

Journal on Efficiency and Responsibility in Education and Science



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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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ADAPTATION OF TEACHING PROCESS BASED ON A STUDENTS INDIVIDUAL LEARNING NEEDS

Kateřina Kostolányová, Jana Šarmanová,
Ondřej Takács

University of Ostrava

katerina.kostolanyova@osu.cz

Abstract

Development of current society requires integration of information technology to every sector, including education. The idea of adaptive teaching in e-learning environment is based on paying attention and giving support to various learning styles. More effective, user friendly thus better quality education can be achieved through such an environment (Schaik, 2002; Barker, 2009).

Learning can be influenced by many factors. In the paper we deal with such factors as student's personality and qualities – particularly learning style and motivation. In addition we want to prepare study materials and study environment which respects students' differences. Adaptive e-learning means an automated way of teaching which adapts to different qualities of students which are characteristic for their learning styles.

In the last few years we can see a gradual individualization of study not only in distance forms of study but also with full-time study students. Instructional supports, namely those of e-learning, should take this trend into account and adapt the educational processes to individual students' qualities. The present learning management systems (LMS) offers this possibility only to a very limited extent. This paper deals with a design of intelligent virtual tutor behavior, which would adapt its learning ability to both static and dynamically changing student's qualities. Virtual tutor, in order to manage all that, has to have a sufficiently rich supply of different styles and

forms of teaching, with enough information about styles of learning, kinds of memory and other student's qualities.

This paper describes a draft adaptive education model and the results of the first part of the solution – definition of learning styles, pilot testing on students and an outline of further research.

Key Words

e-learning, learning styles, study materials, learning management system, multimedia

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Introduction

Motivation for this research in the area is to improve the effectiveness of electronic education. We try to extend the theory of pedagogy and education by designing a theoretical model of individualized adaptable education. We also aim to design an effective methodology of creating adaptive study material to be used in this theoretical model (Bober, 2007).

E-learning in the wider sense means an educational process. It describes and resolves the creation, distribution, management of education and feedback on the basis of electronic courses ("e-courses").

From classic education we know that teaching large numbers of students at once in school slows down and bores some of the students and for others on the contrary it is too fast and they cannot keep up with understanding everything. Other students although satisfied with the pace of the education process may not be satisfied with the educating style of every teacher. They thus close themselves to certain subjects and their results get needlessly worse. (Barker, 2005; Brusilovsky, 1996)

These are all reasons why the need for individualization of education is in the interest of optimizing the learning process of every student. This means teaching each student to match his/her knowledge achieved so far, skills and learning style. We easily realize that it is not possible to teach every student individually in class. In the time of e-learning, internet, SW tools and HW technologies available however, it is no problem to implement such teaching by means of a computer. In technical terms, the computer is capable of presenting information in many ways integrating the actual "counting", working with text, images, sound, and video. It can manage everything, record it, maintain statistics and analyze.

There just remains to design a suitable theoretical model of individualized adaptable education and its implementation.

Adaptive learning

"A learning environment is considered adaptive if it is capable of: monitoring the activities of its users; interpreting these on the basis of domain-specific models; inferring user requirements and preferences out of the interpreted activities, appropriately representing these in associated models; and, finally, acting upon the available knowledge on its users and the subject matter at hand, to dynamically facilitate the learning process" (Paramythis, 2003).

Categories of adaptation in learning environments

Adaptive learning can have many forms that can be divided to following categories (Paramythis, 2003): adaptive interaction, adaptive course delivery, content discovery and assembly, and adaptive collaboration support.

The first category, Adaptive Interaction, adapts the user interface of the learning environment, such as colour schemes, fonts, etc. together with the structure of the user interface and the order of system's actions.

The second category, Adaptive Course Delivery, changes the structure and presentation of the course in a way, that suites user's characteristics and optimizes quality and time of learning. This way of adaptation involves dynamical changes in the navigation elements of the course and its structure and dynamical selection of its suitable parts.

The third category, Content Discovery and Assembly, selects the most beneficial learning material from potentially distributed sources on the basis of users known characteristic and goals.

The fourth and final category, Adaptive Collaboration Support, is focused on the communication between multiple persons and on different kinds of user collaboration. Adaptive techniques can be used to facilitate the communication and collaboration, ensure a good match between users, etc.

This paper is focused on the Adaptive Course Delivery, because other forms of adaptation resemble it in many aspects.

Adaptive hypermedia systems

Adaptive hypermedia systems build a model of the goals, preferences and knowledge of each individual user, and use this model throughout the interaction with the user, in order to adapt to the needs of that user (Brusilovsky, 2001).

In these systems two distinct areas of adaptation can be distinguished: content level adaptation or adaptive presentation and link level adaptation or adaptive navigation support. Adaptive presentation was subdivided into text adaptation and multimedia adaptation technologies; adaptive navigation support was subdivided into link hiding, sorting, annotation, direct guidance, and hypertext map adaptation. Text adaptation can be refined further by dividing it into two essentially different groups: canned text adaptation and natural language adaptation. The main ways of canned text adaptation can now be considered as adaptation technologies: inserting/removing fragments, altering fragments, sorting fragments, and dimming fragments. Adaptation of modality is a high-level content adaptation technology. Modern adaptive hypermedia systems may have a choice of different types of media with which to present information to the user; that is, in addition to traditional text, we can also use music, video, speech, animation, and so on. Quite often fragments of different media present the same content and hence the system can choose the one that is most

relevant to the user at the given node. In other cases, these fragments can be used in parallel, thus enabling the system to choose the most relevant subset of media items (Brusilovsky, 2001).

In further described adaptation of teaching process many techniques of adaptive hypermedia systems are used.

Material and Methods

The principle of the adaptive environment creation – module development

Education process employing computers has been applied for a long time. In most general terms it means the use of the internet environment together with the learning management system (LMS) involving education supports, followed by functions for education management and finally, the information system which registers students and monitors their activities and results. (Kostolányová, 2010)

Our goal is to create adaptive e-learning environment – an environment in which student learns through directed self-study. If the student learns through self-study, usually uses textbooks. A good textbook should contain optimal explanatory procedure in terms of scope and detail of the information presented. Classic textbooks supplement direct teachers reading. Textbooks intended to self-study should replace both new learning interpretation and communication with a teacher, learning practicing, etc. Therefore, these books are adequately and appropriately supplemented with didactic presentation elements and elements for self-testing and feedback control.

Adaptive system which is able to respect the diversity of users cannot be anonymous (Šarmanová, 2009). Collection of data

about students will be implemented in several phases. The most important part is the students' self-assessment, i.e. testing before entering the course. The results of this testing will be classified as statically identified parameters. The second type of students testing during the study course (testing is included as dynamic - changing characteristics, crucial for the adjustment of the proposed course route). (Kostolányová, 2010)

The adaptive education system has three basic modules: Student, Author and Virtual Teacher.

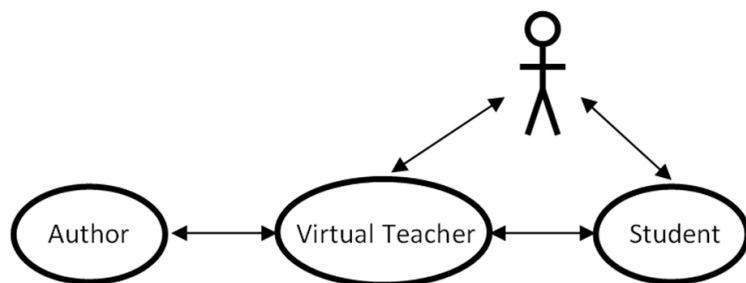


Figure 1 – Basic modules of adaptive education system

The Student Module contains, aside from personal attributes of students, records of their characteristics determining the learning style of each student. The Author Module is to store learning supports in such a manner as to allow selection or creation of different variations of educational procedures, easily handled in the form of e-learning and corresponding with the ascertained students' characteristics.

The Virtual Teacher Module is represented by a system of adaptive algorithms, which, on the basis of the knowledge of the individual type of student, selects the optimum study materials and the optimum teaching style for the student. All

modules will be applied in a newly designed and implemented adaptive LMS.

The intelligent education software, adjusting to the individual characteristics of the student, must be capable of substituting a good, experienced teacher in maximum measure, i.e.:

- recognize and record personal characteristics and learning style of the student,
- teaching supports must be structured in such a way that it would be possible to manipulate them based on the student's needs,
- teach the student according to his/her learning style in the corresponding form and procedure,
- regularly check correct understanding of the educational content and test the skills that the students have attained,
- evaluate the long-term results and derive consequences for the next teaching method from them,
- enable various forms of communication of students and tutors,
- maintain necessary records on students, subjects, and teachers.

The first five of these points will be the main objects of our interest, whereas the others are common, routine functions of LMS.

If we include concerned persons and ongoing processes to the former scheme of modules of adaptive education system, we get the theoretical model of adaptive e-learning.

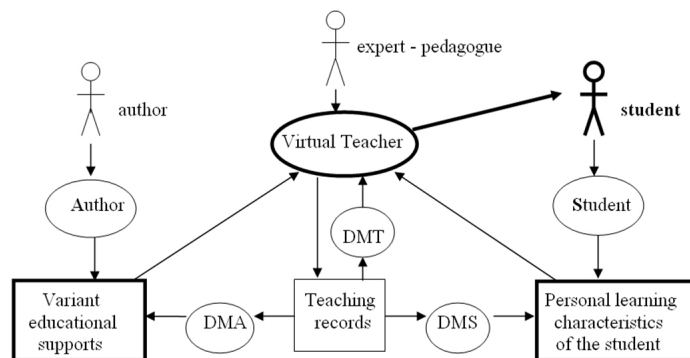


Figure 2 – Theoretical model of adaptive e-learning

DMT = DataMining towards the Teacher, DMA = DataMining towards the Author, DMS = DataMining towards the Student
Teaching records = a protocol of studies, an information database for feedback realization towards the Author, Teacher and Student.

Based on identified personalized approach to learning, optimal variant of passing the e-course will be generated. The user will also be allowed to choose tailored study materials according to his/her actual disposition and level of knowledge. This optimal path will be proposed at the beginning of the static student characteristics which we obtain with initial student's testing with the initial questionnaire. It will be modified subsequently according to the data (dynamic properties) recorded to the protocol during the student's studies (Šarmanová, 2010).

Module student – the student is the target person

Each person is an individual from many points of view. We can divide his/her qualities to each person's qualities, continuous knowledge, the circumstances of study, dynamic qualities, etc.

- They have different levels of aptitude for different subjects;
- They have different levels of knowledge of currently studied subjects;
- They have different learning styles;
- They have different kinds of memory;
- They require different levels of knowledge, understanding, the use and application of the gained knowledge;
- They have different motives for learning, different family backgrounds, different habits of how and when to learn;
- They concentrate and tire in different ways, etc. (Takács, 2009).

To enable the learning management system to react on different students' personalities, we have to choose, describe and suitably store the student's qualities and other attributes, which influence the process of his/her learning. In the whole these qualities will be of several types from their gaining point of view. We can gain one group of qualities straight from students with the help of a suitable questionnaire, next by testing them before starting learning and the third group of qualities we gain by long time monitoring of their study activities. The third group can serve as feedback not only during the current learning, but also for the alteration of the student's qualities, possibly for monitoring of his/her development.

The most important characteristic is the student's learning style. There exists rich, previously mentioned research in this area,

and a number of characteristics are described that determine the learning style. We have performed a detailed analysis of published classified teaching styles and we have selected n-tuple characteristics, which determine the learning style according to various authors (Mareš 1998).

Our aim is to determine the minimum multiplier of characteristics (determining the learning style) that are mutually independent of each other. For new we have defined, after consultation with specialized pedagogues and psychologists, the following list of characteristics selected from publications. We will analyze their independence gradually, until a sufficient number of students, methods of statistics and data mining will be tested. We are currently testing, recording and we are using the following "static", i.e. infrequently changing characteristics:

- type of sensory perception (verbal, visual, auditive, kinaesthetic),
- emotive aspects, level of motivation to study,
- social preferences, prefers to study alone – in a pair – in a group,
- tactics of learning, including:
 - systematic manner, during study the procedure is sequential - random
 - method of compiling information by theoretical deduction – experimentation,
 - procedure of compiling information that is detailistic (from below to above from detail to whole) - holistic (from above down from a general overview to details),
 - the concept of depth – strategic – surface study,

- auto-regulation, level of capability to manage alone his/her study.

During the course of study a "dynamic" quality is recorded. The "level of comprehension" of taught material is recorded as well. Records are kept for each taught subject independently and they are regularly amended according to current student's answers to questions and assigned tasks.

There exists another theory about types of intelligence; H. Gardner has described nine types. Each field requires a different type of intelligence, and possibly does not require certain others. This information should be recognized in the future, and recorded and accepted during the education process as well (Gardner, 1999).

Another important factor of the education process is the student's initial knowledge necessary for studying new material. For this it is necessary to test the student and this test is already a part of intelligent educational support.

Finally it is necessary to record the course of study of each student, a record made per subject, chapter, and paragraph – about completing their studying, verification of knowledge and quality of result, or about retesting for verifying the resilience of attained knowledge.

All described characteristics data are available to the virtual teacher, which selects the optimum educational style of each student according to these characteristics. (Šarmanová, 2010)

Testing and data analysis of individual learning styles

It would not be useful to theoretically define n-tuple characteristics if we did not know how to determine them for each student. For this it is possible to use a questionnaire, by which students directly describe their characteristics, or appropriate

tests where the students answers a series of questions and a result is determined from the combinations of their answers. We used the combination of published questionnaires VARK, LSI, ILS, TSI, ASSIST, or part thereof, concerning e-learning education (Dunn, 2004; Entwistle, 1996, Felder 2009, Gregorc, 1979, Mares, 1993).

The data analyses were performed on the results attained through this group of questionnaires. The reason was to verify the technical capabilities of analyses and the type of possible results, which will be useful for further development of questionnaires. The questionnaire was conceived so that we would distinguish the answers of secondary school students and university students. We thought that analysis will predict "virtual students" - typical representative of the groups of students. But the analysis didn't discover any significant groups, only number of isolated students.

