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Dimensions of Practical Interactions in New Digital Primary Classrooms: Framework for Preservice Teachers

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Abstract

The overview of this article relates to the dimensions of classroom interaction and integration of digital classrooms, which also provides a wealth of information pertaining to the significance of this research. This article first conceptualizes the complex framework of classroom interaction. Following on, the application of digital technologies on the dimensions of classroom interaction is also discussed. As the future teachers, preservice teachers need to have training in the ways of how to integrate and how to choose proper technologies for their teaching goals and pedagogical interaction between students. A clear acknowledgement of social interaction with the digital classroom environment is expected to help preservice teachers adjust themselves better in future teaching career.

Keywords: classroom interaction, digital technologies, digital classroom, preservice teachers

1. Introduction

As education today is becoming dependent on technology, the connection among teachers, students and technology are a long topic and challenge in the education area. Moreover, both teachers and educational policy makers confront the challenges of integrating evoking digital technologies into curriculums. For example, teachers are not automatically turned into the new mode of technology-embedded teaching and learning (Ng, Karacapilidis, & Raisinghani, 2012); they also need to adjust to new thinking and pedagogical methods. Moreover, educators are paying more attention to "pedagogical practice when applying social working modes and digital technologies in teaching and learning" (Kumpulainen & Wray, 2012, p. 140). Hence, instead of focusing on the influence of technologies with regard to academic achievement, the present study is designed to investigate the impact that technologies have on students' classroom experiences, referring to specifically to classroom interaction in the social context. This article focuses on three domains of classroom interaction, which is emotional support, instructional support and behavior management.

2. Research Background

The body literature about learning technologies and elements of classroom interactions "reflect a theoretical shift in perspectives on learning and instruction" (Kumpulainen & Wray, 2012, p. 2) Which concentrates on the importance of students' subjective roles in classroom activities. This type of student-centered classroom atmosphere provides students with considerable chances of engaging meaningful learning in a constructive environment. Hence, students have more opportunities to participate, reflect on, think critically, and practice socially sharing with others; students have more freedom to control the learning activities, and ultimately, promote students' further intrinsic motivation and active engagement. However, more opportunities to participate in social interaction or personalized learning activities do not guarantee "meaningful learning experiences" (p. 3). Therefore, research needs to put serious concerns on the patterns, contents of classroom social interaction referring teacher-student and student-student interactions, and the contexts in which "social interaction is embedded and how they contribute to or influence learning practices in the classroom" (p. 3).

In the 21st century, school education confronts diverse challenges constituted by two significant developments: the increased use of information technology and the forces of globalization (Vrasidas & Zembylas, 2003). The teaching methods and styles have undergone tremendous changes due to digital technology integration. Classrooms today equipped with computers and other technological equipment aim to "enhance the learning

experiences of today's students comparison to their counterparts of just 10 or 20 years ago" (Aggen, 2012, p. 6). Different factors contribute to the manifestations of classroom activities. Westera (2011) argues that digital technologies for learning are the primary driver in the learning context. They enable the effortless cross linking between different locations, different resources, and different users and organizations. Learning devices, such as computers, mobile phones and internet connection have helped with overcoming the restrictions of time and location boundaries. A sound interpretation of the consequences of digital technologies, the information overflow, the impact of the Internet, and multiple other changes, implies that human learning is experiencing transformation, and that it becomes something very different from what it was in the context of traditional book-culture(Kress, 2003; Kumpulainen et al., 2009). There are many activities that students access after school hours as they may affect student school behavior or motivation. After school hours, students interact frequently with friends and acquaintances through social media and mobile devices. However, in many schools, students are not allowed to use electronic devices in classrooms. Technology by itself will not replace paper materials in classrooms, and building an environment which connects school and out-site school is timely and much needed. West also states that combining classroom teaching with increased digitization can produce better results, and improve the manner in which schools function.

