Evaluation of ‘PsyWeb’, a Web Based Learning Environment in a Problem-based curriculum on Psychology.

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Introduction

In September 2001 a new study in Psychology started at the Erasmus University in Rotterdam. The Institute of Psychology has chosen for Problem-based Learning (PBL) as its prime pedagogical method and aims at enhancing the curriculum by means of Information and Communication Technology (ICT). Acknowledging that Web Based Learning Environments (WBLEs) include the danger of making one step ahead for technology but two steps back for pedagogy, the staff took up the challenge of trying to take PBL a step further by using ICT in a way that would extend educational practice without compromising their educational model.

After reviewing the major commercially available learning environments, it was decided to use basic web technology to implement the overall structure of the WBLE. For course specific information the Electronic Blockbook system was selected. This Web-based system has been developed by the Learning Lab and was tailored to the 26 years of PBL practice at the University of Maastricht. The WBLE is incrementally being developed under the name of ‘PsyWeb’. During the first year the general framework was developed as well as the general content and services and the course specific contents for the courses of the first year. In this paper we describe the design considerations of PsyWeb and evaluate whether the actually implemented WBLE supported students during their studies.

Design considerations

Prior to getting ICT onboard of the PBL curriculum, a team of staff members stepped back from the jungle of available WBLEs and tried to find ways in which ICT could improve educational practice. They produced a list of requirements and desiderata for a learning environment to adhere to. Added to more general goals there were some PBL-specific requirements. The general goals included reusability of content, providing reliable access to a wealth of information, allowing students to access the materials independent of time and place and establishing direct and good communication channels between staff and students.

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The three main PBL-requirements were:

1. **Consistency in organisation.** Students are allowed to participate only in one course at the time, to offer functionality that allows them to enroll in different courses, for example, would signal a different type of organisation.

2. **Consistency in pedagogy.** Relevant information, learning resources and functionality should be available in the context of the problem that a student is working on. But students should also be encouraged to use the information across the problems and independent of the course. The learning resources therefore also have to be offered separately from the problems and courses.

3. **Consistency in terminology.** The learning environment should use the semantics of PBL, e.g. a problem should be named “Problem”, not “Task” or “Assignment”.

This team also formulated guidelines on the type of information that should be available in the WBLE. Requirements were formulated regarding general and course specific information and services. General information and services covered the news, test results, general information about the study, the educational organization and the staff and a study specific search engine. Course specific information covered general information about the course, a course schedule, the problems, online learning resources, information about and online resources for practicals and skills training, lecture notes, information about the films and an online Question-and-Answer forum.

To evaluate whether the actually implemented WBLE supported students during their studies, three important user variables were studied: student acceptance and actual use, student appreciation, and student study behavior.

**Evaluation Method**

Participants were all first-year psychology students of the Erasmus University. During the academic year 2001-2002 they could participate in 8 introductory courses on Psychology. Student numbers for the different courses varied between 89 to 66, with an average of 74 students. Demographics were available for the students that were enrolled. Of these students 61 were female, 28 male. Ages ranged from 18 to 43, with a mean of 21 years.

To evaluate the acceptance and actual use of PsyWeb computer log files were analysed. The computer log files were gathered over a period of 33 weeks from the second to the eighth course. Every file lists the day and the time when PsyWeb was used together with an IP-address of the user. An IP-address uniquely identifies a computer from which a web service is accessed. We assume that each IP-address corresponds to one student. The number of IP-addresses per day was used as a measure for acceptance and usage of PsyWeb. The logfiles were analysed using SPSS.
Appreciation of PsyWeb was analysed using 8 surveys and an interview. The survey was completed at the end of every course by all students and consisted of 55 items that covered all aspects of the course, 10 items were related to PsyWeb. Appreciation of PsyWeb was analysed using answers on 5 of these 10 items. These data were supplemented by data from an interview with 12 students at the end of the academic year. The interview consisted of 10 questions, 3 of which explicitly asked for the appreciation of PsyWeb.

Finally, the use of PsyWeb during self-study activities was studied by analysing answers on the remaining questions of the interview previously described.

**Results**

*Acceptance and actual use of PsyWeb.*

The 74 students that were (on average) enrolled in a course logged on about 12465 times to PsyWeb during the 258 days between October 21, 2001 and July 7, 2002. During weekdays, about 68.8% of the students logged on to PsyWeb on a daily basis. During weekends 40.7% of the students made daily use of PsyWeb, 36% of the students made daily use of PsyWeb during their vacations. Overall, an average of 58% of the students made use of PsyWeb on a daily basis.

Of all IP-addresses, 56.1% originated from within the campus, 43.9% of the addresses were from outside the campus. Since about half of the students use PsyWeb from their home, use of PsyWeb clearly is not restricted to on-site log-ins.

*Appreciation of PsyWeb*

Over a period of 8 courses, 516 students filled out a survey that was part of the quality management system of Psychology. Student scores on 4 of the 5 questions that were related to the appreciation of PsyWeb are listed in Table 1. Questions 1 to 3 had to be rated on a 5-point Likert scale (1 = “totally disagree” and 5 = “totally agree”). Question 4 had to be scored on a 10-point scale (1 = “worst” and 10 = “perfect”). Answers on question 5 and 6 have been added for comparison purposes.
There were no significant differences between students’ appreciation of PsyWeb and their appreciation of the courses in general. There were also no significant differences between the appreciation of PsyWeb and the appreciation of their tutors. In an educational program that is generally highly valued by students this is a commendable result.

