

Journal on Efficiency and Responsibility in Education and Science



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JOURNAL ON EFFICIENCY AND RESPONSIBILITY IN EDUCATION AND SCIENCE

Aims and Scope

The Journal on Efficiency and Responsibility in Education and Science aims to publish perspectives of authors dealing with issues of efficiency and/or responsibility in education and related scientific disciplines. The focus is on topics such as:

- theory and methodology of pedagogy and education;
- theory and methodology of science;
- human resources and human relations management;
- knowledge management and knowledge engineering;
- systems engineering and information engineering;
- quantitative methods.

The journal accepts quantitative, qualitative and experience-based full research papers, short communications or review studies. Applications and case studies introducing and describing impacts of new theoretical approaches in real conditions of practical case are also accepted.

All papers passed a double-blind peer review process.

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THE EFFICIENCY OF ACTIVITY-AIDED TEACHING USING AN E-LEARNING PROGRAM IN AGROCHEMISTRY AS A BACHELOR DEGREE SUBJECT

Dytrtová, R., Jaklová Dytrtová, J.,
Jakl, M., Tlustoš, P.

Czech University of Life Sciences Prague
dytrtova@af.czu.cz

Abstract

The activity-aided teaching using e-learning program was assessed in students' training in Agrochemistry subject in the first year of bachelor degree study at the Faculty of Agrobiolgy, Food and Natural Resources of Czech University of Life Sciences Prague. The e-learning program integrated with active methods had greater efficiency in the students' education than in classical, formal teaching. The study was achieved on two groups of students; control group (with classical teaching) and tested group (with activated teaching). Students were distributed into groups randomly and the input knowledge in chemistry followed the Gaussian distribution. Basic students' knowledge on general chemistry was very low on the average and did not correspond with the curricular programs for secondary schools established in the Czech Republic. Activated methods of Agrochemistry teaching consisted mainly from motivation, regularly repetition connected with homework and from usage of e-learning program for self-study. The teaching effectiveness was proved by students' score from three particular tests and by effective progression and by relative progression. The score from particular tests was related to the score from the entrance test. There were two coefficients of the students' progression defined properly, and are applicable for a numerical or percentage value. Students from the tested group achieved statistically significantly ($\alpha = 0.05$) higher scores (186 points) than students in the control group (136 points) in all three particular tests. Evaluation according to effective progression and relative progression proved the higher progress in the tested group compare to the control group. The evaluation of teaching efficiency can be proved by effective as well relative progression. The effective progression was 55 % in tested group and 26 % in control group. Higher significance of tested students' progression was shown on relative progression; 64 % in tested students and 19 % in control students. The e-learning teaching integrated with active methods can be recommended for higher education.

Key Words

E-learning, Activity-aided Teaching, Efficiency, Undergraduate Training, Higher Education

Introduction

Effectiveness is a major attribute in all human activities; it is a quality marker. The leading purpose of any activity is to achieve the best and most effective results, i.e. to optimize effectiveness under economic and time conditions. In addition, the teachers/student relationship should be evaluated according to progress made within process of education and knowledge obtained by individual students.

Key information can be found in pedagogical papers of authors who have made future predictions of the abilities needed in human society, for example Badescu (2006) and Afonso, Aubyn (2005).

The results of education are influenced by both inner and outer factors. Because the outputs are affected by inputs, it is necessary to prepare and select the inputs (i.e. the educational conditions) carefully. Among the inner factors of education involved are the students' awareness for education and their teachers' competence for teaching. The students' awareness means what is the present education level, i.e. the present assumption of knowledge and abilities, which are depended on intelligence and proficiency. The awareness for education is motivation (interest in a given activity) which is also very important. In fact, it represents the impetus for the education process. Thus, when the student does not want to learn, it requires finding a way to raise the interest. If we are not able to motivate students, we are not able to teach them, and the efficiency of the education process approximates to zero.

The outer factors affecting education include outer conditions such as atmosphere, where education is realized, the teacher-student relations, teaching style, methods used and facilities, organization of education, duration of teaching, frequency and

duration of breaks, microclimate and facilities in a classroom, time of day and acoustic and light levels in a classroom. Most of these factors can be provided for optimal conditions (optimal inputs) for education. Teachers are mainly oriented on methods of education in an effort to use optimal (i.e. the most effective) teaching methods. In this, minimizing time and labor used to achieve the maximization of learned subject matter is a general requirement. Most teachers evade finding the best educational method (the most effective) by using homework and self-study for residual subject matter. They find that no method can fit every student, and yield the desired outcome. This problem can be solved by:

- a) selection and application of a suitable method, which has motivation and activation effect,
- b) teaching individual information-searching and studying,
- c) production of situations for application, repetition and practice of appropriate knowledge and proficiency,
- d) control and evaluation of education results and development.

The evaluation of educational efficiency is possible from the study results (outputs). The control and evaluation of outputs can be carried out continually (regularly or randomly), or at the end of the education process. Students must be apprised of the evaluation criteria in advance. Information about education efficiency is obtained, for example, from tests, answer sheets, dialogues, essays, and oral entrances. More often, feedback helps teachers to optimize teaching methods used and the education given. The efficiency of school systems is presented in final reports of competent institutions (Soares, Gropello 2006). Also, comparative studies are very useful, e.g.: for OECD countries (Badescu 2006). Professional literature dealing with education

efficiency is very often related to the modernization of education in the sense of the use of new technical support (Hejmadi 2007). Many authors advocate teacher training in information technologies (IT), or using IT for distance education (Garrison, Kanuka 2004; Veselá 2005). These authors state that the using of IT support in education can increase educational efficiency. Whenever IT is a new component in education, it increases the students' interest in the subject matter demonstrated by IT (Slavík 2004). Whenever students have access to IT, then IT support can be sufficient medium for self-study; the subject matter can be transmitted to students very quickly, and can be used for information searching and in working with information. Professional literature discussed teaching program efficiency, and the standardization of these programs (Ullman 2003), or the theory of their development (Mayer, Moreno, 2002; Pavay, Garland 2004; Salmon 2002). The choice of the most effective method is a basic problem for education (Badge *et al.* 2005). Currently, the challenge of educational quality in connection with educational efficiency is discussed in the context of the educational environment and school climate (Petlák 2000). The relationship between teacher and student is based on going forward with a common interest (Nelešovská 2005). A broader view of the problems of education efficiency was discussed by Cooze (1991).

Agrochemistry is a very difficult subject for students at our faculty and about 60 % of them fail the credit test in the regular term. Students are apprehensive of agrochemistry; however the pursuit of the subject is not difficult. The main problem is that students have poor knowledge in chemistry from high school. The requirements of Agrochemistry are not high in intelligence. Students with average intelligence are able to learn all that is necessary in the subject. The reason why students failed the

credit test is the absence of motivation.

We consider two main assumptions of this paper: to prove the reliability of activity-aided teaching using an e-learning program contrary to formal teaching and to design possible way how to express the efficiency of the teaching process. Both these points are required to be solved in connection with the modern education development at the faculty.

Material and Methods

The learning unit

Three learning units per week cover all the topics included in the educational program for Agrochemistry. The subject Agrochemistry is the basic subject in the Faculty of Agrobiological Sciences, Food and Natural Resources for all fields of studies. This subject is included in all student programs, because there is a low level of common knowledge of chemistry. In the Czech Republic educational system there does not exist uniform evaluation system for chemistry, and the differences among students after secondary school are very substantial.

The teaching was organized in a classroom for 24 students, with classical school equipment and with the possibility to use dataprojection and internet connection. The control group consisted of two study groups with 44 students altogether. The control group was educated by the classical formal teaching method. The tested group consisted of two study groups with 46 students altogether. The tested group was educated using active methods, which challenged an active response by the student.

Students' characterization and experimental design

All focused students were enrolled in the 1st year of a bachelor study programmes studying general subjects before further specialization. Students were educated in different types of high school (Table 1). The knowledge level of chemistry was assessed from the entrance test (Figure 1). From analyses of the entrance tests scores, it is evident that the students' knowledge of chemistry was very poor in all groups, as is shown in analysis of a Gaussian distribution. The distribution of knowledge from chemistry in the tested and control groups was a non-normal distribution. Students' knowledge from high school was very low and do not correspond with the average knowledge.

type of secondary education	agriculture	grammar school	veterinary	health-service	gardening	total
type of group	number of students					
control group	11	3	6	7	17	44
tested group	17	1	4	5	19	46

Table 1: Characterization of secondary education of students

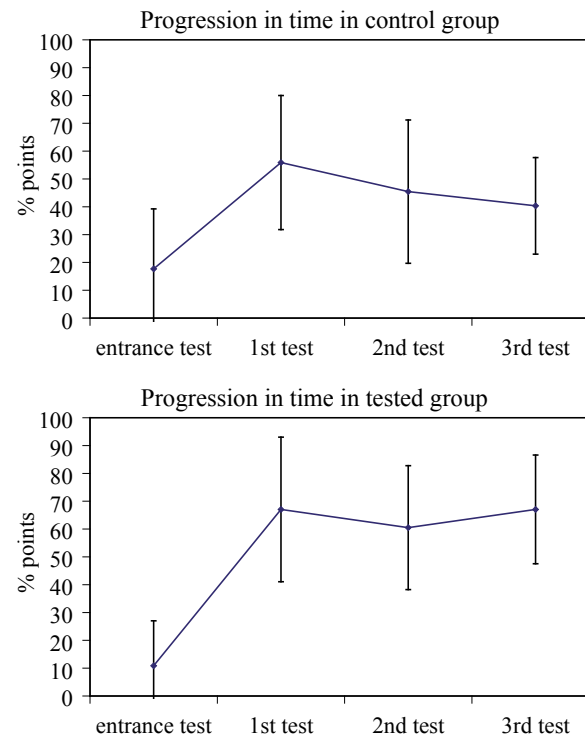


Figure 1: Development of the tests score in control and tested group

Students were distributed into study groups randomly according to alphabetical order. This distribution compensates for the accumulation of students with a specific type of high school in the same class. Students in both focused groups were educated by one teacher, in comparable day time, in the same classroom.

Active methods

The main problem of education was how to explain to students that agrochemistry is easy to learn and how to eradicate the barriers in learning. Active methods, which we used was closely connected with motivation and positive stance. In the tested group we used:

- Different subjects were separated into small clusters (e.g. inorganic nomenclature was divided into nomenclature of oxides, sulfides, acids, hydroxides etc.), which were taught individually from easily understandable to more difficult ones.
- Students had to find relations among each subject matter clusters and postulate general rules.
- The repetition of subject matter was provided before each new lesson and the active contribution of students was required.
- We tried to explain to them every chemical problem by generally speaking language with congeneric examples from normal life, e.g. a problem with counting of mass fractions was explained on the commonly used topic of cooking marmalade.
- Also we tried to be synoptical and visual in every abstract problem, e.g. when the problem of molarity was explained, the amount of one mol of substance was shown on concrete substance; students saw one mol of water, one mol of poppy seeds and one mol of bacteria in a picture.
- Moreover the e-learning program (Čipera 2001) was prepared as a teaching assistance for using in lesson and also for self-studying.

- Students received homework every lesson on the secured internet pages made for them.

The education during the lessons was provided using an e-learning program, which was controlled by a teacher. Actually, the teaching type was blended-learning. However the e-learning program was disposable on internet and students can use it to self-study.

The e-learning

On Agrochemistry web (available through the username and password) were interactive examples, theory, and homeworks. The e-learning saved time, which was imposed to practice and answer students' questions. The main idea of the project was to arouse interest in the students of Agrochemistry, and eliminate distress from chemistry as a subject.

