

# Technology-Enhanced Learning Tools in European Higher Education

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*Abstract:* - The main aim of the contribution is to investigate which technology-enhanced learning tools are nowadays used in European higher education, to what specific purposes and how intensively they are employed, and what costs are associated to them. The source of presented information is based on responses of 100 universities from 27 European countries to a “Learning Tools Survey”, which has been created in Vienna University of Economics and Business Administration and which was distributed under the terms of the European IST project iCamp.

*Key-Words:* - Technology-Enhanced Learning, Learning Tools, Learning Systems, Survey, Europe, Higher Education, iCamp Project

## 1 Introduction

The key idea of technology-enhanced learning is to support learning activities via information technology. Recently, this combination has a great impact on higher education institutions. However, it can be quite difficult to analyze how the rapid development of technology-enhanced learning influences the everyday life in universities, which tools and how effectively are used, and what costs are spent on it.

One of the initial partial tasks of the Information Society Technologies (IST) project Intercultural Learning Campus (iCamp) [1], running under the Sixth Framework Programme, was to investigate the state of the art in the field of technology-enhanced learning in European higher education area. Thus, lots of European universities were addressed with request for help by means of filling the questionnaire constructed chiefly by Fridolin Wild and Stefan Sobernig with the Institute for Information Systems and New Media, Vienna University of Economics and Business Administration. The iCamp partners have collected altogether 100 positive responses from 27 countries.

The main intent of this paper is to briefly present and interpret the selected key results of the mentioned technology-enhanced learning survey.

The contribution is organized as follows. In Section 2, the survey scope and dissemination process is described. The Section 3 then provides the classification of responding organizations. Further, tools characteristics and supported functionalities are outlined in Sections 4 and 5, respectively. The Section 6 contains information about e-learning responsibility and financial sources. And finally, Section 7 offers some conclusion remarks.

## 2 Learning Tools Survey

The survey related to the tool deployment in technology-enhanced learning was firstly answered by the nine iCamp project partner organizations (the tenth one was absent from this due to the purely research status) [1] in the time from March until May 2006. Subsequently, the survey was disseminated among an array of European universities (from April to July 2006). However, not all respondents were willing to fill this quite complex on-line or printed questionnaire in English neither under a potential “motivation reward”. Finally, the responses of exactly 100 universities from 27 countries (including iCamp partners), which seems to be a very representative figure, have been gathered and evaluated.

The scope of the survey covers the use, impact and evolution of the learning tools [2], [3]. The “use” means primarily how are used the learning technologies to the intent of functionalities and interoperability. Then, the tool usage intensity and organizational embeddedness were comprised in the “impact” part. And “evolution” was focused on potentials of interoperability, portfolio and development and also on the financial and staffing resources.

## 3 Responding Organizations

As it was mentioned above, the total number of collected responses is 100. Their distribution among 27 represented countries can be seen in Fig. 1. Then, the classifications of respondents from two different viewpoints are provided in Fig. 2 and Fig. 3. The bulk of organizations were public. Much fewer of them can be classified as private-non-for-profit and the others are of practically no consequence. Similarly, the majority of

survey contributions came from organizations which belong to ISCED type 5A. Only about 20% classified themselves to ISCED 5B [4].

