
Organizacija

Organizacija je interdisciplinarna znanstvena revija, ki objavlja prispevke s področja organizacije, informatike in kadrovskega managementa. Primeri tematskih sklopov, ki jih pokriva revija, so:

- *teoretične osnove organizacijskega razvoja ter spreminjanja organizacijskih struktur in procesov*
- *novi organizacijski pristopi ter njihova uporaba*
- *organizacijski ukrepi za doseganje večje produktivnosti, ekonomičnosti in rentabilnosti poslovanja in proizvodnje*
- *management kakovosti*
- *kadrovanje in izobraževanje kadrov pri prestrukturiranju podjetij*
- *stimulativnost nagrajevanja v spremenjenih lastninskih razmerah*
- *prestrukturiranje organizacijskih in informacijskih sistemov*
- *načrtovanje, razvoj in uporaba informacijske tehnologije in informacijskih sistemov*
- *medorganizacijski sistemi, elektronsko poslovanje*
- *odločanje, podpora odločanju, direktorski informacijski sistemi*

Vsebina ni omejena na navedene tematske sklope. Še posebej želimo objavljati prispevke, ki obravnavajo nove in aktualne teme in dosežke razvoja na predmetnem področju revije, ter njihovo uvajanje in uporabo v organizacijski praksi.

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Editorial / Uvodnik 1/2010

A Word from the Editors

How to extract information from data, how to transform information into knowledge and how to make the transition from knowledge to cognition and wisdom? Humans have been looking for answers to these questions ever since the prehistoric times. As witnesses to this search stand among others creations of the cavemen on the walls of Altamira, Lascaux and other caves, the wealth of literary heritage as well as Internet with its potential infinity.

In these endeavors humans have created various technologies and methodologies which alone have not led and

could not have led to satisfactory answers. The answer can be provided only together with the human who is familiar with the content. Only when the content, technology and methodology are in sync, new value can be created, that is the human value.

Let us quickly remind ourselves what is it that the computer contributes on the path from data to knowledge? For quite some time now the computer has no longer been considered only a machine for merely performing calculations but a machine for handling symbols. The knowledge inside the computer is presented in the form of symbols. In comparison to a book, inside which according to Einstein the knowledge is 'dead', the knowledge inside a computer can also be 'alive'. This means that the computer operates and solves problems. However, there is one key difference between a human and a computer. A human takes a creative approach to problem solving and finds a way in new unpredictable situations. The computer, fortunately or unfortunately, practically cannot do this despite the endeavors in the field of artificial intelligence. Still, computers are regarded as a basic technological invention. Due to computer science and informatics we

create new knowledge what leads to new inventions that would otherwise not be within our reach.

New knowledge as well as inventions are possible and necessary also in education. Technology enables us to make existing knowledge available to everyone at all times. It is this fact that is profoundly changing schools of all kinds. The search for appropriate changes is a never-ending story. Every stakeholder in the process of education from students to teachers and parents has to fulfill their duty for finding new solutions to problems. This brings about new more humane relationships among people within and outside the educational process. It is not a search for 'recipes' on how to do something but a matter of knowing what is the purpose of doing this in the first place. A professional is the one who puts to use theory from her/his field of interest and delivers new solutions through a creative process. To these new professional solutions is dedicated also the present issue of Organizacija titled »Education in information society«.

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Open Educational Resources in E-Learning

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Open educational resources in e-learning are the future source of information for lifelong learners. Open source and open standards are defined as the basis of the "Open educational resource movement" that is beginning to form on a global level in the last decade. The characteristics of the OS are investigated in the relation to e-Learning, existing and new pedagogical principles and copyright issues. Several good practices, ideas and existing initiatives are presented and the vision of the future of open educational resources is introduced.

Keywords: e-Learning, Open Source, Open educational resources

1 Introduction, Open Source Model

At present a world-wide movement is developing which promotes unencumbered open access to digital resources such as content and software-based tools to be used as a means of promoting education and lifelong learning. This movement forms part of a broader wave of initiatives that actively promote the "Commons" such as natural resources, public spaces, cultural heritage and access to knowledge that are understood to be part of, and to be preserved for, the common good of society. (Barnes et al., 2006)

To relevantly describe the meaning of the Open educational resources movement for lifelong learning we have to introduce the Open source and Open standards.

