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Building and Using Knowledge Repositories for Agriculture: An Innovation Case Study

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ABSTRACT

The number of educational institutions, companies and other users applying knowledge repositories has grown significantly in the last decade, therefore they have become as important means and resources as other informational systems of the institutions. However, there are several conditions and components to implement and use these systems successfully. Based on opportunities of knowledge service system we have created a 4-level model. This model shows and expresses the plenitude of the application of knowledge service, has become an integer, and uses all the benefits of this process for the recovery of University of Debrecen service system.

Keywords: Repositories, Knowledge, Innovation, Agriculture, Hungary

1. INTRODUCTION

The number of educational institutions, companies and other users applying knowledge repositories has grown significantly in the last decade, therefore they have become as important means and resources as other informational systems of the institutions. However, there are several conditions and components to implement and use these systems successfully. For example what kind of system is chosen, how it is implemented and introduced. The operation of the system and the services available for the users are also important. Above all, probably the most significant question is what the different types of users can profit from the system. What is the advantage of using it? How does it help the process of getting knowledge? Naturally, the organizational and economical aspects of the use of repositories are also important. The international and domestic institutions of higher education is facing challenges and tasks among the first in what strategy to employ in addition to the rapid development of information communication technologies. There are number of international and domestic research provides important and useful experience for market development of e-Learning technologies. Institutional development strategies, the leaders of higher education institutions must take account of changes in reporting procedures and the potential of e-learning benefits of technology. The integration of the domestic institutions of higher education in the European research area will speed up the e-Learning technologies, knowledge of the results, the recovery experience. The topic choice was the reason that it is primarily agricultural and economic education courses we attend training system at the University of Debrecen Centre for Agricultural and Applied Economic Sciences (UD CAAES). Primarily we can apply the e-Learning solutions for our objectives set

out in these courses. There is a European project which is the basis for my research, with one of the exercise part of an e-Learning system was the introduction of the selection and training of project-defined target group. Accordingly, we have researched the e-Learning applications of UD CAAES. The primary objective was to improve the efficiency and quality of education formulated by introducing e-Learning technologies.

2. E-LEARNING SYSTEM IMPLEMENTATION AT UD CAAES

Like many other higher education institutions, we have introduced the Moodle system at UD CAAES in 2007. The faculty leaders recognize the fact that modern technologies in education should be entered, which was realized in the Moodle system. The phases of the system implementation are shown on Figure 1. In the beginning of the 2006/2007 School year 2nd semester, Moodle was used for 5 exams and objects. In the 2007/2008 School year 1 half have increased to 17 the number of active courses in the Information Technology category, this meant that the Economic and Agricultural Informatics Department of the subjects taught by 80% has been applied in the context of Moodle.