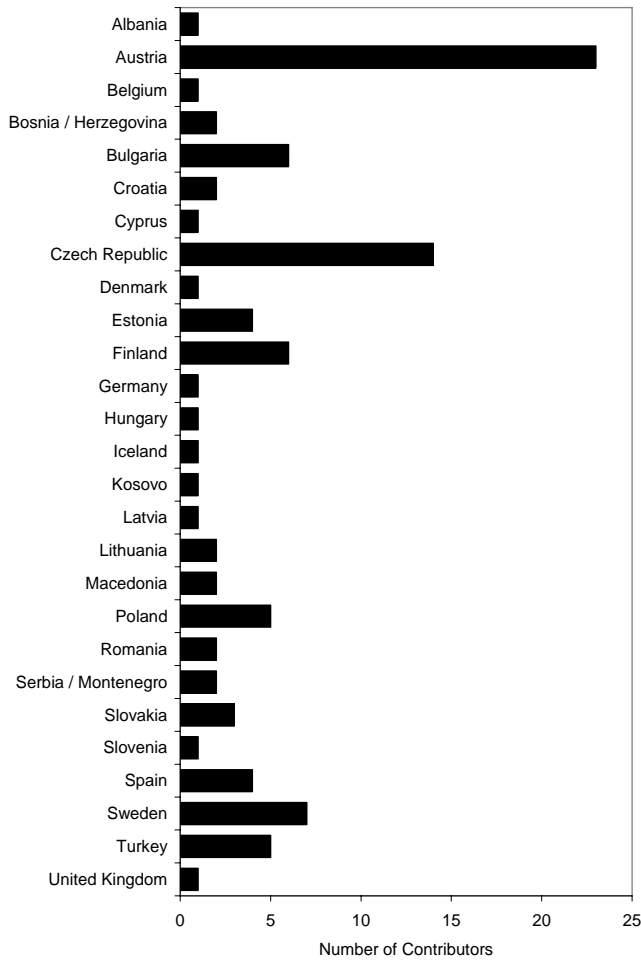


Fig. 1: Representation of Countries

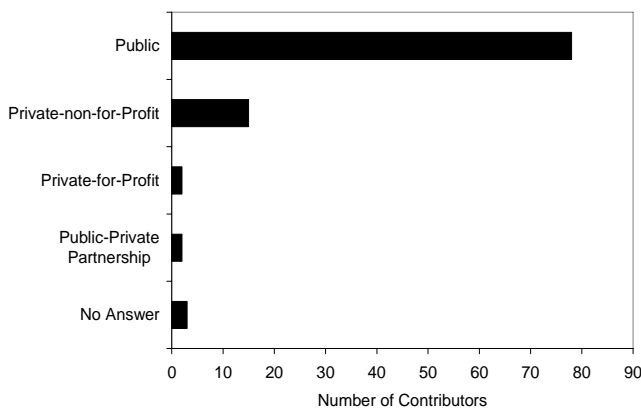


Fig. 2: Type of Organization (Public vs. Private)

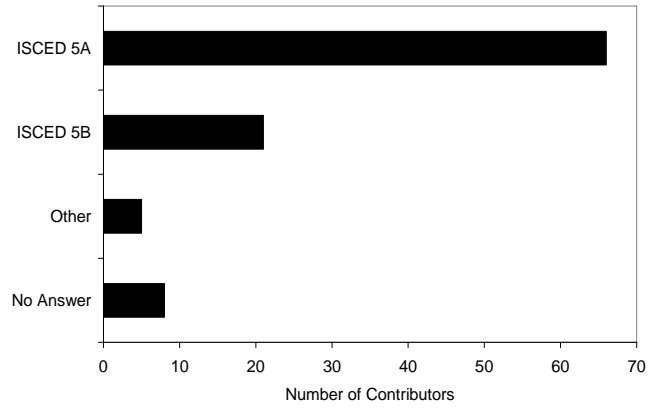


Fig. 3: Type of Organisation (Education Classification)

#### 4 Portfolio Characteristics

The institutions offer altogether 182 different tools (which occurred 290 times). There were 71 sorts of learning (content) management systems (LCMS) in 146 installations among them. The other tool categories were represented by numbers shown in Table 1.

Tool	Number	Occurrence
Learning (Content) Management System	71	146
(Pure) Content Management System	15	20
(Pure) Administrative Information System / (Pure) Course Management System	18	19
(Pure) Authoring Tool	22	26
(Pure) Learning Object Repositories	14	18
(Pure) Assessment Tool	10	10
(Pure) Collaboration Tool	32	51

Table 1: Tool Categories

Focusing more deeply on L(C)MS, an institution operates, on average, 1.6 systems. The most often types and also concrete products of L(C)MS can be found in Table 2.

Tool	Occurrence
Open-Source LMS	47
Self-Developed LMS	44
Commercial LMS	42
Moodle	44
Moodle + Other	29
Moodle + Commercial	15
WebCT	14
Blackboard	5
eDoceo	3
Discendum Optima	3
Eden	2
Fronter	2
Hyperwave	2
Ilias	2
Learning Cubes	2

Table 2: L(C)MS – Types and Products

The most widespread system is Moodle. It has in average 663.07 and a maximum of 3,600 active users in the cases where it is the only L(C)MS. When all 44 installations (including combinations with another systems) are considered, the average number of users is 1,800.73 with a maximum of 28,500.

An intense discussion on the portfolio characteristics can be found in [2], [3].

## 5 Functionalities

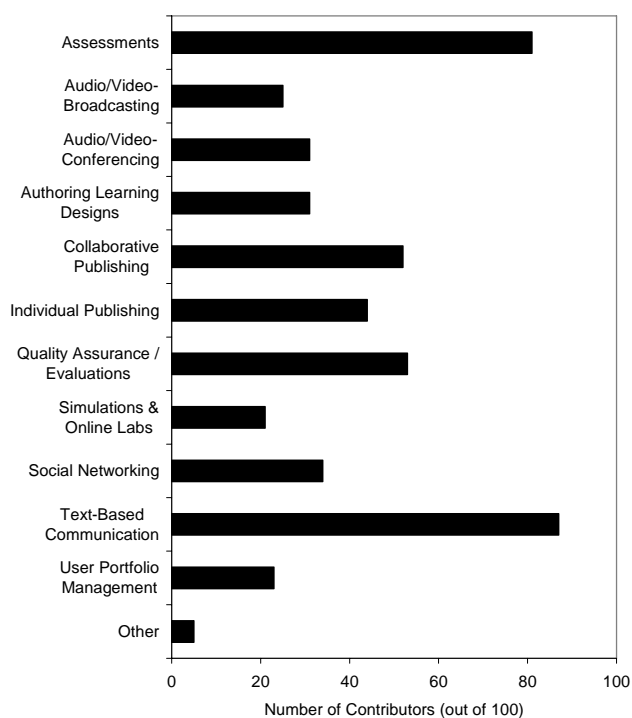


Fig. 4: Supported Activity Types

The analysis of supported functionalities has brought the results from Fig. 4. The dominant types of activity are text-based communication and assessments. Still more than half of the institutions reported the use of quality assurance and evaluation and collaborative publishing. An array of other (e.g. multimedia-oriented) activities is still supported, but more rarely.

