



Conversational learning integration in technology enhanced classrooms

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ABSTRACT

Today's college students have grown up with technology. These digital natives typically gravitate toward group activities in technology embedded social contexts. However, despite this multidimensional evolution, little has changed in conventional classrooms where they build their education experience. We investigate learning models in a classroom environment which still remains the main driver of education today. We describe a conversational learning model based on group activities which involve multi-party conversations. We implement this model in a technology-enhanced studio-classroom to “visualize” conversations which otherwise would remain abstract to learners. Teachers are empowered with instructional patterns to guide their changing role in this novel classroom environment. Based on standard assessment indicators, we conduct an experimental analysis which results show interesting tradeoffs of learning performance that favor the proposed conversational learning approach compared to those obtained from conventional instruction.

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1. Introduction

Technology has revolutionized our culture. Children are born and raised in an environment where virtually anything can be reached at Internet speed. Our education system is rushing to catch up with these profiles of learners through the deployment of technology-enhanced learning facilities. An increasing number of institutions have effectively integrated technology in their learning environments to support novel instructional approaches and improve teamwork, in an effort to reform education (Schrum & Levin, 2010). During the last decades though, little has changed in conventional classrooms despite the rapid and wide proliferation of technology, and the soaring enthusiasm of learners for smart gadgets (Tantatsanawong, Kawtrakul, & Lertwipatrakul, 2011). The lack of sound reference models may have contributed to this slow move to bridge the digital gap in our classrooms. Furthermore, teachers need to be comprehensively empowered to adjust their instruction capability in any envisioned *classroom of the future*.

A contemporary education psychologist argues that learners are not just “passive empty vessels waiting to be filled with knowledge by the experts” (Richtel, 2011). Learners bring their own prior experiences, knowledge and beliefs to the classroom and thus they shape the way in which they construct their own individual knowledge, mediated, but not exclusively provided, by the teacher (De Freitas et al., 2010). The same education psychology expert suggests that classrooms are expected to be “student-centered, promote constructivist activities and communities of practice”. Hence, future learning spaces (Brown, 2005) need to be reconfigu-

able to meet these changing learning modes. Traditional teaching tends to present concepts that are already explained in standard textbooks which does not enrich learners' experience in a classroom. Instead, the classroom experience should provide an opportunity for students to learn through a process of conversation among themselves and with the teacher (Laurillard, 2002; Waite, Jackson, & Diwan, 2003). Our classroom model supports Vygotskian classroom principles which are based on social constructivism theory. These principles state that “Learning and development is a social, collaborative activity”, and “Classroom activity should be reality-based and applicable to the real world” (Vygotsky, 1978). This model is also supported by the emergence of a “Community of Practice” which promote learning processes by which people share ideas and strategies to build solutions and innovations as they interact (Lave & Wenger, 1998; Brown, 1991). The purpose of the proposed framework is to facilitate the transition from formal school learning to real-life learning, in an attempt to assert “authentic learning”, which is defined as situated learning whereby people retrieve and apply formal school learning in real-life (Herrington & Oliver, 2000).

Conversational learning model requires communication channels that facilitate self-organization and interaction. To enable these channels, a technology-enhanced learning venue could empower teachers to provide resourced, coordinated and monitored learning spaces (Espey, 2008). We propose a studio-framework of a classroom as a learning venue where students constantly interact with peers and mentors to implement the proposed conversational learning model. This learning model promotes (1) Collaborative learning with peers, (2) Interaction with teacher or mentor to learn about concepts, (3) Cooperative learning to combine skills, and (4)

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Learning reflection or transfer to apply skills in other new situations. As shown in Fig. 1, the proposed learning spaces integrate essentially four areas in one common classroom: Lecture Area, Collaborative Work Area, Workgroup Area and finally a Transfer Area. The lecture area grabs the attention of all classroom learners into conceptualization of knowledge. It may also serve as a compilation of works done by the classroom groups to contrast solutions/inputs among different groups. In either case, this learning space is expected to extend subjective experiences into conceptual generalizations as part of the learning process. Collaborative learning area combines skills to build a single-flow of a learning product (for example a solution to a problem or presentation of a case study). Workgroup area is a space for cooperative learning to share ideas or past experiences. Finally, the transfer area uses relevant external domains to experience learnt concepts in real contexts/situations.

