A COMMUNITIES OF PRACTICE PERSPECTIVE ON EDUCATIONAL COMPUTER GAMES

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ABSTRACT

Educational computer games provide an environment in which interactions among students, teachers, and texts differ non-trivially from those of the traditional classroom. In order to build and research computer games effectively, it is important to provide a theoretical background that adequately describes and explains learning and interactions in a virtual environment. This article presents the theory of communities of practice as one possible theoretical backing. Five aspects of this theory are presented: shared goals, shared practices, legitimate peripheral participation, co-evolution and adaptation, and identity development. Each aspect is explained and related to educational computer games. Suggestions for game designers and researchers are also given.

Keywords: Educational Computer Games, Communities of Practice, Legitimate Peripheral Participation.

INTRODUCTION

The implementation of computer games into education is a unique opportunity to provoke highly motivational environments in which students acquire and use skills and knowledge in socially interactive environments. To facilitate this, it is important for us to build games following a model that is appropriate to computer game environments. Such a model must enable designers to take into consideration the opportunities and constraints of a virtual medium, which are necessarily different from those of a traditional classroom.

This paper presents and explains communities of practice, a theory that was developed to explain learning that occurs outside of traditional school environments, and applies it to design and research of educational computer games. First, a brief history of the theory is given along with a justification for its use with educational games. Then, five characteristics of communities of practice are explained and related to educational computer games: shared goals, shared practices, legitimate peripheral participation, co-evolution and adaptation, and identity development. It is hoped that the use of this theory as a model will assist game designers in creating effective games and researchers in investigating learning on educational computer games.

Origin and Definition of Communities of Practice

Communities of practice originated in the field of cognitive anthropology. Several researchers were interested in investigating learning that occurs outside of traditional classroom environments. Initially, these researchers focused on apprenticeship type situations (Rogoff, 1990). Later, to provide a model for learning, Lave and Wenger (1991) developed communities of practice from studying five apprenticeship situations (Lave & Wenger, 1991). Since then, the theory has been applied to various non-apprenticeship situations as well. Fields that have appropriated this theory include material anthropology (Minar, 2001; Sassman & Rudolphi, 2001), education (Browne-Ferrigno, 2003; Matusov, 1999), foreign language education (Toohey, 1998, 1996), and socio-linguistics (Moore, 2006; de Fina, 2007; Stapleton, 2001).

This theory has been particularly useful in helping theoreticians and researchers explain how learning occurs outside of the traditional classroom. Traditional school environments can be thought of as a teacher who stands at the front of the class and imparts his or her knowledge to the students, who hopefully absorb this information. From this perspective, learning is thought of as a one-way process. This constrained interaction pattern

is at least partially constrained by physical exigencies such as one teacher to many students and the arrangement of desks, so that all students can see the black/white board.

Computer games are not so constrained. Virtual environments enable new patterns of interaction with materials, classmates, and teachers. Communities of practice have also investigated less constrained learning environments. These situations range from pottery (Lave & Wenger, 1991) and basket weaving apprenticeships (Minar, 2001) to modern international business situations (Down & Reveley, 2004). In brief, a community of practice emerges when individuals who have similar interests collaborate as they strive towards shared goals. During this process, they create shared ways of doing things, shared ways of speaking, and a shared perspective on the world. In short, they create shared behaviors. Lave and Wenger (1991) termed these conventionalized ways of behaving "practices".

Shared Goals

Communities of practice are formed when individuals with a common interest come together as they strive towards common goals. As they work towards these goals, they create a shared set of practices (Lave & Wenger, 1991). Such goals may include creating products such as articles of clothing (Lave & Wenger, 1991), providing services (Wenger, 1998), or engaging in religious activities (Merriam, Courtenay & Baumgartner, 2003). Two characteristics of these goals are different from those in the traditional classroom. First, there is no defined end or test. Thus, there is almost always room for individuals to continue developing. Second, individuals can proceed at their own pace.

Collaborative computer games are social by nature and are marked by individuals who come together to strive towards common goals. These goals may be to develop a powerful wizard or warrior in MORGPs, to beat another player or group of players in a competition, or to develop a small nation or city in games like Nation States and SimCity. Designers of educational games should focus on creating tasks that allow ongoing and incremental development of skills and not an end state at which all material is tested.

Shared Practices

Perhaps the most important characteristic of a community of practice is a shared set of conventionalized ways of behaving. This includes ways of interacting with others and with the environment. Examples of practices include a shared lexicon and shared ways of speaking (Wenger, 1998) as well as physical ways of interacting with the environment (Minar, 2001; Sassman & Rudolphi, 2001). Importantly, learning of the community's shared practice occurs with little meta-talk about the to-be-acquired tasks. In fact, there are few if any questions about skills and tasks to be learned, which differs from the traditional classroom in which questions are sometimes encouraged, and the teacher often speaks about the topics and skills to be learned (Lave & Wenger, 1991).

For computer games, it is important to note that students should be learning skills and lexicon, not just facts. Such skills might include writing, negotiating, typing, completing calculations, or using a foreign language. Furthermore, researchers might investigate the types of practices that groups of students create as they collaboratively engage in educational computer games. These practices could inform future game design and teaching practices.