The first aim was to ascertain possible correlations between defined characteristics and in consequence of this, to decrease the number of characteristics without limiting the scope of resulting information. A factor analysis was used for this. Another aim was, with the help of a cluster analysis, to gain information on the distribution of theoretically possible combinations of characteristics in the actual student population. It would thereby be possible to limit realistic learning styles to a lower number. Finally with the help of designing a decision tree it was researched which characteristics we may consider predictive, i.e. such that on the basis of their knowledge we may predict other characteristics of the given student. (Šarmanová, 2010).

For the future testing a new questionnaire that is tailored to the properties picked by us to characterize the students learning

style has been created. Collecting of data by means of this new questionnaire will begin in February 2011.

Module author - Instructional supports and their forms

Source training material is of course necessary for learning. We have already mentioned that for the realization of intelligent education it is not possible to use any textbook or any other source – encyclopaedias, monographs, the Internet data sources. What is more, good distance learning from textbooks in classical way is not sufficient.

The learning management program (=virtual tutor) in order to be able to adapt to different students' personalities, must process the curriculum in many different ways – the same way the experienced tutor reacts on different levels of knowledge, different talents and approaches to study, reactions, habits, and other qualities of every student.

Curriculum is best presented to a student in structured form – subject is divided into chapters, sub-chapters, and paragraphs. Let's call the smallest complete part, a presenting unit of information, the frame. Factually, the frame is equal, for example, to a newly introduced term (motivation for its introduction, a definition, an explanation, an application, an example, testing questions and tasks to solve). Formally, the frame is the text of the lowest level of numbered or in other ways marked paragraphs, or one Internet page including relevant multimedia elements.

To students with abstract thinking and a good theoretical background, it would be effective to present curriculum in a different way than to students, who for good understanding need to try everything first, understand its meaning and importance of this new information and only then they will be prepared to accept the given theory. Similarly it would be suitable to present

the frame in a different form to students who prefer written text; differently to students with acoustic memory, differently to those with optical memory etc. Finally the same frame can be presented on differently detailed levels for different subjects (or for different levels of required knowledge for gaining different marking) (Kolb, 1984, Sternberg, 1999).

We will now focus on the elaboration of the smallest part of study text – frame.

The basic difference in the form of the support will be based on the type of student's **sensory perception**. Therefore each framework will have sensory **variations**: one with high level of text (for verbal type of students), with many pictures, graphs, tables, and animations (for the visual type), spoken words, audio recordings, communications, discussions (for auditive type) and creative tasks, designs, etc. (for kinaesthetic type).

A different division of variations will be based on concepts of students' approach – depth, strategic, superficial or based on the level of comprehension. Every teacher knows this: some students need only the standard explanation, others need to be explained the material more slowly, in greater detail, with more examples. And for still others, in an effort to keep them from being bored, it is advantageous on the contrary to make available a greater scope of information, correlations to a different problematic. We distinguish these explanatory variations as the so-called **depth** of explanation. Each of them may be in various sensory variations as mentioned above.

But still a series of other characteristics influence the learning style. It is not possible to propagate more and more variations. But let's consider in what way the explanation for these further characteristics differs.

The theoretically well-prepared study type would prefer the ordinary classic explanation in the order of explanation (theory – exposition – examples) – verification (control questions – assignments). The unmotivated student would first need motivation to study perhaps for instance by means of motivational practical resolved examples – followed by explanation of the principles of resolution – only then theory – control exercises. The student incapable of self-regulation would need a detailed guide, leadership towards what to study or do first, what next. The holistic student would first need a brief overview of the entire chapter, and only then gradual movement into more detailed information.

Notice that the explanation for all examples of various types of students differs mainly in the **order** of segmented parts of the explanation within each variation. We call these segmented parts **layers** of variations and we then perform an analysis of the types of appearing layers.

The elementary information of the framework corresponds for example to a newly introduced concept, and may contain parts containing motivation for its introduction, definition, the explanation of the used concepts, the fixation of new concepts by giving them context, their application as examples of use, verifying test questions and tasks to be resolved. According to the named parts, we introduced layers entitled Motivational, Theoretical, Semantic, Fixating, Practical, Questioning, and Tasking. Aside from this, the text book was to contain organizational pedagogical information; this can be found in the Navigational layer.

The author of the support must elaborate all variations of the framework and divide them into layers. It is many times more difficult work than compiling a distance textbook. The author must be experienced and creative, capable of putting himself/

herself in the place of various types of students. Of course the sensory variations are only a technological problem, and perhaps under a different title, the content of the depth variations is applied by skilled textbook authors. There remains the division into layers, and this will present no challenge to an experienced author.

Educational supports compiled and structurally imbedded in this way enable flexible changing of the style of education.

Module of adaptation – the virtual teacher and its teaching style

We know the characteristics of the current student and we know his learning style. We have prepared study material in many variants of explanation, tests and tasks layers. What awaits us now is one of the most difficult tasks - to develop rules for assigning appropriate study material to the students with identified learning styles.

Again, those rules should be formulated and tuned by experts and specialist, and an experienced pedagogue and a psychologist. The rules will become a logical framework for the adaptive teaching algorithm, for the virtual teacher.

The task of informatics will involve implementation of those rules. It will include collaboration of the author database with the expert system recording characteristics of virtual students, metadata recording the student course of learning including ad hoc reactions of the student. It is necessary to monitor all of his/her activities: time spent over individual frameworks, a necessity of using different optimum frameworks than those selected, asking for next, more detailed reading or other examples and of course, correctly answered control questions. Following analysis of the whole process of learning the adaptive algorithm should

respond to all of this information in the course of learning with possible change of student's characteristics.

For the sake of ensuring truly individual course of study, it is necessary to monitor all study activities of the student. Static characteristics on the method of study acquired at the start should be complemented by dynamic characteristics obtained from journaling of student activities and self-reflection. We will learn about them from testing in the course of study. Results of testing will suggest, if the student managed the subject matter or failed, how content he/she is with the proposed course of study, etc. Based on monitoring of those dynamic characteristics a good adaptive algorithm can possibly change the method of presentation, for example by offering a different explanation or other method of practising. However, we should keep on targeting – leading the student to the defined target status of the knowledge of the content of study. (Kostolányová, 2010)

Results

The subsystems Student and Author are currently theoretically resolved on the described level, and the subsystem Virtual Teacher is mostly resolved. Work is being performed on the Virtual Teacher on ambiguous and conflicting situations upon designs of the student learning styles and also on the theoretical model of the protocol and its analysis. Theoretically resolved subsystems have also been implemented. To implement the entire system, the original learning management system (LMS) Barborka was chosen, which has been resolved for a long period of time and is applied at the project partner school, at VŠB-TU Ostrava [Ostrava Technical University]. Its version Barborka 3 provides the mentioned expansion of the subsystems Student and Author and the new subsystem Virtual Teacher, enabling adaptable education.

Results of the Analysis of learning styles

Results of the analysis were published in (Kostolányová, 2010; Takács, 2009). Three hundred-fifty students (32.5% men, 67.5% women) filled in the questionnaire, 23% of which being high school students and the rest university students in various fields of study – pedagogy (59%), informatics (11%), economics (5%), and natural sciences (2%). These results will be now only described by the methods of their having been obtained. Interpretation and consequences of these results will be discussed in a following part of the paper.

Main components

Analysis of main components discovered that the number of mutually exclusive components that represent the results of the questionnaires (in other words the characteristics of the students, see table 1) was three times higher than the number of main components describing the answers to the questionnaires (see table 2).

component name	variability	cumulative variability
PC 1	0.197	0.197
PC 2	0.119	0.316
PC 3	0.092	0.408
...
PC 26	0.008	0.987
PC 27	0.007	0.995
PC 28	0.005	1

Table 1 – Main components of the student's characteristics

název komponenty	variabilita	kumulativní variabilita
PC 1	0.067	0.067
PC 2	0.046	0.113
PC 3	0.035	0.148
...
PC 72	0.004	0.893
PC 73	0.004	0.897
PC 74	0.004	0.900

Table 2 – Main components of the answers to the questionnaires

Analysis of the main components of the sensual types confirmed, that individual sensual types together form the component of multi-modal type.

It has been shown, that the resulting characteristics were mutually dependent. Out of the original 28 characteristics only 18 main components would have been enough to cover the variability of the majority of data (Takács, 2010).

Decision trees analysis

The most interesting results were found in sensual types. The auditive types of students depend strongly on the fact, whether the students are multimodal types or not. If so, then such students are mostly auditive types as well. The same result also came up in visual and verbal types of students. Regarding the kinaesthetic type, the dependency came up slightly differently as shown in Figure 3. We can see, that majority of students (95%) that are multimodal types are also the kinaesthetic types. And every student that is not multimodal is kinaesthetic.

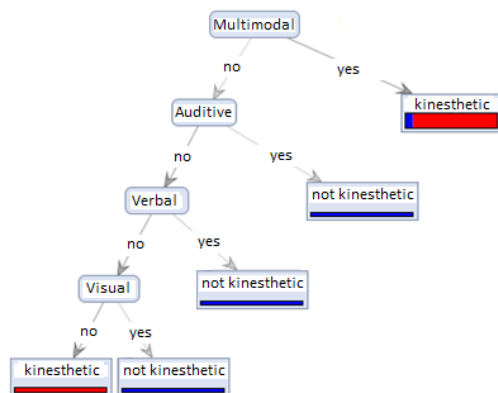


Figure 3 – Decision tree for kinesthetic type

Also a surprising result was the fact which indicated that the students, who exhibit lower responsibility to their studies, prefer to learn with classmates on the contrary to those more responsible.

Furthermore, the influence of student characteristics on their self-assessment was investigated and the results showed that the major influence on positive self-assessment comes from good organization of learning, above all (Šarmanová, 2010).

Cluster analysis

The cluster analysis of all characteristics showed no significant clusters, only a certain quantity of isolated points. Figure 4 shows a clustering tree, so-called dendrogram, illustrating numbers of clusters for individual levels of similarity. Individual students are visualized as horizontal lines, which are at certain levels of similarity connected with vertical lines to clusters. The most significant level of similarities is indicated with a bold line

on the upper axis. At this level, only a single sufficiently large cluster appears which includes students with a single common characteristic: the auditive type of sensation.



Figure 4 – Clustering tree, so called *dendrogram*, illustrating numbers of clusters for individual levels of similarity

Results on the high-school students group

Further, there is a description of differences in the results of the all students' analysis (i.e. of the university students of different

majors and the high-school students) and of the just high-school students' analysis results.

The number of main components detected from the selected answers by the students differed significantly. When analysing the high-school students, the number of main components was half compared to the number of all students' main components.

Out of 28 decision trees, only 5 were slightly similar, and this similarity may be coincidental. The difference is not very surprising, as the majority of results issued by both groups were not very definite and the probability of their general validity was very low. We will describe only the two most interesting differences of two characteristics – the sensual type and the student self-assessment.

When analyzing the sensual types of all-student-group we came to a conclusion that all sensual types are most dependent on the main component called multimodal type, which represents students with more than one sensual type. This dependence applies also to the high-school students, however in the lower scope, especially for visual and verbal type, and therefore the decision trees resulted differently for them.

The self-assessment of the all-student-group is most influenced by their ability to organize their studies, but especially for the high school students, the rate of personal responsibility to their studies bears far higher influence.

Discussion

The results were only crude due to small size of the data and low quality of the data sources. But the main goal of the analysis, verification of methods of analysis and their possibilities, was achieved.

Based on the results of the analysis we can say that:

- The combination of questions from the applied questionnaires is not ideal, because it is too large in size; even though each of the questionnaires was assessed as good and questions not concerning e-learning education were removed, filling out the questionnaire took a very long time and many students answered with diminished levels of concentration. It will be ideal to compile a new questionnaire, made to match the required attributes.
- Methods chosen for analysis of queried data showed to be successful, even though the conclusions from the current data-set may not be considered as sufficiently reliable.

Main components

We presumed that the main components representing the answers would correspond to the evaluated student characteristics proposed by the authors of the questionnaires. But the number of main components turned out to be very different. This significant difference between the numbers of components can be explained by either an inaccurate design of the questionnaires or them being poorly responded to. Considering the fact that the students were not motivated enough to respond to the questionnaire in serious manner and the questionnaires having been individually verified beforehand, we are inclined to think the irresponsible answers to be the reason.

We also found out that the number of student characteristics is greater than the number of their main components. As a result the number of characteristics describing a student could be reduced to the found main components, but the interpretation of such new characteristics would not be explicit. Therefore, it is more suitable to maintain the original characteristics. The reason for this independency of student characteristics may be

the fact that those characteristics arise from several different questionnaires which aim at various groups of characteristics.

Decision tree analysis

Results of the sensual type analysis have been confirmed by the analysis of main components, resulting in the multimodal type as the main component, as well as the decision tree analysis. Based on the kinaesthetic type decision tree it appears that for this data the kinaesthetic sensual type can be completely left out and substituted with the remaining sensual types, multimodal and visual in particular. Additionally, this result is greatly supported, which indicates that the same result could appear even in different data.

Cluster analysis

Results of this analysis suggest that there are no groups of students who would be similar in the majority of characteristics, which can indicate the fact that students are covering the space of all characteristics evenly. But it can also be a result of a small quantity of data related to the number of characteristics, an inaccurate design of the questionnaires, their improper translation or student's poor concentration when responding to large-scale questionnaires.

Results of the high school students group

Great difference of the results of the high school students group analysis can be explained by the high-school students responding to the questionnaires more thoroughly and with greater understanding of the questions than the university students. Still, they were very far from the ideal completion of the questionnaires, which can mean an inaccurate composition of the questionnaires.

The difference in what affects the self-assessment of students can be explained by the fact that high school students follow a tight learning schedule they have to adapt to and therefore, the ability to organize their studies plays less important role than it does at a university (Kostolányová, 2010).

Conclusion

We have described a theoretical model of individualized adaptable education enabling to teach students with regard to their learning styles. From the described principles of intelligent teaching it is clear that it is an extensive project requiring cooperation of several types of experts. In this brief overview of the entire system of individualized education, a number of partial and relating problems, both theoretical and practical, have not been mentioned. Some of them are only named in this project, whereas others are being or have already been resolved.

At the beginning of next year, 2011, the adaptable version of the system will undergo pilot testing on students.

