

# exCampus : an Open Source e-Learning System for Higher Education

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## Summary:

This paper details the development and implementation of exCampus, an e-Learning environment that complements face-to-face classroom lessons in higher education. exCampus is a flexible tool that accommodates both multi-level participation and access for the general public. This paper examines the effectiveness of the exCampus based practices, which participants have confirmed to be fairly significant.

**Keywords:** Higher Education, INTERNET, Virtual University

## 1. The Internet as an Extension of Face-to Face Lessons

Japanese higher education institutions are in the process of implementing educational reform (Arimoto 1998). It is a challenge to answer the multifaceted nature of student needs in this diversifying society (Amano 1998). Key to meeting these needs is both institutional reform and a thorough review of educational activities by faculty members.

At the same time, higher education institutions are moving Internet-based education programs into high gear (Founders of Virtual University Study Forum, 2001). Conventional face-to-face classroom lessons have the potential to be improved and expanded upon through the use of the Internet, the World Wide Web and e-mail ("On-Campus e-Learning").

As an example, distribution of video, audio and other course materials via the Internet allows students to review lessons and adult and absentee students a chance to participate. In addition, bulletin board systems (BBS) provide a forum for learners to exchange opinions continuously and exchange opinions outside the classroom.

Nonetheless, On-Campus e-Learning is still novel to many students and faculty members. Internet use does not in itself directly lead to improvement of education. We have to design each On-Campus e-Learning environments carefully to best meet individual objectives and content of individual curriculums.

To this end, we have been making public a variety of solutions to the issues we have confronted in implementing an On-Campus e-Learning program (<http://www.excampus.org/>). In addition, a suite of On-Campus e-Learning tools: exCampus (extended campus) that we have developed is distributed.

This paper is an overview of exCampus, an On-Campus e-Learning system that outlines the numerous ways that exCampus can practically contribute to e-Learning infrastructure.

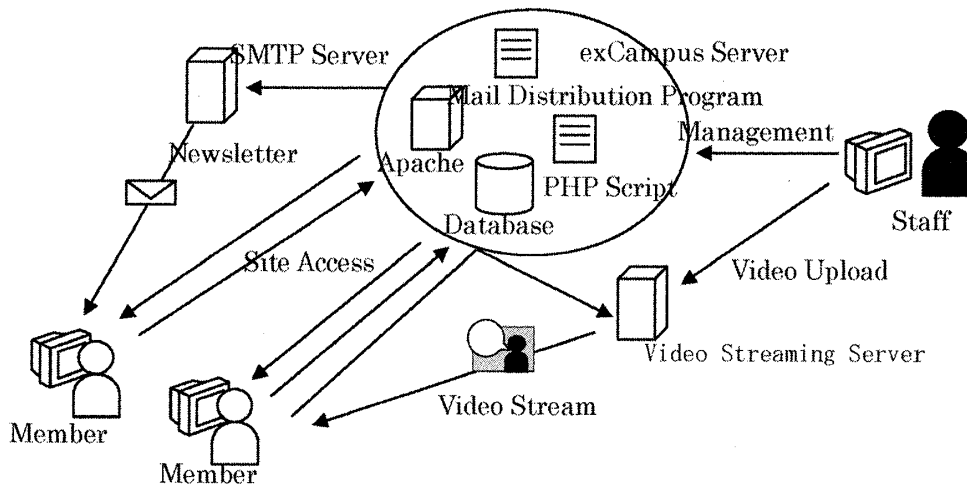


Fig. 1: System

## 2. exCampus Overview

### 2.1 System Overview

exCampus mainly consists of HTML-embedded PHP scripts running on an Apache Web server with PostgreSQL Database (Figure 1).

Presently, at the end of September of 2003, exCampus: (1) manages on-demand class videos and other course materials, (2) delivers lecture announcements, (3) manages member information and

profiles, (4) runs BBS forums, and (5) automatically generates e-mail newsletters, (6) manages term papers. Using this system expands face-to-face classroom lessons into Internet-based education. Note that the video streaming function (1) requires a video-streaming server. The profile function (3) allows members to post their pictures and self-introductions that are shared with members. 'Members', here, are faculty, students, staff, or other registered users.

