Computers in Human Behavior 63 (2016) 556–567

Contents lists available at ScienceDirect

Computers in Human Behavior

journal homepage: www.elsevier.com/locate/comphumbeh

Full length article

Enacting artifact-based activities for social technologies in language learning using a design-based research approach

Antigoni Parmaxi*, [1], Panayiotis Zaphiris [2], Andri Ioannou [3]

Cyprus Interaction Lab, Department of Multimedia and Graphic Arts, Cyprus University of Technology, 30 Archbishop Kyprianou Str., 3036 Lemesos, Cyprus

ARTICLE INFO

Article history:
Received 22 April 2016
Accepted 26 May 2016

Keywords:
Social computing
Social media
Web 2.0
Computer-assisted language learning (CALL)
Information and communication technologies (ICTs)

ABSTRACT

This paper presents the results of a three-year design-based research (DBR) study on the use of social technologies for collaborative construction of shareable artifacts by groups of learners. The study builds on the learning theory of constructionism which assumes that knowledge is better gained when students find this knowledge for themselves while engaging in the making of concrete and public artifacts. In an attempt to infuse elements of constructionism in the use of social technologies, we tasked groups of learners in language learning courses with collaborative construction of an artifact using social technologies. A unique characteristic of our approach is that the process that students adopted and the way technology and context fostered this procedure was analyzed. The cycle of DBR fueled deep insights into the learning processes that emerged through the construction of an artifact, thus deepening our understanding of the multimode and multi-trajectory relationship between theory, artifact construction and social technologies. For sustaining and orchestrating social construction of artifacts by groups of learners, a set of instructional elements emerged, as well as implications for enacting social technology innovations in real-life classrooms.

1. Introduction

The rapid popularity of social or Web 2.0 technologies has led to a wide spread of research studies conducted in various learning contexts demonstrating the multifarious ways that these technologies support teaching and learning (cf. Bennett, Bishop, Dalgarno, Waycott, & Kennedy, 2012; Chwo, 2015; Jalkanen & Vaarala, 2013; Klimanova & Dembovskaya, 2013; Liu, Wang, & Tai, 2016; Mitchell, 2012; Sockett, 2013). Yet, the burst of studies exploring the use of social technologies in learning contexts confronts with two threads with regard to their theoretical and pedagogical alignment. Firstly, a substantial number of studies is not theoretically grounded (Parmaxi & Zaphiris, 2016; Tess, 2013; Wang & Vasquez, 2012); whereas the use of Web 2.0 technologies in learning and teaching calls for better task-technology alignment (Bennett et al., 2012; Parmaxi & Zaphiris, 2016). Hitherto, social technologies do not have an inherent pedagogical approach, thus instructors and practitioners need to consider and theoretically ground the instructional decisions that will guide the use of these technologies. Learning theories aiming to promote educational change remain unused due to their strong philosophical argument and the lack of an "army" of learners, instructors, and instructional designers, who would transform those arguments to practical patterns in real-educational settings. This brings to the fore the need to bridge the gap between theoretical arguments and real classroom practice and provide guided organization of instructional processes that make use of social technologies. Towards this direction, constructionism can offer the cornerstone for theoretically grounding curriculum design, development of instructional materials, and classroom practice (Ruschoff & Ritter, 2001).

This study attempts to ground the use of social technologies under the theory of constructionism, by tasking groups of learners to collaboratively construct an artifact using social technologies. Constructionism is a theory of learning, teaching and design that aligns well with the demands and expectations of computational culture and emphasizes building, creating and making of shared and meaningful artifacts as a means for gaining knowledge (Papert, 1980; 1993). Constructionism builds and expands the Piagetian

* Corresponding author.
E-mail addresses: antigoni.parmaxi@cyprusinteractionlab.com, antigoni.parmaxi@cut.ac.cy (A. Parmaxi), pzaphiri@cyprusinteractionlab.com (P. Zaphiris), andri@cyprusinteractionlab.com (A. Ioannou).
[1] URL: http://antigoniparmaxi.weebly.com/.
[2] URL: http://zaphiris.com/.
[3] URL: http://andriioannou.weebly.com/.

http://dx.doi.org/10.1016/j.chb.2016.05.072
0747-5632/

theory of constructivism (Piaget, 1954). For both constructivism and constructionism, knowledge is built by the learner; instead of being presented and imposed to students by an expert, such as the teacher (Ackermann, 2001). Where constructivists view the learner as an active builder of knowledge, constructionism places a critical emphasis on having learners engage in constructing artifacts that are external and shared. In contrast to Piaget (1954), who focuses on cognitive processes of learning, Papert's constructionism focuses on learning through making and emphasizes individual learners' interactions with their artifacts that are mostly built through the assistance of digital media and computer based technologies (Kafai & Resnick, 1996). Papert (1980; 1993) summarized constructionism in his belief that learning occurs more effectively when learners experience active construction of public and visible artifacts. This artifact should be shared and visible to the world, either "a sand castle on the beach or a theory of the universe" (Papert & Harel, 1991, p. 1). Papert (1980, p. 7) valued surrounding cultures as a source of materials that learners need to relate and build their artifact. Building on the notion of surrounding cultures, Shaw (1996) introduced Social Constructionism (SC) emphasizing the importance of social interactions and materials for the construction of an artifact. Social Constructionism (SC) offers a fertile ground for grounding the use of social technologies to organize activities in which groups of learners are involved for collaborative construction of shareable artifacts (Parmaxi, Zaphiris, Michailidou, Papadima-Sophocleous, & Ioannou, 2013). In this study, artifact-based activities were guided by SC, placing emphasis in social interactions and materials offered within social technologies.