In order to run the testing, it is of course necessary to have educational material elaborated into variations in the described manner. The system development is ongoing in parallel on creation of educational materials. The authors are also supported by the aforementioned ESF project. For the creation of educational supports, several subjects from various fields were chosen: computer science, foreign language, natural science, social science, and technical field. It will thus be possible to test both the aptness of proposed theoretical principles of the structure of educational supports for various types of subjects, and their usefulness for adaptive education. We also want to use the experience gathered within the process of preparing

adaptive educational materials to create methodology for effective creation of adaptive study materials.

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SPEAK YOUR MIND: SIMPLIFIED DEBATES AS A LEARNING TOOL AT THE UNIVERSITY LEVEL

Lenka Lustigová

Czech University of Life Sciences Prague
lustigova@pef.czu.cz

Abstract

This study focuses on the development of speaking skills in intermediate and lower level university classes through the simplified format of debates. The aim of this paper is to describe teaching observations with special attention given to the preparatory stages, strengths and challenges of simplified debate faced by both the teacher and the students. Observations were made while teaching speaking through simple debate to 19 - 20 year-old-students of general English at the Czech University of Life Sciences Prague in intermediate and lower level classes. By describing the methods and procedures used to engage in debates, this paper aims to enrich pedagogical methods for effectively teaching speaking skills and thus serve ESL teachers at large. By contextualizing debate within a milieu larger than the ESL classroom, this study also accesses possibilities for further application of simplified debate to heighten training for other subjects, while drawing upon the democratic context supported by debate.

Key Words

ESL/EFL, pedagogy, intermediate-lower university level, debate skills/development, democracy, lesson plan suggestions

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Introduction

Of the four language skills (speaking, reading, writing, listening), speaking is generally thought to be the most important. Likewise, the ability to speak a second language is often equated with proficiency in the language itself (Thornbury, 2006: 208). According to Hornby (1974: 826-827), "speaking is making use of words in an ordinary voice, uttering words, knowing and being able to use a language, expressing oneself in words, as well as making a speech." In short, speaking is the ability to perform the linguistic knowledge in actual communication. Chancy (1998: 13) further defines speaking as "the process of building and sharing meaning through the use of verbal and non-verbal symbols in a variety of contexts."

On the whole, the principal objective of teaching English at early stages is to develop the student's communicative competence by involving them in their own learning process. However, most of them prefer drilling exercises, i.e. passively memorizing, which in turn does not make speaking the language overly natural. Students struggle to express their thoughts, as they not only lack vocabulary, but often creative thinking as well. Recently, Koteková (2010) has been testing new ways to have students use their own words and express their thoughts. She found that students must be encouraged to respond to text-based situations with their own thoughts and experiences, whether answering questions or doing abstract learning activities. Harmer (2007: 84), however, takes care to emphasize that the teacher must assign tasks which the students are indeed capable of doing, rather than opting for over-challenging ones which have the potential to humiliate them. Likewise, according to him, the teacher should stimulate intellectual activity and thereby aid students in becoming aware of various contrasting ideas and concepts which they themselves can resolve via speaking. As quoted

in Thornbury (2006: 208), typical activities to teach speaking include: dialogue, drama activities, role-plays, simulations, games, discussions, informal classroom chat and debates.

Among such activities, debates are seen as one of the most active learning processes since students learn more through the process of actual construction and creation on their own, as well as working in a group and thus sharing knowledge. Founded by The Open Society Institute, the International Debate Education Association as defines debate in the following manner:

Debate is a formal contest of argumentation between two teams or individuals. More than a mere verbal or performance skill, debate embodies the ideals of reasoned argument, tolerance for divergent points of view, and rigorous self-examination. Debate is, above all, a way for those who hold opposing views to discuss controversial issues without descending to insult, emotional appeals, or personal bias. A key trademark of debate is that it rarely ends in agreement, but rather, allows for a robust analysis of the question at hand. Perhaps this is what French philosopher Joseph Joubert meant when he said: 'It is better to debate a question without settling it, than to settle a question without debating it.' (International Debate Education Association, n.d.)

Focusing on the "critical thinking, effective communication, independent research, and teamwork" which such discussion kindles, the objectives of this association reinforce that "debate teaches skills that serve individuals well in school, in the workplace, in political life" (International Debate Education Association, n.d.) and obviously anywhere else that opinions hold sway. An important educational tool for analytical thinking skills and for self-conscious reflection on the validity of one's ideas (Nesbett, 2003: 210), debate is an excellent activity

for language learning because it engages students in a variety of cognitive and linguistic pathways, directing them into responsible dialogue within a diplomatic, democratic context.

Given the nature of this study, the objectives of this paper are to provide sufficient reason for larger integration of debate into university-level classrooms via simple debate structures for intermediate and lower-level classes. By offering a working framework, the purpose of this paper focuses on a practical and yet motivated solution to multi-faceted issues faced by the university teacher of ESL. Various sources were used, as appropriate to both the intermediate/lower university levels and on a wider scale, via books and other online resources to encourage students to speak, form their opinions and approach questions creatively within the debate context.

The methodology used to formulate this paper comprises a scholarly assessment of the importance of speech, including the definition of debate and a description of speech/debate within the university context. This is followed by identifying simplified debate formats and describing their implementation in practice. Having established the observation processes and explained the organization of the groups, a cohesive integration of grammar and other external language measures into debate are subsequently described. All has been tested in the classroom, as evidenced by the number of students, genders, age, professional goals, etc. This paper then provides a discussion of the strengths and limitations of simplified debate, including those faced by both the teacher, as well as the student, before offering various solutions to specific classroom situations. Special attention is given to the spectrum of wider applications for simplified debates, including their potential as amplified tools to teach students how to think in courses which cover subjects other than ESL, yet are offered in the English language.

Finally, the scholarly results are summarised with a reflexion on the importance of debate within the context of democracy and societal interaction.

Material and Methods

It is becoming increasingly common to introduce debate skills into university programmes as the value of such courses is more frequently acknowledged. For ESL/EFL, debate participation consolidates the students' second language skills via reading, writing, persuasive speaking and eventual conversational fluency. Debate has been described by Lubetsky, LeBeau and Harrington (in Lieb, 2007) as a highly sophisticated form of immediate, interactive communication which assumes an elevated level of discourse skill, the mastery of which is often elusive even for native speakers. Its complexity extends far beyond the level of ordinary conversation, demanding dynamic and critical listening, as well as advanced language competency and critical thinking. At the Czech University of Life Sciences Prague, debate sessions are usually held by teachers who are native speakers and are focused on upper-intermediate and advanced students. Although serious debate topics are too formal and can be especially intimidating for ESL/EFL learners, simplified debate does indeed offer a powerful tool for enlivening teaching and energizing beginner-level students. When students engage in debate, they take an active role in their education, while subjects which may once have seemed dull and abstract come vividly to life (Tumposky, 2004: 52).

The methods and subsequent results analyzed below were tested over the course of two full-length university semesters at the Czech University of Life Sciences Prague. Class sizes varied, from 20 to 25 students, included both genders (however the majority were male - 55 %) and covered an age range of 19 –

21 year olds. The total number of students was 475. All of the students were native speakers of Czech; however some of them also came from multinational backgrounds (including Russian, Ukrainian, Kazakh and Vietnamese families). The English course in which these debates were incorporated was a required course for B.A. degree majors; however the intentions of the students with regard to their professional life after completion of the degree varied (Economics and Management, Engineering, Environmental Science, Forestry, Wildlife and Wood Sciences, Agrobiolology, Food and Natural Resources). Thus it was clear that their career choices would significantly benefit from advanced English skills, specifically in terms of speaking, discussion, opinion-gathering, etc. The choice to introduce debate into the classroom for these students was therefore a contemplated one, taking into account the best for the students based on available time and resources. Of the students participating in the course, 75% continued into a second semester and thus had the benefit of participating in debate sessions for an entire academic year.

Simplified debate formats

For efficient group discussions, small groups turned out to be ideal, because quiet students were formerly avoiding any contributions to large groups. Likewise, larger groups tended to be noisier and thus more difficult for the teacher to monitor. The group members were either assigned by the teacher or the students determined the groups by themselves. However, the groups were systematically rearranged for each separate discussion activity so that the students could cooperate with dissimilar people, learn to be open to different ideas and ultimately, test their own opinions on a variety of people.

Students were placed in two teams of two or three members. The teams were then presented with a "topic" (resolution) such as

e.g. "Smoking should be banned in public places." In teams, the students subsequently prepared their arguments by following this suggested format:

1. Affirmative team speech
2. Opposing team speech
3. Affirmative team rebuttal
4. Negative team rebuttal
5. Questions/answers from teams, field questions from audience
6. Affirmative closing argument
7. Negative closing argument
8. Audience assesses arguments' persuasiveness
9. Teacher provides constructive feedback

Mini-debates primarily focused on language use at the given level of the students. The focus was on a multitude of factors, for example: pronunciation, grammar, vocabulary, use of appropriate register, synonyms, fluency of speech and accuracy to keep the debate going smoothly. It was assumed that with the centre of attention of each debate focused on different language issues, the possibilities for the teacher, as well as the opportunities for the students would grow.

When assessing simplified debate, concentration was not on the organisation, use of arguments, use of examples and facts, and effective counter-arguments, as would normally be done in qualifying debates. Instead, constructive feedback was provided primarily from the language use point of view, particularly in how the language was used and why. Suggestions for improvement were once again tailored, given the debate at hand. Options included, but were far from limited to: use of additional weight-carrying verbs (versus "to be," "to

have," etc.), improved opinion-indication phrases, increased diplomatic approaches and referencing of external opinions to support individual opinions.

This final suggestion sometimes led to number 10) being added to the above-outlined scheme in that enough time for the students' own feedback on the teacher's comments needed to be allowed. This fostered an atmosphere of excellent teacher/student communication. Students were encouraged to be creative with evidence and support for their positions. The goal was not to train world-class debaters, but instead to allow the students to consolidate their language skills, practice speaking, develop a diplomatic approach to opinion expression and enjoy the process along the way (Fedorkiw, 2010).

Simplified debate – methodology in practice

When teaching debate to intermediate and lower classes, it proved to be essential to employ a step-by-step or scaffolding approach. Rather than overwhelming the students with the complex structure of debate speeches, it was best to start with the straightforward process of formulating and becoming aware of their own opinions, while introducing a number of language structures, grammar issues and new vocabulary along the way. Harmer (2007: 84) clarifies that "simplified debates concentrate the content of the ESL/EFL learner's speech, thus allowing the students to focus on improving their skills by using knowledge already grasped," and further explains that "skills integration is a major factor in a lesson planning." Lessons preparations for the students' debate included:

- topic definition,
- class warm-up discussion,
- pre-reading warm-up questions,

- reading short news stories or texts from course textbooks on current topics or on debatable historical issues (for more advanced students),
- comprehension questions,
- reading, watching and listening to recorded debates or videos on a given topic,
- comprehension exercises,
- vocabulary review review of useful debate phrases,
- discussion of where debate may be applicable to real-life situations.

This simplified debate project was split into and/or combined together with several different activities, each supporting the next. The first stage involved choosing an interesting situation to maintain student interest and keep them active. The topics were consistently targeted to the language level and background interests of the class. The students were even offered several cases to be debated and then voted for the most suitable one. Occasionally, a list of potential topics was also developed in a teacher/student brainstorming session during which relevant and thought-provoking issues were chosen.

Subsequently, the aim was to link the topics with the vocabulary and language focus of the textbook which generally served as the basic study material in the classroom. An alternative was to have the students debate a range of less formal topics, since even students with limited language skills could thereby become engaged. Using simple debate topics also allowed the students to sidestep the common stumbling block of ESL/EFL learners trying to translate complex thoughts from their native language into their second language.

Based on extensive trial, the following topics worked well for beginner-level university classes:

- Girls are smarter than boys.
- Celebrities are better people than us.
- Television makes you stupid.
- The world will end in 2012.
- Fashion is more important than quality.
- The internet is just a fad.
- Diet is better than exercise.
- There is too much billboard advertising.
- Little white lies are OK sometimes.
- Summer is better than winter.
- The phone is more useful than e-mail.
- Information technology should be used more in the classroom.
- Smoking should be banned in public places.
- There is a good system of caring for the elderly in the Czech Republic.
- The President of the Czech Republic is doing a good job.
- A student fee should be introduced at state-owned universities.
- Love is more important than money.
- It is better to be married than single.

For intermediate-level university students, the above-mentioned list was also applicable; however more nuanced topics were also addressed, such as:

- WWII still influences life here today.
- Friends are more important than family.

- Without travel, we cannot appreciate life in our own country.
- Being part of the EU helps us live better on a daily basis.
- Without a broad CV, it is impossible to find a good job.
- University education is vital to finding a career-based position.
- The Czech Republic is losing its best people to the West.
- Friends are more important than family.

Obviously the list was tailored, again based on the professional goals of the students in the class.

With an increasing number of debates, students began to form their opinions accurately, explain the reasons for such opinions and provide substantial evidence, all the while acquiring additional confidence in English. Depending on the chosen topic, it was useful to introduce students to the three different types of opinions as defined by Lubetsky et al (in Lieb, 2007).

- Opinion of value: X is better than Y (e.g. Summer is better than winter.)
- Opinion of policy: X should do Y (e.g. Smoking should be banned at public places.)
- Opinions of fact: X is / was / will be true. (e.g. The world will end in 2012.)

Depending on the topic, students were also provided with particular grammar structures (comparatives of adjectives, conditional clauses, simple past, present and future tenses). Sample grammar structures were written on the board or given to the students as a handout. A list of opinions on a given topic was then provided to the students in the form of cue cards. Once the students were given sample grammar structures and explained the variety of opinions for use during the debate,

they pragmatically focused on correct production skills in conversation and, in time, learned to identify their own opinions. Students were also trained to form questions to challenge the other team.

The next step was to provide reasons for the opinions. Given that mini-debates were relatively new to the students, multiple choice activities served this process very well, requiring the students to select the best reason from a list of choices. Students were thus introduced to different types of reasons, such as comparisons, contrast, and cause/effect relationships which were reflected in various grammar structures to be acquired. For example:

Opinion: Summer is better than winter.

- A) ... because summer is a more pleasant season.
- B) ... because summer is my favourite season.
- C) ... because there are usually summer holidays.
- D) ... because _____.