The Open Source (OS) model as defined by Open Source Initiative (OSI - <http://www.opensource.org/>) has a lot to offer. It's a way to build open standards as actual software, rather than paper documents. It's a way that many companies and individuals can collaborate on a product that none of them could achieve alone. It is proved (the references are listed at the mentioned OSI web page) that OS generally means higher security and higher reliability. The real-world evidence shows that OS also brings robustness, clear flexibility and higher quality if compared to closed software in general. In the "Bazaar-mode" development as described in the highly cited and excellent source on OS philosophy "The Cathedral and the Bazaar" (<http://www.catb.org/~esr/writings/cathedral-bazaar/>) one can expect higher development speed and lower overhead.

What is the relation between open source software and open standards? Open source software is based on open distribution of the source code that forms the software's founda-

tions. This means that any technically competent programmer can examine the inner works of the source code, and potentially make changes to the operation to the software. Open source software is typically provided free of charge or with a nominal distribution cost. Open standards are transparent descriptions of data and behavior that form the basis of interoperability. Interoperability is the ability of different software systems to exchange information in such a way that they can both act in equivalent ways on the information, leading to equivalent user outcomes. In practice, interoperability means that users are not locked to any software system – they can substitute a standards-compliant system for another standards-compliant system. Open standards can be implemented by commercial systems and open source systems alike.

In the 1990s open source software has had success in horizontal applications, or applications that are useful in many different industries. These applications include operating systems, web servers, enterprise resource planning and customer relationship management. But open source has had less impact vertically, in applications specific to one single industry, such as e-learning. In addition, open source software tended to focus on rapid innovation rather than the slower consensus-building approach which is typical of open standards.

Open source software has become mainstream today. Applications such as the Firefox Web browser, Apache Web server, Linux operating system, MySQL database platform, and PHP programming language continue to gain popularity. Most importantly, these applications often equal or even surpass the quality of well-known commercial, proprietary software.

2 Open Source and Open Standards in E-learning

E-learning technology went through intense early development without standards or open source software; e-learning standards were initially developed without widespread vendor adoption or open source software examples.

While open source software has both historical and philosophical roots within universities, e-learning was not one of the major focus areas of the early open source software movement. The early development of e-learning technology was based on the rise of the web and the widespread adoption of e-learning software and courses, especially Learning Management Systems such as WebCT and Blackboard in the education sector, and Saba, Click2Learn, and others in corporate training. On the other hand there are early attempts to create open standards for e-learning software and content, driven by specification organizations such as IMS Global Learning Consortium, AICC and ADL, and relevant committees of international standards bodies such as the IEEE LTSC. Despite the potential relevance of these open standards for the proprietary e-learning systems, the consistent adoption of e-learning standards by LMS vendors was slow, particularly in the education sector.

When advocating OS in e-learning applications most of the readers will search for the benefits of the "customers" instead those of developers. What is the main advantage that the OS applications bring to the educational and training institutions? Generally the benefits of open source in e-learning are (Dooley, 2005): low initial cost, flexibility and customizability, extensive active user communities, multi-platform capabilities, adherence to standards and tendency to use and link to other open source software.

The past decade have seen wider adoption of standards by e-learning vendors, especially in corporate training through the adoption of the Shareable Content Object Reference Model (SCORM) from ADL, which builds on work from IMS and AICC. At the same time, there are a number of solid open source software development initiatives, especially in the LMS market like Moodle, OpenUSS, Ilias, Claroline, Dokeos and many others including the Sakai project in the US which is a good example where a consortium of universities is working together to develop a learning environment.

Open source software is already being used by educational institutions not only for basic IT infrastructures but also for educational applications such as Learning Management Systems (LMS), Learning Content Management Systems (LCMS), course authoring tools, tools to create media elements such as animations, audio, and video clips, browsers and players to present content and courseware libraries.

Recent empirical evidence comes from the OSS Watch Survey 2006, conducted by the University of Oxford's Research Technologies Services, with 103 ICT managers responding from UK Higher Education and Further Education institutions. The survey found that more than three quarters (77%) consider open source options when engaging in IT procurement exercises. The most important reasons for choosing OSS are an expected lower total cost of ownership (74%), lower likelihood of getting "locked in" by a software provider

(63%), better interoperability with other products (59%), and the possibility to migrate data better across systems (52%). The use of OSS is most common for database servers (62% of institutions), Web servers (59%) and operating systems (56%); most institutions that use OSS on their servers rely on in-house support for the OSS. Of particular interest are the results regarding the use of Virtual Learning Environments, of which the two proprietary systems Blackboard and WebCT and the open source VLE Moodle were considered in the survey. In the Higher Education institutions there is a greater presence of the proprietary systems (WebCT 20%, Blackboard 17%) than the OSS Moodle (9%). However, 56% of the Further Education institutions make use of Moodle, while Blackboard is used by 21% and WebCT by 3%.