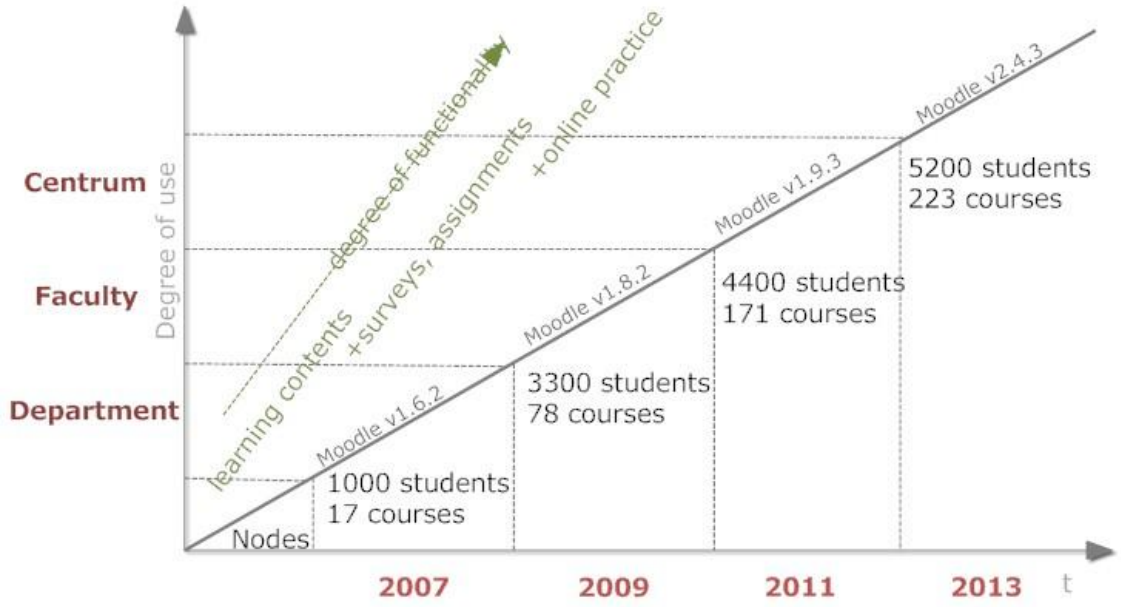

Figure 1. E-Learning System Implementation phases at the UD CAAES

Departmental use and testing of one year after the scheme began in January 2008 with the introduction of the Faculty of Business and Rural Development. Prior to the introduction of the system used in Moodle version has also been updated. The system used a large number of courses has grown rapidly, and with it of course, the users (teachers and students) numbers. Began in 2009, the Agri-Business Administration and site of introduction, which has continued to grow thanks to the courses and the number of users as well. Implementation of the phases during the system upgrade has happened several times in order to become available as soon as the newer features. To

implementation have found that although all the features of Moodle to provide online learning and teaching process, but it does not help the media, the creation of interactive resources, which are important elements of e-Learning.

4. FOUR-LEVEL E-LEARNING MODEL

Moodle provides online learning and teaching process, but it does not help the media, the creation of interactive resources, which are important elements of e-Learning. The Moodle LMS and e-Learning was created based on the possibilities of a 4-level e-Learning model (Figure 2). This model shows and expresses the plenitude of the application of e-Learning, has become an integer, and uses all the benefits of this process for the recovery of UD CAAES Moodle education system. This model shows that the institutional e-learning application, which is ongoing and at levels which have yet to be fulfilled in order to complete each level, together with supporting model, run the UD CAAES e-learning activities.

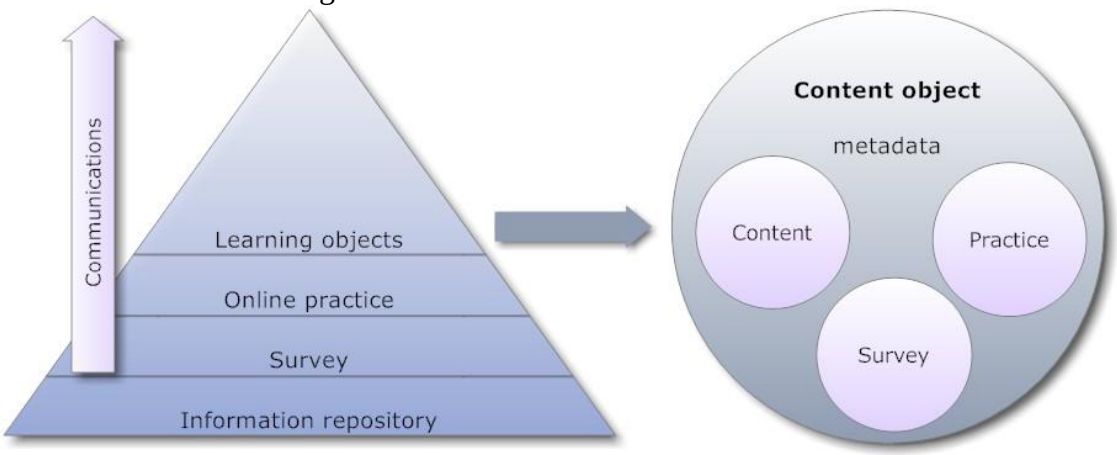

Figure 2. The 4-level e-Learning model

Level 1: Information repository - this is a Moodle system, which includes only those electronic documents, as documents of the courses, teaching materials, PowerPoint presentation. This entry-level functionality of the system is Moodle of UD CAAES.
Level 2: Survey - to assess the knowledge and performance activities, such as the use of tests and tasks.
Level 3: Online practice - - multiple choice, true / false, matching, short answer and other types of questions they answer and create, evaluate and support of Moodle in the question bank and activity of the test beds.
Level 4: Learning Objects - Elements of the curriculum (LOs) are in the final points of the use of e-Learning. An e-Learning content can be built from these elements. The interactive, multimedia learning objects Moodle is not suitable for the establishment, so this should be used for external application.
Our goal for the initial introduction of Moodle LMS was to achieve level 1. Supported by a tutor training which is designed for trainers to create a tutoring team, who are their level 1 of use of e-learning. It quickly met. To do this, it should be noted that not all

teachers see the potential of Moodle system, so they're not actively using the system, but the active systemic tutors observing their activities for entry-level functionality of the Moodle UD CAAES met over a year. (Lengyel et al., 2009). The real challenge for the 4th level has been reached. Over the next few years, the curriculum will be supported by elements of the course structure. The elements of great material progress, as shared and reused. This is a repository eligible.