## 6 Responsibility and Financing

In most cases, a specialized e-learning unit is responsible for technology-enhanced learning. However, considerable degree of responsibility lies also on other groups, such as computer centers, faculties or departments, institutes or chairs, or the rectorates itself – see Fig. 5.

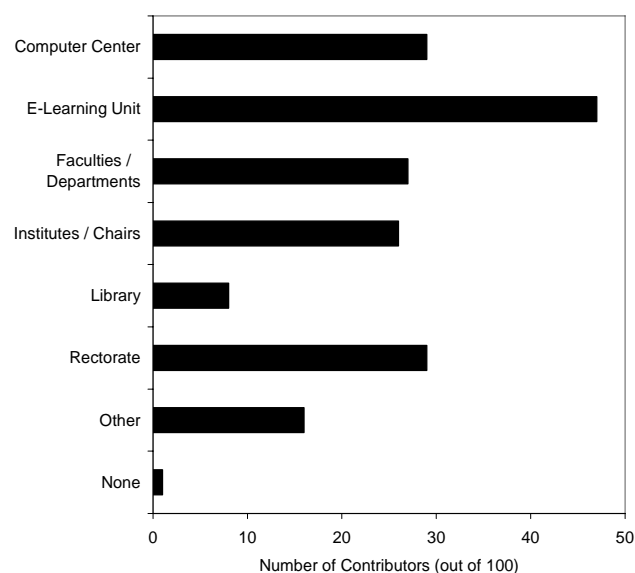


Fig. 5: Responsible Unit

Regarding the budget which is at organizations' disposal for technology-enhanced learning purposes, the most contributors are able to spend only less than 10,000 EUR per year. On the other hand, many universities of bigger size devote to these activities more than 500,000 EUR yearly. The most common source of finances is a regular budget, research grants or public (non-research) funding. The detailed overview of the budgets and their sources are shown in Fig. 6 and Fig. 7, respectively.

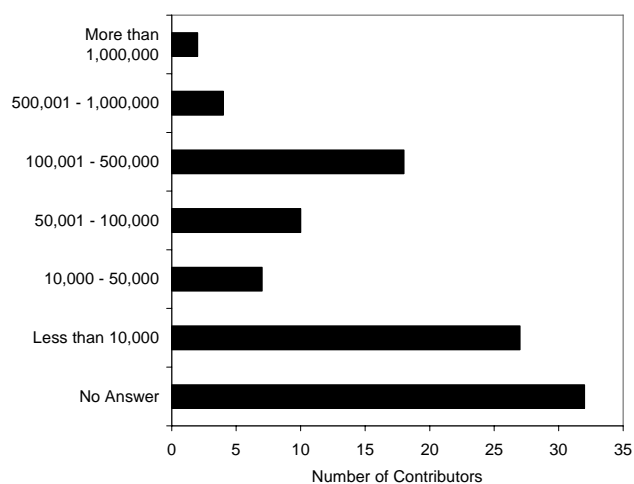


Fig. 6: Yearly Budget (in EUR)

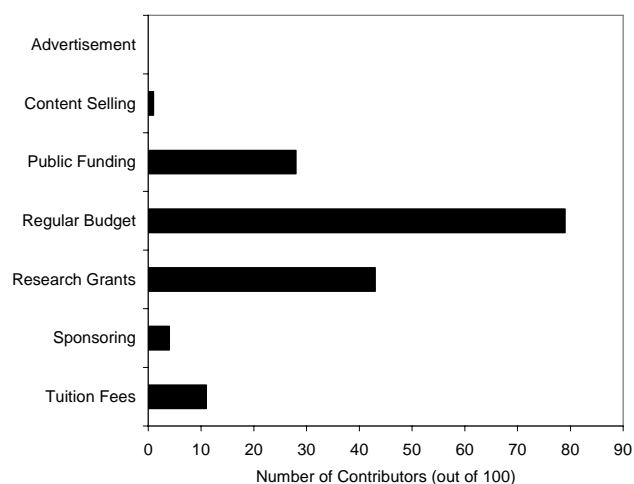


Fig. 7: Financial Sources

## 7 Conclusion

This paper has been focused on the short overview of the state of the art in the field of technology-enhanced learning in European higher education. The most popular L(C)MS is Moodle. All in all, rather traditional technology-enhanced learning functionalities are nowadays supported.

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