

A Proposal for Developing a Situated Learning Support Systems-Based on an MMORPG

Cheng Ri PIAO
Hunan Normal University
China

The primary purposes of this study are to develop a Situated Learning Support System based on an MMORPG (Massively Multiplayer Online Role Playing Game) and to investigate applications of Situated Learning theory both hypothetically and practically. In Situated Learning theory, cognition is interpreted as a dynamic system related to situation, context and activity. According to this theory, learning context, social interaction and personal direct experience are also emphasized. A virtual reality learning system based on an MMORPG provides context, social interaction and a learning environment able to provide direct experiences. However, such a system has been difficult for teachers to develop. This study aims to develop a support system facilitating the construction of a Situated Learning System based on an MMORPG. This study proposes new research and practical applications of Situated Learning theory using educational games.

Keywords: Situated Learning Theory, MMORPG

Introduction

In 1989, the idea of Situated Cognition and Learning was proposed in an article entitled “Situated Cognition and the Culture of Learning” by Brown and his colleagues. Briefly, the authors propose that Cognition is not only a personal psychological process but also a system of social culture, subjective action and environment in which those factors are dynamically

* College of Educational Sciences, Hunan Normal University
piaochengri2002@hotmail.com

related. The authors also contend that learning occurs in the context in which that knowledge is used. They stress social interaction and subjective experience. From this pioneering work, a literature has arisen adding to the theory from a variety of perspectives, including psychology, anthropology and pedagogy. As a result, the theory and practical applications of Situated Cognition and Learning have been developed in tandem with the development of information technology, human brain science and research on human cognitive structure and mechanisms.

Especially, the development of computer multi-media technology and network technology has yielded numerous practical methods and instructional theories related to Situated Cognition and Learning theory. The development of computer multi-media technology and network technology has facilitated the construction of virtual reality “alike real situations” and “virtual social communities” emphasized by Situated Learning theorists and has facilitated “social interaction” similar to real social interaction. These technologies have also facilitated the construction of “direct experience” through virtual illusions mirroring consciousness and actual experience.

This study develops a practical learning support system based on the above interpretation of Situated Cognition and Learning theory. The greater purpose of this study is to develop a simple and concrete Situated Learning system that teachers can employ themselves.

Situated Cognition and Learning theory

Situated Cognition and Learning theory is a system examining the dynamic relationship between society, culture and individual behaviors rooted in Vygotsky’s socio-cultural theory (Han, K.H., 1997). Research in Situated Cognition asserts that human cognition is constructed by an individual in the larger social context, as opposed to the psychological functioning or special intelligence of the individual (Bredo, 1994). That is, human cognition depends on the socio-cultural context and interactional content. Also, it is asserted that human cognition is not only the individual's cognitive process, but also the physical and social environment, and that its content is dispersed in the physical and social environment (Pea, 1988).

Therefore, research in Situated Cognition opposes the dualism that divides knowledge and behavior and is interested in the problems of meaning and interpretation rather than the

problem of objective truth. Also, it is interested in perception of situations and contexts rather than learning through memory and discipline (Clancey 1995).

Research into Situated Cognition has emphasized knowledge of instantaneous behavior and opposes the concept of representation of knowledge. Accordingly, learning uses the contextual clues of surroundings to construct indexed representation. In this process, the brain constructs action-oriented representations of space and the relationship between operational factors and behavior, rather than a storage space for skills or events outside the relevant surroundings. Research in Situated Cognition stresses perception over memory. When individuals manage information, context is important, and memory is not simply storage in the brain (Young, 1996).

Research in Situated Cognition asserts that meaningful and contextual experience should vigorously examine useful and practical knowledge and construct knowledge through practice and individual activity (Lave & Wenger, 1991). Finally, research in Situated Cognition concludes that knowledge exists in a context, and that the knowledge created in it can be problematic, due to context and culture. Also, practical activity, situation and learning form a complex and meaningful community and learning is formed in the context of real life.