In this paper we present the results of a three-year investigation of how SC is materialized in theoretically-driven and pedagogically-aligned artifact-based activities. In order to enact SC design around the use of social technologies, we conducted a series of studies over a three-year period within the paradigm of Design-Based Research (DBR). DBR deals with the complexity of real-life settings by systematically designing and changing the learning environment over time, gathering evidence of the various changes which recursively feed into future designs (Barab, 2006; Brown, 1992; Collins, 1992). The specific research questions that guide this work can be formulated as follows:

1. How can social constructionism inform the implementation of artifact-based activities in language learning with the use of social technologies?
2. What alternatives does constructionism offer to current educational practices in the use of social technologies?
3. What instructional design elements can be brought forward for materializing artifact-based activities with the use of social technologies?

This paper is divided in three sections. Initially, we review the methodology adopted; followed by the findings, using DBR as a grid for reporting the three phases of the study. Finally, we elaborate on challenges in the use of social technologies as constructionist tools, and conclude with implications for those interested in making sense of the context and the intervention and adjusting them for maximizing its effects in their own contexts (Anderson & Shattuck, 2012; Reeves, 2000; The Design-Based Research Collective, 2003).

2. Methodology

2.1. Research design and background of the research

DBR follows an iterative cycle of design, enactment, analysis and redesign, where relationships between interventions and social interactions are refined increasing the impact of education research into practice (Barab, 2006; Barab & Squire, 2004; Brown, 1992; Cobb, Confrey, diSessa, Lehrer, & Schauble, 2003; Cobb, Zhao, & Dean, 2009; Reeves, 2006; Reinking & Bradley, 2008; The Design-Based Research Collective, 2003). DBR is often defined as a series of approaches, rather than an approach, intending in producing new theories, artifacts and practices that can impact teaching and learning in naturalistic settings (Barab & Squire, 2004). In order to enact Social Constructionist design around the use of social technologies, we conducted a series of iterative cycles of testing and refining theoretically-driven and pedagogically-aligned tasks in real-life classrooms.

Fig. 1 illustrates the four stages of this DBR inquiry as adapted from Reeves (2006). In stage one, we reviewed the literature and discussed the current use of Web 2.0 technologies. In stage two we explored the constructionist aspirations and designed the intervention that promulgates theoretically and pedagogically aligned use of social technologies informed by constructionism. The initial design problem was to allow groups of learners to socially construct a meaningful artifact using social technologies. In stage three elements of social construction of artifacts were infused in three iterative design cycles: (a) constructionism was initially infused in a Greek as a second language (L2) course, in which students evidenced the construction of shareable artifacts within social technologies (Cycle 1). Micro-analysis of students' and teachers' behaviors and choices was conducted, demonstrating three core dimensions of SC, that is, *exploration of ideas*, *construction* and *evaluation of artifact* (Parmaxi et al., 2013). The design problem moved further on the types of technologies that support social construction of an artifact. (b) The aforementioned dimensions were infused in a Greek for academic purposes/dissertation writing course (Cycle 2), tasking students to socially build an artifact in the form of an academic manuscript within social technologies of their choice. This study evidenced how different types of social technologies facilitated or inhibited the construction of a shared artifact, yielding Facebook as a popular cultural trend that reached the interest of students as an instructional tool (Parmaxi & Zaphiris, 2014; Parmaxi & Zaphiris, 2015a). (c) Facebook was then used for the development of an artifact in an English for specific academic purposes course (Cycle 3), yielding its potential to act as a common brain for the team (Parmaxi & Zaphiris, 2015b). In view of these results, we chronicle the intervention holistically, with an eye to inform social technology innovations through a set of instructional design elements with a constructionist rule at its heart.

2.2. Setting and participants

All data related to the three cycles were collected at a newly established public university in the Republic of Cyprus. The university accommodates approximately 2500 undergraduate and postgraduate students. The official language of the university is Greek. An overview of the courses, participants, tasked artifact, social technologies used and duration of the three cycles is provided in Fig. 2.

2.2.1. Participants in Cycle 1

In the first Cycle, participants comprised of four male students from Kenya and Uganda, aged between 19 and 23 years. Students had limited knowledge of social technologies and no knowledge of Greek upon arrival in Cyprus. Their computer skills were in general at basic to intermediate level. Three of them were able to turn the computer on and off; all of them had difficulties in advanced functions such as sending emails and attachments; document processing and use of keyboard. In Cycle 1, the instructor was a female, with four years of experience in teaching Greek as a second language. The instructor was both participant and observer of