In the following stage, the students were asked to look for evidence to support the chosen reason (Lubetsky et al in Lieb, 2007). This evidence could be their subjective explanation, an expert opinion based on media research or the use of some statistical data to support the reason for a certain opinion. For example:

Opinion: Large cars are better than small cars.

Reasons: Large cars are more useful than small cars.

Evidence:

- 1. ... because you can fit more things in a large car and....
- 2. If you have a large car, you may
- 3. According to XY magazine, large cars save you money.
- 4. 6 out of 10 people say they prefer large cars over small ones, because they can put many things in them and...

At this stage, the students researched their debate topics using books, newspapers and the internet. This was done in the classroom or sometimes given as homework. This student research emphasized reading skills, including the skimming and scanning of texts. Moreover, students practiced writing while making their notes and developing a list of arguments. The students were asked to write their notes and list their arguments in English. It was not acceptable to write the arguments in L1 and to then translate them into English. Arguments needed to be written in clear and simple English that could be easily understood by their peers. Watching and listening to sample debates using the internet as a video database also significantly enhanced the students' listening skills.

After such preparation, the students were ready to assemble their affirmative speeches. At this point, certain simple refutation language structures were also introduced, allowing for a suitable language framework for agreement/disagreement to be established early on. Students were encouraged to provide linguistic support to the teacher at each stage of the process. Useful vocabulary for the students was sensitively chosen to serve them in the short-term debate context, as well as in the long-term life context. Several examples are provided below:

- Expressing agreement and disagreement (e.g. I agree. / I think so. / That's right. / I disagree. / I don't think so. / I think that you are right.)

- Talking about point of view (e.g. From my perspective... / For example, I think... / In my opinion... / I'd rather... / I'd prefer... / The way I see it.... / I suppose.../ I suspect that....)
- Reporting what others say (e.g. From the point of view of... / So, what you're saying is... / So, if I understand you correctly, you are saying... / So, in your view...)
- Talking about meaning (e.g. I'm not sure I understand what you mean. / Would you mind rephrasing your thought? / I didn't quite follow you, could you explain that point again? / Do you understand what I mean? / Do you follow what I'm saying? / Am I making sense?)
- Drawing conclusions (e.g. We finally all agreed that... / After much discussion, we decided that... / We recognised that... / We are fully aware that...)
- Giving reasons and offering explanations (e.g. To start with... / The reason why... / That's why... / For these reasons... / Many people think...)
- Phrases of interruption (e.g. Can I come in here? / To go back to an earlier point... / Coming back to the chat with John... / I think that I agree with the point you made earlier, Chris... / Sorry, carry on. / No, go ahead. / Sorry, you were going to say....)
- Language of comparison e.g. (X is bigger than Y.) Language of cause and effect (e.g. If you do X, then Y will happen)

(McCarthy and O'Dell, 2008, pp. 68, 72, 80-84, 96, 108).

Given that the debates were oral, the students were requested to use a louder voice than normally used during a conversation and thus be easily heard by their classmates. They were also pushed to change and modulate their tone of speech, highlighting certain words.

Results

The above-described scholarly work confirms that debate is an active learning technique that encourages students to be interested in the teaching-learning process, while significantly benefiting the students in terms of speaking ability, specifically-measurable verbal communication and critical thinking skills. At the start of the debate sessions, they would last approximately 6 minutes; however by the end of the semesters, the students were still debating 20 minutes later – a significant improvement in terms of the actual time that they were capable of speaking. Thus, the efficiency of debate as a technique to train students to cooperate with others in a group-setting also produced the visible by-product of motivating students to express their own opinions and arguments beyond a superficial level.

A step-by-step approach proved to be the most beneficial, as students were gradually introduced to new language structures, grammar and vocabulary. By fine tuning the debate topics to the students' level of knowledge, the students themselves contributed more actively and created a relaxing and positive teaching/learning atmosphere. Taking into account the four language skills, the students manifestly improved their writing, reading and listening skills, as was evidenced within the classroom with enhanced performance in written homework and oral consultation sessions. Vocabulary tests, and other oral activities, during the semester also demonstrated a sufficient increase of gained knowledge.

At the start of implementing these mini-debate sessions, several students expressed anxiety at being forced to express an opinion in front of people with whom he/she did not consider himself/herself to have much in common, beyond attending the same class at the same university. All fears were allayed; however, as it was made clear that the ESL classroom was simply the chance

environment where the students were at the moment. The relevance to real life was also a considerable factor in driving home the importance of debate and made the students feel more comfortable.

By using simplified debate format which focused particularly on language use, English was able to be introduced into the ESL classroom in a way that was both challenging and interesting to the learner and teacher simultaneously. Given the high adaptability of these activities, it became much easier to consolidate previous lessons, comprise reading, writing, listening, speaking, and research skills, while also providing the groundwork for future concepts and integrating these skills in such a way that they supported and enhanced one another. As the students developed communicative competence in English, the teacher directly benefited from a more interactive classroom atmosphere; this was evident from the participating students since attendance rose by 20 % on days where it was previously announced that mini-debates would take place. Students were also observed increasing the number of topics debated in conversation outside the classroom (either before or after class). As a result, society most likely also gained in the long-term since these thinking skills were eventually projected into a wide range of applications in everyday life.

As demonstrated above, the teacher's thorough preparation and sensitive involvement was the tool to overcome potential challenges such as time constraints, limited knowledge and various language capabilities of the students, mixed-level groups, and the occasional nervousness of learners. Overall, the results of significantly merging debate into the classroom, along with other activities, produced the tangible results of more confident students who were keen to contribute to their own language storehouse, to the improved classroom environment

and ultimately, willing to tolerate others' opinions, while responding with well thought-out counter arguments. This type of diplomacy cannot be purchased. Thus, in spite of the challenges presented, debate (even in its modified and simplified version for intermediate and lower-level students) proved effective for everyone involved, as well as for those who would ultimately be influenced.

As students began requesting mini-debate sessions, the range of topics widened and began reflecting increasingly relevant issues to the European Union and the Czech Republic's place within it, specifically the Czech university level, the role of émigrés past and present, the need for Western standards to attain world status for the country, etc. In terms of the topics and associated grammar, the students themselves began suggesting matches or pairings between subject/grammar. As long as the suggestions were within the range of the material which was necessary to teach the students, the majority of the ideas were incorporated. Once again, this placed in teacher in an elevated position of respect from the students who were literally learning how to teach themselves and grateful for the opportunity of participating, first-hand, in their education.

Discussion

Strengths of Debate and Potential Applications outside the Classroom

Although these debates were tested within a classroom focused on ESL/EFL training, the potential applications of such mini-debates for a range of courses can be considered, including: history, politics, anthropology, philosophy, comparative literature, citizenship and responsibility – indeed in any course where the focus of developing the students' capacity for

thinking is vital. With a purposeful modification by the teacher of the topics addressed and increased student participation in more lengthy arguments prepared for the given debate issues, the prospective profits for all involved are multiplied.

As suggested earlier, the development of a student's poise in expressing an opinion for which he/she will not be harassed by outside societal pressure is a key to the growth of the individual within society as a whole. In particular, the scheme for development of thought to a deeper degree is well suited for adaption to other subjects, particularly for those subjects taught in English to students who are non-native. A number of Western European countries are currently offering high-school and university level subjects taught in English, as opposed to the respective language of the country where the courses are based. By changing the core vocabulary reviewed, the actual debate issues, as well as the end target for why each debate is important, simplified debates can appreciably further the offering of teachers of multiple subjects. Books such as Price and Deller's *Teaching Other Subjects Through English* (2007) offer a variety of helpful methods, including discussion within business, design and technology, geography. Debate, however, does not feature.

Based on the above observations and experiments in the classroom, debate held in English, yet not specifically pertinent to the ESL classroom, could also be integrated much earlier than the university level. High school is likewise an ideal ground for students to establish their opinions before facing university. Given that a number of students are opting for business, economic and financial classes early on, the integration of English debate skills is increasingly germane. Multiple science projects taking place within the EU are also choosing English as the language base. Finally, the possibility of travelling for students from the former

Warsaw Pact countries, now that Europe has opened its doors, may well affect students who are already at the middle-school level, offering prospects of cultural and language exchanges and eventual pen pals. As well-informed ambassadors for the country they represent, students, even at lower age levels, need to be able to formulate their opinion and express it simply in order to promote their own nation, as well as themselves.

Limitations of Debates and Suggested Remedies

The main challenge faced by the teacher was the limited classroom time and the varying capabilities of the students, while the students themselves struggled with a limited knowledge of grammar and vocabulary, pronunciation, fluency and nervousness. To overcome time constraints, the debate was moved forward smoothly and quickly, limiting each speaker to one minute. This gave approximately fifteen minutes in total for one mini-debate session. Small teams of two or three students were ideal. These teams were encouraged to solicit help from the rest of the class so that everyone was involved.

Any lack of language capability and/or mixed-level groups was solved by the students' thorough home preparation, sensitive distribution of students within the groups and assignment of appropriate topics. Students were allowed to have their notes on hand, as well as the teacher's handouts or cue cards with sample grammar structures and sample opinions available for the entire debate. It was also effective when the students were assigned specific roles, opinions and points of view that they did not necessarily share. This freed them from having to express their own opinions and they could therefore focus on expressing themselves well in English. Removing this personal investment factor helped students gain confidence in using English. Once this confidence was gained, especially by timid

students, they were then increasingly sure of expressing their own points of view. In specific situations, timid students were paired with more vocal volunteers who offered to “mentor” their fellow students to a more bold position. This had the effect in the classroom of building smaller groups of united students, eventually helping to form a more united class as well.

With an aim to balance the different capabilities of the students and to have *all* the students interact, the following approach was also tried. Once the topic was established, the students were divided into two groups, i.e. those who agreed with the statement and those who disagreed. They then prepared their arguments. The chairs were arranged so that there were two hot seats facing each other with the remaining chairs placed behind each of the two hot seats (enough for all the students in the class). Two students started the topic of conversation, trying to defend their group’s point of view. Once started, the teacher then signalled any two students during the conversation (one who was in a hot seat and one who was not). Once they had been signalled, they had to stop the conversation and two new students had to resume it exactly where the other two left off, even if this was in mid-sentence. They were required to make the debate coherent, following up on the previous opinions and statements. This activity thus involved all of the students and allowed the teacher to influence the process of debate, while considering the language level skills of the individual students. (Southan, 2002).

Any limited knowledge of grammar, pronunciation, and vocabulary needed to be sensitively addressed by the teacher, but not by interrupting the flow of communication. Instead, notes were taken while the pairs or groups were talking and then the problems were addressed to the class after the activity without embarrassing the student who had made the error.

The errors were written on the board and corrected with the interaction of the entire class.

If a speaking activity seemed to be stagnating, the teacher sometimes needed to assume a role-play, asking additional discussion questions, clarifying instructions or stopping an activity if it was indeed too difficult. During the preparatory stages, the teacher circulated around the classroom to ensure that students were on the right track and see if they needed help while working in groups or pairs. The teacher could also thus diagnose the problems faced by the students who had difficulty in expressing themselves in the target language and provide more opportunities adjusted to these students’ needs.

Ultimately, the teacher’s role was also very critical in overcoming the nervousness of the debating students. Among others, the following approach proved to be very successful. I, for example, prompted the students to imagine that the room was full of people who were begging and crawling before them, simply because they wanted to listen to their speech. Through this technique, students gradually gained sufficient confidence.

Conclusion

Present study was aimed to develop speaking skills of the ESL students through simplified debates. The findings indicate that both students and teacher found such teaching – learning tool very useful and highly effective. The study also indicates that used approach brings substantially more positive effects, not only improvement of students’ speaking skills. Rights activist Jesse Jackson has been credited with expressing his thoughts on debate in the following manner, “Deliberation and debate is the way you stir the soul of our democracy.” Although he was referring to American democracy with his words, the essence remains pertinent to the concept of democracy in its truest

sense, i.e. power staying with the people. In her essay entitled "The Debate Debate," associate professor Nancy Rennau Tumposky (2004: 52) also links the maintenance of debate, as a method of learning, to democracy, "finally, and perhaps most significantly, debate's resilience is no doubt partly attributed to its associations with two powerful concepts: critical thinking and democracy." With the stand which Central Europe has taken with regard to democracy, specifically after the Iron Curtain fell in the late 80s and early 90s, the importance of demonstrating to students that their opinion counts has become increasingly pertinent. In a region of the world where silence was formerly lauded and adhering to the status quo was a virtue, the relevance of debate becomes all the more essential, given this historical background. Debating opinions and issues, laws and amendments is a privilege; the ability to do so diplomatically, with well-formed initiatives for action is an opportunity.

In the university context, this power can be understood in terms of training individuals who are interested in the improved functioning of inter-human relationships whether that is to a larger international extent or in one-to-one interactions. A country is composed of its citizens and the values they purport, demonstrate and put forth on a scale, eventually larger than their own immediate surroundings – where strategic thinking, fair practice and mutual understandings take centre stage. Teaching is not merely transferring knowledge to students, but also helping them to develop a deeper understanding of themselves (Browden & Ference, 1998: 22), as well as the ability to think individually and responsibly within the greater context of society and to display empathy (Tumposky, 2004: 53). Eventually, this newly-gained awareness of themselves can lead students to more effective contributions to society.

For the teacher, the goal – both short and long term – should be to make a change for the better. And debating at any level can aid the teacher in reaching this goal. As students are not only allowed to debate, but supported in their discussions and taught the mechanics of successful, responsibility thinking, the future can only hope for increased accountability from these individuals for the world. Debates – even in simplified formats – belong in our classrooms.

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COMPARISON OF FULL TIME AND COMBINED STUDIES WITH GENDER ASPECT

Abstract

The Czech University of Life Sciences operates seven tutorial centres for combined education in several regions of the Czech Republic. The number of female students is over 50% in the tutorial centres as well as in the full-time study form in Prague. The share of women is remarkably growing in combined study. The article focuses on the students in tutorial centres. The data on their demographic structure, their subjective opinions and motivation are from a questionnaire survey which the authors proposed and realised in several centres outside Prague. The goal of the survey is also to discover differences in motivation and conditions for male and female students. The article contains results of the questionnaire survey and its statistical analysis. The analysis brings basic demographic structure of the respondents and other information from students with comparisons of answers of men and women. The analysis of quantitative signs, tests of relationships and odds ratio, are made to find relations and dependencies between chosen variables. The statistical analysis uses software SPSS, version 17. The differences between the genders are found only in two questions and none of them was strong. The data from questionnaires are eked out with official data given by the faculty study department. These data are used for comparison of full-time and combined studies. The article considers the numbers of students, their achievements

Ludmila Dömeová, Hana Vostrá,
Andrea Jindrová

Czech University of Life Sciences Prague
domeova@pef.czu.cz

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and gender structure in full-time and combined form of study. The results appears more beneficial (and with raising trend) for women both in full-time and distance studies.