3. Classroom Interaction Dimensions

3.1 Classroom Interaction Types

Interaction in the classroom is an element of teaching and learning process. Communication can be regarded as one part or manisfection of interaction. Studies into classroom interaction have demonstrated some consistent findings. According to Moore (1989), there are three types of interaction in classrooms, which are teacher –student, student-student and student-content. Meaningful learning can be achieved if one of these three types of interaction is at a high level (Murphy, Casey, & Fraser, 2007). Markwood and Johnstone (1994) also outline four different types of interaction in the classroom. The first type is the interaction between students and course material such as textbooks or tape recording. The second is the interaction with resources. In this case, individual students or groups may collaborate with technology tools such as word processors. The third interaction is between students and experts, and the fourth type of interaction is among students through digitally sharing newly learned knowledge. Hence, interactivity is associated with interaction among students, teachers, and resources while understanding and acquiring knowledge through technology. Both Moore (1989) and Markwood and Johnstone (1994) "provide a solid foundation on which to build our idea of interaction and draw up a typology of interaction" within an analytical framework foundation called classroom social interaction in this research (Ng et al., 2012, p. 48).

3.2 Three Domains of Classroom Interaction

The University of Virginia's Center for Advanced Study of Teaching and Learning developed an observational tool named Classroom Assessment Scoring System™ (CLASS™) to measure effective classroom interactions from prep for high school, and beyond classrooms. CLASS™ has been developed, tested, and researched for over a decade in more than 4,000 classrooms (LaParo, Pianta, & Stuhlman, 2004). Based on the CLASS, Hamre and Pianta (2007) present three primary dimensions of classroom interaction: emotional support, instructional support, and organizational support. As the dimensions of classroom interaction promoted in this paper is an inquiry-based framework for preservice teachers, and the organizational support requires high experiences of classroom teaching, so this present study specifies the organizational support domain into behavior management. The following sections introduce how the emotional, instructional, and behavior management of classroom interaction relate to classroom practices.

3.2.1 Classroom Interaction Involving Emotional Support

The quality of emotional interactions creates emotional climate in classrooms (Pianta, La Paro, & Hamre, 2008), and high classroom emotional climate caters students' emotional and academic needs, which respond to students by choosing appropriate activities or by encouraging both self-expression and interests (Hamre, Pianta, Mashburn, & Downer, 2007; Reyes, Brackett, Rivers, White, & Salovey, 2012). Evidence showing that a civil classroom emotional climate that meets the students' basic needs such as belongingness and connection is linked to greater engagement, higher student motivation and fewer disruptive behaviors as (Ryan & Patrick, 2001). Teachers who create a positive classroom emotional climate are more likely to foster students' connectedness or positive teacher-student relationship and, in turn, better classroom behavior. These arguments are supported by evidence that positive classroom climate relate to greater student motivation, interests, enjoyment and engagement (Brackett, Reyes, Rivers, Elbertson, & Salovey, 2011). In the classroom, the sets of emotions are viewed in relation to interactions and associated transactions contributing to a climate that inscribes the feelings,

actions and social identities (Tobin, Ritchie, Oakley, Mergard, & Hudson, 2013, p. 72). Emotional climate is then a collective state of emotional interaction between students and teachers. According to, positive emotional climate within which expressions of happiness and joy, belongingness and social integration are conducive to students' learning motivation while negative emotional climate would bring students with of negative feeling, such as less confidence or fear (Tobin et al., 2013).

3.2.2 Classroom Interaction Incorporated with Instructional Support

Instructional support focus on promoting children's thinking, understanding, and problem solving skills; helping children develop more complex language skills (Pianta, Hamre, & La Paro, 2008). In the TTI framework, instructional support involves how teachers promote children's thinking and problem solving, use feedback to deepen understanding, and help children develop more complex language skills. The theoretical foundation for instructional support is based on research on cognitive and language development (Pianta, Hamre, & Allen, 2012; Taylor, Pearson, Peterson, & Rodriguez, 2003). Through instructional behaviors, conversations, and various activities, teachers foster students' development of concepts and higher-order thinking skills (Farrell, 1996; LaParo et al., 2004). In the classroom, teachers stimulate students' higher-order thinking through the questions and feedback in the conversation. Technology-mediated classroom allow students to assume the dominant roles and take on more responsibilities for their study, which in return students use higher level thinking skills than passive learners in a teacher dominated traditional classrooms.

