

## Multidimensional Analysis of U-learning

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**Abstract.** Ubiquitous learning as a new concept has been accepted by more and more countries since it is proposed. Many countries are researching and practicing deeply which makes it develop rapidly. However, it lacks further research on its real connotation, advantages, trend etc. Ubiquitous learning will be the revolution of learning paradigm. We should research and understand the concept of U-learning, its advantages and its trend in a multi-dimensional point of view.

### The Origin and Development of Ubiquitous Learning

Ubiquitous Learning is what we often call the U-learning. Ubiquitous learning is a word that originated in the “ubiquitous computing”. Mark Weiser is the father of ubiquitous computing. In 1988, was in the laboratory of Palo Alto Research Center of Xerox for computer science, Weiser first described the ubiquitous computing: “Offer each office and everyone with hundreds of wireless computing devices .The operating system propose new requirements, like user interface, network, wireless, display and many other aspects .We call our work as “ubiquitous computing”, which is different from the PDA, Dynabooks or palmtop computer information .It is invisible, also is a kind of ubiquitous computing and it does not depend on any form of artificial equipment.” In “The Computer for the 21st Century” he further explains: “The most sophisticated technology is the technology of disappearance”, “the machine is to adapt to human environment but not to force human into the machine environment which allows the use of computers as easy as woodland walk.”

With the development of information technology and the application in the field of education, education also started to research and application the ubiquitous learning. Many countries in the world are in-depth study and practice on U-learning.

The “Handheld Devices for Ubiquitous Learning” (HDUL) project at Harvard University in the United States. The study of HDUL demonstrated a wireless handheld device is very useful portable research assistant and on the travel channel of online learning.

Reliving the Revolution, RTR project at the Massachusetts Institute of Technology researched the varieties of functions and potentials of handheld devices in support of teaching. It researched to teach history survey, effective collaboration, media fluency, decision-making and critical thinking skills by using wireless handheld device models.

Museum without walls project (MWOW) of MIT was a five years’ plan that was scheduled to establish a MWOW system by the year 2011. The project was a research project with innovative, location-based, storytelling.

The Mobile ELDIT project in the European aimed to develop a mobile version of online language learning system, which provided to the mobile users in the way of ubiquitous learning. This system allowed the learners to download ELDIT learning materials from the Internet through windows operating system PDA, and to learn offline.

### Concept and Connotation of Ubiquitous Learning

In 2001, “New Research Challenges for Technology Supported Learning” open conference (founded by the European Commission IST project) in the final report noted that U-learning was

not a unitary concept, it involved many problems in which the relationship were not easily understood, and there was a phrase could reflect the concepts and characteristics of ubiquitous learning, named “learning as a way of life”

Zhao Hailan said in 2007 that “With the development of information communication technology U-learning is changing limitations of E-learning to create a new educational environment that is highly autonomous, unlimited by space and time and learner centered.”

Professor Ding gang puts forward that “U-Learning defined exactly is mobile-Learning, which is the unity of action and learning.”

Some scholars put forward that in China Southern Song Dynasty a famous philosopher Zhu Xi once said: “To learn everything, to learn at any time and to learn anywhere leads to success.” That was the learning concept, and that the earliest representations of ubiquitous learning in history.

So we can see that there are many definitions in the academic field of the world. But most of them include the same main points. We conclude them and put forward that Ubiquitous learning is a kind of learning mode for anyone to learn anywhere, anytime and can get anything he wants.

## Characteristics and Advantages of Ubiquitous Learning

**Characteristics of ubiquitous learning** Permanency: Learners can keep on learning unless they cancel it, and the learning process is continuous and seamless. Accessibility: Learners can access to learning materials include text, pictures, video, audio and other forms. Immediacy: Learners can get the information directly from the server or the peer to peer network no matter where they are. And the information is immediate, such as clicking online learning videos and watching videos at the same time. Interactivity: learners can discuss and communicate with other learners synchronously or asynchronously, which realizes information interaction and interactive learning. Adaptability: ubiquitous learning means anyone who are in any place, at any time can obtain their needed information and learning support, so that he can easily complete the task of learning. Situation of instructional activities: Learning can be integrated into learners’ daily life. Learning problems or required knowledge can be represented naturally and effectively. This will help learners pay more attention to situational characteristics of the problems.

### Advantages of Ubiquitous learning.

**The advantage of space and time.** The traditional learning is largely limited by time and space, it has uniform, relatively rigid plan and arrangement in time, and the space is limited to specific locations. In regular schools one must get to the given site at given time, and learn the given courses. Even in the network environment one can only learn at limited time and limited environment. However ubiquitous learning is not limited by time and space, students can learn at any time and any place. If they would like they can learn .When learning time, space is no longer restricted people’s learning activities become more diverse. Learning behaviors occur not only in the classroom, computer, mobile phone, also can occur in any activity of life and work. That is to say spatiotemporal changes of ubiquitous learning make learning, working and life as a whole. And that really can make life-long learning possible.