The e-learning included:

- hand-outs available for student,
- examples with solution:
 - theoretical question with multiple matching or open-cloze answers,
 - computations,
 - nomenclature,
 - reactions,
- a chat room,
- a glossary.

Formal teaching

Formal teaching makes an opposite to active methods. The subject matter was presented to student by a teacher without any immediate feedback. The subject matter was not divided

or structuralized; the subject matter was put forward to student as fact without any space to discussion yielding to conclusion formulation by students.

The subject matter was theoretically explained to student (without any supportive method) and students tried to applied theory in lesson or at home. Neither teacher nor students had any immediate feedback.

Any examples from common life were not used and students did not obtained subject matter relation to other subject and how to use it in complex problems.

Efficiency of education

In the evaluation of education efficiency (Dytrtová, 2008) of a teaching style it is possible to evaluate:

1. *Efficiency of a teacher* can be ascertained by **students' questionnaire**, which appraised a teaching style of a teacher from the students' aspects. This evaluation identified :
 - The way of applied education.
 - The quality of teaching.
 - The level of communication.
 - Relation among teacher and students.
2. *The immediate efficiency* deals with efficiency during teaching process in short time (e.g. during one educational unit). This efficiency is detected on the base of **entrance and final test**. This type evaluation of efficiency is competent to:
 - Comparison of different teaching styles and methods.
 - Comparison of different groups of students.
 - Comparison of teaching quality.

- Validation of new teaching methods (e.g. e-learning, blended-learning or multimedia education).

3. *The long-term efficiency* is suitable to the monitoring of students' progression in their knowledge or acquirement during long time period (semester). Using this efficiency can be detect the same characteristic as with the immediate efficiency reaching to longer time. The evaluation can be provided in several times during the monitoring to obtain a time development determining a progress curve. This efficiency is detected by **entrance and final/current (continuous) tests**.
4. *The applied efficiency* evaluates the ability of the student to apply his knowledge and acquirement in problem situation. This efficiency is very complex and includes students' creativity; however it is the best characteristic in evaluation of education process.
5. *The total efficiency* includes before mentioned efficiency categories, whereas it is mostly influenced by the applied efficiency.

The longitudinal progression was used to determine efficiency. The initial state of the students' knowledge was determined from the entrance test. The maximal score from the entrance test was 100 points (which amounts to 100 %). When students got in the entrance test more than 60 points (60 %), they passed the credit automatically. This test was conceived with its structure and range as a simulation of final test. In the final test the same knowledge content was required. Three continuous tests during the semester were given. The maximum score for each test was 100 points. Students needed at least 180 points from three tests for passing the credit. The longitudinal progression of students' knowledge was monitored from continuous (current) test scores. At the end of monitoring the total points were

recounted (according to the rule of proportion) from points to percentage (300 points equates to 100 %). The recounting point to percentage is useful due to general applicability of results. Following this calculation we were able to count the indicators of the students' progressiveness, and consequently to decide about the efficiency of active education. From a consideration of individual progress, it was possible to define the maximal progress (MP):

$$MP = 100 - ET \quad (1),$$

where ET (entrance test) is the score from the entrance test in percentage. MP presents the maximal feasible progress in the students' knowledge during their education. This maximum is given by knowledge requirements. Another very suitable measure of efficiency is the effective progression (EP):

$$EP = MP - \left(100 - \frac{\sum_{i=1}^n TS_i}{n}\right) \quad (2).$$

The TS is the score from continuous tests in percentage, where i is the number of tests, and n is a total count of tests. EP is the progression which respects individual aspects of progress for each student with consideration for the score from the entrance test (entrance students' knowledge). The value of EP can be positive or negative; when positive, means progress, when it is negative, its meaning is regression (what is also possible to notice, not just in a theoretical way).

For the comparison among students it is advisable to design a relative progression (RP):

$$RP = \frac{EP}{MP} \cdot 100 \quad (3).$$

Relative progression tells us about a students' knowledge progression during the focused period. This characteristic can be comparable in tested data set. RP can also take a negative or positive value (meaning).

Results

Evaluation of teaching using progression coefficients

The maximal value of progression (MP) was calculated according to the equation (1) from the difference between the maximum score of the entrance test and actual scores of the entrance tests. The value of MP (Table 2) counted for each student denotes maximal possible progression of the student in percentage. The connotation of MP results from the maximal feasible score which is possible to get in the test, as the MP has a theoretical value. Only two students from the focused students passed the entrance test; the others had very low scores from the test. The value of MP in the tested group was higher (89.14 %) than in the control group (79.65 %). This difference results from lower score in the entrance test in the tested group compare to in the control group; however, this difference is not statistically significant. The real value of students' success is given by the effective progression (EP), counted from equation (2). The EP (Table 2) is statistically significantly higher in the tested group (55.17 %)

than in the control group (26.23 %). Moreover, the EP has not a normal distribution in the tested group compared to the control group. The relative progression (RP) counted from equation (3) is the percentage improvement of each student comparing to MP. The value of RP (Table 2) respects entrance knowledge misalignment of the students, and controls their knowledge development in dependence on using pedagogical methods individually. The RP (Table 2) is statistically significantly higher (62.40 %) without a normal distribution, compared to the tested group (19.43 %) with normal distribution. The mean values of MP, EP, RP and their standard deviation (SD) are given in Table 2.

Type of progression	Methods of instruction			
	Test group		Control group	
	M	SD	M	SD
Maximal progression (%)	89.14	16.15	79.65	26.56
Effective progression (%)	55.17	20.85	26.23	26.04
Relative progression (%)	62.40	21.03	19.43	65.42

Table 2: Result of the teaching efficiency evaluation (in %) in control and test group

Evaluation of teaching using test score

The score in the entrance test in the tested group was 10.86 % (points), and in the control group the score from the entrance test was higher 20.35 % (points). The normality test improved in the entrance test score, not-normality in both group. The score

was very low in both groups. After teaching, differences were found in student scores in the 1st test, and also in the distribution; the character of score distribution in control group was normal, however in the tested group it was not normal. The student score (Figure 1) in 1st test of the tested group was higher (67.05 %, points) than in the control group (55.91 %, points). On the other hand this difference in not statistically significant. Statistical significant differences in student scores between control and tested groups were found in 2nd and 3rd tests (Figure 1).

Statistical analyses

Statistical analyses were itemized in the program Statistica 7.1 (StatSoft, Inc.). Results from correlation analysis of each student's progress show that the formal teaching process (Table 3) gives medium correlation coefficients, while the activate process gives lower than expected progress (lower correlation coefficients; Table 4) based on the motivated cognition of most students.

test	entrance	1 st	2 nd	3 rd
entrance	1.0000	0.4650	0.3460	0.4634
1 st	0.4650	1.0000	0.8455	0.6846
2 nd	0.3460	0.8455	1.0000	0.7186
3 rd	0.4634	0.6846	0.7186	1.0000

Table 3: Control group correlation analysis ($\alpha=0.05$)

test	entrance	1 st	2 nd	3 rd
entrance	1.0000	0.2628	0.2454	0.2084
1 st	0.2628	1.0000	0.6298	0.3015
2 nd	0.2454	0.6298	1.0000	0.5953
3 rd	0.2084	0.3015	0.5953	1.0000

Table 4: Test group correlation analysis ($\alpha=0.05$)

Skewed values are not clearly different from 0, and the median values are near the arithmetic averages. Thus the distribution is almost normal in both groups, in all tests, except the entrance test (an asymmetrical distribution). The teaching process aims to uniformity of student records as a group.

The active teaching process (by medians comparison) significantly improves the records.

It is possible that the main contribution of active teaching is through increasing the students' interest in the subject, eliminating students' apprehension about the subject and, last but not least, motivation. This corresponds to scores from the control group. Also the atmosphere in the control classes was very unfriendly; students copied in the test and made little effort to solve any problem. In the tested group, there was a very friendly and cooperative atmosphere and over time (during the semester) the atmosphere improved. Students in the tested group compared to the control group were polite to the teacher and asked questions and the absorption of the subject could be seen. At the end of the study, 86 % of students from the active group passed the score test compared to 35 % of students from the control group.

Discussion

The results of this short study are very encouraging for further studies, with testing of active methods and using them in the praxis. The preparation of the active lesson is more sophisticated than the classic lesson, at first sight. And sometime it is also problem with literacy of teachers in e-learning technologies (Goodfellow 2005). However, preparation of active activities for students is an investment for the future. Especially, preparation of e-learning programs is very problematic; however, its usage in lessons saves time and also is useful in students' self-study (Pintrich 1999). Our results are better than were expected, and they are supported by progress coefficients, from test scores and from statistical analyses (Skewness test, correlation analyses and median counting).

Nevertheless, our results could be better using more sophisticated e-learning system; it means support teacher's effort by e-learning program concerning motivation, explanation and answers other possible associated questions. Clear scaffolding ("red line", context), printable handouts, search engine and bookmarking are essential. (Ardito et al., 2004)

The main treatment of the e-learning could be distance learning because of its lower cost compare to normal teaching (Wentling, Park 2002). The e-learning program is money and time demanding in its introductory part (Thomson 2000), however the long term use must get to pay back.

Conclusion

Teaching using active methods including e-learning teaching is successful. Students got better relations to Agrochemistry, decreased their apprehension of the subject, and were successful in the score test compared to the control students taught by classic formal teaching. The created e-learning program can be also used for home preparation or distance education. Active teaching, especially e-learning, will be tested next semester on a larger number of students. Thus, the question of using these modern methods does not consist in "if" or "why", but in "how" or "which way".

The mentioned description of long-term efficiency evaluation is applicable to similar problem.

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FREEDOM IN ADULT EDUCATION

Hrubý, M.

Abstract

The paper deals with the term 'freedom' in the education environment. The author's attention is focused on the adult education. He attempts to specify his point of view on the important role of freedom in conjunction with teaching and learning processes. It is shown that the 'freedom' can play a key role in the field of motivation. A few basic possible recommendations are formulated and discussed. A good deal of attention is focused on some open questions formulation in the domain of adult education. The next goal of the paper is to introduce some methods and tools which are based on IT and, from the author's point of view, could shift the educational process to higher level. The author deals with selected methods and tools which he has come across in the European Net-Trainers course. They use modern approaches to the educational process and are suitable for the university environment. They can support the implementation of freedom in adult education. The concrete praxis at the various faculties can differ but experience exchange among various workplaces is very useful. The discussion about this topic can bring valuable ideas for the work of all teachers who are responsible for teaching not only informatics, but many other subjects. Lifelong learning also calls for some new concepts and modification of the approaches used. The text of the paper reflects the possibility of educational process modernization and freedom in education wider implementation. From the author's point of view the topic 'freedom in adult education' may soon become a hot-topic.

Key Words

Education, Freedom, Information and Communication Technologies, Motivation, Net-Trainers Course, University

University of Defence in Brno
miroslav.hruby@unob.cz

Introduction

The earliest known written symbol representing the idea of freedom is a Sumerian cuneiform word 'ama-gi' (Freedom in Wikipedia The Free Encyclopedia, 2008). The English word 'freedom' comes from an Indo-European root that means 'to love'. Freedom can be a philosophical and psychological question, it can be the object of social and political investigation. The paper attempts to discuss the term freedom from the point of view of the information age and the teaching and learning processes. An information society calls for lifelong learning. Members of this society have to be motivated to learn and one of the important sources of this motivation can be the use of some attributes of freedom. The author supposes that there is a lack of works about freedom in education aspects. Some ideas can be found on the web (Freedomofeducation.net, 2008). He would like to focus teachers' and students' attention on this significant topic. His first work oriented on the topic of 'freedom' aspects in education (Hrubý, 2004) was step by step developed into the text of the following chapters.