3.2.3 Classroom Interaction Incorporated with Behavior Management

Emmer and Stough (2001) also subscribe to the contribution of organization and management of students' behaviors and attentions to the value of teacher-student interaction. For example, teachers' organizational supports include their efforts in managing the behavior, time, and students' attention in classroom activities. Teachers contribute effective teacher-student, student-student interaction by the strategies they use to manage students' behaviors and hold students engagement or participation. Classrooms that incorporate effective behavior management strategies have less misbehavior and higher levels of engagement in classroom learning activities; which ultimately, help students learn more in the classroom (Emmer & Stough, 2001; Pianta & Hamre, 2009). Teachers use behavior management strategies to make students active in participating in classroom activities and ultimately, students have higher levels of engagement within the classroom (Bowman & Stott, 1994) in learning and learn more. Hence, organizational support can be established to focus students on their individual or group learning involving two types of subject-based interaction (teacher-student, student-student).

4. Induction of Classroom Interaction Dimensions

A range of hardware and software applications support as "knowledge manager" have been implemented in the classroom, which have led students to communicate and express their ideas in a variety of media forms (Murchú, 2005). Teachers and students have had lots of opportunities in accessing different learning and teaching materials. Students could pick up different tools to find the supporting information for teachers' questions, such as the commonly used Google, mobile or other social media network. Based on these findings, the current research aims to find out whether the new learning technology impacts on this in balancing the interaction mode of teacher control over and student participation. However, there are findings suggesting that the optimal level of teacher control may vary depending on factors such as learning objectives (Pianta et al., 2012) and grade (Valeski & Stipek, 2001).

Brown (2004) acknowledges that technologies enable students to ask questions in a virtual way just to avoid face-to-face interaction; to post assignments for feedback prior to final submission for grading, and to clarify thinking through threaded discussions. Moreover, Luckner and Pianta (2011) supports that teachers influence children's peer behavior both through modeling and feedback provided during teacher–student interactions and through the ways in which the teacher uses these interactions to indirectly support and facilitate peer experiences in the classroom. Zurita et al. (2008) argue that mobile computer supported collaborative Learning applications enable three types of interactions among members in the classroom, including one-to-one teacher-student interaction and student-student interaction; one-to-many communication between the instructor and students and many-to-many communication among students.

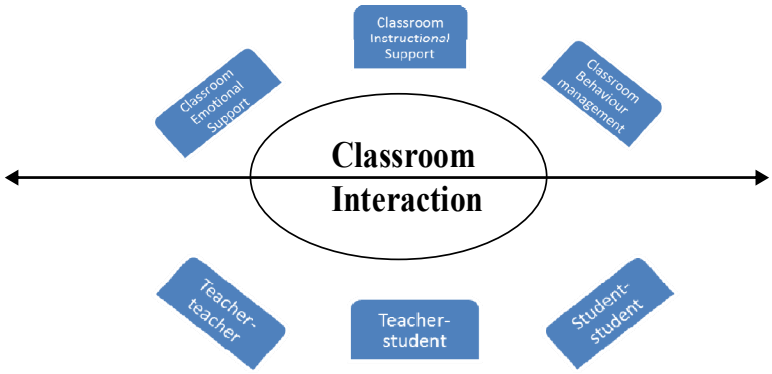

Figure 1. Structure of classroom interaction

According to this framework, this research will examine how learning technology in the classroom impact on the dimensions. These dimensions all fall into three domains of classroom interaction: emotional support, instructional support and classroom organization. Besides, these three dimensions invlove with teacher-student, student-student, and student-content interaction. When one or more type of interaction(s) happen in classrooms, they accompany with emotional support, instructional support or classroom organization support.

