

Context-Aware and Ubiquitous Learning (Guest Editorial)

Stephen J.H. Yang

National Central University, Taiwan // jhyang@csie.ncu.edu.tw

Toshio Okamoto

The University of Electro-Communications, Japan // okamoto@ai.is.uec.ac.jp

Shian-Shyong Tseng

National Chiao-Tung University, Taiwan // sstseng@cs.nctu.edu.tw

Context-aware and ubiquitous learning is a computer supported learning paradigm for identifying learners' surrounding context and social situation to provide integrated, interoperable, pervasive, and seamless learning experiences. The objective of context-aware and ubiquitous learning is to enhance Web-based learning a step further from learning at anytime anywhere to learning at the right time and the right place with right resources and right collaborators.

We summarize the characteristics of context-aware and ubiquitous learning in the following eight aspects: mobility, location awareness, interoperability, seamlessness, situation awareness, social awareness, adaptability, and pervasiveness:

- **Mobility:** The continuousness of computing while learners move from one position to another.
- **Location awareness:** The identification of learners' locations.
- **Interoperability:** The interoperable operation between different standards of learning resources, services, and platforms.
- **Seamlessness:** The provision of everlasting service sessions under any connection with any device.
- **Situation awareness:** The detection of learners' various situated scenarios, and the knowledge of what learners are doing with whom at what time and where.
- **Social awareness:** The awareness of learners' social relationship, including what do they know? What are they doing at a moment? What are their knowledge competence and social familiarity?
- **Adaptability:** The adjustability of learning materials and services depending on learners' accessibility, preferences, and need at a moment.
- **Pervasiveness:** The provision of intuitive and transparent way of accessing learning materials and services, predicting what learners need before their explicit expressions.

The aforementioned characteristics of context-aware and ubiquitous learning pose significant challenges and motivate the original of this special issue.

Huang, Huang, & Hsieh present a ubiquitous cooperative learning environment using proposed annotation services, wireless communication devices, and the Jigsaw method of cooperative learning. The purpose of their study is to investigate the potential benefits of studying digital course materials with embedded annotations.

Chen, Kinshuk, Wei, & Yang present a Group Area Network (GroupNet) learning environment, which is a mobile learning management system providing better support of mobile learning for small groups of learners with effective social interaction within proximity.

Chen & Chao present a paper-based learning support environment in which mobile phones, traditional books and a Web-based discussion forum are integrated together to promote students' acquisition of knowledge. Students receive contextual messages from an online learning community based on their learning status.

De Jong, Specht, & Koper present a generic technical framework for contextualised media for learning. The technical framework can be used in a range of different learning scenarios which results in an easier integration of contextualised learning appliances into current learning.

Peng, Chou, & Chang investigate the interactivity concept and its applications for interactive function design in a ubiquitous-learning system (ULS). They compare interactivity dimensions and corresponding interactive functions of Web-based learning systems with ULS, and offer a technical framework for a successful incorporation of interactive functions into ULS.

Sung, Chang, Lee, & Yu present a study on the effect of a mobile electronic guidebook on visiting behaviors in a museum of history, and evaluate how to use mobile devices to support the museum's functions of lifelong learning.

Hwang, Tsai, & Yang present the basic criteria, strategies, and research issues of context-aware ubiquitous learning, and identify the necessary check items for the development of such learning environment. They also present how to conduct context-aware ubiquitous learning activities and requirements of setting up such learning environment.

Chiu, Choi, Wang, & Kafeza present an alert management system (AMS) featuring ubiquitous communications management in distance education to ensure timeliness and availability of consultation and decision under various requirements.