Classrooms are designed to meet current and future needs of teachers and students who will use them, rather than simply replicating what was done in past classrooms or making compromises that have a negative impact on the quality of the learning environment. Current classrooms are ill-designed to support conversational learning styles. Earlier research presented the concept of a collaborative computer integrated classroom specially designed to achieve a combination of interactive and collaborative learning in the context of the European NIMIS project (Hoppe et al., 2000). However, this approach does not support communication and suits only a particular category of students. Besides it is not grounded on the advocated principles of conversational theory (Scott, 2001). A technology-enhanced classroom model was set up at North Carolina State University as a prototype to transform education by allowing instructors to project any group of student's display alongside the instructor's display, or side-by-side with another group of students. This research aims too at demonstrating that a shared computer per team fosters student interaction (Beichner, 2006). However, this classroom model does not induce standard instructional patterns to systematically guide teachers who utilize the power of the provided technology. More recently, Iowa University housed a technology-rich classroom where stu-

dents are seated at six round tables placed evenly about the room, with the instructor's station located in the middle. Each table in the classroom is equipped with three laptops, with the expectation that each team of three students would share a single computer and display. Students can choose which of the three laptops will be projected on the display (Soderdahl, 2011). However, the classroom technology infrastructure is not supported by pedagogical grounds and does not specifically focus on conversational learning models.

As educational institutions are under pressure to keep pace with new developments in technologies, good pedagogy practice recommends a technology-supported classroom that maximizes discussion while limiting "noise" to foster cooperation, collaboration and knowledge sharing (Mäkitalo-Siegl, Zottmann, & Kaplan, 2010). Current classroom design makes a judicious mix of education and technology disciplines to ensure that adequate attention is given to different types of instructional methods. The proposed approach in this paper facilitates reconfiguration of a learning environment and its related processes using the power of today's technologies.

The remaining sections of this paper are organized as follows. In Section 2, we describe the structure of our technology-enhanced classroom where we integrate the proposed implementation of a conversational learning design. Then, in Section 3, we discuss the learning dynamics that occur in this novel learning environment. In Section 4, we show an assessment methodology to continuously monitor learning retention in the proposed studio-classroom. In Section 5, we reveal performance indicators which we use to evaluate the outcomes of the proposed learning approach through a case study. Finally, we conclude the paper with a summary of the presented work in this paper and some future extensions to this work.

2. Conversational learning design

Conversational learning involves active learners in the process of customizing educational tools to trigger conversations in every learning situation. This domain-independent model is part of Gordon Pask's conversation theory which conceptualizes effective communication as the process of coming to know where one participant in a conversation can be said to understand another participant's "knowledge" (Pask, 1976). This process creates instances where "ideas, concepts and even whole chunks of knowledge are transported from a speaker to a listener . . . rather each must abstract meanings, concepts and knowledge from his or own experience" (Scott, 2001). We employ key central entities of Pask's theory to frame our learning design, which are "conversations," "individuals" and "concepts" (Scott, 2009) and to elaborate related interaction scenarios. The main actors are student groups to trigger questions, teacher to offer explanations, class to apply and contrast knowledge and domain to transfer knowledge.

This learning model poses new requirements for instruction designers to develop learning environments or spaces which are capable of linking conversational learning practices with Information and Communication Technologies (ICT).

2.1. Learning space

Learning spaces encompass the places in which learning occurs, including physical and virtual virtual areas (Brown, 2005). Fig. 2 shows a model of a classroom, which provides a studio-framework as a conglomeration of learning spaces to respond to conversational learning requirements and related instruction processes. This self-contained model is currently implemented in our institution as a prototype classroom. It embodies three work areas for

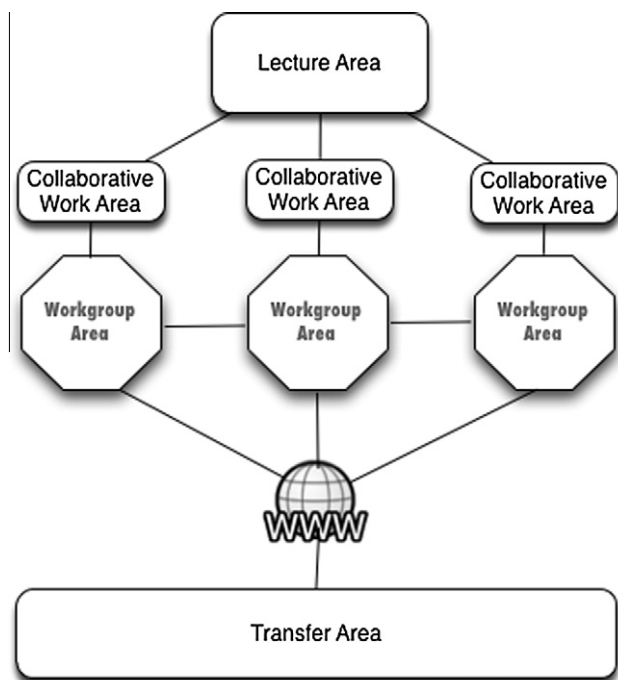


Fig. 1. Conversational learning spaces.

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