The features of MMORPGs

Multi-media has become one of the main factors in information processing and the development of the Internet has made interactive communication possible in more complex text and image combinations and interactions, which was previously confined to simple text delivered unidirectionally. Interactive communication made up of complex text, based on new media, has many points of likeness with reality, yet it is created in a cyber world (simulation world), or Simulacra. The appearance of MMORPGs is one example.

The appearance of MMORPGs offers social context as a form of reality in cyber space. Therefore, the proper use of MMORPGs can support Situated Cognition and Learning theory (Baek, Y.K., 2005). This cyber space, or virtual space, in Situated Cognition permits the creation of new intellectual environments as intermediaries to the process of inner Cognition. That is, cyber space constitutes the learning situation and then offers it to the learner. The learner experiences social cognition through individual cognition and according to the appropriate learning level. In this case, experience in cyber space permits the acceptance of

the other's cognition and places the process of cognition in a social and cultural context. Therefore, the learner constructs knowledge through subjective experience in a context similar to reality. This experience consists of conscious experience and the illusion of practical experience, but psychological state remains a subjective experience. Also, according to the Affordance point-of-view, this cyber space can be extended or reduced and can control the complications of the "real world" that may disturb learning and can improve teaching and problem-solving in the context of cyber space (Clegg, 1991).

Finally, this cyber space can support Situated Cognition and learning theory, provided the proper deployment of these cyber spaces offers well-conceived material and environments that are based on Situated Cognition theory.

Reconsideration of Situated Cognition and Learning theory for the system design.

In Situated Cognition and Learning theory, the dynamic system of cognition and its activity and culture are considered important. That is to say, Cognition is formed through positive activities in a socio-cultural context (Brown and Duguid, 1996). In teaching practice, Situated Cognition theory can be characterized as the construction of intellectual context, social interaction and the learner's subjective experience. These characteristics are also an important variable in this study. The system design of this study was designed to address these three characteristics.

The concept of "context" according to Vygotsky's theory, was also taken into consideration. Vygotsky utilized historical-materialist methodology to review the process of evolution in historical development and social culture for human beings (Vygotsky, 1978). Context can be said to be the extension of time and space. Therefore, this study focused on the construction of such a situation within the limitations of cyber space.

Social interaction is the root of social community and is the beginning point of human cognition. From the standpoint of Situated Cognition theory, social interaction is the process of "Enculturation", the source of practical activity, and the core of the cognitive process (Rogoff & Lave, 1984). Social interaction among people is most commonly made through language. That is, it is possible to communicate through a written language and a spoken language. This interaction becomes more complex when facial expressions, gestures and

motion are taken into account.

These diverse forms of communication are embodied in the system under consideration in this study. The system allowed for diverse expressions such as facial expressions, gestures and motion. That is to say, this virtual communication system attempts to replicate real communication through character controls. The construction of situations including backgrounds and settings of virtual space and music are also an important part of the attempt to overcome the problems of real communication and to recreate real communication systems.

Individual subjective experience is one of the main factors in Situated Cognition theory. Situated Cognition regards both the Situated characteristics of cognition and inner cognitive processes as important. That is, most people have individual subjective experiences through positive activity in a socio-cultural context, and then this subjective experience is changed through the processes and content of cognition. In MMORPGs, as characters are controlled in virtual space, subjective individual experiences can be controlled by designers (Thuman & Matton, 1994). That is to say, learners acquire conscious experience through control of characters and subjective experience through the illusion of practical experience. The cognitive characteristics of these experiences are direct and subjective.

Also, situated learning in real life is not always possible. Therefore, research employing Situated Cognition theory attempts to create “context similar to the real world”, and “the representational experience” (Bransford & Vye, 1989). This is the basic premise of the system design under examination in this study.

This study developed a support system to facilitate the creation of a virtual space as similar as possible to the real world, including opportunities for interaction that attempts to mimic real human interaction. Furthermore, this study constructs a system to facilitate subjective experience.

Development of a Situated Learning Support System Based on an MMORPG

This study undertook the design and development of a support system based on Situated Learning theory. The development of the system is divided into three parts: learning content creation tools, a server engine and a client engine. Content creation tools were used to facilitate the development of learning content. The content creation tools included character

making tools, background making tools and integration tools. Following the completion of the learning content, the sever engine and the client engine were loaded with the learning content to allow full operation.