**Resource advantage.** Ubiquitous learning resources are not only the school education special resources but also the entire network information resources. Even the whole society and the nature can be regarded as learning resources including the physical environment, information environment learning resources and the elements that are helpful for acquiring knowledge. These resources can be transmitted through the three-dimensional learning network that includes schools and also includes satellite networks, digital television networks, Internet, mobile networks and other mobile terminal equipments as phone, PDA, MP3, MP4, etc.

**Humanization service advantage.** The traditional classroom teaching, online learning and mobile learning can partly record the students' learning contents and learning activities. Based on these records and archives computer networks or the mobile communication equipments provide students with a set of learning support services. But learning supporting service systems are predesigned based on the simple and subjective analysis to the learners, so the learning contents are always rough, biased and rigid. Although the students can choose and adjust somewhat, it is still not

comprehensive and targeted enough. Ubiquitous learning can not only automatically record all the students learning contents and learning activities, but also record the learning environment information simultaneously. It also can analyze the complex information and provide personalized learning support service for the learners, showing the “people-oriented” concept.

**Advantage of learning and evaluation.** In ubiquitous learning environment, evaluation of learning has been able to extend to any place outside of the classroom. The system can ask questions whenever and wherever, and evaluate constantly, based on students' location, surrounding environment, learning activities and learning processes. After a stage of measurement and evaluation, the system can provide the evaluation result and the related auxiliary materials immediately to help students adjust their learning behaviors, so that they can achieve more effective learning. More importantly, in such an environment, can we evaluate these aspects, such as their knowledge, skills, abilities and emotional changes. The contents of learning and evaluation are more abundant and specified.

### Outlook of Ubiquitous Learning

**To deepen the essence of learning.** The essence of learning is that people, in practice, continuously acquire knowledge and internalize it consciously into their own quality and ability in various ways, means and methods. It is the process for people to reform themselves, to develop, to improve and perfect. It is the process for people to be the subject and enhance the subjectivity.

This essence has three meanings. First, it emphasizes that learning is a kind of practical activity that makes people to be subject and improve the degree of freedom and practicalness of subject. Second, it emphasizes that people's self-reform, development, improvement and perfectness is achieved depending on learning and acquiring knowledge. Third, it emphasizes that acquiring knowledge needs to have certain ways and methods.

**Promoting technology development, creating learning environment.** Ubiquitous learning requires “de-technology”, namely requires technology “disappears”. This sounds contradictory to promoting technological progress and development. In fact, that ubiquitous learning demands technology “disappears” and “de-technology” does not really want to eliminate technology, but makes technology to be more intelligent, simple and more humane in everywhere of life.

This highlights the convenience of life with technical support. Its standard actually makes higher demand to technology. It requires technology join the information space and physical space seamlessly. In the space people can get digital service whenever and wherever and transparently. These services are invisible, contained in the satellite network, digital television networks, internet, mobile network, other networks and context-awareness mobile devices. For example, ubiquitous learning technology as various built-in, hidden wireless communication devices and sensor technology are becoming mature. In the future no matter where we go, tables, chairs, appliances, street lamps can detect and collect our specific personal information as our temperature, heartbeat, blood pressure, location, weather conditions and so on. The computer system will collect and record people's activities. According to these parameters, computer system will provide various supporting services, records and evaluations.

Using surrounding environment we can learn whenever and wherever Ubiquitous learning is making teaching and learning change fundamentally. It will create a better social environment of learning.

**Extending freedom of subject, realizing personalized education.** Freedom, which not only has ultimate significance but has contemporary significance, is the highest value for human to pursue. Pursuing Freedom is the nature need for human as subject. In ubiquitous learning environment, learners are subject, intelligent space, constructed with information space and physical space, is object. The learning process is that subject acts upon object. In this process, people's initiatives and subjectivity will be played fully. Ubiquitous learning concerns the individual learner, fully reflects learners' freedom. Learners can learn and practice with their own needs. In ubiquitous learning environment learners get learning resources services and support freely. It shows the subjectivity of subject. Invisible technology and peaceful environment makes learners free. The

freedom brought by technology gives more choices to learners. And it creates unprecedented conditions for the development of human. With ubiquitous learning equipments, resources and support, learners care less about technology itself, otherwise they pay more attention to the learning tasks and needs. Essentially, it is self teach and individualized education regarding the learner as subject.

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