Members can access the site via any Internet-connected computer running a Web browser, a video player, and email software. Members' on-site activities such as logging in and out, streaming video, accessing course materials, and posting to the BBS forum can be logged and recorded for assessment purposes. Additionally, members with administration privileges can register members, moderate the BBS forum, as well as upload video and course materials via any Web connection.

## **2.2 Multi-Level Participation and Public Access**

exCampus multi-level participation capabilities enables it to serve a variety of participants. It also allows the public flexible access to education.

The expansion of face-to-face classroom lessons onto the Internet allows participation by a greater variety of people, including adult students with day jobs or students junior and senior to the course itself. It will also allow the participation of experts from outside the university, guest lecturers, students from other universities, and interested parties other than students and faculty both inside and outside the university.

As Internet usage spreads, the variety of e-Learning participants is likely to grow. With the trend will come greater public access to information. This public access to higher education confers on institutes advantages such as greater openness, accountability, outside feedback, and publicity.

The exCampus site features an open area and a members area, as shown in Fig. 2. In the open area, lecture videos and course materials are made available to the general public. All site content can be individually opened or closed to the public through management tools. Members officially enrolled in classes can access lecture videos, course materials, the BBS forum, and other content after logging on to the members area with their ID and password.

exCampus can be accessed by a variety of participants beyond the member category of "students." Other categories such as "experts" and "postgraduates" can be freely assigned. Each member can access to resources and the BBS forum, depending on their member category property.

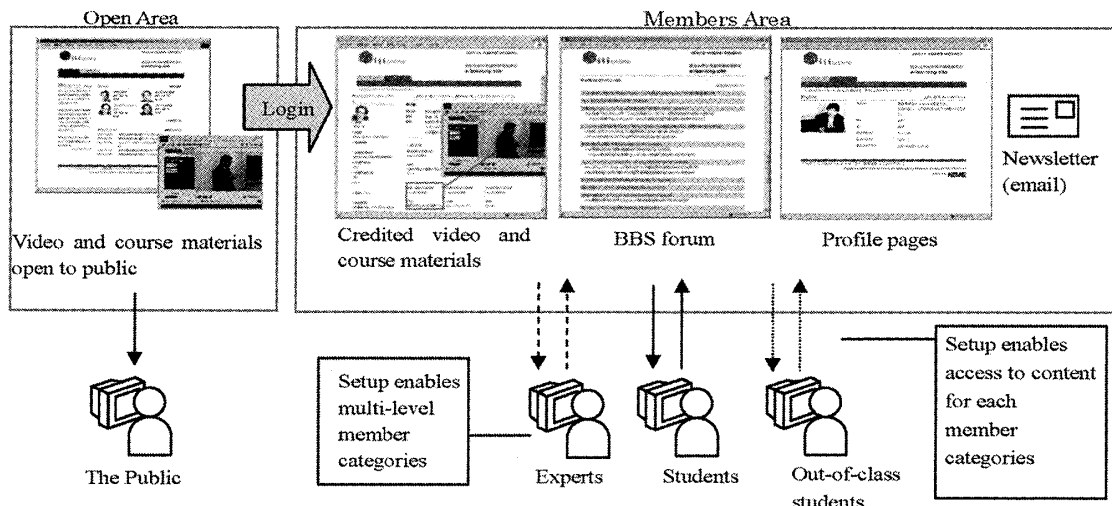


Fig. 2: exCampus Sites

### 3. Present Usage

#### 3.1 Overview of Use

In the 2002 academic year, exCampus was used in fourteen courses at three universities. exCampus was used in different way to suite to each courses' needs.

Launched in April 2002, exCampus-based site "iii online" was used at the Tokyo University Interfaculty Initiative in Information Studies and at the Graduate School of Interdisciplinary Information Studies. The site was incorporated into three courses in the first half of the academic year and two courses in the latter half. The main intention of the project was to support the participation of adult graduate students. Four of these courses made material available in the open area of the site. Lectures were videotaped, and after encoding by a hired technician (often a graduate student), uploaded to a server either the same day or the following day. Fifteen minute video clips were encoded in the Real Video format (225 Kbps). In some classes, students were given questions or tasks to be answered in the BBS forum.