5. Discussion of the Importance of the Dimensions of Classroom Interaction

Knowledge of what affects digital learning technologies in classrooms is growing rapidly. Since teachers are the ones who play a pivotal role in determining how much advantage can be drawn from technology in the classroom (Brosnan, 1998; Mercer & Fisher, 1992), it is necessary to understand the teachers' effective integration of learning technologies in classrooms. Nevertheless, research also found the barriers or disadvantages of integrating learning technologies in classrooms,such as computer anxiety (Wood et al., 2005) and mobile phone (Cobb et al., 2010). This section addresses the influx of integrating digital technologies into classrooms and its importance to preservice teachers.

5.1 The Impacts of Digital Technologies on Classroom Interaction Dimensions

Emerging technologies in the classroom have created new challenges and concerns for teachers about how to interact with students in a technology-embedded classroom. Emerging technologies, especially those referred to as Web 2.0 technologies, change the way people access, interact with, create, and share data and information (Ajjan & Hartshorne, 2008; Dearstyne, 2007; Maloney, 2007; Robbie & Zeeng, 2008). For example, digital technologies enable the increase of students' engagements and cooperation in classroom practices (Arenas, Castillo, Vega, & Merelo, 2012). As web technology provides opportunities to bridge the gap between the instructor and the learner (Jin, 2005), the keys to the learning process are the interactions among students themselves, the interactions between instructor and students, and the collaborations in learning that result from these interactions (Palloff, Pratt, & Stockley, 2001). According to Liaw & Huang (2000) and Chuah (2007), the interaction must be intentionally designed into any learning experience so that learners are able to learn and construct knowledge through the intentionally designed interactive activities.

Current school students engage in the amount of social networking and electronic tools for learning or entertainment out of schools. Teachers need to find a way to interact with students and encourage students interact with their peers about learning activities more efficiently in a class environment. West (2012) states that educators need to figure out how to use technology to engage and instruct students (p. 21). Research has found that students enjoy the flexibility of online learning environment at school and addressed that they perceive benefits in being able to self-pace their learning on conditions of teachers' guide and reminder (Beard & Harper, 2002; Murphy et al., 2007). In a qualitative study identifying the impact of information communication technologies on learning, half of the female participants identified relatedness as an important intrinsic motivation of ICT and it provides cooperation and interaction with other students (Myllari et al., 2011).

5.2 The Significance of Classroom Interaction Dynamics of Preservice Teachers

Teachers can be classroom facilitators or consultants, who are responsible for preparing students for an environment in which students become creative problemsolvers and able to analyze subject information to obtain higher order thinking. Teachers' decisions about using ICTs rely on their knowledge of curriculum and skills of manipulating ICT-based learning tools. Beyond that, it is necessary for teachers to know their students well, and

then decide which technologies to be introduced and how students can use these technologies well that match curriculum requirement and make up a new digital context. Research suggests that successful technology integration rely on teachers' pedagogical, content, and technological knowledge (Renshaw, 2013). These three domains of knowledge are known as Technology Pedagogical Content Knowledge (TPACK) model. The model attempts to focus on the "essential qualities of teacher knowledge required for technology integration in teaching while addressing the complex, multifaceted, and situated nature of this knowledge (Mishra & Koehler, 2006, p. 1017)". Therefore, integrating updating technologies into classroom invloves not only the manipulative facet of technologies as learning tools, but also the consideration of the situation that preservice education with increased focus on meaningful and problem-solving based learning activities. The present research does not discuss the details of TPACK, but the future research will involve the penetrating status quo of the three domains of TPACK models in the Chinese context.