Key Words

Combined education, tutorial centres, questionnaire survey, statistical analysis, gender differences, fruitfulness of study

Introduction

In recent years there are more than 50% of female students in Czech universities. In 2010, there were 370 000 students in all Czech universities, 57% women. In 1991, there were only 41% of women. The number of female graduates is 42 000 (57.5% of the total number); male graduates make up 31 000 (Vavroň, 2010 and CSO, 2010).

A similar situation is also in the Czech University of Life Sciences in Prague (CULS), definitely with differences depending on a study branch. The fruitfulness of the study in the regular form is about the same for women and men. The fruitfulness we understand here as successful graduation with a bachelor's or master's degree (Houška and Beránková, 2007 and 2008).

A different situation is for women who due to some reasons interrupted their studies or did not continue to the university right after the secondary school. If the women had not finished their studies nevertheless they still had potential and abilities, they got into a threat of social exclusion. They can be long-time unemployed (more probably in rural regions) or they are permanently not satisfied with their work which is not qualified enough. They often change jobs and in fact never can get into a position which would be acceptable for them. The permanent dissatisfaction can lead to problems in many aspect of their everyday life.

Such women rarely go back to regular studies. Some of them are interested in improving their qualification in various long-time or short-time courses.

Often they try to get the university graduation in their mid-age when their children are grown up and the apprehension of losing a job is stronger than when they were younger. Usually the women are working in a certain position for many years and

suddenly they have to face the situation that they would not be allowed to stay in their position without higher (university) education. This situation is now typical for women employed with the state and local executive, with police and army, with financial and labour offices, as well as the teachers and nurses. These are probably the reasons of steadily higher numbers of female students in distance form of study with even a small increase which were monitored in the whole Czech Republic (IEE, 2010).

The article deals with studies of women in distance courses realized by the CULS, the Faculty of economics and management (FEM). It gathers the results of the survey which took place in the TC outside Prague.

The traditional presumption is that the men are better in maths and science and that there are many other differences in educational capability caused by the gender. This point of view is too simple. It was discovered that there are more factors that are causing the gender test score gaps (Bedar and Cho, 2010). In some investigation the scores of women were even better but the gender achievement gap favouring girls decreased during the middle school (Lai, 2010). This corresponds with our point of view – the gender differences are getting stronger with age.

Socially responsible educational development issues include examination of whether students in diverse situations have equal access to educational programs. Within a global society that supports equal opportunities for individuals, issues of access to educational content have merit at both individual and social levels (Stewart, 2004).

Very important part of the distance studies is the on-line communication and exploitation of the on-line materials, e.g. text books and tests. The way of using seems to be different for

men and women however this fact looks to be more beneficial for women.

Blum (1999) characterized the voice of male messages as tending to be confrontational, autonomous, certain, abstract, arrogant, or consisted of a controlling nature, while female messages tended to be empathetic, mentioning self, family, or spouse, or had a cooperative tone. Blum also noted that male communication patterns were different online where male domination seemed to be stronger than in face-to-face communications. Confrontational behaviour appears to be more common in virtual environments, which seem to reduce inhibition and constraints of etiquette.

Based on his investigation of gender differences in distance learning, Sullivan (2001) reported: "The data provide compelling evidence that online courses are of great value to non-traditional students, particularly female adult learners with children or family responsibilities". Females appeared to have more compelling needs for flexibility. Sullivan suggested that might be why adult female students are seem to take more and successfully complete more distance courses than male students.

Distance learning is a new trend of education. One of the attractions of the distance learning is its flexibility of instruction. Since students and instructors can be separated spatially and temporally from each other, students in a remote area and part-time students can all benefit from this spatial-temporal flexibility as well as a high degree of information sparing (Chang, 2002).

New communication technology, such as the internet, has been widely used in order to reach those who are unable to enrol at conventional universities. By way of such technology, students are supposed to be able to study wherever and whenever they

want, and thereby gain the flexibility necessary for conducting their studies (DePew and Lettner-Rust, 2009).

This flexibility in time and place can be one of the main reasons of higher percentage of female students in distance studies. Travelling for course to a certain place might be especially difficult for women with families.

There are questions on ability or disability of women in context of using technologies. Many researches have been made on this topic.

Technology itself (e.g., computer software programs, computer lab space) may also be a type of learning material that maintains or promotes gender bias in the classroom by including male lead characters in a majority of software programs or by having limited computer lab space, making it difficult for everyone to get a chance to use technology on a daily basis. While technology is becoming more of a necessity in the classroom because of its widespread use, concerns about the disadvantages technology may produce in education have been set aside. As technology in the classroom increased and was intended to make education easier for all students, it has actually served to increase gender-bias (Plumm, 2008).

A significant sex difference in attitudes towards computers was observed. Although both males and females alike were aware of the value and benefits of computers in daily life, females showed less interest in learning about and using computers. Male and female differences were mostly realized with respect to self-confidence in using computers (Shashaani, 1993).

The distance courses we investigated are also based on communication technologies, mainly on Internet. This article can be taken as another contribution to above mentioned discussion.

The objective of this work is to investigate the motivations and results of students in the TC. The study includes search for dependencies between demographic signs and reasons for study. The second objective is to compare motivation of men and women in the TC and the results of men and women in both TC and in regular studies. These investigations are made on real data coming from a questionnaire survey and from official database of the FAM. The data from survey we analyse by standard statistical methods. We use both single and multiple dimensional statistical methods to characterize the responders and to find and prove supposed dependencies.

This article reassumes the publication presented on conferences (Dömeová et al., 2010). (Vydrová and Dömeová, 2009) extended with deeper insight into survey data and comparisons with faculty and national statistics.

Material and Methods

Survey administration

The FEM operates TC in Litoměřice, Hradec Králové, Most, Cheb, Jičín, Šumperk, Klatovy and Tábor. The centres were established with a support and cooperation of local secondary school or other organization like agrarian chamber. The capacity of each TC is about 100 students in one class; three classes are on bachelor's level and two on master's level. There are about 1,500 students in all TC in all classes.

The study includes contact education – 16 lessons for one subject, five subjects per semester.

The questionnaire was developed by the authors and was pre-tested using 10 students of full-time study to assess its logical consistence and easy understanding.

The respondents of the survey were male and female students of various TC in both bachelor and master levels. The questionnaires were distributed by teachers and the students were asked to complete them during the breaks. 356 of complete and valid questionnaires were collected and analyzed. The study was realized as a pilot one with supposed amplification to other faculties and universities.

Statistical background

The 2x2 contingency table is called a four-field table (the scheme is in Table 1), It compares two dichotomous signs (Hindls et al. 1999).

The influence of each sign is possible to test by χ^2 test for the contingency table. The χ^2 is able to reject or not the null hypothesis on dependency or homogeneity of data on a given significance level α . There are also some modified coefficients or testing based on odds ratio. (Řezanková, 2005)

Sign A	Sign B	
	b_0	b_1
a_0	a	b
a_1	c	d

Table 1 Contingency table 2x2 (source Řezanková, 2005))

We suppose that each sign A and B can be classified by two variables (sign A a_0, a_1 ; sign B b_0, b_1). The **a** is then defined as number of elements (from selection with extent n) which belong to category a_0 by the sign A and to b_0 by B. The definition of **b**, **c**, **d**, is similar.

The influence of factors was expressed by odd ratio and relative risk for selected 2x2 tables. The odd ratio is equal to 1, $\Psi = 1$, if the variables B and A are independent. The values $0 < \Psi < 1$ indices the negative association, values

$1 < \Psi < +\infty$ positive association between A and B. It follows, the scale of values Ψ is asymmetrical around the value 1 (Řezanková, 2005).

The odd ratio is calculated as relation of relative risks RR_1 a RR_2 , where

$$RR_1 = \frac{\frac{a}{a+b}}{\frac{c}{c+d}} = \frac{a(c+d)}{c(a+b)}, \quad 1.1$$

$$RR_2 = \frac{\frac{a+b}{d}}{\frac{c+d}{d}} = \frac{b(c+d)}{d(a+b)}, \quad 1.2$$

$$\Psi = \frac{PR_1}{PR_2}, \quad 1.3$$

Goodman –Kruskal's λ

The coefficient λ presents the measure of reduction of prediction error; in the case we know the value of the describing variable. This value can be zero even when the dependency between variables is proved.

$$\lambda_{Y/X} = \frac{\sum_j n_{mj} - n_m}{n - n_m}, \quad 1.4$$

n_{jm} ... maximum (modal) absolute frequency of j-th line

n_m ... maximum marginal frequency, i.e., summation line

By analogy can be derived: $\lambda_{X/Y}$.

The calculation of the coefficient λ is possible only when the nonzero frequencies occur in more than one column. The coefficient can take the value from $<0;1>$ interval. The value 0 is for the case when the categories of the line variable do not contribute to the prediction of the category of the column variable in any way. The value 1 appears when each line of the table contains at most one field with nonzero frequency.

Goodman – Kruskal's τ

Calculation of this coefficient is based on a analysis of dispersion. With growing scale of the contingency table the coefficient tends to reach relatively small values. Seeing that coefficient is a result of the variability decomposition the extraction is suggested. The values are then more similar to the contingency coefficient.

$$\tau_{Y/X} = \frac{n \sum_{i=1}^r \sum_{j=1}^s \frac{n_{ij}^2}{n_j} - \sum_{i=1}^r n_i^2}{n^2 - \sum_{j=1}^s n_j^2}, \quad 1.5$$

The statistical analysis was realized with the statistical software SPSS, version 17. The significance level for test was $\alpha = 0,05$ (Field, 2005 and Leech et al., 2008).

Materials

This analysis was based on a questionnaire survey realised in the TC of the CULS, FEM. The content of the inquiry form is in Table 2 and Table 3.

The statistical analysis was focused on all parts of the form with exception of the question 13-16. The goal was to describe the structure of the responders and to describe the motivation for study with gender aspect.

The motivation with gender aspects were searched in questions 10-12. The responders can chose more than one answer for each of these questions. The null hypothesis H_0 was: There is no difference between the answers of male and female students.

No.	Question	No.	Question
1.	Sex	7.	Previous educational attainment
2.	Age	8.	Uncompleted university studies
3.	Number of children	13.	Proposals for study system improvement
4.	Place of living, number of inhabitants	14.	Study branch
5.	Place of living	15.	Proposed changes in time schedule
6.	Working activity	16.	Other proposals

Table 2 Socio-demographic questions and students' proposals
(source: own work)

No.	Question
9.	Reason of incomplection of previous studies.
10.	Identify the main reasons for present studies.
11.	Why do you study in a combined form?
12.	What do you most appreciate on the distance form of study?

Table 3 Questions on motivation (source: own work)

Results and Discussion

Information on the respondents

The total number of women was higher than the number of men. The female forms 61% and male 39% in the questionnaire survey. This gender distribution is in line with the real share of men and women in TC of the CULS. It confirms higher demand for study among women.

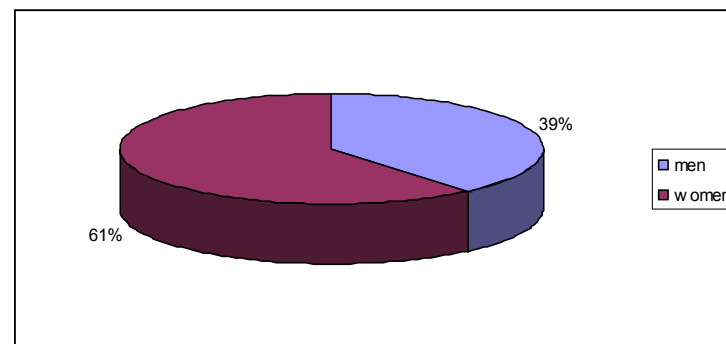


Figure 1 Distribution of men and women in the questionnaire survey (source: own work)

The responders were divided into 5 age groups. The most frequent was the age 26-30, the second 31-35; both for men and women. The most frequent were full time jobs. 8% of students were on the parental leave (all of them women).

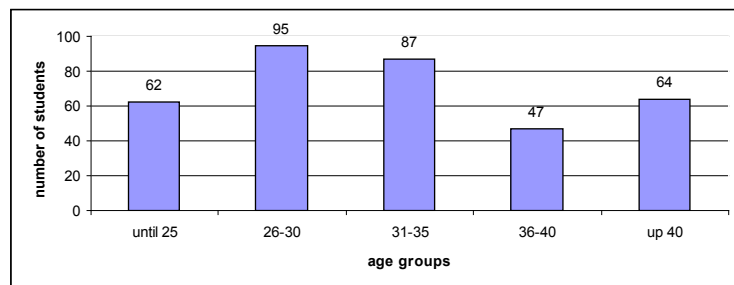


Figure 2 Distribution of age groups in the questionnaire survey
(source: own work)

All the respondents have finished some kind of secondary school; some of them have finished university (another branch not suitable for their today's employment) or have not finished their previous university studies. The graduate students are usually from pedagogical or lawyer's faculties. The demographic information on the respondents is in Table 4.

We use the contingency tables for the analysis of dependency of certain signs. The contingency tables are two dimensional tables of frequencies which contained always one couple of categories. This process is used for calculation of dependency measures. (Řezanková, 2005).

The chi-square test is able to confirm or to refuse the H_0 hypothesis that the signs are independent. The value p which was calculated in the test was compared with the value $\alpha = 0,05$. When p is lower than α than the dependency is significant (proved). If the dependency is proved, the intensity of dependency can be

measured by the measures of the dependency intensity (Hindls et al., 1999).

79% of women are in full time jobs (83% for the whole file), 14% is on maternity leave. The high number of full-time employed student is caused, by our opinion, by raising demand of university degree for state employees. They have to reach the university degree to maintain their position or to further progress in their carriers.

