

# Towards Constructing a Platform that Makes Learning Contents on the Web “Anti-Ubiquitous”

Noriki AMANO

Center for Research in General Education, Saitama University  
255 Shimo-Okubo, Sakura-ku, Saitama City, Saitama 338-8570, JAPAN  
amnrk@mail.saitama-u.ac.jp

## ABSTRACT

In this work, we propose a method of constructing a platform that makes learning contents on the Web “Anti-Ubiquitous”, resolve the problem of halting study by “ubiquity” in WBL(Web-based learning) and make WBL more effective and beneficial. “Anti-Ubiquitous” that we have proposed is an opposite concept of “Ubiquitous” and means to add constraints to the location and time in “Ubiquitous”. Anti-Ubiquitous learning based on the concept increases the awareness and level of concentration of learners and promotes effective and substantive learning. However, it is not efficient for each teacher to create Anti-Ubiquitous learning contents from scratch. Therefore, we propose a method to make existing learning contents on the Web “Anti-Ubiquitous”. Currently, since high-quality learning contents such as OCW and MOOC already exist on the Web, the significance of our approach is great.

## KEYWORDS

Web-based learning, Anti-Ubiquitous learning, Platform, learning contents

## 1 INTRODUCTION

Although WBL[1] is ubiquitous learning that is highly convenient (whenever, wherever, whoever), the ubiquity may lead the halting study. This is because it is easy for the priority on learning to drop when there are not any limitations. In fact, it is easy for “anytime, anywhere” to become “sometime, somewhere”, as a result, it may lead to the procrastination of learning activities.

In this work, we aim to establish a method to make learning contents on the Web “Anti-Ubiquitous” in order to resolve the problem of halting study by “ubiquity” in WBL and to make WBL more effective and beneficial. “Anti-Ubiquitous” that we have proposed is an opposite concept of “Ubiquitous” and means to add constraints to the location and time in “Ubiquitous”. Anti-Ubiquitous learning[2] based on the concept increases the awareness and level of concentration of learners and promotes effective and substantive learning.

However, it is not efficient for each teacher to create Anti-Ubiquitous learning contents from scratch. Because there are a lot of learning contents with high-quality on the Web, it is desirable to realize Anti-Ubiquitous learning by using such existing contents.

From such a point of view, we propose a method to make learning contents on the Web “Anti-Ubiquitous”. Concretely speaking, we aim to construct a platform for Anti-Ubiquitous learning on the Web and to adopt the way of adding constraints to the access time and location when we access the learning contents through the platform. Since high-quality learning contents such as OCW(Open Course Ware)[3] and MOOC(Massive Open Online Course)[4] already exist on the Web, the significance of our method is great.

The remainder of this paper is organized as follows: Section 2 mentions our research background and clarifies the problem, which we try to solve. Anti-Ubiquitous learning that we have proposed is also mentioned in this Section. Section 3 mentions our method to

make learning contents on the Web “Anti-Ubiquitous” in detail. Section 4 discusses related work. Section 5 concludes this paper.

## 2 RESEARCH BACKGROUND

### 2.1 The Inherent Problem in WBL

Nowadays, there are a lot of high-quality learning contents such as OCW, MOOC, etc. on the Web. WBL has spread rapidly all over the world. In fact, several hundreds of thousand students have been rushed to the free online courses provided by famous MOOC platforms like Coursera[5], edX[6], etc.

Such online courses are high-quality and some state-of-the-art technologies are used in their platforms. For example, they provide a place that has the function of SNS(Social Networking Service) for social learning where students mutually learn from each other. In final exams of the online courses, they try to deal with substitute exam takers and identity thieves by analyzing students' typing, etc.

However, even if such MOOC platforms have some state-of-the-art technologies, they cannot handle the inherent problem in WBL, which is halting study by “ubiquity”. Although WBL is ubiquitous learning that is highly convenient (whenever, wherever, whoever), the ubiquity may lead the halting study. This is because it is easy for the priority on learning to drop when there are not any limitations. Since it is easy for “anytime, anywhere” to become “sometime, somewhere”, it may lead to the procrastination of learning activities[7].

