Language Learning in Computer-assisted Collaborative Learning (CACL) Environment

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Abstract. Does computer helps learners improve their cognition? If yes, then what are the theories support such improvement? The different computer-assisted system will be used in the different purpose and needs of the education. Besides discussing the theories and some basic computer-assisted learning environment, this paper is trying to find the answers of the following questions as well: In which way do Computer-assisted Collaborative Learning (CACL) systems help learner improve the cognition? Will CACL help students in language (both first language and second language) learning?

Introduction to Computer-assisted Collaborative Learning (CACL)

According to Mayer, learning could be treated as response acquisition, knowledge acquisition and knowledge construction. These theories could be sued in the different purpose in designing teaching and learning instruction. For the different stages of learning, different theory could be applied. For example: in the language learning, response acquisition maybe occurs at the beginning stage while knowledge construction may happens when a learner have obtained the basic vocabulary and known the grammar rules (advanced language learner or user).

Computer-assisted Collaborative Learning (CACL)

Simply translated, collaboration is the face that people work together to solve a problem or perform a task. CACL is the learning occurred in the environment of a computer-assisted network system. This computer-assisted network system supports group task in a common task and provides a shared interface for group members to work with. It focuses on what is being communicated in the teaching process. The research in this field covers not only the technology used but also its social, learning, and psychological effects.

Theories of CACL

Many theories contribute to the understanding of CACL. These theories are Sociocultural Theory, Constructivism Theory, Problem-based Learning, Distribute Cognition, Situated Cognition and Self-regulation Learning Theory.

These theories are based on the same underlying assumptions that individuals are active agents that they are purposefully seeking and constructing knowledge within a meaningful context.

Vygotsky’s Sociocultural Theory

Vygotsky’s sociocultural theory of learning emphasizes that human intelligence originates in our society or culture. Rather than solely based on experience with the physical world, the construction of knowledge is seen as fundamentally social activity. The learner gains the resources of the whole society in and through this activity.

The potential for cognitive development is limited to a certain time span which he calls the “Zone of Proximal Development (ZPD)”. Vygotsky defined ZPD as a region of activities that individuals
can navigate with the help of more capable peers, adults, or artifacts. In Vygotsky’s view, peer interaction, scaffolding, and modeling are important ways to facilitate individual cognitive growth and knowledge acquisition. Vygotsky’s sociocultural approach of learning and ZPD can be successfully employed in the study of CACL environment.

Constructivism Theory

Constructivism theory treats learning as knowledge construction. “Learning occurs not by recording information but by interpreting it”. This means that learners do not transfer knowledge from the external world into their memories; rather, they create interpretations of the world based up on their past experience and their interactions in the world.

Problem-Based Learning

Problem-based learning is a student-centered approach. According to this theory, learning begins with a problem to be solved rather than content to be mastered. It suggests that the emphasis of instruction needs to shift from teaching as knowledge transmission to less teacher-dependent learning. And it believes that knowledge can be recallable only when individual is questioned explicitly in the context in which it was learned.

Distributed Cognition

The concept of distributed cognition emphasizes the interaction among individuals and environment. It claims that development and growth of cognition of individuals should not be isolated events, rather the changes should be a reciprocal process. It starts from the mind of individuals, through the reciprocal teaching and guide each other or acquainting themselves with the tools.

Artificial Intelligence (AI)

Computer-assisted Learning (CAL)

CAL was developed in the 1950s with the simple “linear programs” at its beginning. It initially followed the behaviorism theory in learning. The computer will output of text which will take student one small step towards the desired behavior. Student then make some kinds of response based on what he already knows. At the end, the machine will immediately tell the students whether he has given the correct answer. Such a prime CAL is still being used in teaching and training nowadays. By looking at the development of CAL, we could tell that it still suffers from a behaviorist and reinforcement theory of learning.

Intelligence Tutoring System (ITS)

ITS was the first example of a new approach to educational computing. While CAL has tended to basically drill and practice, ITS aimed more to be diagnostic. For example, an ITS will not display the message like “Wrong. You lose one point” on the screen but will diagnoses learners’ mistakes and help learners to correct the errors.