The calculated value of $p = 0.00027$ is lower than the value of chosen α . The null hypothesis that the signs are independent can be refused. The dependency between gender and working activity exists. According to the values of dependency measures the dependency is weak – all the calculated measures have the value of about 0.3.

Measure	Items	Percentage
Gender	Female	61.0
	Male	39.0
Age	Under 25	
	do 25	17.4
	26-30	26.7
	31-35	24.4
	36-40	13.2
	above 40	18.0
Number of children	0	42.1
	1	20.2
	2	32.3
	3	4.5
Job title	Full time employee	82.9
	Part time employee	1.4
	Entrepreneur	5.3
	Maternity leave	8.4
	Unemployed	0.9
Place of living	Town	75.0
	Countryside	23.3

Table 4 Demographic information of the respondents
(source: own work)

Motivation analysis

For the questions 10, 11 and 12 we construct relative frequencies

Question no.9: The reason for unfinished previous university studies

In the case of unfinished university studies, the students could have named the reason of the previous failure. Majority of students had no previous experience with university studies or they have successfully graduated. The most frequent reasons of not completing the studies were "dissatisfaction with chosen branch of the study" and "other reasons". According to the results of the analysis we can say that the dependency between gender and reason for unsuccessful termination of university studies exists ($p = 0.0004$). The calculated intensity of dependency is medium.

Question no.10: The reasons for present studies

The sum of percent does not give 100% because the responders can chose more than one answer. The most frequent reason was "I want to have good feeling and to raise my self-confidence. "; in about 30% were answers: "I want to get higher position." and "I want higher income." (Table 5). The gender relation was proved only for the answer "I want to have good feeling and to raise my self-confidence" (see Table 6) which was remarkably more often selected by women (see Table 7).

Answer	Percentage
I want to keep my position at work.	23.0
I want to get higher position.	33.1
I want to change job (employer).	19.1
I want to change job (qualification).	10.7
I want higher income.	29.2
I want to have good feeling and to raise my self-confidence.	57.6
I want to raise my prestige in family.	6.5
I want to raise my prestige in employment.	23.3
I want to raise my prestige among friends.	5.1
Other reason(s).	4.2

Table 5 Reason for studies – relative frequencies (source: own work)

Answer	Dependency proved	p-value	Pearson's coefficient
I want to keep my position at work.	No	p = 0.072	
I want to get higher position.	No	p = 0.171	
I want to change job (employer).	No	p = 0.209	
I want to change job (qualification).	No	p = 0.318	

I want higher income. No p = 0.488

I want to have good feeling and to raise my self-confidence. Yes **p = 0.004 0.152**

I want to raise my prestige in family. No p = 0.993

I want to raise my prestige in employment. No p = 0.199

I want to raise my prestige among friends. No p = 0.141

Table 6 Reason for studies – gender dependencies (source: own work)

		Yes	No	Total
Sex	Female	137	78	215
	Male	67	72	139
Total		204	150	354

Table 7 Number of answers: The reason for study is: "I want to have good feeling and to raise my self-confidence." From men and women (source: own work)

Question no.11: Why do you study in a combined form?

The sum of percent does not give 100% because the responders can chose more than one answer. The most frequent reason was "I do not want to leave my job." (Table 8). The gender relation was proved only for the answer "I have to keep the house and husbandry." and for "I do not want to leave my job." - see Table 9.

Answer	Percentage
I do not want to leave my job.	62.6
I cannot effort reduction of income.	40.0
I cannot commute.	18.8
The entrance examination is the main problem.	10.4
I think that the regular study is more demanding.	3.4
I have to take care of children.	25.6
I have to take care of handicapped or seniors in the family.	2.0
I have to keep the house and husbandry.	6.5
I have to run my firm.	3.7

Table 8 Reason for combined form of studies – relative frequencies
(source: own work)

Answer	Dependency proved	p-value	Pearson's coefficient
I do not want to leave my job.	Yes	p = 0.045	0.106
I cannot effort reduction of income.	No	p = 0.796	
I cannot commute.	No	p = 0.243	
The entrance examination is the main problem.	No	p = 0.113	
I think that the regular study is more demanding.	No	p = 0.850	
I have to take care of children.	No	p = 0.168	

I have to take care of handicapped or seniors in the family.	No	p = 0.566	
I have to keep the house and husbandry.	Yes	p = 0.008	0.140
I have to run my firm.	No	p = 0.265	

Table 9 Reason for studies – gender dependencies
(source: own work)

Question no.12: What do you most appreciate on the distance form of study?

The sum of percent does not give 100% because the responders can chose more than one answer. The most frequent answer was "I can combine the study and the full time job." (Table 10). More frequent answers for women were two – see Table 11.

Answer	Percentage
I can study in a place close to my home.	52.2
I can combine the study and the full time job.	78.9
I can use my free time for my own development.	11.0
The self study based on provided materials is possible.	24.2
I can socialize, find new friends and contacts.	11.5
My fellow students are in a similar situation, I do not feel second-rate.	12.6
The teachers have better access to adult students.	9.3
Other benefit(s)	2.8

Table 10 Benefit of combined studies – relative frequencies
(source: own work)

Answer	Dependency proved	p-value	Pearson's coefficient
I can study in a place close to my home.	No	p = 0.765	
I can combine the study and the full time job.	No	p = 0.159	
I can use my free time for my own development.	No	p = 0.438	
The self study based on provided materials is possible.	No	p = 0.354	
I can socialize, find new friends and contacts.	Yes	p = 0.041	0.108
My fellow students are in a similar situation, I do not feel second-rate.	No	p = 0.888	
The teachers have better access to adult students.	Yes	p = 0.002	0.121
Other benefit(s)	No	p = 0.471	

Table 11 Benefit of combined studies – gender dependencies (source: own work)

The odds ratio calculations for proved dependencies

The odds ratio 1.887 means a direct positive association between the gender and the reason for study (good feeling and higher self-confidence). For the women, there is 1.887 times higher chance that the reason of study is “good feeling a higher self-confidence” – see Table 12.

There is 0.632 lower chance that the reason of study is “I do not want to leave present position” and the reason “Take care for house and/or farmstead” is 0.316 lower for the women – see Table 12.

Odds Ratio	Value	95 % Confidence Interval	
		Lower	Upper
For gender x good feeling, higher self-confidence	1.887	1.223	2.912
For gender x I do not want to leave present position at work	0.632	0.403	0.991
For gender x care for house and/or farmstead	0.316	0.130	0.768

Table 12 The odds ratio for proved dependencies (source: own work)

In the questions where the dependency was proved the measures of predictability were calculated – see tab. 13.

Question	Goodman–Kruskal's λ	Goodman–Kruskal's τ
For gender x good feeling, higher self-confidence	0.129	0.098
For gender x I do not want to leave present position at work	0.153	0.128
For gender x care for house and/or farmstead	0.217	0.169

Table 13 The measures of predictability for proved dependencies (source: own work)

Discussion

There are often questions of effectiveness and overall fruitfulness of the combined studies. Many people believe that the students of combined studies, especially students in the TC outside Prague, have worse results than full-time students in Prague. Other question is which form of study is more suitable for women and why.

This year the CULS, FEM, has 2 925 students in regular full-time form of study; 58% of them are women. The prevailing number of female students is also in the TC; even more remarkably. There are 1 607 students in the TC and 70% of them are women.

We investigated the period 2003-2010. The growth of total number of students was continual and the share of women was always above 50%.

We compare fruitfulness of students in full-time study and in the TC. The database of the FEM records only the numbers of students enrolled and graduate for each school year. That's why we were able to compare only these total numbers (see tables 14 and 15). To follow an individual course of studies for single students (e.g. number of repeated exams or classes) is impossible because it contains operations with private data of students.

Year	Number of enrolled students			Number of graduates		
	total	women	%	total	women	%
2003	423	232	54.8	50	31	62.0
2004	118	62	52.5	158	86	54.4
2005	212	151	71.2	163	90	55.2
2006	710	468	65.9	314	191	60.8
2007	1054	668	63.4	472	227	48.1
2008	1376	938	68.2	813	528	64.9
2009	1492	1008	67.6	905	612	67.6
2010	1607	1128	70.2	1140	789	69.2

Table 14 Number of enrolled students and graduates in tutorial centres of the FEM 2003-2010 (source official database FEM)

The share of women is higher both in the number of enrolled students and in the number of graduates. The percentage of women is higher in the TC. The number of graduates from the TC is raising and this trend can be forecasted for next two years (considering the number of enrolled).

The data from the study department enables us to calculate the percentage of students who have successfully passed the state exams in the third and fifth year. The percentage of satisfactory results is about 70%. Generally more successful are student of the fifth year who get the masters degree.

Year	Number of enrolled students			Number of graduates		
	total	women	%	total	women	%
2008	2568	1514	59	1363	890	65.3
2009	2741	1576	57.5	1632	1061	65.0
2010	2925	1698	58.1	1700	1146	67.4

Table 15 Number of enrolled students and graduates in full-time studies in the FEM 2008-2010 (source official database FEM)

The data from the FEM correspond generally with the national data (see Table 16). The national investigation also states that the percentage of women in distance studies is higher than in regular studies with slight increase in last three years (IEE, 2010).

Year	Percentage of women applied	Percentage of women enrolled	Percentage of women graduate (bachelor level)	Percentage of women graduate (master level)
2006	57.1	52.5	56.7	53.5
2007				
2007	56.9	52.7	56.4	55.4
2008				
2008	56.8	53.1	57.7	56.9
2009				

Table 16 Percentage of women in the Czech Universities (IEE, 2010)

The main difference between mentioned two forms of study we found in the number of women. The percentage of women is remarkably higher in the TC. These findings are in line with other authors. (Chang, 2002), (DePew and Lettner-Rust, 2009). The main advantage of the combined study is found in the higher flexibility. In our survey, the women appreciate that they can continue in a full time job and keep the position in their job. In the same time they can take care of the family and the household.

There are many traditional prejudices concerning women's capabilities and gender differences in education. Many of them are not proved; some of them are rather outdated. Quite often the women's test gaps are reported in connection with certain age group. The research concerned with females in regular studies from primary to tertiary level found worse results for

higher age groups (Lai, 2010). This study does not deal with adult students over 26 who form the majority of students in combined study.

Our results are not worse for women (the percentage of graduated is about the same as the percentage of enrolled – see Table 14) in the TC and better women in regular studies (Table 15).

Other studies (Plumm, 2008), (Shashaani, 1993) see a big problem in using modern communication technologies and computers by women. By our experience the computer skills of female students are on satisfactory level. The students in the TC are highly dependent on using these technologies because they have only limited number of contact lessons. They use various computer communication tools for discussions and asking questions. The results of studies are not worse for women and their interest in this form of study is even higher than the interest of men.

Conclusion

The share of graduates from the TC is comparable with the regular students. The number of women is higher than the number of men in both forms with higher percentage of women in the TC. The women in regular studies are slightly more successful (the percentage of women enrolled is lower than the percentage of women graduate).

The described form of combined study in the TC of the CULS, FEM, is in a long time horizon successful and welcomed by women (61%-70% enrolled). The majority of female students are fully employed persons, entrepreneurs or mothers on maternity leave. The high number of graduates refers to a strong

motivation of students and their intensive work even though they have less free time.

The proved differences between male and female students in the motivation factors were not very important and did not discover possible threats of educational handicaps of any gender.

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INFORMATION SYSTEMS EVALUATION CRITERIA BASED ON ATTITUDES OF GRADUATE STUDENTS

František Dařena

Mendel University in Brno
frantisek.darena@gmail.com

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Abstract

Importance of information systems in supporting business activities and managerial decision making is growing. Decisions related to selecting a suitable information system, including the technological background, human resources, procedures and information belong to one of the most difficult and most responsible ones. As in the case of other types of investments, assets and resources invested into information system should return in a reasonable time. There has been a lot of work done in the research and application of IS evaluation techniques to different kinds of information systems. Such evaluations involve a wide variety of technical and technological considerations made by technical experts, on the other hand impacts on management of the organization or financial impacts can be addressed. The objective of the paper is to reveal the preferences of graduate students related to their information systems evaluation and to propose a general framework for such evaluations. During the experimental period two surveys were carried out within the information systems course – at the beginning when the students were completely uninformed and at the end when the students had the knowledge of individual aspects of information systems, their role within organizations and process of information systems evaluation. The former survey used a simple scoring method whereas the latter relied on formal usage of the Analytical Hierarchy Process. The results show the differences in opinions of the students between these two surveys. Presented criteria hierarchy as well

as the importance of individual evaluation criteria can be used for demonstration of attitudes of graduate students of management study programs and as a general framework for information systems evaluation.

Key Words

information systems, evaluation, multi-criteria analysis, Analytical Hierarchy Process

Introduction

Importance of information systems (IS) in supporting business activities and managerial decision making is growing as a response to the need for maximizing return on investments, reducing time to market and satisfying stakeholder needs (Wei, Chien, Wang, 2005). Information systems often significantly shape the work of organizations (Renkema, Berghout, 2005), therefore the decisions related to selecting a suitable information system, including the technological background, human resources, procedures and information belong to one of the most difficult and most responsible ones (Irani, 2002).

Organizations are investing into information systems in order to exploit benefits from implementation of information technologies (Chatzoglou, Diamantidis, 2009). As in the case of other types of investments, invested assets and resources should return in reasonable time. Therefore many researches focus on financial evaluation of information systems investments and economical evaluation of such projects (Irani, 2002; Chen, Doumeings, Vernadat, 2008; Thouin, Hoffman, Ford, 2009).

Although information systems are one of the drivers in achieving competitive advantage (Wiseman, 1985) and not only financial aspects are important, assessment of all implications of the information systems infrastructure by companies is full of difficulties (Irani, 2002) on both operational and fundamental levels (Homburg, 2008). Good theoretical background together with decision support might facilitate this complicated process.

The objective of the paper is to reveal the preferences of graduate students of management curriculum related to information systems evaluation, to show how their attitudes can change as the result of increased knowledge of information systems field

and to propose a general framework that can be used as a basis for evaluations of the same or similar type.