Actually, from usage situations of the learning management system in our institution<sup>1</sup>, we had to understand the reality that many students had accessed to the learning contents only one week just before final exams.

### 2.2 Anti-Ubiquitous Learning

We have proposed Anti-Ubiquitous learning that is the learning “at specified time and place” by using ICT(Information and Communication Technology) to create such a virtual situation for learners. It is based on the directly opposite concept from “Ubiquitous”, however the foundation is “e-learning”. Anti-Ubiquitous learning is not “Non-Ubiquitous” one that does not use e-learning at all, but “Anti-Ubiquitous” one that is produced by adding restrictions and limitations to ubiquity in e-learning.

Anti-Ubiquitous learning makes it possible for learners to learn only at specified time and place by themselves. Therefore, since the learners feel that “we can only study now and here”, Anti-Ubiquitous learning increases the awareness and level of concentration of learners and promotes effective and substantive learning. As a result, the learners develop self-motivated learning attitude and regular learning habits, because they specify “learning time and place” by themselves.

In Anti-Ubiquitous learning, the most important point is the constraint and/or restriction on the learning time and place. This is because the time and location are thought to occupy an extremely important position during learning. In fact, the times where people are able to concentrate are various greatly between individuals depending on lifestyle habits and natural biorhythms. Based on these points, more effective learning can be anticipated by choosing the time and place of learning carefully.

However, it is difficult to realize Anti-Ubiquitous learning completely because of technical issues such as accuracy of location information, etc. Nevertheless, assuming that there is some degree of correlation to the time and place of learning, it is possible to simulate Anti-Ubiquitous learning by using existing LMS(learning management systems) in a pseudo way. Actually, we practiced pseudo Anti-Ubiquitous learning in real lectures by using WebClass[8] that is an existing LMS, and verified the effectiveness[9]. In particular, we practiced two methods in two classes of the

---

<sup>1</sup> It indicates Okayama University that is the author's former institution.

same subject. One is pseudo Anti-Ubiquitous learning, and the other is ubiquitous learning. We compared the average score and time of learning in both classes. On both the score and the time of learning, the class in pseudo anti-ubiquitous learning was superior to those of the class in ubiquitous learning.

Furthermore, we designed and implemented a prototype system for Anti-Ubiquitous learning. The prototype system is based on LMS, which is a platform of e-learning. It enables or disables the accesses of learning contents according to the specified time and place of each individual learner. Although it was built on the Web, we had to implement learning contents according to the specific specification for Anti-Ubiquitous learning from scratch. Moreover, there was a fatal problem, which we could not use a lot of existing useful learning contents on the Web by using the prototype.

### 3 A METHOD FOR ANTI-UBIQUITOUS

#### 3.1 Basic Policies

We consider the research background in Section 2, and aim to establish a method that makes existing learning contents on the Web “Anti-Ubiquitous”. Specifically, towards learning contents on the Web, we design a mechanism for adding constraints about the learning location and time, and implement a prototype system. The basic policies are the followings:

1. It does not alter the implementation (HTML, CSS, etc.) of learning contents.
2. It does not require any special knowledge and skills to users.
3. It does not require special programs except for Web browsers.
4. It does not depend on particular Web browsers.

The above 1 and 2 are prerequisites rather than policies. The above 1 also includes the change of configuration files of Web sites that have

learning contents. The above 3 means a special program except for Web browsers, but there may be some cases where plug-ins for Web browsers will be required. Although we aim to realize the above 4 as far as possible, it is difficult at present. Since mechanisms for HTML5[10], CSS3[11], etc. are not implemented by some Web browsers, it is hard for us to achieve the above 4 completely.