The author wants to emphasize that the text is oriented on adult education only with no regard to its form. Readers' opinions on described ideas can differ. The text should provoke necessary discussion. The author would particularly like to stress the fact that adult education in an information society environment should be based on modified teachers' approaches and a sensitive 'freedom' aspects implementation. According to the author's point of view, it poses no serious risk. The expectations can be great, but competent teachers and responsible students are assumed.

Some Aspects of Nowadays Education

Nowadays education differs more and more from the education at the end of 20th century. We are living at a time of a greater and greater implementation of modern information and communication technologies (ICT) into education of children and adults of the all age groups. Lifelong learning becomes a life necessity and a prerequisite for keeping a place at the labour market. Contemporary society is more and more managed by modern technologies. ICT can support teaching and learning processes very positively, but on the other hand, the improper use of technologies can change the teaching and learning processes into a down-trip.

It is possible to see the movement of 'free hands' and the parts of freedom from universities toward the lower levels of the Czech school system, but on the other hand, it is possible to see the increase of the role of various Learning Management Systems (LMSs) in education. LMSs are the very useful tools but they can enforce a very strong supervision of the learning process. The teachers (tutors) often use these features of LMSs without practical reasons. Their aim is to collect the most complex datasets of students' behaviour during their studies. Some students are sometimes displeased with it. They consider it to be as invasion their privacy.

There is a necessity to know the students' point of view, their needs, ideas and capabilities. One of the key aspects in the field of education is the students' opinions exploration and a narrow co-operation with students working groups.

ICT development gives a chance for a so-called customised education. It can be based on the fact that the student is more responsible for his/her optimal individual way selection for the study activities and the study goals fulfilment. Under this

condition the main task of the teacher can be to set up the proper study goals, to recommend the way and to be a partner of the student during the learning process.

Freedom in Adult Education

The term 'freedom in adult education' can be referred to as a study environment in which an individual has the ability to study and to act, to go to his/her study goals, according to his/her own will. There is the ability to study without restraint from the educational institutions, the ability to have access to particular resources. Compulsory study goals exist, enough suitable study materials prepared with respect to the main study styles and the learning process is based much more on self study with ICT support.

It is a fact that the technical level of the contemporary society makes possible to affect the private sphere of the students during their on-line learning. It is the time when the access to information and education itself is based on computer networks and the society has no problem with a large amount of data archiving, rapid, powerful and effective searching. Analytical tools and data mining systems are available. Information society calls for motivated people. Freedom in adult education can support their motivation significantly.

Below are the some examples of the principles of freedom usage in adult education:

- Every member of a society has the right for education in the field of his/her interest.
- Clear rules exist for funding this education and every potential student has enough information for his/her decision making process.
- The society has to offer enough information about the

possibilities and recommendations for education, especially how education can be achieved effectively and what the concrete effects of the education are.

- Every student has the right of his/her own selection of the ways to the education goals.
- There are no mandatory texts, but only recommended texts.
- Students mustn't be forced to use educational methods which are in conflict with their opinions on the effectiveness their time devoted to study and their efforts.
- Educational methods, which are used by a particular student, are his/her private matter and the monitoring of students is not possible without his/her own agreement and written permission.
- The electronic self-tests are available without 'spying' on the students' behaviour and self-tests results.
- The assessment of students is equitable, the cheating is impossible.

Some Open Questions in Adult Education

There is possible to find some contemporary open questions in the field of freedom in adult education. Three of them were chosen at random as the examples.

Software

Should there be a possibility to choose the optimal software for study goals fulfilment by each individual student?

Possible solution:

In some cases alternative software can be used for some tasks of students. When it is possible the student should have an option

to use software. For example, some students prefer open source software and if there is no special reason, this fact should be accepted by the teacher.

Students Working Groups

Is there a reason to give the student an opportunity to create work groups?

Possible solution:

One of the most important skills is participation in team work. It seems to be a suitable solution to give the students an opportunity to form their working groups that, from their point of view, are optimal. Each student should get known himself/herself and some social activities help him/her to know his/her colleagues.

Homework

What is the right role of homework in adult education? Should it be a recommendation only or should it be obligatory?

Possible solution:

The student should receive a recommendation for his/her self-study after every lesson. This assignment should not be a compulsory study activity. It should be a recommended activity for a student's self-study preparation. In this case the right for individual or group consultation about such homework results in the next lesson should be implemented.

The Signs of Freedom in the Net-Trainers Course

The Net-Trainers course (Vejvodová, 2006) can serve as a good example of the signs of freedom implementation in adult education. The Net-Trainers project has been carried out with the support of the European Commission. It is a concrete output of Leonardo program. Nowadays the Net-Trainers course is running in ten European countries. The pilot Czech version of the Net-Trainers course was finished at the University of West Bohemia in Pilsen in November 2006. The author of this text was one of the course pilot version participant.

The technology of the Net-Trainers course is proved competent in Europe and the next propagation in Europe and in other countries is pre-supposed. The conception of a new language version of the course is possible, too. Information about the Net-Trainers course are available (Web pages of European Net-Trainers Association (ENTA) about the Net-Trainers course, 2008), (Web pages of Lifelong learning Institution in Pilsen about Net-Trainers course, 2008). Selected methods and tools mentioned later in chapter 6, could help to modernize contemporary teaching and learning processes at the university environment successfully. Some interesting elements of the course are as follows:

- According to an introductory questionnaire survey the individual study agreement between each student and the tutor is prepared for every student.
- Each student studies each course module according to his/her individual study plan.
- Each student can always use all study materials in the Czech language.

- Each student can access and use study materials in nine languages. So, a comparison of various national approaches to the same topic is possible.
- The tutor is a real partner of the students.
- The tutor leads an open discussion with students.
- The course is supported by suitable communication tools based on ICT for a free communication among all participants of the course.
- Every student has active access to three levels of asynchronous communication (international forum, national main forum, his/her own national group forum).
- Every student has a passive access to all other national group communication forums.
- Every student can fulfil the study activities according to his/her own choice of information sources.
- Some study activities are not compulsory.
- There is a possibility to study a module in a foreign language with a foreign tutor and a foreign group of students.
- There are some not compulsory face-to-face sessions with informal discussion about the course.
- Every student can evaluate every module of the course and express his/her opinions or suggestions for the module content and the methods used.

The high quality of the Czech version of the Net-Trainers course was appreciated and positively evaluated by its participants (Hrubý, Coufalíková and Smejkalová Mazálková, 2006).

Selected Educational Methods and Tools

This chapter is divided into seven parts. The author wants to describe some interesting aspects of the European Net-Trainers course in detail.

The Individual Study Agreement

The author of this contribution met the individual study agreement in the Net-Trainers course and found it to be a very good tool for the motivation support. This tool can be used in lifelong learning processes. There is the necessity to pay a good deal of attention to the appropriate content of the individual study agreement between every individual student and his/her teacher (tutor). The individual study agreement should be formulated with respect to the special profile of the student and based on the information gained from the questionnaire survey before starting of the teaching and learning processes. This document should set the rights and duties of all education participants. Stress should be put on communication rules. When education is provided in the distance form the introductory face-to-face session is the best opportunity for the creation of the individual study agreement. It is possible to say that in the Net-Trainers course the individual study agreement helped many participants to pass the course successfully. The full utilization of this tool's potential depends on the social skills of the tutor.

Working Group Creation and Usage

Nowadays, there is an increasing demand for the close cooperation of individuals, their capabilities to work together, and their ability to create useful working groups. The Net-Trainers course participants were also divided into working groups. There were five working groups per 7 people created

since the beginning of the course. Most of participants were from the university environment but some members from state administration and the private sector were also included. The age distribution was from the age of 24 to the age of 65. There were various kinds of university degrees from professors to Ph.D. students of Czech universities.

The Net-Trainers course used the concept of the large diversity of personalities in each working group. This methodology was evaluated by course participants as the best and it can be very inspiring especially for the area of lifelong learning. The working groups of participants of various gender, age, qualifications, skills, and interests were very innovative during tasks solution and this groups structure brought the best results.

It is obvious that team-work skills should be developed, it has to be an important goal of education. Besides fixed working groups temporary working groups can also exist according to the needs of study activities. Temporary working groups can be limited by time or by concrete tasks fulfilment.

On-line Study Materials

The technology base of the Net-Trainers course was the Learning Management System (LMS) 'AllWebSolution'. Every course participant had on-line study materials continually at his/her disposition. Study materials were in the Czech language but the course participants could also use alternative study materials in all other languages of the course. The course consisted of five modules and there was an opportunity given for limited number of the Czech participants to study the third module in other course language in a foreign study group.

From the author's point of view the Net-Trainers course study materials prepared in a few alternative languages can serve as a pattern for the other educational materials production. In

this case a student can learn the content and a foreign language together. This solution has an importance for the Europe integration and the student can compare various national approaches to the same topic.

The Net-Trainers course showed convincingly that on-line study materials should be brief, apposite, links to other sources have to be included. Other sources of information should be divided in compulsory and optional (recommended sources). The very important fact is that on-line study materials can be updated easily, colours and multimedia can help their understanding.

Study Activities Planning and Fulfilment

Every Net-Trainers course participant had his/her own study plan for each module of the course. Every study activity had its date of fulfilment, its deadline. The beginning and the end of the module was set by the tutor but the timeline of study activities of every student depended on his/her real self-evaluation, his/her contemporary level of knowledge, time possibilities and study activities demandingness. Students were forced to overcome difficulties in team work planning and team work outputs production.

This concept of study activities planning seems to be a useful tool for the adult education. It is possible to expect a higher implementation of on-line studies in the future. Especially group study activities fulfilment can form special and social competencies and skills of students in a formal and informal manner. It was shown that individual and team study activities should be implemented in every education smartly.

On-line Study Tutoring

One of the qualities of the Net-Trainers course was the high level of its tutoring. This was very well done by the tutor from the University of West Bohemia in Pilsen. The course participant had seven months for the appreciation of this fact and during this rather long time period they could get a general idea about the requirements of good tutor work. Time demands, special and social skills requirements cannot be met by everyone. The tutor can be a decisive factor of motivation, he/she has to be capable to solve possible study problems of students sensitively and he/she has a dominant role in ensuring fruitfulness of on-line education.

Tools for Communication Support during Studies

Three hierarchical levels of the asynchronous communication in the Net-Trainers course were implemented. They were: the international discussion forum, the national Czech discussion forum and the special Czech discussion forum for every Czech working group. The course participants could also use a synchronous communication tool. The LMS 'AllWebSolution' provided the chat. All communication among the course participant was controlled by the means of server located in Greece.

Three levels of asynchronous communication seems to be an optimal solution for multinational on-line education. It would be useful to implement: an international discussion forum for common topics discussion in English or other suitable world language, national forums for communication in national languages of every participating state and working groups discussion forums for every national working group in the national language. Chat at international level can sometimes bring some problems because of various students' different

language competencies. It needs some experience to use chat in foreign language and write briefly and clearly under time pressure.

E-mail communication need not be implemented in LMS, every student can use e-mail by his/her choice. E-mail communication is the optimal tool for sending the results of study activities to tutor and e-mail communication is fully acceptable for all contemporary students.

A very important communication channel is a voice communication. Students can use phone, mobile phone or computer network. It is possible to recommend the use of the Skype software, it is free of charge. In the case of the appropriate equipment ownership, videoconference can also be a suitable solution.

