E-learning process modeling technologies, development technologies for Web-based learning support system tools

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Summary of Research

Research, Development, and Proposal of "Technique Studies" for Effective E-learning

Our laboratory creates new education/learning models for the network era. It also designs and develops learning support technologies to explore a new world of learning. We propose "technique studies," a field of study for investigating effective learning methods using new media. This is our first project.

As the Internet continues to expand and grow more sophisticated, expectations are growing for e-learning, or systems that would enable lifelong study unbound by physical or spatial constraints. However, in reality, e-learning has not lived up to its promise.

One reason is that e-learning requires the learner to collect and reconstruct the necessary information from a vast volume of Web content. In other words, the learner must take the initiative of seeking out information and studying on his/her own.

Metacognition Support Tools

In light of the above, our laboratory decided to formulate a learning model (method of learning), rather than examining what tool is needed. Based on this model, we then develop tools.

The metacognition support tool is one of these tools. When a learner browses the Web and visits websites to gain knowledge of something, he/she jumps from website to website without viewing them in an orderly manner, unlike reading the pages of a book in strict sequence. The learner correlates the information obtained from the websites viewed in haphazard sequence or maps the information in his/her head in order to reconstitute the information into knowledge.

If the learner is unable to perform the above process well, he/she will be quickly lost in a vast sea of information and become uncertain of what he/she was searching for or why he/she reached and viewed certain websites. The learner ends up learning nothing after many hours of browsing the Web.

During the browsing process mentioned above, the metacognition support tool automatically stores information on Web pages accessed by the learner and creates a map. It then correlates the pages and creates a browsing history. By viewing the map and browsing history, the learner will understand at a glance the process (route) by which he or she reached the current Web page and its mutual relationships to previously viewed pages. Those using this tool for learning purposes can spontaneously acquire the skills needed to gain knowledge using the Internet. In short, the metacognition support tool gives people the ability to learn how to learn (meta-learning).

E-learning Library and Learning Resource Navigator

We have developed other learning tools as well, including an e-learning library and learning resource navigator. Using these tools, we are building a new learning environment beyond the reach of conventional textbook-based instruction methods. This is our second project.

We will post the newly developed learning environment on the Web to invite people to participate in our project. This will allow us to incorporate comments and viewpoints and to develop more effective systems. Our open research activities have drawn positive response.

Keywords

E-learning, learning science, learning engineering, technique studies, learning models, metacognition support tool, e-learning library, learning resource navigator, Web-based learning support

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Advantages

Learning Science that Introduces Engineering Approaches to Education

The e-learning addressed by our laboratory differs from the e-learning advocated by many educational organizations and educational researchers in that we take an engineering approach to achieve effective e-learning based on a learning model for learning how to learn. This is a characteristic of the University of Electro-Communications, a science-/technology-oriented educational institution.

We closely observe how learners accumulate knowledge using new media called the Web, then incorporate the techniques observed into tools. Learners who use a tool for learning spontaneously acquire the skills required to learn using the Web and the tool. The concept of this tool is carefully thought out and radically different from other learning tools that merely enumerate content or incorporate novel learning features simply to showcase their unique functions. Our scientific approach to learning reflects a unique characteristic of our laboratory.

Making "Learning Bench" Available on the Web

Another unique feature of our laboratory is that we promote "open projects." Instead of pursuing research activities in the isolated environment of the university, we invite those interested in remote learning and lifelong learning to participate in our projects. Our laboratory posts a so-called "learning bench" on its homepage, a learning environment that draws on learning support tools much like those introduced above.

When large numbers of people use this environment to learn, the process of their learning is fed back to our laboratory and reflected in the development of new learning models and learning tools. This approach to research is both advanced and novel and takes advantage of the characteristics of the Web as a medium.

Future Prospects
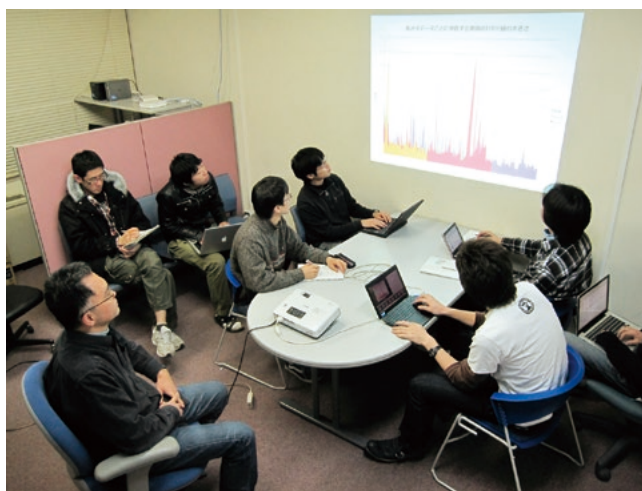
Triggering an Era of Full-fledged E-learning

Educational needs continue to grow in breadth and depth. While demand is growing for more detailed education for children, there are active discussions on new lifelong education systems for older people and people living in remote locations.

Against this backdrop, expectations are growing for new learning systems based on the Internet, and there is urgent need to establish new Web-based learning models.

The learning models and learning tools developed by our laboratory will continue to evolve. We expect them to trigger the dawn of an era of full-fledged e-learning.
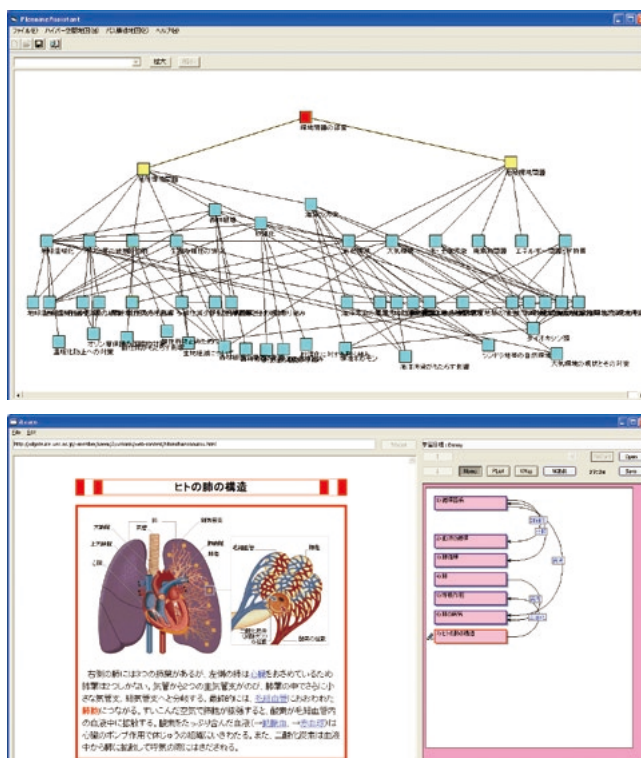
Metacognition support tool designed to make effective use of Web resources for learning

Research meeting

Programming