#### 3.2 Difficult Problems

The most difficult problems on Anti-Ubiquitous learning contents on the Web are the followings:

- hiding URLs of learning contents
- real-time control of learning location and time

In this work, to make learning contents on the Web “Anti-Ubiquitous” means to add restrictions to accesses of learning contents according to the time and location. However, if we cannot hide URLs of learning contents, the effect of “Anti-Ubiquitous” is reduced by half. Needless to say, if URLs are known, we can access directly to learning content at anytime, anywhere. This is a fatal problem, but from the security point of view, to hide the address bar of Web browsers is inadequate. Currently, it is a specification that we cannot hide the address bar in many Web browsers.

Using the redirection of HTTP, it is possible to realize Anti-Ubiquitous learning contents without hiding URLs[12]. However, in that case, there is a need to modify configuration files in Web sites where there are learning contents. It is a violation of the basic policy 1 in Section 3.1, and it is impossible in the real.

The access control of learning contents is required not only at the start of learning, even during learning. The time is changing, and learners may move during their learning. In other words, from the beginning to the end of learning, we have to continue monitoring the time and location of learners, and if constraints

on access time and location are no longer met, we must block access to learning contents.

However, the exact track of learning location is difficult with current technology. In this work, we rely on technological innovation in the future about this. The accuracy of location information measurement stays in the range of current technology.

### 3.3 Handling the Problems

It is difficult to solve the problems in the previous section completely. At present, we are working on the implementation of a prototype system based on the followings.

- Use of inline frame in HTML5
- Prohibition of right-click on Web pages
- Use of Ajax for asynchronous communication

If we put learning contents into inline frame in HTML5, URLs of the learning contents are hidden outwardly. However, if right-click on Web pages is available, the URLs are revealed from source codes by using the context menu on Web browsers. Therefore, right-click on Web pages must be prohibited. This can be easily implemented in JavaScript. Unfortunately, these methods are incomplete at all. This is because it is also possible to display source codes of Web pages from the menu of Web browsers. Even if we can hide the address bar and menu of Web browsers, it is insufficient. We must also prohibit screen capture and printing. Although we can do such things, what can we do for screen photography with digital cameras? For these points, there are researches of prevention technologies of spying displays[13]. In order to exceed the scope of this work, we do not adopt such technologies.

Moreover, we use Ajax to control access for location and time during learning. By using Ajax, changes of learning location and time can be acquired asynchronously from Web browsers. As a result, we can control the access to learning contents on Web sites.

### 3.4 System Architecture of Prototype

We are currently working on the implementation of a prototype system for Anti-Ubiquitous learning. Figure 1 shows the system architecture.

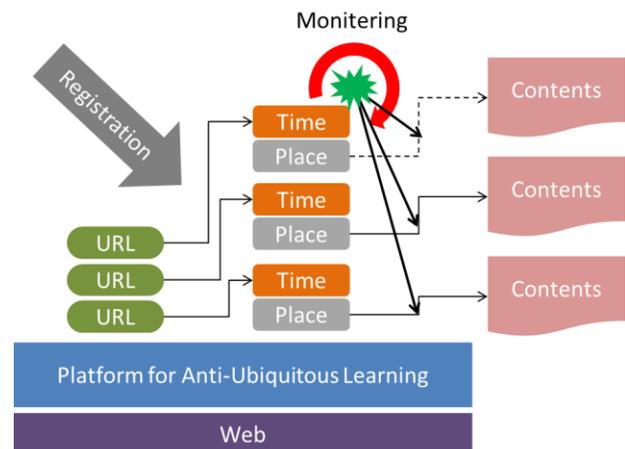


Figure 1. System Architecture of Prototype

The prototype system is a platform on the Web. When users access learning contents through the platform, the accesses are controlled depending on the learning location and time. The followings are procedures of use.

1. User registration (initial time only)
2. Registration of names and URLs of learning contents
3. The learner selects a registered learning content and registers her or his learning location and time.
4. The learner logs in the platform from the registered location at the registered time, then she or he studies by using the learning content.
5. When the learner leaves the specified location during learning or the time of learning is over, the platform will detect it and block access to the learning content.