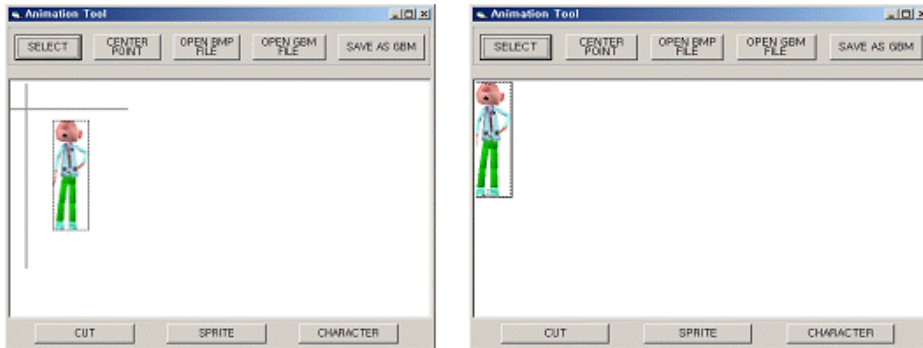


Figure 1. Animation Tool

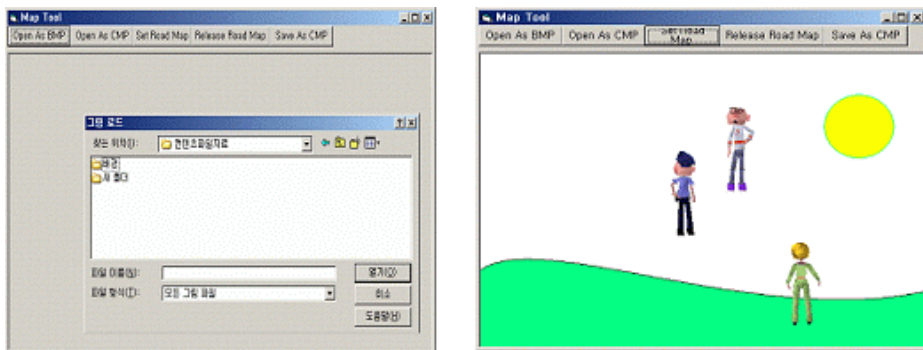


Figure 2. Map Tool

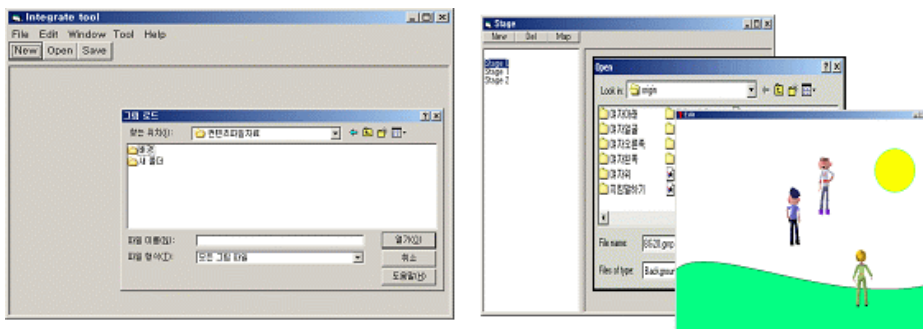


Figure 3. Integration Tool

The server engine contains a module for communication with the client. In addition, the sever engine can function by providing and enabling the operation of the learning content, can provide opportunities for client chat, and can also support screen synchronization among and with clients.



Figure 4. Server Engine

The client engine provides and enables the operation of the learning content and has a module for communication with the server. Also, the client engine provides and enables the learning content as a sever engine and permits chat with the server in addition to supporting screen synchronization with the server. The input from client computers was passed to the server computer through the communication module and by continuous renewal of the server and client screen displays. Chatting was designed to occur between the server and client, and the chatting screen allows synchronization between the server and all clients.