The Portfolio as a Study Activities Fulfilment Review

Every module of the Net-Trainers course required a student's portfolio creation at its end. After the last study activity of the concrete module every student had to create a review of his/her work. Portfolio contains the results of all study activities of the student. Some of them were individual activities, some of them were group activities. Student had to select his/her own part of outputs of the group activity and to add it to his/her portfolio. The final file was sent to the tutor.

In the university environment the portfolio can be used as a useful tool. It can serve in the process of assessment of student's work and especially in the case of great number of students it can help the teachers in their decision process about credits and exams evaluation.

Conclusion

From the author's and some students' point of view the optimal form of education is blended learning. The needed face-to-face contact between the student and teacher is kept, but the number of face-to-face lessons gradually decreases, and the role of the self-study with the support of ICT is much higher. So, the required freedom in education can be implemented. The elements of freedom in education can support motivation – the key to the successful teaching and learning. The freedom is also close connected with the efficiency and the responsibility in education. The Net-Trainers course belongs to a very good European educational technology. The text of the paper describes seven of the most interesting methods and tools of the course. From the author's point of view they can be very usefully implemented at the university environment and to support the freedom in adult education. The students of the all age groups should be the users of technologies, not the slaves of technologies in education.

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ANALYSE: THE COMPARISON OF CZECH AND FOREIGN ASP / SAAS PROVIDERS

Beer, D.

Abstract

This report gives an overview of the current Application Service Provider's (ASP) market, especially the offered services. A questionnaire was sent to more than 20 companies which offer some kind of ASP / SaaS, but none of them replied. For this reason all comparisons were done only on the basis of their websites.

Chapter three gives an overview of ASP and SaaS definitions, as well as describing the differences between the two. The analysis is focused on the comparison of Czech and foreign companies. Czech companies were compared in accordance with the survey. As the foreign companies offered all services inquired in the survey given to Czech companies, comparison was instead based on the classification of the kind of ASP models offered such as business ASP, enterprise ASP, functional oriented ASP, vertical market ASP and ASP aggregators. At the end of this report, some trends in the ASP market are mentioned.

Key Words

ASP, SaaS, the comparison of the ASP market, the difference between ASP and SaaS, ASP / SaaS trends, business ASP, enterprise ASP, vertical market ASP, function oriented ASP, ASP aggregators

The University of Economy Prague
daniela@artelglass.com

Introduction

This study identifies the „big players“ on the Czech and foreign markets in the field of ASP/SaaS. The aim of this study was neither to address and identify all potential ASP/SaaS providers and publish the whole list of these providers nor compare or test single offered applications.

Czech companies may offer the same services as foreign competitors but the lack of information available may discourage potential customers. For example none of the Czech companies had a demo version available for potential customers to test their offered services. In my opinion every customer would like to test a service before purchasing it and in most of the examples seen below it would have been possible to have a demo version available.

In the first part of this study the general overview of ASP / SaaS is given. The main part of this study is devoted to the comparison of Czech and foreign providers. Czech companies were analysed using the original survey. This was not possible with foreign companies as they provided all the services described in the survey, so instead they were compared by the various ASP/SaaS models offered.. At the end some trends are mentioned in this area.

Material and Methods

Ideally the comparison would have been based on the attached survey answered personally by each company. I contacted more than 10 Czech and 10 foreign companies, but unfortunately nobody replied to my request, so all comparisons were done solely on the basis of the particular companies' websites. This kind of comparison is not ideal as it would have been if the companies had personally replied to my survey. On the other

hand it showed that the presentation of the Czech companies are far behind that of the foreign competition, seen by the detail foreign companies take in describing their services. Czech providers were taken from a big statistical list issued on <http://www.computerworld.com>. These statistics represents the TOP 100 ICT companies in the Czech Republic. Foreign ASP / SaaS providers were taken from <http://www.aspnews.com/top50/> and some companies were also taken from Application Service Providers in Business [11].

Czech representatives were chosen only from the TOP 100 ICT companies, which only included companies with mainly Czech ownership.

ASP versus SaaS

Application service provider (ASP)

An organization ASP Industry Consortium is defined as: „An organization that hosts software applications on its own servers within its own facilities. Customers rent the use of the application and access it over the Internet or via a private line connection. Also called a "commercial service provider."

According to the book [5] the definition could be further extended for:

- Applications produced by the software provider.
- Applications which could be rented and used by many customers.
- The maintenance which is carried out by an application provider.
- Services that customers can use on his or her own computer with only a web browser with a very simple friendly user interface.

ASP is one of the most discussed technology of the 21st century. The ASP future is very hopeful because the model provides a high degree of flexibility, which common software providers can not provide in the sense of „plug, use and pay what you really use“. The Czech ASP market is not very large and waits for some new inspiration. Currently applications have to be offered as a service portfolio. However, companies may fear the risk of data abuse and small companies may fear to pay the high prices for these services.

ASP models could further be sorted according to 5 basic groups [11]:

1. Business ASP – typically supply low-end, standard software applications. Support business administration processes.
2. Enterprise ASP – high level software - ERP or CRM, which could also be provided by online shops .
3. Functional oriented ASP – specific software for managing customer relationships and services in connection with www.
4. „Vertical Market ASP“ – applications fulfill complex customer requirements, such as banks and schools.
5. „ASP Aggregators“ – companies providing the whole spectrum of ASP. Application are either produced by the company itself or bought in from other ASP producers.

Software as a Service (SaaS)

The biggest SaaS advantage is the model based on the web model supported in many cases by SOA.

According to the Aberdeen Group study [10] we can recognize at least 5 hosted programmes and as a real SaaS is taken only the first option – Multi-Tenant.:

Multi-Tenant – Multiple companies use the same instance of hosted software.

Multi-Instance Shared Service - Each company is given its own instance of the software but shares some common services, such as an integration platform, security, permissibility models, and/or optimization engines.

ASP (application service provider) – An application is hosted by the vendor or, more often, by an outside hosting company in a separate instance on a separate piece of hardware just for your company.

Utility ASP – An application is hosted by the vendor or outside hosting firm in a separate virtual instance just for your firm but is housed on hardware shared by multiple companies.

Hybrid – A primary application located on your company's or your trading partner's premises. Supplementary functionality provided via SaaS model.

ASP services versus SaaS

In the world of IT terms are redefined more frequent than anywhere else due to the lack of basic standards. Nowadays ASP and SaaS definitions are very often fluctuating.

Differences between ASP and SaaS are currently the following [10, 15, 16]:

	ASP	SAS
Application design	Bought and further licenced from separate providers or hosting providing	Produced only for SaaS sellers, could be used multitenant
Time necessary for the implementation	A long cycle from installation to customization	The possibility of easy customization for all customers using this service.
Multitenant model	Every customer has his data separated from other customers. Single applications are placed on separate servers.	Applications are created to be able to use multitenant and they are available for more customers. Data could be placed on one server.
Upgrade and extension	ASP is mostly depended on the software producer, the upgrade is limited and it is usually done once a year.	Upgrade and extensions could be placed into the datacenter and the customer could choose to use it or not.
Integration	Can be integrated via the HTML interface	Can be integrated via the XML interface

IT support	Depends upon the customization and integration level	Is included as a part of the provided service
Costs of service	Very limited possibility to share costs.	Costs of software, hardware, networks are shared by companies using this applications.

Table 1: Differences between ASP and SaaS

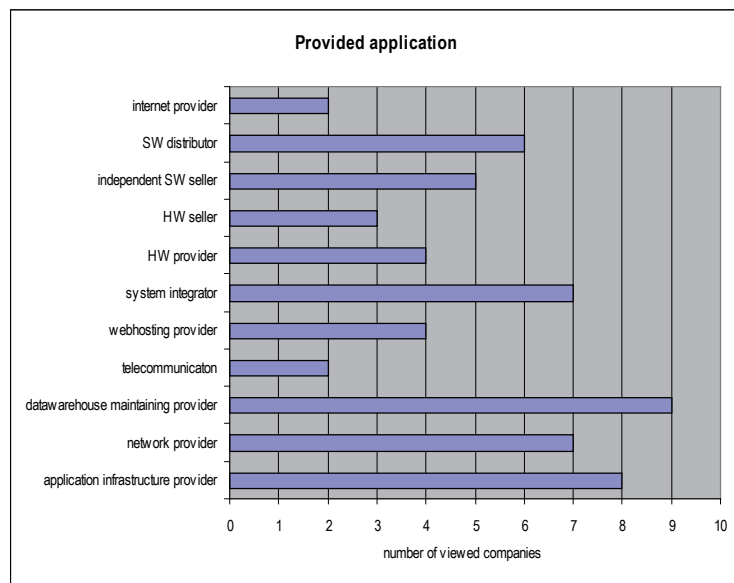
Results - The comparison of Czech and foreign companies

Chosen Czech ASP providers survey

First we will look at the comparison of Czech ASP providers. The choice of companies alone was very difficult as Czech companies, contrary to their foreign counterparts, do not have a detailed description of the services they provided on their website. Only Czech companies with the minimum of foreign ownership were taken as a sample. The survey below was sent to these companies and all companies were kindly asked to complete this information. Unfortunately none of the company replied to this request. Due to this the description was fulfilled only on the basis of their websites. The list of all companies is mentioned in table 2.

COMPANY NAME	THE COMPANY REVENUE (IN MIL. Kč) IN 2005	THE APPLICATION INFRASTRUCTURE PROVIDER	N E T W O R K PROVIDER	DATAWAREHOUSE MAINTAINENCE PROVIDER	T E L E - COMMUNICATION COMPANY	WEB HOSTING PROVIDER	S Y S T E M INTEGRATOR	H A R D W A R E PROVIDER	H A R D W A R U SELLER	I N D E P E N D E N T SOFTWARE SELLER	D I S T R I B U T O R WITH ADDED VALUE	I N T E R N E T PROVIDER
PVT www.pvt.cz	1 018											
<i>Main customers: SCP, Ministry of Finance, Třinecké metalworks, ČSOB - bank</i>												
GC SYSTEM www.gcsystem.cz	956			X								
<i>Main customers: Carefour, Ahold, HVB bank</i>												
AUTOCONT www.autocont.cz	2 613	X	X	X			X	X		X	X	
<i>Main customers: kooperativa, Health Insurance company, ASPI Publishing, Telefonica O2</i>												
UNICORN www.unicorn.cz	779	X	X	X	X	X	X	X	X	X		
<i>Main customers: Česká spořitelna, Komerční banka, Česká pojišťovna, COCA COLA beverages ČR, Raiffeisenbank</i>												
ANECT www.aneet.cz	755	X	X	X			X				X	
<i>Main customers: DHL, Ministry of labour and social affairs, Česká pojišťovna</i>												
INFINITY www.infinity.cz	431	X	X	X			X				X	
<i>Main customers: Tesco, ČÚZK</i>												
NWT COMPUTER www.nwtcomputer.cz	378	X	X	X		X	X	X	X	X	X	X
<i>Main customers: GE Capital Leasing, Uniqua pojišťovna, Prague castle administration, Sykora</i>												
LOGOS www.logos.cz	299											
<i>Main customers: ČSOB, Komerční banka</i>												
SKYNET www.skynet.cz	201	X	X	X	X	X	X	X	X	X	X	X
<i>Main customers: it was not mentioned</i>												
VEMA www.vema.cz	116	X	X	X		X	X			X	X	
<i>Main customers: ČSOB, Health Insurance company - VZP</i>												

Table 2: The list of Czech companies



Graph 1: The list of provided application by individual companies

Selected criteria for the evaluation of Czech companies

To be able to classify Czech companies, the following survey was completed based on website data [13, 17, 2, 3]. All companies were evaluated based on survey results.