3 Open Educational Resources

The term Open Educational Resources (OER) has been introduced and promoted in the context of UNESCO's aim to provide free access to educational resources on a global scale. The term was first adopted by UNESCO in 2002 in the final report of the Forum on the Impact of Open Courseware for Higher Education in Developing Countries, to refer to "the open provision of educational resources, enabled by information and communication technologies, for consultation, use and adaptation by a community of users for non-commercial purposes". (UNESCO 2002).

With regard to this definition, it is important to note that "resources" are not limited to content, but comprise "three major areas of activity: the creation of open source software and development tools, the creation and provision of open course content, and the development of standards and licensing tools. The outputs of all three may be grouped together under the term Open Educational Resources (OER)." There are also much broader interpretations of Open Educational Resources (OER). For example, the OECD's Centre for Educational Research and Innovation (CERI) states on the webpage of their OER survey that this would comprise "Open courseware and content; Open software tools; Open material for e-learning capacity building of faculty staff; Repositories of learning objects; Free educational courses".

The most descriptive and practical definition comes from the cited report (Gesser, 2007) which tries to define it with the statement that it is based on the following core attributes:

- that access to open content (including metadata) is provided free of charge for educational institutions, content services, and the end-users such as teachers, students and lifelong learners;
- that the content is liberally licensed for re-use in educational activities, favorably free from restrictions to modify, combine and repurpose the content; consequently, that the content should ideally be designed for easy re-use in that open content standards and formats are being employed;
- that for educational systems/tools software is used for which the source code is available (i.e. Open Source software) and that there are open Application Programming Interfaces (open APIs) and authorizations to re-use Web-based services as well as resources (e.g. for educational content RSS feeds).

The definition is concluded by the very brave statement: »It is expected that adherence to the principles outlined above can bring about tremendous benefits for education and lifelong learning in a knowledge society, not least of which is to eliminate many inefficiencies and bottlenecks in the current provision of e-learning opportunities.« For the detailed set of discovered benefits of OER as seen from the viewpoints of educational networks, teachers and students please consult the report itself.

It is pretty obviously that pedagogical model is not a key point in the OER as such. The discussion of OER has often been dominated by technical and management considerations rather than the perspectives of educational practitioners. To achieve the ambitious goals of the presented lifelong learning philosophy the didactics and pedagogy must be deeply involved into the practical solutions. This subject requires a wide and integral approach that exceeds the scope of this paper. Obviously serious research will have to be invested in the direction of pedagogical models in lifelong learning.

3.1 Open Educational Resources idea and initiatives

With reference to the OER movement, the William and Flora Hewlett Foundation justifies their investment in OER as follows: "At the heart of the movement toward Open Educational Resources is the simple and powerful idea that the world's knowledge is a public good and that technology in general and the Worldwide Web in particular provide an extraordinary opportunity for everyone to share, use, and re-use knowledge. OER are the parts of that knowledge that comprise the fundamental components of education – content and tools for teaching, learning and research."

There is an established understanding that easy access to educational resources is required to promote lifelong learning by active learners of all ages. Also the role of such access in reducing social inequalities, fostering social inclusion of migrants, and supporting education in developing countries is often acknowledged. (Halimi 2005). No doubt that open access to resources is an important element in educational innovation; on the other hand it is also clear that it doesn't solve all the problems. The decisive factor is that open educational practices are fostered by the appropriate institutional culture and mindset and supportive environment, including easily accessible and shareable tools, services and content.

There are a variety of "Open questions" on this subject among which the most important is: Who (and why) will create and provide educational content? The answer to this question is not easy. Probably the public and politics must answer it (and not the publishers).

Today, one can find several repositories of learning and teaching resources that are accessible freely by anybody. They are of several kinds but mostly project based with a lot of volunteering work invested. The amount of the learning material is usually very low and the diversity is limited.