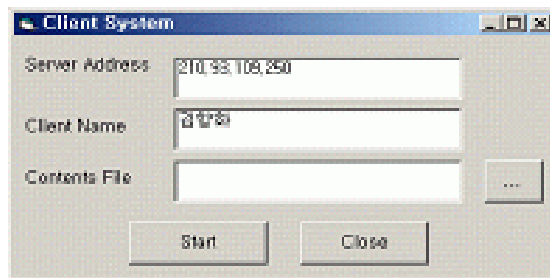


Figure 5. Client Engine

For development of this system, Visual Studio was used. Automatic Script Interpretation was used to interpret the script and Direct X was used for the graphic and communication module.

Conclusion

This study developed a Situated Learning support system based on an MMORPG. While designing the system, virtual space, social interaction and subjective experience were the main elements of the design, reflecting the main emphases of Situated Learning theory. This study designed a system able to construct situations for social interaction and for subjective experience. This system consists of content tools, a sever engine and a client engine, so that teachers utilizing this system can construct learning systems specific to their needs.

This study proposes a practical method of implementing Situated Learning theory, along with the possibility of multiple applications and upgrades of the system for its further development. More widely, this study provides a design paradigm for educational utilization of new media. However, this approach requires further research. That is to say, further theoretical and practical research is necessary and will contribute to enhancing teaching methods and style in virtual space.

References

- Baek, Y. K. (2005). *The Understanding and Practical Use of Edutainment*. Seoul: Jung Il.
- Han, K. H. (1997). Relationship between cognitive science and cognitive psychology. *Human Science*, 76-77.
- Bransford, J. D. & Vye, N. J. (1989). A perspective on cognitive research and its implications for instruction, L. In Resnick & L. Klopfer (Eds). *Towards the Thinking Curriculum: Current Cognitive Research*. (pp. 173-205). Alexandria, VA:ASCD.
- Bredo, E. (1994). Reconstructing educational psychology: Situated Cognition and Deweyian pragmatism. *Educational Psychologist*. 29 (1), 23-35.
- Brown, J., Collins, A., & Duguid, P. (1989). Situated Cognition and the culture of learning. *Educational Researcher*. 18(1), pp. 32-42.
- Brown, J., Duguid, P. (1996). Stolen Knowledge. *Educational Technology Publications*. 1996: 47-56.
- Clegg, A. (1991). Games and simulations in social studies education. In Shaver, J. P., (Ed). *Handbook of Research on Social Studies Teaching and Learning*. (pp. 523-528). New York: Macmillan.

- Clancey, W. J. (1995). A Tutorial on Situated Learning. Proceedings of *The International Conference on Computers and Education (Taiwan)*, Self, J. (Ed.) Charlottesville, VA:AACE, pp.49-70, 1995.
- Clancey, W. J. (1997). *Situated Action: On Human Knowledge and Computer Representations*. Cambridge: Cambridge University Press.
- Lave & Wenger. (1991). *Situated Learning: Legitimate Peripheral Participation*. Cambridge: Cambridge University Press.
- Pea, R. D. (1988). Distributed intelligence in learning and reasoning processes. Paper presented at *The Meeting of the Cognitive Science Society*, Montreal.
- Rogoff, B., & Lave, J. (Eds.). (1984). *Everyday Cognition: Its Development in Social Context*. Cambridge, MA: Harvard University Press.
- Thuman, R. A. & Matton, J. S. (1994). Virtual reality: toward fundamental improvements in simulation-based training, *Educational Technology*.34(5), pp. 56-64.
- Vygotsky, L. S. (1978). *Mind in Society: The Development of Higher Psychological Processes*. Cambridge, MA: Harvard University Press. (Original material published in 1930, 1933 and 1935.)
- Young, K. S. (1996). Internet Addiction: The Emergence of a New Clinical Disorder. *Cyber Psychology and Behavior*. 1, pp. 237-244.



Cheng Ri PIAO

Associate Professor, Dept. of Educational Technology, College of Educational Sciences, Hunan Normal University. Interests: Instructional Design, Knowledge Management, and Computer Programming
E-mail: piaochengri2002@hotmail.com