Legitimate Peripheral Participation

Legitimate peripheral participation is the way in which individuals learn in a community of practice. In brief, individuals learn as they are afforded opportunities to observe other, more competent individuals and as they are given incrementally more difficult tasks (Lave & Wenger, 1991). A new tailor, for example, may be given very simple tasks at first such as running errands for his / her master. Also, the novice is allowed to observe the master at work. Over time, the novice is given more and more difficult tasks until s/he completes some sort of masterpiece that is judged by various other masters.

Legitimate peripheral participation is particularly common in collaborative online games such as MORGPs. New players come and learn some on their own. Then,

more experienced players help them by showing them aspects of the games, strategies, and ways to engage in the game and with other players as they participate together. New comers are able to observe more competent members engaged in game play and mimic their behaviors. Computer games in general facilitate one aspect of this way of learning well: giving players incrementally more difficult tasks to complete as they master simpler tasks. Players are confronted with situations and must develop strategies to overcome them. Once they master these, they are presented with still more difficult situations in which old strategies do not work, so they must learn new strategies of employ old ones in new ways.

For educational computer games, designers should lay out a series of tasks to be completed, each somewhat more difficult than the previous one. Importantly, students should be required to learn new skills and strategies and modify old ones as they encounter more difficult situations. Students should also be able to participate with more competent individuals, perhaps the teacher or other, more experienced classmates. From these observations, students should acquire particular strategies and skills by seeing how others address particular tasks.

Co-evolution and Adaptation

The practices of a community are not stable but change and evolve over time. New members may join the group and bring with them new ways of interacting. Old members may leave, perhaps causing outdated practices to be discarded. And, importantly, elements in the environment, including neighboring communities of practice, may necessitate the changing and adaptation of existing practices as well as the implementation of new ones (Wenger, 1998). In short, a community must constantly be learning and adapting to its environments in order to succeed and thrive. This constant changing of practices can be called co evolution or adaptation.

Co evolution and adaptation are common in computer games, particularly in collaborative internet games. Players are always modifying their skills and strategies as they attempt to overcome novel situations. By modifying their behaviors, they become much more successful at the game, so game administrators may modify the game by providing a new area of the game or making particular situations more difficult for players. In response to new challenges, players invent still new strategies, and administrators implement new challenges. Thus, a recursive process unfolds as players and administrators constantly adjust their behavior and the environment in response to the other. What results is not a static, unchallenging game environment with stable patterns of game play but rather a dynamic virtual environment with ever-changing ways of engaging with the objects in the environment and with others. Gaming environments thrive off of such changes, and players are able to continue their individual development when games continue to provide challenges. Games that fail to provide ongoing challenges typically die off as players become bored.

Frequently, bulletin boards are set up to facilitate communication about this ongoing process of recursive change. These bulletin boards ask players to provide administrators with feedback on changes to the game. Administrators typically use this feedback as they re-evaluate changes and make decisions on future changes. For educational games, designers should enable student's continuous challenges. This can be done in many ways, perhaps allowing teachers to alter the game environment, or possibly by creating rival groups of students within the game. Furthermore, designers can create bulletin boards on which students can post feedback on the environment and any changes designers may have made.

Identity Development

One's identity in a community of practice is tied directly to one's competence in the community's practices. Newcomers to a community begin on the periphery of the community, and, as they gradually become more proficient in the practices of the community, they slowly progress along an invisible trajectory towards the center of the community where the masters reside. Thus, as individuals learn, they develop their identities. This frequently involves going from newcomer through a series

of stages until one becomes an expert. Individuals may undergo both marked (Merriam, Courtenay & Baumgartner, 2003; Hundeide, 2003) and unmarked (Wenger, 1998) changes in their identities.

In computer games, identity development is the process through which individuals go as they progress in a game. As their virtual selves gain more levels and power, their non-virtual selves gain new skills and knowledge about the game. Examples of identity development span many games, particularly fantasy games in which individuals take on particular roles and identities that gain power as they progress (Gee, 2007).

Conclusion

Educational games afford new patterns of interaction among students, teachers, and texts. These new ways of engaging in a learning community cannot easily be modeled by traditional models of learning. It is thus necessary for designers, researchers, and teachers to employ a theory that more accurately explains the interactions and the learning process that occurs in computer games. This article has argued for the use of communities of practice as such a model. Communities of practice facilitate the view of learning that occurs in everyday situations in which individuals with common goals and interests come together to participate in a joint endeavor. While interacting, individuals form conventionalized ways of behaving or practices. New comers to communities learn these practices by observing more competent individuals and by successfully engaging in progressively more difficult tasks. As new comers become more competent in the community's practices, they undergo a series of changes in identity.

In short, it is hoped that this article may help inform the design and research of educational computer games by introducing a learning theory that takes into consideration patterns of interaction that occur in virtual environments. Education worldwide is at a critical point. Information has expanded exponentially in the last few years, and students of today need a wide range of skills and knowledge to succeed in an ever-increasingly competitive world. The implementation of computer games into education has the potential of helping educationalists enable students to acquire the skills they will need to succeed in the current world.

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