Other type of repositories is in a way "public", but not free for all. The most important are those initiated by national Ministries of Education or other political initiatives. The

special place has the European SchoolNet (EUN), which is a collaboration of ministry departments and national educational networks throughout Europe. The initial idea of the EUN, which was started in 1996, was a "bottom-up" process with the EUN as a central access point to educational resources from the national and regional networks. This included the idea that in the emerging digital environment educators would themselves increasingly create and provide content to a common pool of teaching and learning materials. Over the following years the EUN, and the national educational networks, learned that there are considerable barriers to an effective participation of educators in pooling educational resources. Consequently, the approach shifted towards a more "top-down" approach, which over the years has been massively supported through project-based EU funding. Today, the core longer-term initiative of the EUN is the European Learning Resource Exchange (LRE), which will be accessible to all interested Ministries of Education participating in the EUN and other public and private sector owners of educational content repositories. Important ongoing work is the creation of the LRE Application Profile, which provides a set of metadata elements and vocabularies that are to be used by all participating learning object repositories.

The MIT. Open Courseware initiative, which started in "early" 2001 was one of the first and the most well-known all over the world as a single institution effort for open content (in March 2006 about two thirds of MIT professors had their courses online). In the Higher Education, the "MIT broadened" Open Courseware Consortium with over a 100 participating universities from all over the world seems to have a critical mass for a serious breakthrough. There are also several other excellent repositories initiatives, like the US-based Connections platform which has about 200,000 unique visitors per month who come from over 150 countries.

The special place among the "big plans" deserves the Google Print Library Project which has the ambitious aim of digitally scanning millions of books from the collections of major American libraries and making them searchable online via Google's search engine.

On a global level an encouraging example is the recent establishment of the Global Learning Objects Brokered Exchange (GLOBE) initiative, which is a collaboration of ARIADNE (Europe), Education.au (Australia), eduSource Canada, MERLOT (USA) and NIME (Japan).

To come to the big repositories of high quality content which will be free for all, still a lot of answers have to be answered and finding them will be one of the major research trends in lifelong learning and e-learning in the following years. Clearly open content itself (though high quality one and even localized for the end user) is not enough for effective lifelong learning. Before addressing useful open content, tools and licenses, one must consider the pedagogical approaches in which these resources could make a difference, i.e. by being used in innovative forms of teaching and learning.

3.2 The nature of open content

Open digital content has some fundamental differences when compared to the published commercial content. The roles of

all the stakeholders in learning processes are different when open content is used as a learning material. Though there are several licensing, accessibility and copyright solutions for open content, we can draw some general principles of its lifecycle (creating, using, modifying, sharing, licensing, controlling quality and managing): Open content obviously has many authors, including professional authors, teachers and also learners and is therefore in the constant improvement process. Open content quality control is in the hands of learners and teachers (and is conducted simultaneously with the learning process) instead of instructional experts. The learning units are constantly evolving with various granularity of inter-linked material, variety of micro content from different content feeds is present and updates are frequent. Wikis, Weblogs, RSS feeders and aggregators, are the authoring tools together with content acquisition and creativity tools which results in different formats and usually poor metadata structures. The creation of rich metadata will remain costly and OER initiatives will need to strike the right balance between the achievable richness of metadata and the costs they incur (e.g. due to the need to employ skilled personnel).

Open content licensing is a separate story, where the leading role is that of "Creative Commons" (CC). As a response to "open content unfriendly" commercial "all rights reserved" license, the non-profit organization Creative Commons provides an easy to use mechanism for choosing and attaching to a creative work one of six standardized CC licenses from the most liberal "Attribution" to more restrictive (but still open) "Attribution-NonCommercial-NoDerivatives". Creative Commons licenses have already been "ported" into several legal jurisdictions around the world and are in the process of integration into many others (<http://creativecommons.org/worldwide>).

3.3 The vision for the future of Open Educational Resources

In the excellent recent publication »Open Educational Practices and Resources« (Gesser, 2007) the vision for the situation in »Open educational resources in e-learning in 2012" is presented approximately like this:

Educational institutions from primary schools to universities and lifelong learning providers will foster and support open learning practices that help equip teachers, students and workers with the competences, knowledge and skills to participate successfully in the knowledge society. Educational institutions and teachers will understand their key role in a knowledge society much better, and will be encouraged to employ and experiment with innovative educational practices making use of a rich pool of open resources. The current dominant paradigm of teacher- and subject-centred learning in formal education will have given way to a learner-centred, competency-based paradigm. In particular, learning communities and collaborative approaches will flourish, making use of a new generation of easy-to-use Web-based tools and information services (e.g. Wikis for collaborative work on study projects, Weblogs for sharing ideas and comments, RSS feeders and aggregators for receiving current "real world" information,

etc.). As a rule, all educational material as well as research publications, the creation of which has been publicly (co-) funded, will have to be published under an appropriate open content license. With respect to Open Educational Resources, teachers will not be simple "end-users", as they understand the importance of continuous questioning, evaluation and improvement of educational practices and resources.