Material and Methods

Evaluating information systems

There has been a lot of work done in the research and application of IS evaluation techniques to different kinds of information systems. There exist methodologies for evaluating information systems in various industries (Yusof et al., 2008). Different topics are also differently important in different phases of information systems development life cycle. Many criteria for evaluating information systems in individual stages of systems development life cycle are discussed e.g. by Díez and McIntosh (2009). The why, who, when, what, and how approach for evaluation information systems was introduced by Yusof, Paul, Stergioulas (2005). Heo and Han (2003) developed six variables measuring the information systems performance – system quality, information quality, information usage, user satisfaction, individual impact, and organizational impact. Chatzoglou and Diamantidis (2009) measure the performance using three parameters – productivity (in supply chain, business planning, human resources and customer support), coordination (in data and process management and human resources) and information ability (in customer support and data and process management). For overview of other evaluation methods see e.g. Wei, Chien, Wang (2005).

It might seem favorable to adopt a generic framework for evaluating information systems of various types. However, application of specific evaluation criteria in contrast to generic criteria can lead to deeper understanding and thus to better manageability and project success. The wide variety of technical

and social factors also complicates the evaluation process and therefore the search for a generic evaluation framework becomes very difficult, if not impossible (Irani, 2002). As the consequence, in some fields (e.g. public administration) is the IS evaluation an issue complicated more than in other fields (Homburg, 2008).

There exist many aspects that can be evaluated on information systems. On one hand, there can be mostly technical and technological evaluations made by technical experts, on the other hand, impacts on management of the organization or financial impacts can be addressed. For several types of information systems the majority of evaluations use system-centered approach assessing e.g. the algorithms, and omitting the user or organizational perspectives (Wang, Forgionne, 2006). The perspectives of IS evaluation may include concerns of individual groups of stakeholders as defined e.g. in Boonstra (2006), Boonstra, de Vries (2008), or ANSI/IEEE 2000. Different types of stakeholders view the system from different perspectives. An important part of IS evaluation are the opinion of its users. Only in the case they accept the system the IS can bring benefits to the organization (Borovits, Giladi, 1993). However, other important groups are the managers and owners of the organization. These subjects are responsible for organizations success and economical outcomes. Information systems as one of the most valuable business resources can play a significant role in this field. Returns of information systems investment therefore depend on how much the information system participates in the strategic role of the organization (Heo, Han, 2003).

It is usually impossible to evaluate an information system using one measure, e.g. financial, because there exist also non-financial consequences that cannot be easily expressed e.g. in monetary terms. More generally, it is not possible to compare all consequences on an equal basis (Renkema, Berghout, 1997).

Analytical Hierarchy Process

Because of the complexity of IS evaluation one single criterion that would be generally agreed by all involved parties will rarely exist. It is also often very difficult to identify all important factors influencing decisions and to assess the impact of all these factors. There will also always be a part of subjectivity in evaluating information systems (Gremy, Fessler, Bonnin, 1999). Therefore it is necessary to adopt a methodology that is able to deal not only with objective information but also with the subjectivity.

Creating a structure is usually the first step in organizing, representing and solving a problem. A proper structure can help not only in understanding but also in visualizing the problem. A hierarchy, as one of the possibilities of representing structures, is a powerful way of classifying the information in order to understand the complexity of the world (Saaty, Shih, 2009). Organizing the goals and criteria of evaluation into a hierarchy can also help in aligning with the competitive strategy and goals of the organization (Wei, Chien, Wang, 2005).

The Analytical Hierarchy Process (AHP) is a decision making tool with possible applications in many fields. Its main methodological strength is the ability of rendering a complex problem (system) into a form of a structured hierarchy. This hierarchy covers all possible alternatives, evaluation criteria and the general objective (Lipovetsky, 1996). The result of such process is a single overall score for ranking decision alternatives. AHP is one of the mostly used tools for multiple criteria decision making. It was used in almost all applications related to decision making (Vaydia, Kumar, 2006). AHP has also wide utilizations in many fields related to information systems (Salmeron, Herrero, 2005).

The Analytical Hierarchy Process is a theory proposed by Saaty (1980) that is used for measuring relative variables on absolute scales of both quantifiable and non-quantifiable criteria. It is based on pair wise comparisons, which is a natural way of decision making (Ozdemir, Saaty, 2006). The quantification of preferences regarding two criteria A and B from the criteria hierarchy can be found in Tab. 1.

Value	Meaning
1	A is equally important as B
3	A is slightly more important than B
5	A is strongly more important than B
7	A is very strongly more important than B
9	A is extremely more important than B

Table 1: Scale for pair wise comparisons for AHP method

It is generally possible to use also values 2, 4, 6, and 8 as well as real numbers to specify the comparisons very finely and precisely. The same principle is later used for comparison of two alternatives A and B from one perspective represented by a criterion.

After all pairs of criteria and alternatives are evaluated simple calculations based mostly on matrices are carried out to get the relative importance of each individual criterion and overall evaluations of all alternatives (see Saaty, 1980).

Making decisions in groups

To achieve a decision in a group, group members need to accept the judgment of the group (Saaty, Vargas, 2007). Individual members of the group can have different importance, thus

different weights can be assigned to their decisions or preferences. The group can achieve a consensus on both hierarchy and judgments. In the case of nonsuccess, the group can vote for the results or choose a compromise. If it is not possible, the judgments of individuals can be synthesized (Lai, Wong, Cheung, 2002). To aggregate the judgments of individuals a synthesizing function that fulfills several conditions (separability, unanimity, homogeneity and power condition) must be used. According Basak and Saaty (1993) only the geometric mean satisfies all these conditions (plus the reciprocity) and therefore is used to synthesize judgment matrices in a group of equally important individuals (Vaydia, Kumar, 2006).

Experiment

In this paper, the focus in information system evaluation is aimed at the early stages of the systems development life cycle since it is likely that after leaving the university, the students can participate in a process of selection of an information system/subsystem. Because of the major of the students (economics and management) the evaluations were performed from the perspective of managers and users of the information system, without excessive focus on e.g. technical and implementation details. The objective was to build a framework for evaluating and considering alternatives of information systems rather than to select or recommend a particular product from several alternatives (the reason was a big number of available information systems and vendors as well as the inability to do the evaluation in a particular organization) and also to demonstrate how formal techniques could help in understanding and solving problems, not only in educational process.

The group of evaluators was formed of students of the Information systems course (about 25 students). These students

were almost at the end of their five-years studies and they were expected to be employed in managerial positions where they could play a significant role (decisive, advisory or consultative) in the process of IS implementation or innovation. The first part of the experiment started at the very beginning of the course, even before the first meeting. The objective of this first part was to identify the opinions and attitudes of people who were not influenced by theoretical aspects of information systems project and impacts of information systems on organizations. The students were not presented any existing evaluation framework and they needed to decide only according their judgments. The students, however, had some experience as regular users of various information systems (at least the information system of their university) and possibly with evaluations of projects of different nature. The results of this first part of the experiment should show that without enough relevant information and without having a proper framework and methodology for evaluation the results have the tendency of providing inappropriate conclusions.

The second part of the experiment was carried out at the end of the course after the students became more informed about the information systems field thanks to the information systems classes where they got acquainted with many areas related to information systems, such as enterprise and information systems architectures, information systems development approaches, systems integration, frequently used applications or economical aspects of information systems. To improve the decision making process, a formal technique (Analytical Hierarchy Process) was used to capture and clearly structure the preferences of the students.

When information systems should be evaluated from multiple perspectives it was necessary to select those criteria and assign

relative importances to them. First, the students individually prepared several criteria and grouped them into several categories, according their feelings and opinions. Such the criteria also reflected their gained knowledge during the course. The criteria were later discussed during the class so they could be explained, clarified and understood by all participants. Based on the categories of criteria that were created by the students, one aggregated set of categories, as well as their structuring into a hierarchy was identified (the results see in Fig. 1). Using the scale from Tab. 1 the relative importances of individual criteria were quantified based on pair-wise comparisons.

For finding the outcomes of the group decision making process (during creation of the criteria hierarchy as well as during criteria importance quantification) a consensus reached after discussion was considered. It was assumed that all members of the group were equal so that it was not necessary to assign more weight to the opinions of some group members.

Based on the results of criteria quantifications and using the method described by Saaty (1980), normalized weights for individual criteria on all levels of criteria hierarchy were obtained (see the results in Tab. 3).

Results

The identified criteria of students' evaluation and the quantification of their importance at the beginning of the course can be found in Tab. 2. The importances were rated using a number on the scale 1 – 10 where 1 means “the least important” and 10 means “the most important”. The same value could be assigned to more criteria which meant that these criteria had the same importance. The scores in Tab. 2 were obtained as the average from the scores obtained from individual students. Costs, Complexity and user friendliness, Speed of implementation, Security and safety, Covering all agendas, Good accessibility, access from the Internet, Support from manufacturer, services and Integration with other systems, openness, adaptability, modularity were identified by at least about a half of the students. Other criteria were mentioned very rarely (some criteria only once) and therefore some of them, especially very unusual, were removed from the list.

Criterion	Frequency among all evaluations	Average ranking
Stability and efficiency	Very low	9.5
Security and safety	Very high	9
Covering all agendas	Very high	9
Complexity and user friendliness	High	8
Matching company needs	Middle	8
Good accessibility, access from the Internet	Middle	7.5
Costs	Very high	7.5
Speed of implementation	Very high	7
Support from manufacturer, services	High	7
Multiple lang./national environment for multinational companies	Very low	6.5
References, evaluation of supplier	Middle	6
Integration with other systems, openness, adaptability, modularity	High	6
Benefits	Very low	5
HW and other system requirements	Low	4

Table 2: Criteria and their importance on scale 1 (least important) to 10 (most important) and frequency identified at the beginning of the IS course

In the class at the end of the course, the criteria for IS evaluation were arranged into a hierarchy. Before that, the students first reconsidered the criteria they identified at the beginning and

they also identified other criteria that had become important for them after they had an insight to the information systems domain (some of these criteria naturally did not appear in their evaluations at the beginning). The students also individually proposed a hierarchy of their criteria. The hierarchies of all students were then aggregated and based upon the group consensus the hierarchy that is shown in Fig. 1 was developed.

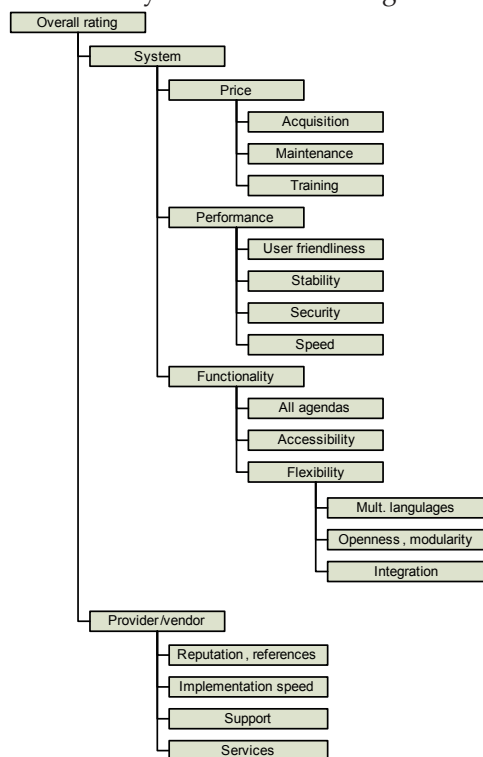


Figure 1: Aggregated hierarchy of criteria for IS evaluation identified at the end of the course.

The hierarchy had two major branches, one of them focused on the information systems as core products, another one was aimed at the vendor or provider of the product and related services. The hierarchy provided a better insight into the overall evaluation and enabled better focusing on some of the criteria. Some criteria, e.g. the costs were also decomposed into several subcategories after the students realized all economical implications in the IS project.

The results of quantification of all criteria from the criteria hierarchy can be seen in Tab. 3. The weights assigned to each criterion can be later used for evaluation of a particular set of information systems after considering their characteristics. The weights were calculated using the Saaty's method based on students' preferences that were captured in the class and adjusted using a group consensus. Because of the large quantity of evaluations, criteria comparisons, and calculations, only the final results are presented here.

Although it is difficult to compare results obtained using the Saaty's method (see Tab. 3) and the simple scoring method (see Tab. 2), several differences as well as common outcomes can be discovered. They are discussed in section Discussion.

System 0.833	Price 0.123	Acquisition	0.286	
		Maintenance	0.612	
		Training	0.102	
	Performance 0.557	User friendliness	0.130	
		Stability	0.333	
		Security	0.531	
		Speed	0.057	
	Functionality 0.320	All agendas	0.331	
		Accessibility	0.120	
		Flexibility 0.549	Multiple languages	0.102
Openness			0.532	
Integration			0.366	
Provider 0.167	Reputation, references		0.090	
	Implementation speed		0.135	
	Support		0.360	
	Services		0.415	

Table 3: Weights of IS evaluation criteria calculated using Saaty's method

Discussion

At the beginning the students were not able to identify all important criteria although all of them had several experiences with various types of information systems. Also the sets of criteria were often very different within the group of students. However, it was usually possible to merge several criteria into one class to reduce the length of the criteria list.

It was also interesting to observe that some of the criteria were evaluated relatively consistently (e.g. Complexity and user friendliness, Security and safety, Matching company needs, Covering all agendas) whereas others had very different rankings among the students (e.g. Speed of implementation, Integration with other systems, openness, adaptability, modularity).

The first important fact from the final evaluation was that the information system itself was strongly more important than the subject providing it and the services and activities related to the information system. Also the services and support provided by the IS vendor became more important in comparison to other vendor related issues after the pair wise analysis of criteria. Thus, the relative importance of speed of implementation, reputation and references of supplier decreased in comparison to the initial evaluation criteria importance and service and support gained their significances.

Security, stability, user friendliness and coverage of all important agendas were still the most important criteria, which was the result of the fact that the system and its performance were seen as the most essential. Openness of the system, its adaptability and modularity became more important than at the beginning, which could be attributed to the awareness of the position of information systems in organizations, their importance and

positive role in gaining competitive advantage and facing the changes in external and internal environment.

Costs of the information system were evaluated as quite important and also by almost all students at the beginning. However, later, after the students realized the nature of costs related to the information systems life cycle and became familiarized with frameworks for costs classification, the information systems related costs were split into three groups – acquisition costs, maintenance costs and training costs. The importance of maintenance costs and their impact of overall rating were identified as the most significant.