The "iii online" project offered a chance for learners such as adult graduate students to participate in classes through the lectures and the BBS forum available online. It also made available to the public two courses in each semester, with the exception of certain videos, course materials, and the BBS forum. As a result, the site accumulated 1.07 million hits from 46,347 individual users, streaming a total of 5,474 hours of video up to February 20, 2003.

Additionally, Shiga University and Hyogo University of Teacher Education jointly had the exCampus-based site "eMATE", which offered both BBS forum and email newsletter functions to

complement face-to-face teaching. It did not provide video streaming. The eMATE BBS forum was for discussions and the submission of work results.

Classes utilizing eMATE provided a chance for graduate students and students from other universities to meet on the BBS forum, thus expanding the scope beyond the possibilities of face-to-face education. As an example, an assignment to write a proposal of a lesson plan for junior high school was given to students in classes at both universities in the first semester. Students at each university were able to access the other university's BBS forum in the later stages, allowing students to interact with their counterparts at a different university, and review each other's work with each expertise.

### **3.2 Assessment by Participants**

At the end of the 2002 first semester in late July, participants at each university were surveyed to gauge their reaction to the system. Scores on the five-point Likert scale ranged from 1 = Strongly Disagree to 5 = Strongly Agree. The purpose of the survey was to gauge the effectiveness of the present system and find ways to improve it in the future. Table 1 shows an abstract of survey items and their results.

Results from Tokyo University "iii online" participants (62 effective respondents) regarding distance participation were over the intermediate value. This can be seen in their responses to the items "Could access in my own time" and "Physically easy" in the comprehensive assessment category. In contrast, results for "Solved a problem" and "Economical" were below the intermediate value. It must be said that it is not clear whether the former is directly related to use of the Internet. It probably can be surmised that the latter has some relation to connection fees, etc. Though it will be difficult to address these concerns, perhaps the introduction of an inventive scheme to efficiently access videos and the BBS forum may alleviate them.

As for video streaming, the results by and large were higher than the intermediate value. Participants seemed to find the "iii online" video bit rate and fifteen-minute clip length acceptable. However, picture quality was assessed at approximately intermediate value, suggesting room for improvement, which of course should take into account picture content and viewing conditions.

The BBS forum can be considered somewhat successful. On the whole, items related to the forum were evaluated favorably.

Results from participants at Shiga University and Hyogo University of Teacher Education (15 effective respondents) were comparatively higher for items such as "Thought provoking" and "Came to an in-depth understanding". Responses to the BBS forum were also high. This result is considered to be due to the provision of classes at the Universities that encourage BBS interaction.

The results of this survey indicate that students, on the whole, find the On-Campus e-Learning system exCampus a significant and useful study tool. We can conclude that the video streaming and BBS forum design is useful.

Table 1: Abstract of Student Assessment

Item	Average (Standard Deviation)	
	Tokyo Univ.	Shiga Univ./HUTE***
<input type="checkbox"/> Comprehensive Assessment		
[1]** Could access in my own time	3.89 (1.21)	3.05 (1.13)
[2] Could learn about desired subjects	3.03 (1.00)	3.64 (0.95)
[3] Solved a problem	2.62 (0.90)	3.68 (0.95)
[4] Thought provoking	3.10 (1.04)	4.50 (0.60)
[5] Came to an in-depth understanding	3.13 (1.00)	4.50 (0.60)
[6] Physically easy	3.66 (1.20)	n/a*
[7] Economical	2.70 (1.32)	n/a
[8] Efficient way to study	3.27 (1.14)	3.72 (0.83)
<input type="checkbox"/> Video-streamed Lectures (Tokyo Univ. only)		
[1] Good picture quality	2.96 (1.96)	n/a
[2] Good sound quality	3.46 (0.98)	n/a
[6] Segment length appropriate	3.63 (0.92)	n/a
[24] Generally comfortable watching video-streamed lectures	3.21 (1.22)	n/a
<input type="checkbox"/> BBS (Discussion Space)		
[14] Thought provoking	3.30 (1.02)	4.59 (0.67)
[15] Participation was fun	3.23 (1.20)	4.64 (0.49)
[16] Hope to use again	3.46 (1.07)	4.31 (1.04)

\* n/a: HUTE and Shiga University students were not surveyed on items not relevant to them.

\*\* Items are listed in questionnaire order.

\*\*\* HUTE: Hyogo University of Teacher Education

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