The survey consists of the following criteria:

1. Technology architecture - examines whether the SaaS vendor has employed a technology architecture specifically designed for Web performance and rolebased security. When viewing demos and conducting reference checks, the speed at which application interface screens refresh and queries are answered and what type of connection is being used to access the SaaS application was evaluated.
2. Strategy, mission and vision of the company.
3. References - examines any references available on their website from customers who have used their services.
4. Flexibility – examines the possibility to rent only a part of an application or if customers have to rent the whole application without the possibility of any changes.
5. Enhancement process - looks at whether the SaaS vendor has a faster enhancement cycle than a traditional software vendor.
6. Training approach such as on-line tutorials- evaluates whether the SaaS vendor has created an on-demand model of training to match its on-demand application approach. For instance, some SaaS vendors have created voice-directed self-training modules that can be accessed by users over the web. This same process can be used to educate users on enhancements when new versions of the software are released.
7. Customization approach – examines the ability of

customization of applications Most SaaS vendors limit customization and instead use web technology to enable customers to create unique configurations of the application. For hard-core customizations, a few SaaS vendors provide toolkits for application extensions, enabling unique code to be written.

8. Community benefits- evaluates whether the SaaS solution enables community benefits such as industry benchmarking, business partner discovery (e.g., identifying appropriate suppliers or carriers), or group buying power. Multi-tenant architectures are intrinsically constructed to make community benefits easier to achieve, while gaining these benefits from an ASP model is more challenging, though not impossible.
9. Security and reliability of hosting environment - examines the ability to have your IT organization assess the security and reliability of the vendor's hosting environment. Evaluates the actual outages for scheduled downtimes as well as the unplanned downtimes. Also looks at assessability of backup and disaster recovery plans.
10. Internal integration capabilities - ensures that the vendor has proven integration capabilities to back-end systems with its SaaS offering. They also will support integration with your enterprise portal environments (or your customer-facing or supplier-facing portals).
11. Ease of application upgrades - examines how will your company be alerted to new application versions and enhancements. Are new versions and software patches released on a set schedule or will they appear on a rolling, ad hoc basis (which may be preferred by companies seeking to access new innovations or product extensions)? Many SaaS vendors will automatically ensure that your company

is always on the most current version so you can exploit the latest functionality and thus run more advanced business processes than competitors.

12. Current legislation – looks at the ability to run the application under the most current legislation (accounting, tax laws, ..).
13. The use of Service Level Agreement (SLA) – looks into the diversification of the helpdesk, networks, systems, applications and data security.
14. Help desk – analyzes the help desk provided to customers
15. Services – looks at the list of provided services (if it is only SaaS, ASP or if it also includes internet connection, etc.).
16. Application pricelist (and their comparison).
17. Trial – examines the possibility of a demo version of the available applications.
18. Quantity – evaluates how many customers can operate at one time on one given server (or application, etc.).

The survey interpretation

In general ASP services provided by Czech companies and their web presentations are very poor. Most of the points set in the survey are not included on the website and many companies do not offer them at all. As stated above, none of the Czech companies have replied to this questionnaire. For this reason the Czech ASP market was mapped only on the basis of the company's websites. The ASP focus in the Czech Republic is mainly banks and public administration.

1. Technology architecture - all mentioned companies except PVT describe what kind of application they use and what kind of hardware platform is needed. It was not possible to

try neither the speed of the application nor information on how to access the applications. Only very basic descriptions were given.

2. Strategy, mission and vision of the company - this point was described by almost all companies.
3. References - companies consider this category probably as the most important and all companies provided reference to their successful projects.
4. Flexibility - the possibility to rent only part of application was offered only by 3 companies. Unfortunately they did not specify what part of the application could be used.
5. Enhancement process - companies did not provided any information regarding the enhancement process or only very little notes were given without any further specification.
6. Training approach such as on-line tutorials - tutorials could help customers better orientate themselves to a new application. None of the companies provided tutorials. On the basis of website presentations there were not any remark regarding on line tutorials.
7. Customization approach - the customization approach was described only by 2 companies.
8. Community benefits - none of companies mentioned this possibility.
9. Security and reliability of hosting environment - most of companies described the communication between the server and the client, whether they use encryption and security protocols and how the authorization is carried out.
10. Internal integration capabilities - approximately half of the companies stated that integration is provided

automatically, but a detailed description was not presented, with the exception of Autocont.

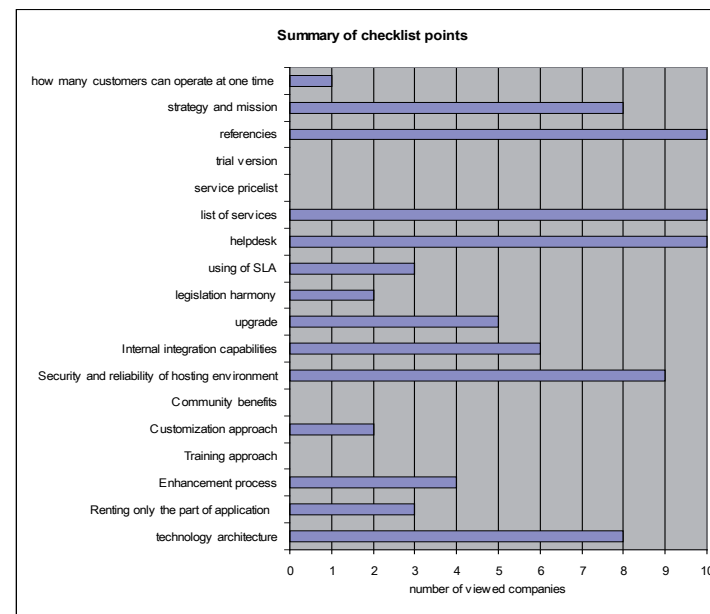
11. Ease of application upgrades - only some companies presented this possibility even though it should be given automatically.
12. Current Legislation - the legislation harmony was mentioned only very rarely even though it should be included into the SLA conditions.
13. Using of Service Level Agreement (SLA) - only 2 companies had a small note regarding SLA.
14. Help desk - help desk was mostly described everywhere, with 2 level of the support.
15. Services - services were mentined by all companies.
16. Application pricelist - only one company mentioned the price of the provided service. It seems that one of the most important criteria was missing from most of the examined websites.
17. Trial - there were no possibilities to try a demo version nor any application preview.
18. Quantity - this criteria was not mentioned by any company.

Generally most of the points in the survey were not mentioned at all. Mostly companies mentioned only a lot of references, the list of provided services, and the company's vision and strategy. The overall summary is given in the table below. Numbers on the top of the table correspond to single points of the given survey.

CHECKLIST COMPANY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
PVT		X	X											X	X			
GC SYSTEM	X	X	X		X				X	X	X			X	X			X
AUTOCONT	X	X	X	X	X		X		X	X	X	X		X	X			
UNICORN	X	X	X	X	X		X		X	X	X	X	X	X	X			
ANECT	X		X						X	X	X		X	X	X			
INFINITY	X		X						X					X	X			
NWT COMPUTER	X	X	X	X	X				X	X	X			X	X			
LOGOS	X	X	X						X					X	X			
SKYNET	X	X	X						X					X	X			
VEMA	X	X	X						X	X			X	X	X			

* X means that the company does not complete the point of the checklist.

Table 3: The summary of checklist points



Graph 2: The summary of checklist points

Exploring the effectiveness of the ASP / SaaS

The ASP / SaaS effectiveness can be measured by the method of critical success factor (CSF) or balance score cards (BSC). All hereabove mentioned criteria can be taken as a basis. Each measure or criteria should be reviewed with the view of each actor, clients and ASPs, because the actor related with each perspective is distinct. All measures can be divided into 3 perspective - business value, client perspective and internal process perspective. Business value estimates risks of the ASP service, unexpected transition and management, number of pricing changes by ASPs. The criteria of security and trust is

also very important, because data center is located outside the company. Therefore they are afraid of loss of information and data. If clients did not have trust about ASP security, they could not utilize the ASP service. Effectiveness of the ASP / SaaS process can be evaluated ratio of reworks, time spent to repair bugs and fine-tune new application, and on time service. A well-developed performance measurement system may give signals to senior management that something is wrong and that an ASP strategies has to be considered again. Criteria provide not only a tool which makes clients evaluate the ASP service effectively, but also a tool which makes an ASP concentrate on economic number of success factors. When we acquire the value per each criteria, the effectiveness of the ASP service can be evaluated with total score which represents integrated value of all measures. However, the model for calculating total score having the value of multidimensional measures is not considered in this research, because this area is not our interest. We suggest that further research should investigate measures in larger scale case study to validate whether these affect mission or CSFs.

Results - The overview of foreign ASP / SaaS providers

Foreign ASP providers are advanced and services are more popular among companies than in the Czech Republic. While the Czech ASP offer is still at its beginning and companies offer very simple applications, foreign companies offer not only global applications but also to provide complete outsourcing of all supported process. In this cases we can speak about the Business Service Providers (BSP).

Originally the survey should have been carried out the same way as in the comparison with Czech companies, but the amount of companies offering ASP abroad is inexhaustible and

all top companies fulfill all points of the given checklist. From that reason, it was not very useful to extract points from the survey just to state that all points were completed. Instead the survey was focused on the chosen ASP models. ASP models were divided the following way:

1. Business ASP.
2. Enterprise ASP.
3. Functional Oriented ASP.
4. Vertical Market ASP.
5. ASP Aggregators.

In the following paragraphs representative companies of each model are chosen and their services are described. By each model the technology, services, references and the territorial scope is listed.

Business ASP

Business ASP provides prepared application for general business use. They target small and medium sized companies. The biggest providers are given in the following table:

Company	Provided application	Technology	Territorial scope	Reference
INTERLIANT www.interliant.com	Wide scale of ASP including Exchange/Outlook, Domino with complete web support. Implementation, full web oriented applications.	Microsoft Windows NT, Unix, Sun Microsystems' Solaris	USA and branches in the UK and France	online encyclopedia World Book Online, Beacon.
FUTURE LINK www.futurelink.com	All application suitable for Microsoft Terminal Server or Citrix Metaframe	Administrative applications with a partnership among Compaq, Citrix, Microsoft	USA, Canada, Europe	Watson High School, KIK Corporation
MI₈ www.mi8.com	Microsoft Exchange/Outlook with an extension of virtual office enabling the access from anywhere, wireless access.	Microsoft, ThinAirApps, Compaq, Cisco, Digex, AT&T, Citrix	USA, UK	Small companies, law firm Mc Conell and Associates, Cornell University's School of Management
TELECOMPUTING www.telecomputing.com	Offer more than 200 applications, including Microsoft Exchange and Office 2000	Microsoft, Citrix Systems, Exodus, Compaq	Europe, Norway, Sweden, USA	More than 400 medium sized companies: West Fish Norwegian Salmon, Confex

Table 4: the „BUSINESS ASP“ provider's overview

All these models have very little possibility of customization and integration for customers. Most are limited, predefined services and only some of them are able to satisfy the need of an entire company.

Enterprise ASP

Here we can assigned different ERP and CRM systems and e-commerce applications. Contrary to the previous group, these applications include a wide range of business use, and customization goes without saying. This group of providers mainly target large and medium sized companies.