Conclusion

The objective of the paper was to reveal the preferences of graduate students related to their information systems evaluation, to show how their attitudes can change as the result of increased knowledge of information systems field and to propose a general framework that can be used as a basis for evaluations of the same or similar type. During the experimental period two surveys were carried out within the information systems course – at the beginning when the students were completely uninformed and at the end when the students had the knowledge of individual aspects of information systems, their role within organizations and process of IS evaluation. The former survey used a simple scoring method whereas the latter relied on formal usage of the Analytical Hierarchy Process.

The results show that within the time between these two surveys the opinion of the students regarding several criteria has changed. Some criteria, e.g. openness of the system, its adaptability and modularity become more important, which is in correspondence with current trend in information system design – the systems need to be constantly and smoothly re-

engineered to respond to changing market demand and technological evolution (Chen, Doumeingts, Vernadat, 2008). On the other hand, some criteria that were related to the systems as well as to the provider (vendor) of the information system have lost on their importance as a consequence of clear structuring of the problem of IS evaluation.

Presented criteria hierarchy as well as the importances of individual evaluation criteria can be used for demonstration of attitudes of graduate students of management study programs and as a framework for information systems evaluation. However, it is always necessary to consider company characteristics during the process of evaluation of candidate information systems. Adopting only common evaluation criteria can lead to delay in IS implementation and under-performance of the system (Wei, Chien, Wang, 2005).

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ANSI/IEEE 1471-2000, Recommended Practice for Architecture Description of Software-Intensive Systems.

SOME PITFALLS OF EFFICIENCY IN CONTEMPORARY HIGHER EDUCATION

Jaroslav Komárek

Karel Englis College
jaroslav.komarek@vske.cz

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Abstract

The strategic objective of the Long-Term Intent of the Czech Ministry of Education represents a fundamental change in orientation towards the development of higher education from quantity to quality, which is due to the enormous growth in students' figures in recent years. The aim of the implementation of the objective is to establish three priority areas: quality, openness and efficiency. The analysis of only one part of the higher education system in terms of quality management has shown weaknesses in the systems approach to the structure of economical programs especially and lack of definition of key processes generally. Moreover, the current progress of the Bologna process is not fully satisfactory, the bachelors are not ready for practice and the original principle of multi-stage education has not been efficiently applied.

Key Words

Long-Term Intent, Ministry of Education, higher education, quality, openness, efficiency, effect, economy, analysis, study program, study branch, quality management, system, systemic approach, key process, Bologna process, bachelor study, practice, multi-stage education

Introduction

All universities in the Czech Republic were familiar with the “Long-term Intent for the Scholarly, Scientific, Research, Development, Innovation, Artistic and Other Creative Activities of Higher Education Institutions for 2011-2015” by the Ministry of Education (hereinafter the “Long-term Intent”) in mid 2010 (Kopicová, 2010). The proclaimed aim of the Long-Term Intent is a fundamental change in orientation towards the development of higher education from quantity to quality. It is due to the enormous growth in students’ figures. In 2000, a number of students in tertiary education were less than a quarter of the population of corresponding age. However, in 2009 it was more than two-thirds. With the enormous expansion in students’ figures has increased the number of institutions of higher education more than two times (Ústav, 2010). The question is, whether a number of professors have increased proportionally? Certainly have not and also a number of doctoral students have nearly stagnated compared to other types of studies (Figure 1).

The meaning of implementation of the Long-term Intent is to establish three priority areas: 1. quality and relevance, 2. openness, 3. efficiency and funding. This document deals with the term efficiency (the adequacy of effect compared with cost) but it is clear just from the initial mention of an international quality assessment of higher education in relation to expenditure. The real content of area efficiency is focused on university funding without evident links to effect, and thus focused on the economy only. The efficiency can be increased by the higher economy, but it means less cost and it is not certainly on agenda now. On the other hand the efficiency can be increased by the higher effect – quantity and quality of education. The higher quantity can be counterproductive as above mentioned and therefore a focus on quality. The evaluation of quality in education is a very complex

and demanding issue, obviously besides the possibility of a short communication. The aim of this paper is to draw attention to some ways for influencing the quality without a need for cost, and how the principles of Quality Management can help.

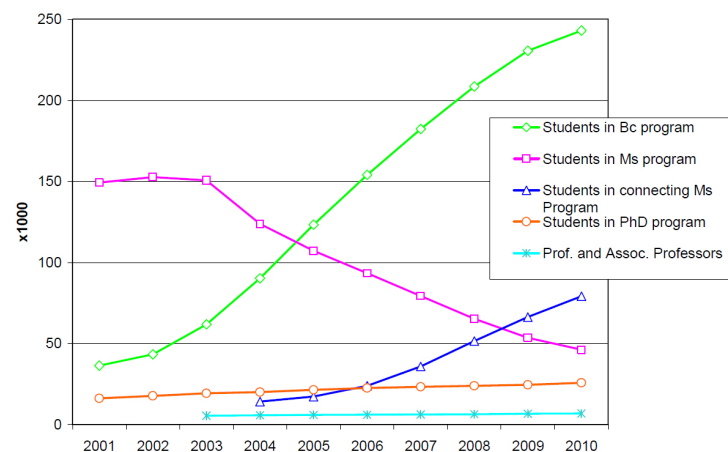


Figure 1: The development of the Czech Higher Education (Ústav, 2010)

The quality of education

According to the principles of quality management system, the first principle out of eight basic principles is the customer focus – “understand and meet current and future customer needs requirements” (ISO, 2005). But education is the product (service), which has no clear customer. As the primary customer could be taken a student, but if he/she does not pay for the education, he/she is just a user of product, which is paid by public money. The role of customer at a public school realizes student primarily

at the stage of selection branch and school, but the quality is guaranteed by the Accreditation Commission of the Ministry of Education generally and by the system of internal evaluation (if applied) individually. The paying student of private school is the customer “de facto”, but by current conditions is in the same situation as a student of public schools and also the quality is guaranteed by Ministry. The evaluation of the quality of education is not easy because the degree of fulfillment of needs in the final result can be evaluated only in confrontation with the practice and the result depends on both, the specific conditions of practice and the prerequisites of the individual student (Is it not the practice, which is the customer indeed?). Such an evaluation “a posteriori” while being crucial, can be applied only generally and in a long run. The evaluation of quality must be used also (mainly?) for its feedback interaction and therefore assessed “a priori”. Continuous assessment of the quality of education is therefore in accordance with the quality management focused on both, a product being offered (study program) and key processes (teaching, research, administration, cooperation with the practice). The question whether the principles are respected in practice will be answered below.

Systemic approach

The fifth principle of quality management system is the systemic approach – “identifying, understanding and managing interrelated processes as a system” (ISO, 2005). Have a look from this point at only one aspect of the undoubtedly multidimensional system of higher education, namely the system of study programs and branches. It will also not be easy, since in 2010 were accredited 7674 branches (Ministerstvo, 2007)! This figure seems high but some branches are accredited many times. But more important, the system is defined as an

effective set of interrelated elements, and so how the current system of study programs and branches is organized?

As an example of a not very systemic approach can be noted the study program Economics and Management (Ministerstvo, 2007), that is accredited at 22 faculties and 18 non-university colleges. When we apply the cluster analysis to this study program, we come to an interesting result: the term “economy” exists in the database of accredited programs in 145 branches, while “management” in 339! What is the cause of this significant difference, further analysis suggests - only 152 branches containing the term “management” belong to the economic programs – KKOV 62, most others particularly to the technical ones. Similarly, out of the 15 branches containing the term “logistics” only three have the economic program and out of 77 “transport” (and mutation) only one. The results highlight the fact that there is a group of analogous branches relating to a proceeding of: labor (management), material flows (logistics), transport networks (transport), and even information (informatics). The affinity of these branches is given by the characteristic attributes, namely by the functions of planning (a procedure to ensure the objectives), organization (activities and resources) and controlling (feedback). In practice, according to the nature of the problem, occur the intersections of these areas and the formation of cross-disciplines such as information management, transport logistics, telematics, etc. Because the objects of procedure in these branches are systems, use their doctrines common theoretical basis - systems theory and its methods. There is therefore no reason that the study program 6209 System Engineering and Informatics belongs just to Economics. Moreover, the “father” of systems theory Ludwig von Bertalanffy (1968) noted that “There appear general system laws which apply to any system of a certain type, irrespective

if the particular properties of the system and of the elements involved". Adding the group of Systems science into study programs would have significant synergistic effect on all areas that are still using this theory ad hoc, or as the branch of a program with a fundamentally different scientific basis. I should like mention another similar experience from study at the Naval Postgraduate School in Monterey (CA) in the early nineties. The school offered a range of Master programs in Management (Project, Quality, Information, Acquisition, etc.), Logistics and Transportation under the collective description Administrative Sciences. Management should not be only a part of Business Economics (which originated in the early 90s apparently influenced by the broader concept of the term Betriebswirtschaftslehre (Wöhe, 2010), it is an autonomous discipline with applications in all areas of human activity, based on scientific foundations different from Business Economics, and related to the above mentioned field.

Process approach

The fourth principle of quality management system is a process approach - "A desired result is achieved more efficiently when activities and related resources are managed as a process" (ISO, 2005). Let's raise up a question, how are defined the processes of education in accredited study programs? The answer is obvious: in different ways. The program or branch is defined by the content of the Application for accreditation (Ministerstvo, 2010), in particular, by Annex C "Guidelines for curriculum design and themes of works" including study plan, subjects of the final examination and admission conditions. The study program is accredited individually and therefore the curriculum content is original and different for each school. How can be then ensured openness based on the transfer of credits between

schools? The subsequent problem is in the definition of learning process in Annex D "Characteristics of the study subject". It can not be simple "characteristics", but the binding definition of the subject and the real guarantee of the quality of whole product. Just a few requests for a transfer from another school documented by listing of the content of subjects and it is just something to think about - to acknowledge the passed exams (or that were contrary to our program, just credits?) or how to overcome eventual differences and the proclaimed openness in education make possible in practice.

The solution is evidently to define the mandatory (more or less) content of the study program but maybe it would be difficult to implement in a situation, where there is a considerable resistance against the state graduation as a quality standard of secondary education. But this is possible. Ministry of Education of the Slovak Republic, like the Czech Ministry administers the system of study programs, that the Higher Education Institutions in the Slovak Republic can provide (Ministerstvo, 2002). The Accreditation Commission adopted (but approved by the Ministry) as well as detailed descriptions of these programs (Akreditačná, 2003), prepared by experts of universities as recommended information material both for schools and for assessing applications. In the subgroup 3.3 Economics and Management there are 25 programs (Management as a separate program!), each is described in terms of defining the competencies of graduates, the "core knowledge" (i.e. names of subjects) after years of study, the conditions of the final examination, and that all for each stage of study separately. Further, the rationale needs of the program, similar study programs abroad and related programs (important for the permeability of different programs). In this context it should be particularly emphasized that, unlike the practice in the

Czech Republic, there are similarly defined the processes of accreditation proceedings (Ministerstvo, 2003) and so space for subjective evaluation significantly reduced.

In connection with the quality the third principle of quality management should not be forgotten - the people involved. Nothing is valid when processes are properly defined and managed but not well performed. In this area are obvious tendencies to influence the quality of teachers from the outside through more precise and rigorous definition of staffing requirements for the study program. Less obvious are the efforts on the implementation of internal evaluation systems, where the "ball" is at the school side. It is important to realize that it is not easy to evaluate the final product of education and as well is not easy to evaluate performance of the individual holder of process. But that's another contribution.

Bologna Process in the Czech Republic

The problems of quality in higher education raise a number of questions that should be answered and solved and their solutions are possible, though not easy. More serious and right strategic problem is the embarked route - the Bologna process.

The Bologna Declaration was adopted as the European Education Program, which was to meet the needs and traditions of Europe, to be attractive for students and to strengthen competitiveness in the national, European and global scope. In the Czech Republic became as the basis the three-stage education system and in a relatively short time has been introduced. A quick process but does not always mean good process. After ten years of implementation of the Bologna objections appear to the first stage (Matějů, 2009), and also to the whole process at all (Liessmann, 2006). A Bachelor's degree program in standard length of three years was applied to universities through the

unsystematic division of "long" program with few links to practice and so practice (labor market) it did not accept. The result is an enormous share of connecting Master studies (Figure 1), which is now necessary to reduce by administrative intervention with regard to the public cost.

Unfortunately, outside of interest remains the problem of the third (doctoral) stage, as the Bologna declaration (EHEA, 2010) supposed only two-stage studies (two main cycles) like the universities in the U.S. or Great Britain. Bachelor in practice finds there that he/she needs more education and can enter Master studies or directly the science-oriented Doctoral studies, which appears to be very effective approach. The practice is usually a prerequisite for the admission to postgraduate study (Harvard, 2010); connecting Master or Doctoral studies are more the exception. It is clear that such a conceptual framework of higher education is not mass-accessible; the study during the career puts high demands on the learning as well as on personal mobility, and therefore a high proportion of distance learning. But the Berlin Conference of European Ministers 2003 (EHEA, 2010a) introduced the third cycle in the European Higher Education Area and there is no alternative in fact.

Obviously it has not been fully respected that in the U.S. and in Great Britain are Bachelor studies practically oriented, usually four years and generally accepted by labor market. Contributes the fact that in social intercourse the titles are not used, and so there is no hunt for Master's degree. When applied these models it was also underestimated, that in Great Britain and U.S. there are traditionally very good private universities and a lot of average public ones. The efficiency of education in the private sphere is based on the market principle and its substitution by public administration will always be lagging behind, namely just in efficiency. In continental Europe dominates the view that

education is a public good and there is also no tradition of major benefactors that could support private universities.

Conclusion

Czech higher education is not in a good condition, which has a number of reasons (Matějů, 2009). The proposed solutions primarily argue as the main reason the lower level of public funding compared with developed countries, and the need to increase resources - "without turnabout of adverse trend in financing, the colleges will not be able to meet demands placed on them" (Matějů, 2009). But the requirements of the Long-Term Intent can not significantly support improvements in the efficiency of education in the near future, because they are focused on administrative interventions from the Ministry and calls for "improving" the current state of the schools. Desirable changes in the efficiency of higher education can be expected from the future National Qualifications Framework of Tertiary Education, especially by defining the profile of study programs and converting them into verifiable competencies. The question remains, whether this redefinition of study programs will respond to the need for systemic changes, of which only a few mentioned in this contribution (namely study program Economics and Management).

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