4 Conclusion

Author believes that one of the most important e-learning development directions, in order to come to the lifelong learning reality, are open access to learning, open source software, open standards, and open educational resources. To come to the big repositories of high quality content which will be free for all, still a lot of answers have to be answered and finding them will be one of the major research trends in lifelong learning and e-learning in the following years. Clearly open content itself (though high quality one and even localized for the end user) is not enough for effective lifelong learning. Before addressing useful open content, tools and licenses, one must consider the pedagogical approaches in which these resources could make a difference, i.e. by being used in innovative forms of teaching and learning.

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Prosto dostopni izobraževalni viri v e-izobraževanju

Prosto dostopni učni viri v e-izobraževanju so vir informacij prihodnosti za udeležence vseživljenjskega izobraževanja. Oprta koda in odprti standardi predstavljajo temelj »Gibanja prosto dostopnih učnih virov«, ki se v zadnjem desetletju oblikuje na globalni ravni. V članku so raziskane karakteristike odprte kode v relaciji z e-izobraževanjem, obstoječimi in novimi pedagoškimi principi ter problemi avtorske zaščite. Predstavljene so dobre prakse, ideje in obstoječe iniciative ter vizija prihodnosti prosto dostopnih učnih virov.

Ključne besede: e-izobraževanje, odprta koda, prosto dostopni učni viri

Elements Influencing Study Success

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Study success can be influenced by following factors: (i) social elements (social class position, parents' education, parents' profession, parents' income); (ii) student-related factors (motivation, aptitude, effort, IQ, time spend on study, opportunity to learn, pre-university education); (iii) quality of instruction (organisation, course material, communication, assignments, exams, grading, course outcomes); (iv) curriculum (number of courses, sequence of courses, test schedule, system-block or parallel); (v) government (grant, student accommodation). In the paper the influence of these factors on study success is presented. Social and academic integration are central aspects. In the research we found out that "social elements" greatly influence the decision to enrol, but have less influence on marks received and the duration of study. Grants also greatly influence study success. We were surprised when we found out that factors from the "quality of instruction" group can only explain 12.3% of the variance of exam results.

Keywords: study success, students, social elements, academic elements

1 Introduction

On average, one-third of students in OECD¹ countries drop out before they complete their first degree, regardless of whether they are following university-level or advanced programmes. The dropout rate is much higher for advanced research programmes, with a survival rate of less than 60%. University-level survival rates differ widely among OECD countries, ranging from below 60% in Austria, France, Italy and Sweden to above 80% in Ireland, Japan, Turkey and the United Kingdom. Advanced vocational survival rates range from above 80% in Denmark, the Flemish Community of Belgium, Japan, Mexico, Poland and Sweden, to around 50% in Ireland and Italy (Higher Education: Quality, Equity and Efficiency 2006). In Slovenia the survival rate is about 66%.

Comparison of the study time needed to complete a first degree in the university sector shows that the United Kingdom clearly has the shortest study time, at 3.4 years, closely followed by Ireland with 3.6 years. At the other end of the scale, we find graduates in Germany and Austria take on average of up to twice as long (6.8 and 6.7 years). In Finland and in Portugal, students take about 6 years to graduate from university. The Netherlands and Spain are mid-range with average times of 5.2 and 5.5 years. In most of these countries, a degree in "engineering" takes longer than a degree in "humanities and arts". Particularly in Portugal, the Netherlands and Austria, these differences are substantial and amount to between one and two years (Eurostudent Report 2005). However, in Germany students studying "humanities and arts" take about 6

months longer to complete their studies than those studying engineering subjects (van den Berg and Hofman 2005).

In Slovenia the average graduation time is 6.9 years. The typical graduation age for students completing higher professional studies is between 24 and 25 years, for university studies 25 years, and for postgraduate studies between 30 and 34 years. On average, women graduate a year earlier than men. In 2004, 1,829 students graduated from vocational colleges, half of whom were women. The total number increased by 46.3% from 2003. Social sciences had the most graduates, followed by engineering and services. 11,608 students completed their undergraduate higher education studies, 3.3% more than in 2003. The proportion of women was 63.2%. 49.1% of students graduated from higher professional programmes and 50.9% from university programmes. In 2004, 1,096 students completed their master's degrees or specialisation studies, 1.3% more than in 2003. The proportion of women was 54.4%. The highest academic title, i.e. doctor of science, was awarded to 355 persons, 3.3% down on the previous year. Of these, 40.6% were women (Rapid Reports 2005).