5. ANALYSING THE COSTS OF E-LEARNING APPLICATION

E-Learning project is a very complex analysis of economic activity, which includes business and economic factors. For this reason, perhaps the most important economic factors affecting the training process and their specific interactions, environments, knowledge of conditions (Marengo et al., 2005). After they concluded that analysis of the combination of factors which best fits the specific training needs. We listed the cost items to 3 groups, which are assisted in Table 1.

Table 1. Type of cost items

	Cost	Number of students	Course duration	Value
Technological costs	Content development	Fix	Fix	High
	Hosting content	Fix	Variable	Low
	Maintance content	Fix	Variable	High
	Distribution content	Variable	Fix	Low
	LMS licence	Fix	Fix/Variable	High
	LMS installation	Fix	Fix	High
	LMS customization	Fix/Variable	Fix/Variable	High
	LMS hosting	Fix	Variable	High
	Infrastructure	Fix/Variable	Fix	High
Cost of e-Learning staff	Technical tutoring	Variable	Variable	High
	ETM training cost	Fix	Fix	High
	Administration e-manageme	Variable	Fix/Variable	High
	External consultancy	Fix	Fix	High
	Synchronois teaching	Variable	Variable	High
General costs	Promotion	Fix	Fix	High
	e-Learning support	Variable	Variable	High

The first cost includes the cost of technology. The development of digital content, or to obtain the total cost of the training process is one of the largest part. The Digital content is much better quality; better quality figures should be prepared as conventional printed education curricula. More videos and other learning elements can be colorful and assist in the learning process in which the creation, development, acquisition greatly increases the cost. The cost is not dependent on the number of employees, the number of student, the number of training programs and the duration of a course.

The storage of materials using a hosting service or your own server to solve the operation, which involves cost for both cases, but only for the duration depends on the

number of students in training programs do not. However, it should be noted that the total cost of this cost is low. The cost of the distribution of content from anywhere, at any time ensure that broadband internet access provided. This is a cost, both service providers (educational institutions) and the service recipient (student) side is shown, but not the total costs.

E-Learning project is undoubtedly one of the biggest costs of purchasing LMS (Holton, 2002). Opportunity cost of ignoring this, in case if we choose an open-source framework. These frameworks may be used freely and can be downloaded free of charge, may be obtained. This significantly reduces the introduction of an e-Learning system costs, helping the educational institutions to make a minimal cost to start an e-Learning project.

The Hungarian higher education institutions reduce costs significantly by internal humánerőforrásból to ensure implementation of these activities. Compared to the traditional training they all represent additional costs, which are also an important part of a project's total cost of e-Learning. The system will allow you to use and operation of infrastructure (hardware and software) the cost must be considered in calculating the total cost. It should be designed, what server, servers are required, or in conformity with the current network implementations, student and faculty computers. The costs vary by number of participants in the student as necessary to ensure the conditions for e-Learning service. The cost can vary the distance such as wiring costs. The hardware costs, software costs can be counted as such. server, study material, software and other multimédiaszerkesztő replacement value. The traditional training costs are too high compared to costs on. As the information technology applications has reduced the cost of web-based education support systems for the cost of a downward trend is expected. Accordingly, the same cost more "powerful" systems can be obtained, or the same system at lower cost to operate, but they are optimistic about the prospects for any of the attractiveness of e-Learning application. This means that the e-Learning investment return on the total cost will be faster.

The overall costs and advertising support costs to be reckoned with, E-Learning program to ensure the effectiveness, for example, students should have the basic IT training to allow them to participate in e-Learning training. Personnel costs and overheads to be high value against the cost of traditional education.

6. E-LEARNING IN THE DEVELOPEMENT OF HUMAN RESOURCEMANAGEMENT OF AGRICULTURAL TRADE

Many organizations that are active in the agricultural sector, such as the Agricultural Administration Office (MgSzH) and the Rural Development, the Training and the Consultant Institution of the Ministry of Rural Development (VKSZI) realized the opportunities of e-Learning. The e-Learning training of the MgSzH's professionals began on the 27 December, 2009. The goal of this training was to test the usability and the possibility of integrating the e-Learning user surface in the actual education system. Although, this was a pilot testing, the curriculum and the tests were real (Vörös et al., 2010). Due to the growth of the volume of internet users and the reduction of the

