The research on teacher and peer coaching, and tutoring has identified positive effects on learning. Teacher and peer coaching primarily focuses on improving the teaching process, but research on how to take advantage of online media is rare. Tutoring and e-tutoring have been defined in a myriad of ways but usually focus on teachers tutoring students, peer tutoring or computer tutors. When comparing with the reviewed concepts, the focus of student-student online coaching is somewhat different. It emphasizes learning a specific subject matter by giving a student the opportunity to get coached by a more experienced student. Online coaching can occur within schools but can also be supported across schools and levels of education, as illustrated by the math coach example described below.

A number of the studies were especially relevant for student-student online coaching. Bolton (1999) emphasized the importance of giving just-in-time feedback and to provide focused and concrete guidance. Cohen et al. (1982) showed that school tutoring programs have had positive effects on academic performance and attitudes to the subject matter for both tutors and tutees. Kopp et al. (2012) found that experienced e-tutors develop more sophisticated tutoring methods. Similarly, Stickler and Hampel (2005, 2007) argued that it was necessary to provide pedagogical training and that the skills necessary for e-tutors include learning to use technology in beneficial ways, social skills, to be able to teach creatively and to develop a personal teaching style in an online medium.

3. Theoretical foundations for student-student online coaching

The potential of student-student online coaching can be motivated by Vygotsky's (1978) theory on the zone of proximal development (ZPD). He argued that intellectual development is based on collaboration between a learner and a more capable person: "[ZPD] is the distance between the actual developmental level as determined by independent problem solving and the level of

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potential development as determined through problem solving under adult guidance or in collaboration with more capable peers” (p. 86). The purpose of teaching is to support intellectual development, i.e. by developing activities that are aligned with the child’s actual developmental levels. This implies that the exposure of students to materials through lectures or other teacher-centered activities is not enough, as it does not effectively support adult guidance or collaboration with more capable peers.

Vygotsky (1978) argued that the most significant intellectual development occurs when language and practical activity converge, as interpreted by Säljö (1999, p. 150): “to a significant extent [knowledge] is created in such interactions when we convert our experiences and reflections into language and make them public”. By using language, humans have a unique way of sharing experiences with each other. Language is the link between the external (communication) and the internal (thinking) (Säljö, 2000). Vygotsky (1978) describes this as the two levels of learning, occurring first as an interpsychological category, between people, and then as an intrapsychological category, inside learners.

Wenger (1998) also emphasizes the importance of language for learning when discussing reification, defined as “the process of giving form to our experience by producing objects that congeal this experience into ‘thingness’” (Wenger 1998, p. 58). Examples of the products of reification include “abstractions, tools, symbols, stories, terms, and concepts” (p. 59). In student-student online coaching, reifications of the conversations are typically created during the coaching process. For example, in the Math coach project that is discussed below, the typical reifications are chat statements, symbols and figures drawn using digital pens, but also using or adapting online resources, such as figures already available online. Reifications support students in learning to describe and discuss mathematical concepts.

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4. Example: Math coaching by instant messaging

In this section, the Math coach project, which is an illustrative example of student-student online coaching, is described. A more thorough discussion of the project is presented in Hrastinski et al. (2012). The Math coach project was initiated during spring 2009 in Stockholm, Sweden. It offers K-12 students (year 6-12) help with their homework in mathematics by coaches that are available on Windows Live Messenger, every Monday to Thursday between 5 p.m. and 8 p.m. The coaches are either studying to get a double degree as Master of Science in Engineering and Education or studying towards becoming K-12 teachers with a focus on mathematics. Below, transcripts of math coaching conversations are used, as all communication is logged, currently comprising more than 8,000 conversations. Moreover, selected coaches have been interviewed as part of a previous study (Hrastinski et al., 2012) and a brief survey was sent to the K-12 students that participated in a math conversation during spring, 2011.

After each conversation the K-12 student conducted a survey that measured perceived satisfaction. The mean was 4.3 on a five-point Likert scale, where 5 was very satisfied and 1 was very dissatisfied. During spring 2011 (Jan 18-May 31), there were 1,909 conversations taking 1,448 hours. The mean length of a conversation was 46 minutes. Reasons for the rather long conversations were that the coaches are instructed to develop understanding with the K-12 students, rather than giving them the answer, as illustrated by the following interview quote:

“Many think that we are a kind of addition to the answer key, and that it’s all about questions and answers. That isn’t the case at all.” (Coach)

"It would be better if [the coaches] just told us what to do instead of going deeply into things." (Student)

It can be regarded as beneficial that IM communication is not necessarily in real-time. It is possible, for both students and coaches, to stop and reflect. At times, the K-12 student might spend time working with an exercise. Also, the coaches often conduct several simultaneous conversations, which might delay them. Table 1 displays the reason a K-12 student initiated a conversation with the coach. Most of the students had questions regarding a specific exercise or problem.

[Table 1 about here.](#)

4.1 Challenges and limitations

In Hrastinski et al. (2012), explorative interviews were conducted with coaches. Communication via IM is usually anonymous and misunderstandings occur. Some coaches felt that, despite the anonymity, it is possible to get to know students. As a student returns he or she gradually gets to know the coaches. One problem many coaches mentioned is that it can be difficult to know whether the student has understood. Several coaches also mentioned that they sometimes found it difficult to coach on the right level, especially since they sometimes coach several students at the same time. For students to learn effectively, the coaches need to be able to interpret the students' competence level in order to coach on a level that is within their development zone. It was regarded particularly challenging to coach at the right level in this type of online learning setting, where the coaches did not know the students beforehand. There are also limitations with the use of the instant messaging tool Windows Live Messenger. In math coaching, the conversations are based on text and pictures sent via IM. This can limit students' and coaches' ability to express themselves. Moreover, relying on a freely available tool, such as Windows Live Messenger, can result in unexpected challenges. In the

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recent versions of Windows Live Messenger, the whiteboard tool was no longer available. In order to overcome this problem, the coaches and students need to exchange picture files, which is time consuming.

5. Conclusions

Student-student online coaching emphasizes learning a specific subject matter by giving a student the opportunity to get coached by a more experienced student. Student-student online coaching can be organized within schools but can also be supported across schools and levels of education, as illustrated by the Math coach example described above. Online coaching is encouraged by an organization, but the control of learning is primarily in the hands of the student (Marsick & Watkins, 1990). A key challenge for coaches is to interpret the students' competence level, despite that they often do not know the student beforehand, in order to coach on a level that is within their zone of proximal development.

An agenda for future research can be divided into three fields. The first field is regarding software where the focus is on research and development of software to support online coaching. The second field is teaching and learning. For example, future studies need to explore student learning and attitudes, and coaching methods. The final field is learning analytics, i.e. content analysis of the actual conversations. As all conversations are stored, it is possible to collect and analyze large volumes of conversations from both micro and macro perspectives. A challenge that lies ahead is to better understand how the data can be used for research purposes and, eventually, to guide coaching practices.

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Table 1. Reasons for initiating contact with a math coach.

Reason of contact	Percent
Specific problem	68
Help with an area/topic	10
Interrupted	6
Social	5
Not serious	5
Other subject	3
Student needing advice	2
Other	1
Total	100