COMPANY	PROVIDED APPLICATION	TECHNOLOGY	TERRITORIAL SCOPE	REFERENCE
AGILERA www.agilera.com	e-commerce, implementation possibility, supported by SLA, Business Intelligence. Specialized for industry, finance services and retail stores.	Ariba, BroadVision, Oracle, CRM from PeopleSoft, ERP Lawson, SCM from J.D. Edwards	USA	Flash Electronics, MD Helicopters
CORIO (IN 2005 MERGED WITH IBM) www.ibm.com	e-commerce, implementation possibility, supported by SLA, Business Intelligence. Specialized for industry, finance services and retail stores.	Ariba, PeopleSoft, Microsoft, Oracle, SAP, Siebel Systems (CRM), BroadVSION (e-commerce)	USA with many branches all over the world	Peppers and Rogers Group, Enporion
INTERPATH www.interpath.com	e-commerce, the whole package from implementation and maintenance to internet providing.	SAP, CRM aplikace, Cisco Systems, IBM, Nortel Networks, Sun Microsystems - technologie, Microsoft, Pivotal - application	USA,Australia, with branches in Europe	Pharmaceutical company Bayer, Greenville Utilities, Manpower, UPS

Table 5: the „ENTERPRISE ASP“ provider's overview

Function oriented ASP

This kind of ASP is very specific for industry, production, and the financial sector. It targets the characteristic problems and professional activities in a company with data analysis and special management software. Only the part of application could be used and they specialize in only a few processes in a company.

COMPANY	PROVIDED APPLICATION	TECHNOLOGY	TERRITORIAL SCOPE	REFERENCE
EMPLOYEEASE.COM www.employease.com	HRM application up to 3000 employees, they support the service which would meet all of a customer's needs.	It was not mentioned	USA	Small and medium sized companies. PSS/ World Medical, Works. com
NETLEDGER www.netledger.com	Small and medium sized companies. Specialization for the financial, e-commerce, ERP	Oracle, partnership with ADP, Yahoo!	USA, Canada	Open Door Technology, Alan George and Associates
OUTTASK www.concur.com	Can provide a whole portfolio of applications, which could be used separately or as a whole.	A strategic partnership with CyberCFO, Grant Thornton	USA, merged with Concur Technologie's	Electrolux, Polaroid, Ericsson, McKinley Marketing Partners
UNITED MESSAGING www.unitedmessaging.com	Web applications	Microsoft Exchange, Lotus Domino - applications, Sun Microsystems - technology	USA, UK	Thomas Jefferson University, Trustmark, Centocor

Table 6: the „FUNCTION ORIENTED ASP“ provider's overview

“Vertical Market” ASP

These applications are characterized by a very small number of customers with specific needs in the field of hardware, software, system, and services. Products are determined by specific activities such as educational and health service. These kinds of applications are characterized by the specialization and expensiveness of the customer's need.

COMPANY	PROVIDED APPLICATION	TECHNOLOGY	TERRITORIAL SCOPE	REFERENCE
PORTERA www.portera.com www.exigengroup.com	Provide full web applications.	Oracle, Microsoft - application, Avasta, Cisco Systems, Storage Networks	USA, Canada, Latvia, Russia, Australia	More than 250 companies. McLaren Consulting, AvantGo
TRI ZETTO GROUP www.trizetto.com	Web applications in health services.	Didn't mention	USA	150 companies with more than 70 thousand of patients Eye Clinic of Wisconsin, Talbert Medical Group
LEARNINGSTATION.COM www.learningstation.com	Web applications in educational services, online tutorials, and application for teachers and students.	Microsoft, Tom Snyder - application, Qwest, EarthLink - technologie.	USA, Canada, Australia	More than 144 schools with 23000 pupils. Lowcountry Day School
FULLSCOPE www.fullscope.com	Targeted for industrial production. Online services of – CAD, project management	Microsoft, BAAN - application, UpShot Inc., Sunset Direct-technology	USA	Komatsu America
SALESFORCE.COM www.salesforce.com	Targeted for financial services, CRM		USA, Europe	Merrill Lynch, CA, Hawaiian Airlines, AMD

Table 7: „VERTICAL MARKET ASP“ provider's overview

„ASP Aggregators“ – companies which provide a different kind of ASP

Companies integrate various kinds of ASP and provide them as a whole in the accordance with the customer's branches. They can provide many ASP „under one roof“ with one single access point.

COMPANY	PROVIDED APPLICATION	TECHNOLOGIE	TERRITORIAL SCOPE	REFERENCE
JAMCRACKER www.jamcracker.com	Various applications with one access point.	They cooperate with more than 20 important ASP producers.	USA	B2Bworks, Vitria, Digital Island
EZIGMA www.ezigma.com	Web application in the field of HR, finance, international trade, ...	They cooperate with applicaton vendors as well as with companies who provide infrastructure.	USA	Newhomesmedia
IFUEL www.cantono.com	Approximately 50 various applications which can be used via a web interface.	Citrix, RSA Security	USA	Applications for more than 11 000 customers. Onyx

Table 8: „ASP AGGREGATORS“ provider's overview

Most of the companies use a „best practices“ method to be able to meet customer's needs, which are presented on their websites. It is mainly SLA, customer's support and data security. „Best practices“ can be summarized by following:

- The designed system has to be complex with fast accessibility and data security.
- All provided services have to be covered by an SLA agreement. SLA enable to track whether all applications work at the optimal level and if a customer pays only what he uses.
- Data security has to be monitor at all times in connection with the data back up system.
- The regular customization must be readily available.
- It is necessary to use the multi tenant model. Applications are produced so that many customers may use them at one time.

All applications are we applications.

Current internet giants - Google, eBay, Amazon

In the above mentioned list „internet giants“ such as Google, eBay and Amazon are not mentioned, as this study is targeted towards companies which provide the complex applications of some of the field's branches such as HR, finance or logistic. In my opinion no one provides applications for business process controlling. Ebay provides e-business on the basis of auction sales. Google provides an email client and “searching” software which are SaaS. On the other hand, it now provides “Google Desktop” and “Google Earth”, which needs to be installed onto a computer which puts to question whether it is still SaaS. In present days Google has been expanding, making some wonder when they will start to offer some kind of ASP or SaaS services. It could also help them merge with Salesforce.com company, which has recently been considered.

Discussion - The ASP/ SaaS future

The original aim of this paper was completed only in part because the comparison of the Czech and foreign market was not possible. The study should have been comprised from the returned questionnaire, but as no one from the addressed company replied, only the information available on the companies' website was compared.. Due to the fact that Czech companies for the most part do not have any description of provided services, no possibility to try the application, no price estimation, the comparison is by far not complete. On the other hand foreign companies were not compared according to the same survey as Czech companies as they fulfilled all points of this survey, making the comparison pointless. This is why foreign companies were compared according to separate ASP models.

None of companies provide straight SaaS, but instead offered services including ASP as a whole. It was also very difficult to choose a presentable sample because the question is whether or not the provider is also the company who offers internet connection and gives the possibility for webhosting. This study was primarily targeted for companies who offer global solution in the field of information systems for human resource, economy or logistics. The basic difference between foreign and Czech companies was the more sophisticated strategy on part of the foreign companies ability to present tutorials and demos. The potential customer can be in a position to try how a single application works. This kind of strategy was not mentioned by any of the Czech company. Another problem of the Czech companies is providing a guarantee covered by SLA. The suggestion of SLA was from time to time given on a Czech company's website, but details were never described. Due to the the globalization and the uniformity of the society we can be very optimistic regarding either ASP or SaaS services as it seems that both will be successful without saying.

Gianpaolo Carraro, the leader of Microsoft SaaS writes in his blog that Microsoft (8th of February 2007) issued a sample SaaS application, a fictional HR software. He stated that it does not matter what the software does, but how it goes about doing it. During the next few years it is possible that SaaS will be an integrated part of business SOA and it is obvious that SaaS/ASP will be shifted from individual applications to integrated solution „under one roof“ as companies become ASP aggregators. This situation is also supported by the general globalization, including the fusion of big companies. One of the problems when you decide to use ASP / SaaS could be the concern regarding data security. If a company places data on a

hosting server, it does not want to rely on a small supplier, which is only on the market for a few years. But can we really recognize which supplier will be successful and secure and which will not? One of the criteria could be, for example, a technical model of hosted software, customer references or the company vision. To be able to be sure which supplier is reliable, it is necessary to find somebody who is on the market for a long time or who merged with one of the bigger companies (Microsoft, Oracle, IBM, ...). However, as larger companies merge, smaller ones go under. Larger companies have better services and set security standards, accessibility etc. at the highest level. Small ones become smaller, more risky and at the end are most likely to go under. All want the best and the safest services, confidence being the most important. Everybody follows what was first done by Google and is currently the most discussed. The company has more customers, with more stability, quality, etc and (with more and more companies merging) the market monopolization is increasing.

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[21] websites of chosen companies (mentioned at the each chosen company) aph 2: THE SUMMARY OF CHECKLIST POINTS

SYSTEM FOR ADAPTIVE ANNOTATION OF HYPERLINKS IN THE CONDITIONS OF UNIVERSITY COURSES FROM THE FIELD OF INFORMATICS

Turčáni, M., Kapusta, J.

Abstract

The main aim of implementing adaptive hypermedia in education is the increase of effectivity of the learning process or the process of acquiring the information related to educational activities. One of the adaptive systems is the system for adaptive annotation of hyperlinks, iLMS. The paper deals with experiences in implementing this system at the Department of Informatics, Faculty of Natural Sciences, Constantine the Philosopher University in Nitra.

Constantine the Philosopher University in Nitra
mturcani@ukf.sk
jkapusta@ukf.sk

Key Words

adaptive hypermedia, e-learning, adaptive navigation, adaptive presentation, LMS Moodle, iLMS

Introduction

E-learning has become a buzzword nowadays and it has been implemented more or less into various methods and teaching forms on the academic round. It is very important for teaching of Informatics to accept and effectively apply new IT technologies in order to enhance efficiencies in areas such computer sciences teaching and learning (Khan 2006).

During the last years, preconditions for a successful introduction of teaching by using e-learning and the combined form of study have been created at the Department of Informatics. In the first phases, methodics that gave rise to many e-learning courses have been developed. These courses have already been implemented and have become an important part of external studies program, but also a supportive material for internal studies in the field of Applied informatics and Teaching of Academic Subjects (Vrábel 2008).

To sustain a good educational trend by using modern ICT forces us to look for and to implement the newest methods and forms of teaching. At present, those seem to be AHS that represent a higher form of e-learning. The research beginnings in the field of AHS come from the year of 1992 at the University of Pittsburgh. By saying adaptive hypermedia systems, it is meant to be all hypertext and hypermedia systems that reflect certain user characteristics in a user model and that use this model to adapt different properties of the visible output that is presented to the user by the system. In other words, AHS should satisfy three criteria: it should be a hypertext or a hypermedia system, it should contain the user model and it should be able to adapt the hypermedia by using this model.

Adaptive navigation support

AHS are based on two groups of adaptive techniques: adaptive presentation and adaptive navigation support. The main concept of adaptive presentation is adaptive text presentation. Hence, among the adaptive presentation belong the techniques of alternative page fragments or the whole pages, alternative picture presentation, alternative text, drop-down text and others (Brusilovsky 2007).

Adaptive navigation support consists of influencing user's path in an information space. When using this technique, the system's adaptive core evaluates the applicability of each shown link for the given user and offers a result upon which it influences the user's path in the document system. This influence can be directive in such a way that the system disables the paths that aren't applicable for the given user and context or which are non-directive. In this case, the system presents recommended (or not-recommended) path in the information system to the user by using various instruments. When using the non-directive way, the system just sorts the links according to their relevance or distinguishes the important link differently (Bieliková 2006).

To achieve the listed navigation methods in information content, if using the directive or the non-directive approach, the following techniques are used mostly: direct guidance (the AHS guides the user in an information space, which means it selects the most applicable concepts and fragments assigned to them), sorting links (links leading to other pages are sorted hierarchically according to their relevance), links annotation (the adaptive system marks links that are advisable for the user), hiding links (the links that guide to the non-recommended information are hidden) etc.