amount of money spent on education, it was necessary to develop a cheaper and more efficient way of education. This resulted in the development and the launch of the e-Learning system of VKSZI in 2010. All consultants can access the curriculum of all the trainings via the e-Learning system. There have never been any surveys about the application of the e-Learning system among the professional consultants which enforced my aim to carry out a research among them.Our questionnaire was accessible through Limesurvey. According to the consultant register, 450 of the 600 registered consultants with valid email addresses received the questionnaire. accessibility and the request to fill the questionnaire electronically. 88 questionnaires were filled out, which is 19.6% of the total amount. Basic IT skills and computer usage are the minimal criteria for the consultants to be able to participate in the electronic exams. The respondents could rate themselves about their computer skills by a scale of five, from 1 to 5. Figure 6 shows that 37% rated themselves into the category of three, 34% to four, 22% to five and only 7% rated themselves to a two. This means that the consultants have enough IT knowledge to do exams via electronic distance learning. This statement is also supported by figure 6, which indicates that 56% of the consultants rated the role of the Internet regarding the acquisition of new knowledge by a 5. The research also shows that the consultants use the introduced e-Content systems because it is compulsory, therefore most of them (51%of the respondents) use the system only every 2-3 months including the download of the curriculums and the compulsory testing (Figure 3).

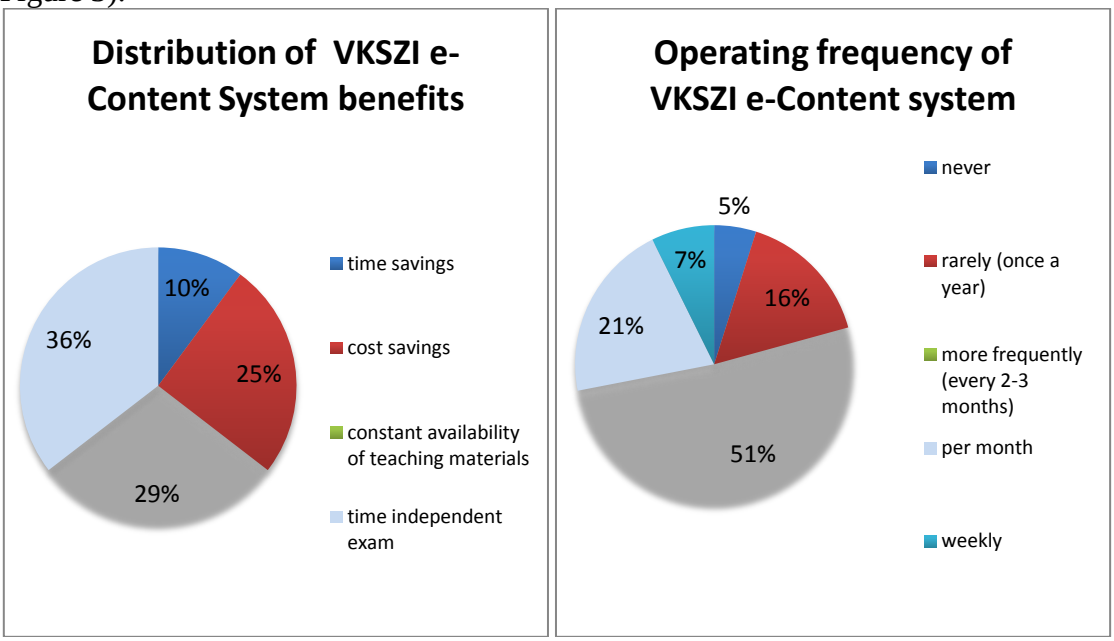

Figure 3. The evaluation of e-Learning System benefits and the use of frequency

According to 36% of the consultants, the most important advantage of the system is the independent testing regarding the exam appointments. It is interesting to see that only 10% of them think that the most important advantage is the time saving. My conclusion

is that the most difficult part is the time management and not that they have to have time for examinations.
The research clearly demonstrates that the introduction of the e-Learning system was welcomed positively by the consultants and they recognized its benefits and advantages.

7. COLLABORATIVE SYSTEMS AND KNOWLEDGE BASES

Increasingly difficult to navigate among the proliferation of digital objects due to the lack of powerful search options. The full-text search engine no matter how sophisticate, will never be able to absorb so many aspects and the accuracy of search results lists, such as those familiar with computerized library catalogue. The latter case is flexible and refined over the centuries, the search for precise and consistently applied standards for describing bibliographic permit. The documents published on paper documents stored as data in a computer is required to accompany metadata only began in the nineties more widely recognized. Since then, many different detailed recommendations and standards have been different document types and applications.
The repositories will allow the different types of contents (text, image, video, audio, etc), storage and publication of re-use. Capable of organizing information stored in the (developing categories, meta-tags) and use them to ensure efficient retrieval.