As the above, the mechanism of the platform is simple and obvious. Currently, we do not handle the access control of learning contents in

real-time for frequent movements of users during learning. Namely, after learners are away from their learning locations and their accesses are blocked, if they return to their locations during learning, they must log in again.

In addition, we let the platform have the function of storing learning histories of registered learners. As we described in Section 3.2, the complete hiding of URLs of learning contents is too difficult. Therefore, the learners can access learning contents directly without using the platform. In such case, there is no meaning to build a platform like this.

However, the purpose of “Anti-Ubiquitous” is not to prohibit learning. It is to boost the awareness of students who cannot learn proactively. Paradoxically speaking, it is not necessary for students who are accustomed to learn proactively to use this platform. But if they do not use the platform, their learning histories do not remain in the platform. This means there is no evidence that they have learned. From teachers' point of view, they can see learning histories of students in the platform and can use the histories for academic assessment. By devising how to use the platform in this manner, we can avoid the fatal problem such as incomplete hiding of URLs.

### 3.5 The Role and Authority of Users

As users of this platform, we assume teachers and students. Now, we examine whether we distinguish the roles of teachers and students. The issue is the following.

*“Should we permit students to register learning contents into the platform?”*

In terms of proactive learning support, it is desirable that students can also register learning contents into the platform. However, in such case, to hide URLs of learning contents becomes almost meaningless. As described above, it is not essential to hide URLs of learning contents. However, it is unlikely that

students without regular learning habits and proactive learning attitude to register learning contents into this platform and to practice autonomously Anti-Ubiquitous learning.

In addition, the platform needs a mechanism to bind teachers and students. To see and evaluate learning histories of students by teachers compensates the incomplete hiding of URLs of learning contents and promotes the use of the platform by students.

## 4 RELATED WORK

In e-learning such as WBL, since the ubiquity that gets rid of constraints of learning time and location is the merit of the best, there is no idea such as addition of constraints to the learning time and location. However, as similar methods, there are SRL(Self-Regulated Learning) and CBL(Cohort-Based Learning).

SRL[14] is a learning method that learners specify schedules of learning, study according to the schedules, and evaluate learning outcomes by themselves. As a method to enhance the effectiveness of e-learning, SRL comes to the front recently. Although SRL is similar to Anti-Ubiquitous learning in terms of initiative learning schedule by learners, it is hard to bring a sense of tension for learning by specifying the schedule only. SRL does not have the concept of learning location, either.

CBL[15] is a group learning method that designates start and end points of a learning course, and requires learning targets and problems given at fixed intervals to be cleared. University of Illinois adopts CBL in order to increase the effectiveness of e-learning, and obtains high achievements. CBL shares several things in common with our work in terms of setting temporal constraints on e-learning. However, in Anti-Ubiquitous learning, time settings are based on regular learning habits of learners. Moreover, CBL does not have the concept of learning location, either.

Kajita has been doing the research of a context-aware LMS(Learning Management System)[16]. It is based on ubiquitous

computing. It provides educational services for students and faculty staffs depending on their context. Therefore, it can be regarded as a kind of research on Ubiquitous Learning[17]. There is also similar work by Li[18], etc. Ubiquitous learning and Anti-Ubiquitous learning are not competitive but complementary.

For the problem of halting study in e-learning, there are also methods which are not systematic: mentors in e-learning[19], Blended Learning[20] that combines face-to-face lectures and e-learning, etc. However, students in MOOC are more than hundreds of thousands, and the number of students in WBL is uncountable. In such case, the introduction of mentors in e-learning and/or the realization of Blended Learning are not appropriate and realistic.

## 5 CONCLUSION

In this paper, we proposed a method that makes learning contents on the Web “Anti-Ubiquitous”. Since a lot of high-quality learning contents such as OCW and MOOC already exist on the Web, the significance of our method that realizes Anti-Ubiquitous learning by using such learning contents is great.