The iLMS module

The iLMS module has been used for link annotation which enables to recommend links to a user according to metadata and defining of dependencies. The system recommends the links by using four tags: recommended link tag, 'neutral' link tag, a tag when the system could not decide according to the metadata and the not recommended link tag.



Figure 1: Layout of icons for links recommendation

The iLMS module is an addition to the Moodle system. From the technical point of view, the module contains a new adaptive course format (the format complements the traditional course formats, the thematical and weekly ones) and some blocks for creating adaptive content in LMS Moodle.

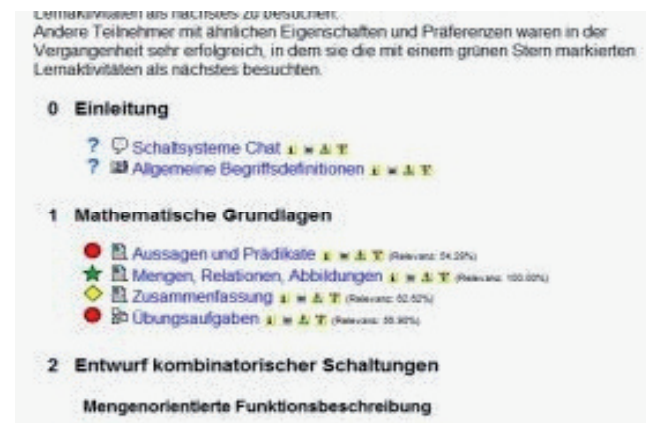


Figure 2: Course content design in a links annotation system

The module has been developed by Gert Sauerstein as a part of his diploma thesis „KI-Ansätze zur Lerner-Adaption in Lern-Management-Systemen“ at the Technische Universität Ilmenau (Ilmenau, Germany). As the author states in his thesis, the module had been developed based on the ideas of P. Brusilovsky. After recommending each link, the module asks for evaluation of applicability and content relevance from the student.

The attraction of this module is the fact that it includes the mood and the student's actual motivation into the adaptive mechanism. This attribute is gained in a block of the Moodle system where the students can mark their current mood.

The disadvantage of the iLMS module is the fact that it is not being developed at the moment and also that it can be implemented into LMS Moodle 1.9+ only. Unfortunately, probably the greatest problem of the module is that it is only a prototype dedicated

for 'simple' courses only. These disadvantages have also shown up in our experiment when the system has been collapsing after multiple simultaneous access attempts of students.

Results

The advisability of using the iLMS module for adaptive links annotation has been examined in the end of the winter term based on the students' results of the end-of-term test. During the term, we have been monitoring three groups of students that were created by standard enrolling into groups. The students were divided into the following groups:

1. Without the LMS Moodle support (Unsupported) – a group where classical F2F teaching method was applied,
2. With 'standard' e-course support (Non-Adaptation) - a group that was supervised by using blended learning in LMS Moodle,
3. With adaptive system for links annotation support (Links Annotation) – a group where the adaptive iLMS system was used.

56 students have taken part in the end-of-term test. The groups seem to be equipollent at first sight – both groups have attended the same courses with the same teachers. Results of the end-of-term test can be seen in the categorized histogram that shows the post-test variable distribution in each group.

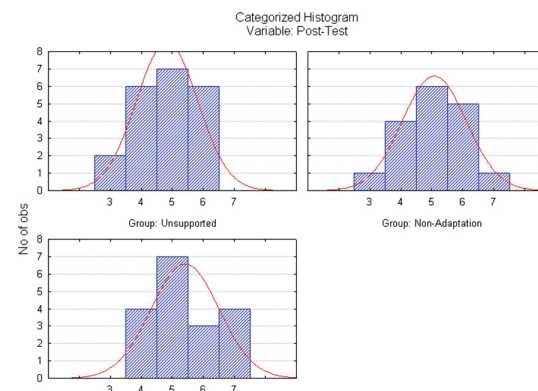


Figure 3: Categorized histogram of post-test variable distribution in each group.

The graph shows that slight abnormalities are apparent. Because of this, to examine the differences between groups in a post-test score, we will use the nonparametric median test.

Overall Median = 5,00000	Unsupported	Non-Adaptation	Links Annotation	Total
<= Median: observed	15,00000	11,00000	11,00000	37,00000
expected	13,87500	11,23214	11,89286	
obs.-exp.	1,12500	-0,23214	-0,89286	
> Median: observed	6,00000	6,00000	7,00000	19,00000
expected	7,12500	5,76786	6,10714	
obs.-exp.	-1,12500	0,23214	0,89286	
Total: observed	21,00000	17,00000	18,00000	56,00000

Table 1: Contingency table

Chi-Square	df	p
0,4805549	2	0,7864

Table 2: Median test

Based on the test results, we accept the null hypothesis stating that the post-test score difference is not statistically significant, this means the Post-Test dependant value does not depend on the Group factor.

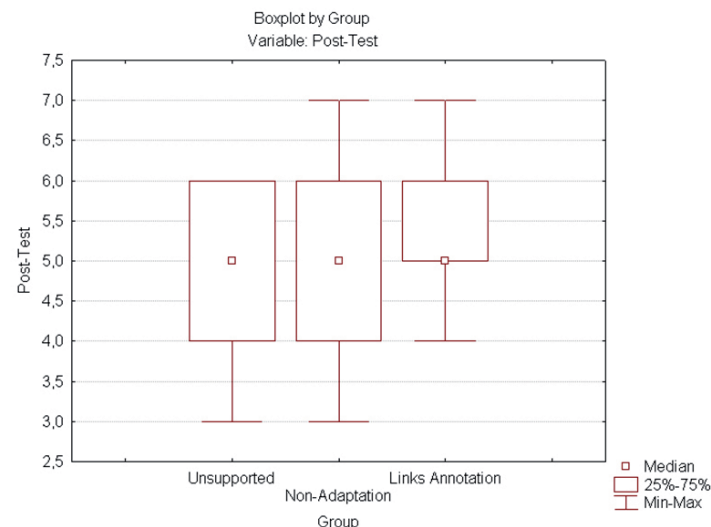


Figure 4: Graph of median test results

The previous graph visualizes the median test results. Although the results are not statistically significant, it is obvious that the results of students using the adaptive system for hyperlinks annotation are slightly better and more homogeneous.

Seeing that the applicability of implementing the adaptive system for hyperlinks annotation compared with the classical blended learning form has not been expressly statistically proven, we are thinking of using the adaptive system with direct guidance with its experimental examination in our further work.

Conclusion

The current task within the increasing of students' knowledge level is the field of adaptive management of educational activities of informatics-based subjects. It is closely connected to the personalization of education which enables the classification of the knowledge acquired by the student and consequently the regulation of his/her study. The outcomes published in the paper show that the application of this method into the Applied Informatics education was correct and reasonable.

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PROFESSIONAL MONOGRAPH REVIEW

Mildeová, S.

Title of the monograph:

Systems Approach to Knowledge Modelling

Authors:

dr. Ludmila Dömeová

dr. Milan Houška

dr. Martina Houšková Beránková

University of Economics, Prague
mildeova@vse.cz

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First edition

Reviewer :

dr. Stanislava Mildeová

Department of Systems Analysis,
Faculty of Informatics and Statistics,
University of Economics, Prague

Review

A starting comment to the review:

Knowledge science is a developing field that is still an open question in theory and practice. A lot of theoretical approaches to knowledge, knowledge modelling and knowledge management exist.

Academic research continues to explore the knowledge science and produce insights and tools that would be of great value to knowledge workers. A new book, **"Systems Approach to Knowledge Modelling"**, written by **Ludmila Dömeová, Milan Houška and Martina Houšková Beránková**, is a good example of such research, and a successful way of supporting practical use and further research.

In the subsequent narration I will try not just to scrutinize the text, but to realize the concealed and implied meaning of the authors. I will stand as an observer, who pretends to act as the reader him/herself would do by expressing own opinion, desires and expectations of the monograph "Systems Approach to Knowledge Modelling". In other words, I hope some new scientific knowledge will be made meaningful by sorting and sifting the bits and pieces into the following book review, in order to provide a larger picture.

Content

- The content
- The goal of the book
- The book structure

As A.P. Wierzbicki says that technology now changes civilization eras, from the industrial to informational and knowledge

civilization, similarly the authors understand "knowledge age" to be a natural development of society.

A lot of theoretical approaches to knowledge and knowledge management exist. As stated in the preface, the main purpose of this book is, from present state of knowledge science, to make two accesses to knowledge - the object-oriented and process-oriented approach - closer. The systems analysis is used for this purpose. (The application of the systems methodology and systems approach goes through the whole book.).

I think that one of the aims of the book is based on a very wide scope of literature. And we have to admit that from five professionals we will have five definitions of knowledge. Thus the authors' objective could be to convince their target readers about it, and to make various approaches clear to each other.

The new environment of a knowledge society necessitates changes in managerial behaviour. In the context of these necessities, decision/makers need efficient support in contributing to the "building of knowledge" for future and current managers. Another goal of this book is to help people see the transfer of innovation from the academic/research environment to economic practice deals with knowledge support for the decision making process of managers for improving the competitiveness of organizations in the EU market, and thus to support networks formed from university teachers, researchers, students and practitioners.

Concerning the chapters' structure and judgment on the adequacy of the book topic to the content: *the book* begins with the list of dedications connected with the relevant projects and their financial support, and the work is divided into four main chapters: Part I, "FUNDAMENTALS"; Part II, "PRODUCT VIEW OF KNOWLEDGE"; Part III, "PROCESS VIEW OF KNOWLEDGE"; and Part IV, "APPLICATIONS AND CASE STUDIES". Each chapter begins with a short introduction and each chapter (and also subchapter) ends with a useful summary.

The first part provides a full explanation of relevant terms, plus summarizes the historical development of the sciences dealing with knowledge and describes the present status of the field. Based on my reviewer's assertion it is well done.

Also the objective of this chapter is to provide a theoretical foundation for the creation of knowledge-based organizations and knowledge management. But it is not a how-to guide for building such organizations. Rather, it is more like a nice attempt to convey as much as possible in a higher context: "The publication is also intended for those who need to work with knowledge. They are not necessarily only knowledge workers whose main scope of employment is to manage and realize processing knowledge in organizations. It can be also a inspiration for managerswho can get a basic orientation in the current trends in the knowledge science", the authors said.

Perhaps a small critical comment could be made here. In the section "Knowledge in Decision Support Systems" a lot of space is concerned with the basic of DSS, and thus the connections between knowledge and DSS are not thoroughly covered.

The heart of the book is the object-oriented and process-oriented approach, and the differences between product and process

approaches to knowledge modelling are shown. The authors, in their book, write that the application of the systems approach to knowledge modelling shows how to proceed and make analysis in the knowledge science.

The book shows why a product view of knowledge and its modelling is more suitable in cases when a business company is stabilized and knows its business strategy and the strategy is ideally based on standardization. Unlike this, the process approach is connected by authors with knowledge sharing and developing unique expertise and opinions. It is absolutely correct - it makes a world of difference.

In the subsequent Part 4, several demonstrations and examples are also provided. It covers implementation issues such as: a semantic network for the knowledge visualization, math models using linear programming and game theory, knowledge concept application in educational texts, knowledge creation and share by a knowledge interactive portal and learning modules.

In the preface, in partial summaries and in the final summary, to provide a general overview of a significant slice of science, the authors organize and synthesize the reported knowledge into a much larger, more meaningful package.

A list of literature and a final summary close the book.