Teachers' beliefs about the roles of technologies affect their decision to sufficiently or limit their efforts to incorporate technologies into classrooms. Based on an in-depth study of 55 first year preservice teachers, Lei (2009) explores their perception of the knowledge of integrating technology into classrooms and reveals the strong positive beliefs regarding the effects of web 2.0 technologies. For example, preservice teachers believe that accessibility of web 2.0 technologies facilitate interaction among students and teachers by sharing ideas. However, Lei (2009) also reports preservice teachers' are not confident enough in using web 2.0 technologies in their future teaching. Consistently, Sadaf, Newby, and Ertmer (2012) also announce that although preservice teachers' self-efficacy in using web 2.0 technologies was high, but their self-efficacy in incorporating web 2.0 technologies in teaching was low. For example, some preservice teachers are concerned with "budget and the ability to access internet" and the situation that not every student have a computer or internet access at home (Sadaf et al., 2012, p. 943).

According to the discussion above, the dimensions of the technology-embedded classroom interaction can be summarized as follows.

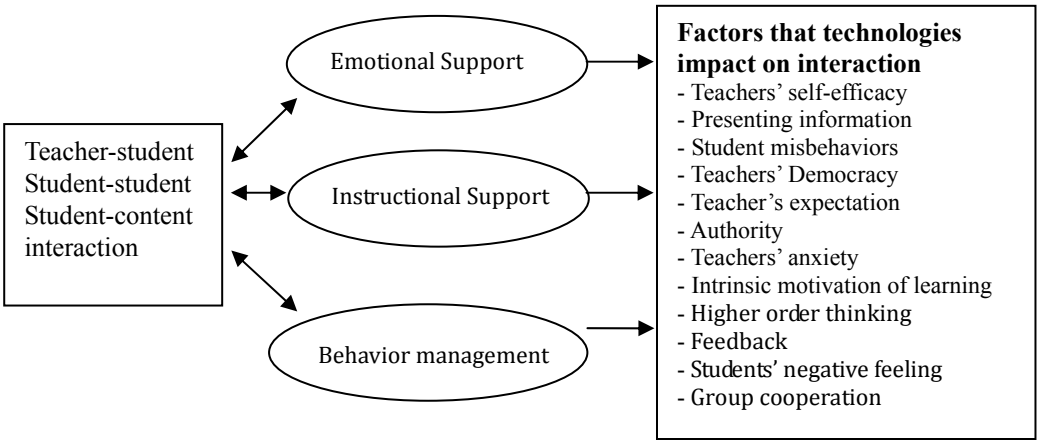

Figure 2. Dimensions of classroom interaction in digital clasrooms

This dimensions framework provides a simple structure of analyzing the impact of technologies on classroom interaction for preservice teachers. Classroom interactions involve three types of interactions: teacher-student, student-student, and student- content. Within these three types of interaction, teachers demonstrate three primary dimensions: emotional support, instructional support and behavior management support. These three dimensions involve the impact of technologies in different factors as outlined in Figure 2. Instructional support and emotional support also apply to student-student interaction, but behavior management involves instructional support. The future research will work on the revision of this framework attempting to complete a more comprehensive analytical framework for preservice teachers in a more diverse cultural context.

6. Conclusion

In summary, to situate the study at a macro contextual level, this article simply conceptualizes the structure and dimensions of classroom interaction in the digital classroom. Technologies enable the primary classrooms to be more diverse; enable the learning process to be more related to students' experiences out of schools. Technologies also help students in preparing social collaborative skills with peers; help them to challenge deeper

and harder assignments. Nevertheless, some research reveals that the learning benefits of using technologies was hard to be identified, so the advantages of technology-rich classroom activities are not obvious (Dynarski et al., 2007; Moyle, 2010). Besides, some researchers demonstrate the disadvantages of utilizing technologies in classrooms such as classroom cyber-bullings , classroom distraction, computer anxiety (Shariff, 2008; Wei & Wang, 2010). This research organizes a framework of classroom interaction in digital classrooms, which attempts to provide a reference for preservice teachers to prepare them for content, pedagogical and technological knowledge. Future research will examine how and to what extend of this framework would be effective for preservice teachers from different disciplines and cultural backgrounds. More work of how preservice teachers perceive the technology-embedded classroom practices will be demonstrated in the author's other journal articles during PhD candidature.

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