We are in the stage of implementing a prototype system using PHP and HTML5. In the prototype system, we use Geolocation API[21] to acquire location information. Since the accuracy of the location information depends on each Web browser, we are considering to focus on specific Web browsers at the moment.

Furthermore, we have a plan to use the platform in our classes. After carrying out the experiment and evaluation of the platform in real, we open it in public.

## Acknowledgment

This work is supported by JSPS KAKENHI (Grant-in-Aid for Scientific Research(C)) Grant Numbers 26330400.

## REFERENCES

- [1] H. F. O'Neil, R. S. Perez, “Web-Based Learning: Theory, Research, and Practice”, Routledge, 2006.
- [2] N. Amano, “Anti-Ubiquitous Learning: A New Learning Paradigm”, Proc. of the Ninth IASTED International Conference on Web-based Education (WBE 2010), pp.219-224, 2010.
- [3] OpenCourseWare, <http://www.occonsortium.org/>
- [4] M. Nanfito, “MOOCs: Opportunities, Impacts, and Challenges: Massive Open Online Courses in Colleges and Universities”, CreateSpace Independent Publishing Platform , 2013.
- [5] Coursera, <https://www.coursera.org/>
- [6] edX, <https://www.edx.org/>
- [7] C. Kogo, A. Nakai, E. Nozima, “Relationship between procrastination tendency and student dropouts in e-learning courses”, Japan Society for Educational Technology, JSET04-5, pp.39-44, 2004. (in Japanese)
- [8] WebClass, <http://www.webclass.jp/> (in Japanese)
- [9] N. Amano, “An Experiment and Consideration of Pseudo Anti-Ubiquitous Learning by using Learning Management System WebClass”, Journal of Japan e-Learning Association, Vol.13, pp.87-94, 2013. (in Japanese)
- [10] HTML5, <http://www.w3.org/TR/html5/>
- [11] CSS3, <http://www.w3.org/Style/CSS/>
- [12] D. Gourley, B. Totty, M. Sayer, “HTTP: The Definitive Guide”, O'Reilly Media , 2002.
- [13] T. Yamada, S. Goshi, I. Echizen, ”Method for Preventing Illegal Recording of Displayed Content Based on Differences in Sensory Perception between Humans and Devices”, Journal of IPSJ Vol.54, No.9, pp.2177-2187, 2013. (in Japanese)
- [14] B. J. Zimmerman, D. H. Schunk, “Self-Regulated Learning and Academic Achievement: Theoretical Perspectives”, Lawrence Erlbaum Associates, 2001.
- [15] I. M. Saltiel, C. Russo, “Cohort Programming and Learning: Improving Educational Experience for Adult Learners”, Kieger Publishing Co, 2001.
- [16] S. Kajita, R. Iwasawa, T. Kanegae, S. Ura, A. Nakazawa, K. Kakusho, H. Takemura, M. Minoh, K. Mase, “Development of Context-aware CMS under Ubiquitous Computing Environment”, 8th Annual WebCT User Conference, Chicago, IL, 2006.
- [17] T. T. Kidd, I. Chen, “Ubiquitous Learning: Strategies for Pedagogy, Course Design, and Technology”, Information Age Publishing, 2011.
- [18] L. L. Zheng, Y. Ogata, H. Yano, “A conceptual Framework of Computer-Supported Ubiquitous Learning Environment”, International Journal of Advanced Technology for Learning, Vol.2, No.4, pp.187-197, 2005.
- [19] O. Simpson, ”Supporting Students for Success in Online and Distance Education : Third Edition” , Routledge, 2013.
- [20] J. Bersin, “The Blended Learning Book: Best Practices, Proven Methodologies, and Lessons Learned”, Pfeiffer, 2004.
- [21] Geolocation API Specification, <http://dev.w3.org/geo/api/spec-source.html>