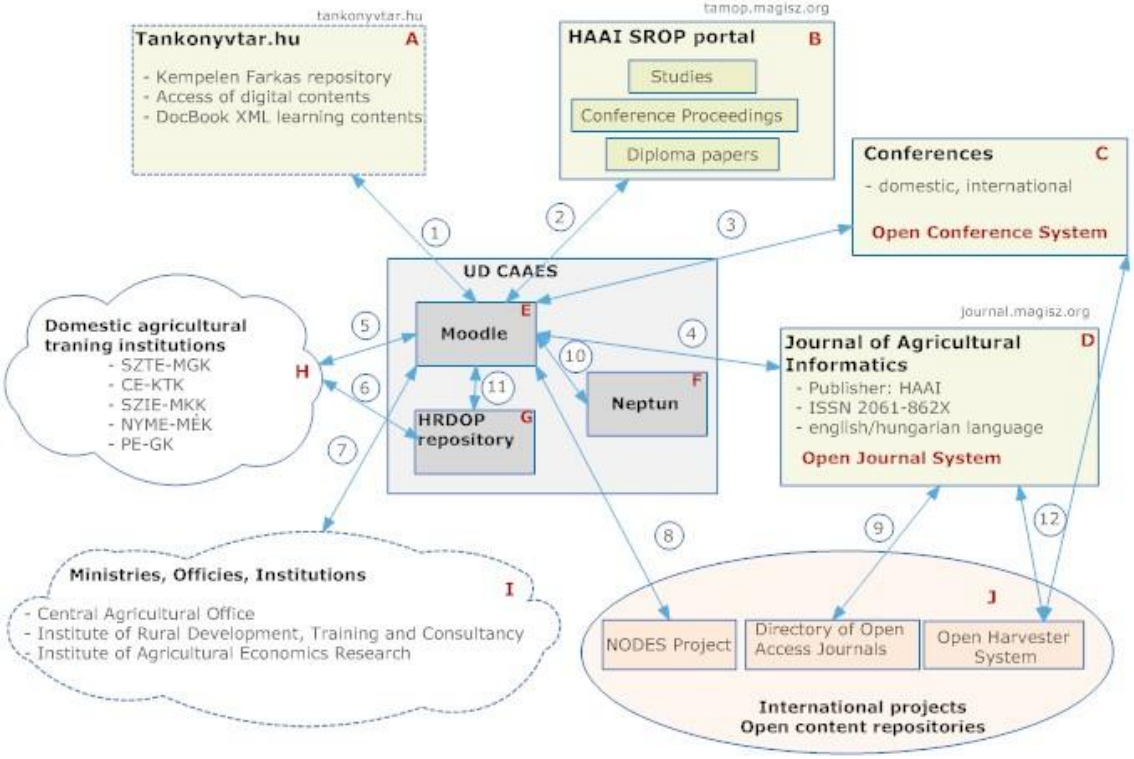

Figure 4. Collaborative model of e-Learning research development and application

A repository of universities and research institutes work with document servers, and archive scientific material to be accessible worldwide for free. Distinguish between

institutional and disciplinary repositories. Institutional repositories document server they are called, are financial institutions (especially university libraries and research organizations) are operated, and their members to enable the digital publishing and archiving. Nodes of the EU project have developed an Index of Knowledge (Burriel, 2007), which are a based on Dublin Core metadata. The Dublin Core is not intended to displace any other metadata standard. Rather, the role is to be used in parallel, often with the same resource, a metadata standard, which is based on different semantics. The simplicity of both reduces costs and facilitates the preparation of metadata for operational cooperation. On the other hand the simplicity does not accommodate the semantic and functional richness supported by complex metadata formats. We created a collaborative model to illustrate the papers presented and analyzed in e-Learning systems, knowledge base and learning repositories and the functional, informational and cooperative relations of them (Figure 4). The model plays a central role in the UD CAAES e-learning system consists of a number of knowledge base (Journal of Agricultural Informatics, conferences, HAAI academic portal) repository (Kempelen Farkas repository) institutional database and linked to international projects. The creation of the model, my aim was that I developed, implemented in open source systems and apply the knowledge base to realize the relationship, helping students with faculty, collaborations among researchers, learning contents interactive knowledge bases and the use of their own, domestic partner institutions and foreign partners.

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