Analysis

- The evaluation
- The critical comments on the book

The important thing the reviewer has to do is to speculate on the topic him/herself. I should also undertake through my own research to discuss the theme, assess the authors' ability to express and explore this theme, and provide an opinion of the book.

The main point of the reviewed book is knowledge. The section defining knowledge covers general distinctions between knowledge, information and data; explicit versus tacit knowledge. This part of the book is devoted to clear, simple explanations of what's out there. (Read just this part of the book, and you would be talking like an expert).

In order to evaluate knowledge formulation the authors use the SECI model that is connected with Nonaka, I. and Takeuchi, H. Indeed they say

"..... an explosion of different approaches development could be dated to 1995, when the Knowledge Creating Company and the SECI Spiral (Nonaka, Takeuchi, 1995) was formulated." And they are completely correct.

While some aspects are less meaningful, others have to be marked out as prerogative issues. This is surely knowledge in organizations. That is helpful for readers thinking on this topic.

According to my own research the understanding of the term 'knowledge' in management practice is not clear. Some managers see knowledge as a result of the causal chain 'data – information – knowledge'. Others lean to the definition of knowledge as a state of mind (a result of mental processes, the

outcome of which is understanding), or they define knowledge as gnosis (insight) and point to its changing nature in terms of its dependence on interaction with the environment. The system environment contributes also to the support of the individual nature of knowledge (socially constituted from subjective experience). Similarly in firms, the term knowledge is explained in different ways. Such variability corresponds to the objective nature of knowledge in the context of technologically designed knowledge applications, in comparison to the clearly subjective nature of knowledge in soft systems approaches. Due to the modelling method used, the knowledge has an objective nature here. The system environment – the individual users – contributes also to the support of the subjective nature of knowledge. According to P. Drucker the knowledge workers are IT technologists, so we expected such an understanding in Czech companies. It is therefore surprising that firms in the questions "Which interpretation of knowledge management is applied in your enterprise?" and "Who is a knowledge user in your enterprise?", marked primarily tacit knowledge and personal growth of everyone.

The basic idea behind the book is that knowledge modelling is exhibited in two different ways. These are:

1. the "product" approach,
2. the "process" approach.

The book highlighted for a reader some of the overlaps, and distinctions between them. The authors, in their book *Systems Approach to Knowledge Modelling*, write: "The differences between product and process approach to knowledge generate a problem of suitability of these two approaches in different situations."

I absolutely agree with the statement that knowledge engineering

subordinates the formal representation to capacities of automated computerization and sometimes neglects the system aspects of knowledge modelling, and in contrast to knowledge engineering, the discipline of knowledge management deals with knowledge from the content point of view.

This approach are put in the context of the currently prevailing understanding in the Czech Republic as describe P. Berka, J. Havlíček, V. Sklenák, A. Rosický, etc: the recipient (human) is primarily in touch with data. Based on his present experiences and attitudes (i.e. knowledge) he interprets this data and derives information from it – thus receiving messages which are, in a way, new for him. On the basis of this information he alters his present knowledge and creates new knowledge, which he further uses in the evaluation and processing of data and information. This concept corresponds to famous word theories according to references that the authors show inside the text and in the list of literature in the end.

I enjoyed the sections on cases that are demonstrated by the examples that were being continuously solved. It is important for practitioners, the theories behind the techniques will be apparent. The theoretical and practical applications of the elementary knowledge concept is provided by semantic network – analysis (connections between semantic networks and knowledge maps are also mentioned), by individual learning and transforming educational texts into knowledge texts and by mathematical models (concretely by linear programming models and by the game theory models).

The description of the potential of math models as some specific type of elementary knowledge source, situated in the end, will be of particular interest to knowledge professionals as it is there that their expertise will be directly applicable. That's where the best and most useful part of the book comes into play: Part 4.

References

- The information source working
- The quotations and references to the ideas in the book
- The list of literature

At first the goal of the book reviewer is to discuss the content of the book; deduce if the authors managed to reveal the core; whether they properly achieved the purpose of the book and to make the critical comments on the book. I hope I have covered all of this.

Secondly the goal of the book reviewer is to provide analysis of what they had read. The problem is the quality and a quantity of the quotations and applied literature sources generally.

I think the information source working, research and studying of literature are correct. The authors used all relevant literature sources that are shown in the list of literature. With respect to the lack of information in the Czech Republic, it was necessary for book working to read foreign literature that deals with the discussed topics. That seems a reasonable quotation under the "fair use" doctrine of copyright law, with proper attribution to the source.

For prospective extension of the book I recommend in part related to knowledge in decision making process and its support by decision support systems use some work by D.J. Power, S.L. Alter, and E.F. Mallach, and for the connections between complexity theory (not systems theory) and knowledge management practice use publications by ISCE and by K. Richardson.

Originality

- The comparing the book with a similar work by a contemporary
- The expertise of the contents authenticity
- The opinion of new outcomes

In the previous step my function as the book reviewer was to determine whether the subject of the text is treated clearly, in a way that is likely to enable readers to grasp and to appreciate the knowledge presented. My additional responsibility is to provide appropriate comparisons with similar books (and find out if other texts on the same subject exist) and provide expertise of the contents authenticity.

The book "Systems Approach to Knowledge Modelling", summarizes and enlarges results of long time systematic work of the author's collective. By comparing the reviewed book to other books in the given category, I have found the book authentic and unique. It is the same in the context of scientific peer reviewed journals, such as the Journal of Knowledge and Systems Sciences and relative to conference presentations I have seen in the last few years.

The main purpose of the book is to bring unheard of pieces of information and a new point of view to the knowledge workers community. With a focus on the systems approach to knowledge modelling, the authors try to form a new framework for thinking about knowledge and create a new collection of tools and methods. Particularly in part concerned with the process approach to knowledge the authors bring a new view to knowledge transfer and sharing, an original micro theory "Combined model of learning" is newly introduced, and new findings are shown by applied mathematics and operational research in illustration examples.

Book authors

- The identification of the author's qualifications
- The reference to the author's other writing

The book is written by three authors, Ludmila Dömeová, Milan Houška and Martina Houšková Beránková. They work in the Czech University of Life Sciences Prague, which defines the specialization of the book authors.

The authors are mainly academics with specialties in the area of systems science. They are scientists as well. In the last few years Ludmila Dömeová, Milan Houška and Martina Houšková Beránková have also been working on research projects: first of all the Leonardo da Vinci project "TRANSFAIR", No. FR/06/B/P/PP-152513, the project "Interactive Portal for Knowledge Management and Share", No. CZ.04.3.07/4.2.01.1/0035, and the grant project of the Ministry of Education of the Czech Republic, No. MSM6046070904 "Information and Knowledge Support of Strategic Management".

As far as the reference to the author's other writings, some outputs of their work have already been presented in books and in articles in scientific journals (for example the International Journal of Knowledge and System Science), and also in conference proceedings. New knowledge was defended within the domestic conferences (for example Systems Approaches) and at important international specialized forums - scientific congress and conferences (for example The New Roles of System Science for a Knowledge Based Society), and as I am informed, there have been positive international responses.

Pay attention to:

Beránková, M., Dömeová, L. (2006): "Knowledge Points in Communication Interface", *International Journal of Knowledge and System Science* 3 (3), pp. 29-34, ISSN 1349-7030.

Dömeová, L., Houška, M. (2005): "Objectives Evaluation as Knowledge Development", In: *The New Roles of System Science for a Knowledge Based Society*, JAIST Press, Japan, ISBN 4-903092-02-X.

Houška, M., Beránková, M. (2007a): "Elementary Knowledge Representation by Linear Programming Model", *Journal of Knowledge and Systems Sciences* 3 (3), ISSN 1349-7030.

Houška, M., Beránková, M. (2007b): "Individual Learning Based on Elementary Knowledge Concept: Experiments and Results", In: *Proceedings of Conference ICBL, Florianopolis, Brazil*, ISBN 978-3-89958-277-2.

Houška, M., Beránková, M. (2007c): "Specific Type of Knowledge Map: Mathematical Model", *International Journal of Knowledge and Systems Science* 3 (2), ISSN 1349-7030.

Houška, M., Beránková, M. (2008): *Semantic Network as a Form of Knowledge Representation and Knowledge Map*. *Scientia Agriculturae Bohemica*, 39 (Special Issue 2), pp. 139-147, ISSN 1211-3174.

Readership

- The author's intentions
- The audience for which the book is intended

While especially valuable for knowledge workers (the value and relevance to records professionals is not questionable), a wider audience should find this book useful. In "Systems Approach to Knowledge Modelling", the authors lay it out for everybody who is interested in working with knowledge and/or use it for their professional purposes: university teachers, researchers, students and practitioners from managerial practice (all businesses are knowledge based). The reader could be a student or a manager, not a peer of the knowledge workers or the academics (= scientists) who wrote this monograph. The breadth of topics covered is relatively wide; however, their relevance to the broader audience varies.

Technical terms were used, of course, but each basic term was carefully defined at first use. I found this book easy to read and understand.

The authors take a reader through their thoughts and show very interesting examples. As was mentioned above, the author's professional area is systems engineering, especially operations research. Thus from this area there are practical applications and case studies.

Style of writing

- The writing mechanics
- The language
- The relation of the book to a literary trend

The book "Systems Approach to Knowledge Modelling" is written in a professional style, in accordance with the present literary trend, clearly written, well organized, and with good editing.

Command of language is high, the authors express their thoughts excellently in English. Adequate proof reading was provided.

Clarity of reasoning is high and it is easy to follow the flow of logic and see how the conclusions follow the information presented. There is enough abstraction in the form of clustering to offer hands-on advice for a reader.

Verdict

- The overall evaluation
- The experience while during the reading

The audience for which the book is best suited would similarly be knowledge professionals, though many essays will be of interest to everybody who is interested in working with knowledge in general. The topic is very interesting and it is not narrowly specific. It uses a broad definition of knowledge.

It has a lot of focus and depth required by a scientific communication and academic audience. Thus it is a very useful addition to the existing library of knowledge science literature.

The main research goal is achieved, the focus matches with the derived conclusions. They derive conclusions directly from their findings.

The absolute quality of the book and the command of language are high. I do think there is a lot of food for thought here and a lot of statements are helpful.

They have a very good set of references. References to relevant literature are considerable, built on reference to prior work, and not presenting old material.

The authors could be considered as professional writers of scientific books. I think the topic, quality of the book and new outcomes are such that the authors should be encouraged to submit this to the scientific publishing level such as ISCE publishing series books.

Closing comment to review, the recommendation for buying:

What did I experience whilst reading?

I tried to communicate to the readers mind the ideas, new knowledge and sensations that I experienced during reading and while researching the content, in this way I was explaining to the reader the exact meaning that the authors - Ludmila Dömeová, Milan Houška and Martina Houšková Beránková - presumed to transmit. I tried to stand as a reporter, who briefly informs readers of the book "Systems Approach to Knowledge Modelling", as an analyst, who makes judgments basing them on my own experience. I hope these book review explanations make the reader feel this "that is just what I thought" sensation.

I would recommend buying the book "Systems Approach to Knowledge Modelling" by the authors Ludmila Dömeová, Milan Houška and Martina Houšková Beránková. Even if you're not one of the knowledge modellers, everyone who works in a business today needs to understand this topic.

I want to end with the wonderful words, that finished the book and that could stand as a motto for knowledge science everywhere:

"Reasons, purposes, aims, meanings, goals and objectives, these terms are keys to knowledge. It is only way how people can understand reasons of tasks that should be done, sense of curriculums that should be studied, etc. This is crucial for people's motivation and creativity. Motivation, because people know why to work, creativity, because people know that problem and objective of its solution matters, but way of solution is up to them, up to their ability to apply their knowledge and experiences."

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