The development in the AI field finally led to the innovation of developing the learning environment. New computer-assisted learning environment provides students with powerful computing tools. Students will be engaged in a learning-by-discovery process by operating, manipulating or programming the computer or the computer-assisted system.

Language Learning in the CACL Environment

Computer-mediated Communication

Mark Warschauer described some useful methods for us to understand the CACL approach which he called it Computer-mediated Communication (CMC) which includes five feature namely:
Text-based and Computer-Mediated Interaction. The communication based on the text-based and computer-mediated form make the materials easily transmitted, stored, archived, reworked and edited.

Many-to-Many Communication. Many-to-many communication means any member of a group may initiate interaction with any or all of the others. This creates an excellent environment for a group of people to construct knowledge together by expressing themselves in print and then assessing, evaluating, comparing, and reflecting on their own views and those of others.

And more, the social dynamics of computer-mediated discussion have proven to be different than face-to-face discussion in relation to issues such as turn-taking, interruption, balance, equality, and decision-making.

Study done by Weisband, it was found that in face-to-face discussions, the second speaker tended to agree with the first speaker and so the third one was even more. By the time the third person spoke, the group was often close to achieving consensus. But in on-line electronic discussions, the third member’s position was as far from the final decision as the first member’s was. The results suggest that electronic discussion “reduces conformity and convergence as compared with face-to-face group discussion”.

Time- and Place-Independent Communication. Time- and place-independent communication extends the potential of online collaboration. First, it allow for more in-depth analysis and critical reflection. Secondly, it allows students to initiate communication with each other or with the teacher outside the classroom.

- Students in the computer group wrote more per session than did students in the paper-and-pencil group.
- Students in the computer group also asked more questions, responded to more questions.
- Students used a variety of language functions more frequently than did the students in the paper-and-pencil group.
- The electronic discussion was more conversational and informal, with students and teacher discussing various aspects of a topic back and forth.

That though, is one of the goals—to take advantage of the medium to develop students’ skills of narration, description, and interpretation.

Long-distance Exchanges. The simplest form of distant collaboration via computer-mediated communication is the one-to-one exchange, for example: Email. Study showed that email between two persons could help them improve their language ability. Learners are learning through interaction. More comprehensible language input in writing will be received.

Many-to-many long-distance collaborative learning enables a learner to use the language (first language or second language) in exchange, negotiation, management talk, and discussions with other learners. Thus they may gain more knowledge to the topic or subject they are working on and they will increase the knowledge of the language they are using as well. For example, studies showed that students naturally edited and revised their writings to make them appropriate for their peers during the many-to-many distant exchange. And instead of writing work alone, they are keener to made use of peer tutoring and other collaborative methods in order to compose their e-mail together.

Hypermedia Information and Student Publishing. Computer-mediated communication allows multimedia documents to be published and distributed via links among computers around the world, is a particular published and distributed via links among computers around the world, is a particular feature of the World Wide Web. It provides access to up-to-date authentic information, form distributed sites all over the world, which can then be incorporated into classroom collaborative activities. So, for example, students can work collaboratively to plan and carry out tasks or role plays.
Computer-mediated Learning Tool

Besides acting as a communication media, computer affects the learner’s cognitive process by providing learner varietal programmed tools for language learning.

For example, the research of Bridwell, Geoffrey Sirc, and Robert Brooke showed that word processors actually alter the cognitive process by which writers compose and revise. And many writers said that spelling checkers improved spelling because they encourage students to use the dictionary. And for the second language learning, more and more software are designed in the multi-language environment to make the biggest amount comprehensible input to users. Those computer-mediated learning tools (software) are bringing the learners a subtle but not obvious change in the cognitive process.

But there is another thing we should notice and investigate more is the limitation on the use of computer-mediated tool in language learning. For example, David N described in his research that some computer programmes meant to respond to the meaning of one’s writing are not and will not be useful in writing.

Conclusion

There are still some questions left for further investigation to find the complete explanations like: How computer-assisted learning effective in different subject learning? When and how is computer-assisted learning system effective? But the researches do tell us that computer-assisted collaborate leaning has many priorities compared with the traditional academic teaching method. A tailored instructional design under the CACL environment will improve learners’ cognition and make learning more effective.

References