The 5th question “What did you miss or appreciate with regard to PsyWeb?” invited students to write a short comment. These data are supplemented by the answers students gave during the interview to the question “Would you like to modify functionalities of PsyWeb?” Of all responses students expressed 160 times their appreciation towards PsyWeb, 215 times they expressed ideas for improvement. Students appreciated the online articles the most (44/160), followed by news (15/160), internetsites (19/160), video (16/160), online Q&A (8/160) and the online test results (8/160). However, they also asked for more learning resources (48/215), smaller files (32/215), better accessibility (30/215), sooner access to the learning resources (24/215), more structured interface (18/215), more information services (17/215), and better scanned electronic articles (15/215).

During the interviews students were asked how important some of the prominent functionalities of PsyWeb was to them personally. The answers were given on a 5-point Likert scale (1 = “not important at all” and 5 = “very important”). They were also asked to estimate their own use of the same functionalities. These answers were given on a 5-point Likert scale (1 = “never” and 5 = “always”). Figure 1 shows the mean scores of the 12 students on both questions.

<table>
<thead>
<tr>
<th>Question</th>
<th>MEAN</th>
<th>SD</th>
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<tbody>
<tr>
<td>PsyWeb had added value over the paper study guide.</td>
<td>3.50</td>
<td>1.01</td>
</tr>
<tr>
<td>PsyWeb was a useful supplement to the other information services in this course.</td>
<td>3.67</td>
<td>0.96</td>
</tr>
<tr>
<td>The contents of PsyWeb were suitable for the education.</td>
<td>3.75</td>
<td>0.95</td>
</tr>
<tr>
<td>Rate PsyWeb with a school grade.</td>
<td>7.39</td>
<td>0.91</td>
</tr>
<tr>
<td>Rate the course with a school grade.</td>
<td>7.30</td>
<td>0.92</td>
</tr>
<tr>
<td>Rate your tutor with a school grade.</td>
<td>7.61</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Table 1. Mean student scores on 8 successive surveys, N=516
Students considered all the offered functionalities “moderately important” up to “very important”, and thereby agreed with the staff that these functionalities were useful. The differences between the reported importance of information about the staff, the study, the course, and the films on the one hand and their infrequent use on the other hand can be explained by the fact that the information was rather static. Once students had read the information they did not need to check it again. The difference between the reported importance of the search engine and its actual use can be explained by the fact that the most important component of the search engine (searching in a database with online articles) was not yet available.

The most remarkable discrepancy is between the reported importance and the actual use of the online Question-and-Answer forum. Apparently, students consider it very important to be able to ask questions online but only rarely need to use it.

**Study behavior**

All students reported using PsyWeb to prepare for the tutorial meeting. They used it for downloading online articles (12/12), looking at internetsites/videos (8/12), reading the news (4/12), looking at the schedule (1/12) and asking questions to the staff (1/12). The majority of the students (7/12) also used PsyWeb to prepare for the formative course tests.
Especially the lecture notes (5/12), the schedule (2/12), the news (1/12), the online articles (1/12), the internetsites/videos (1/12) and the opportunity to pose online questions (1/12) are considered relevant during the preparations.

For the preparations of the summative progress-test one-third (4/12) of the interviewed students used PsyWeb. They used it for downloading additional online articles when learning goals still were not entirely answered (2/12) and for a final check of the schedule (1/12) or the news (1/12). Asked whether students felt supported by PsyWeb in their studies, 9 agreed and 2 students considered it somewhat redundant with the available paper information. One student did not feel supported by PsyWeb primarily because she did not use computers much at all.

**Conclusion**

The study Psychology made the principal choice for Problem-Based Learning (PBL) as its prime pedagogical method. Acknowledging the disappointing results for pedagogy of many of the WBLEs to date, the staff decided to start from their own list of requirements and incrementally broaden the core functionality (the Electronic Blockbook) aided by feedback from students and staff.

Despite the fact that psychology students are not the most computer-savvy students in the world, we were surprised to find that 58% of the enrolled students made daily use of PsyWeb (including weekends and vacations). Many students logged on to PsyWeb from their home-addresses and during their weekends and vacations. Students’ appreciation for PsyWeb nicely aligned with the high student appreciation of the entire educational program, and they agreed with the importance of the requirements formulated by the staff prior to the implementation of PsyWeb. Students also indicated that they are relying on PsyWeb for their preparations of tutorial meetings, course tests and progress tests. PsyWeb therefore has become an integral part in the lives of many of the students.

Students’ acceptance and enthusiastic use of PsyWeb, the fact that PsyWeb is considered to be important during self-study and their suggestions for improvements form important incentives in the further development of PsyWeb. During this first year several projects have started to prepare the implementation of facilities that target specific innovations, like a literature search-engine, contextualization of theoretical concepts by means of documentaries, and online skills training.
References