In this study we aim to determine the extent to which: (i) social elements, (ii) quality of instruction, (iii) the curriculum, (iv) government and, (v) students themselves contribute to study success.

2 Elements influencing study success

The following five key elements influencing study success in higher education were considered: (i) social elements (social

¹ Organisation for Economic Cooperation and Development

class position, parents' education, parents' profession, parents' income); (ii) student-related factors (motivation, aptitude, effort, IQ, time spend on study, opportunity to learn, pre-university education); (iii) quality of instruction (organisation, course material, communication, assignments, exams, grading, course outcomes); (iv) curriculum (number of courses, sequence of courses, test schedule, system-block or parallel); (v) government (grant, student accommodation).

Social elements

The different ways in which children are brought up influence their desire and capacity to learn, and their adaptability to the requirements of school. Middle-class parents have been found to expect more of their children, who internalise those expectations – expecting more of themselves, they care more about achievement at school. Moreover, in middle-class families, children will generally have been better prepared to make good use of school, because their relations with their parents will have prepared them for relations with their teachers, and the activities their parents encourage will have resembled those of the school (Phelps Brown 1979). Analysing extensive US data, Duncan (1967) found that large families exerted a consistently depressing effect on educational attainment relative to the attainments of children from small families. It is understandable that where there are fewer children in the family, the parents have more resources with which to support the education of each child and more time in which to attend to the progress of each. But they will not do this simply because their children are few: they must also have the will to do it. Blau and Duncan (1967) found that with parents of a given socio-economic status, boys from small families where the eldest brother did not go beyond elementary school enjoyed no educational advantage over boys from large families.

Bowles and Gintis (2001) found that parental economic status is passed on to children in part by means of unequal educational opportunity, but that the economic advantages of the offspring of higher social status families go considerably beyond the superior education they receive. The authors believe that the social class into which an individual was born leads to the principal differences in educational levels.

Van den Berg and Hofman (2005) claim that the education and professions of students' parents, as well as parental income, are strongly associated with students' study progress.

Bevc (2003) measured the success of students at Slovenian faculties, and found that the ratio of graduate students is proportional to the level of education of their parents. But she also found that, in Slovenia, a relatively large number of graduate students also come from poor families. This is, for instance, not the case in the United Kingdom. In the UK, university dropout rates for working-class students have been identified as one of the most pressing issues in the higher education sector (Quinn 2004).

The aim of our study was to determine the extent to which the social class into which students are born, and their parents' education, profession and income affect students' study progress. The Goldthorpe class schema was used to define social class position (see Goldthorpe, 1980).

Student-related factors

Developmental factors and students' perceptions about their own abilities also affect their level of engagement in learning. The older that students get, the less likely they are to take risks and engage themselves fully in activities at which they are not sure they will succeed. Students' attitudes about their abilities and their interpretation of success and failure further affect their willingness to engage themselves in learning (Anderman and Midgley, 1998).

According to Jansen (2004), dedication, planning behaviour and the way time is spent also affect academic success. It goes without saying that the amount of time students spend studying is an important factor. Carroll's model of school learning (1963) established the importance of effective study time. Carroll stated that effective use of study time is enhanced by an optimal learning environment, with two preconditions: 'quality of instruction' and 'opportunity to learn'.

Furthermore, there is evidence that student characteristics like sex, age, and grade point average in pre-university education are linked to study success or study progress (Jansen 2004). Van der Hulst and Jansen (2002) and Lindblom-Ylänne et al. (1999) reported that ability or grade point average (gpa) in pre-university education affected achievement in higher education. As far as access to higher education is concerned, women have in the meantime overtaken men (Eurostudent Report 2005). In Slovenia, 60.4% of graduates in 2004 were women (Rapid Reports 2005). Shah and Burke (1999) also reported better university results for female students. According to Macan et al. (1990), women are better time managers than men and have greater work discipline. Intrinsically motivated students actively engage themselves in learning out of curiosity, interest, or enjoyment, or in order to achieve their own intellectual and personal goals. According to Dev (1997) "A student who is intrinsically motivated . . . will not need any type of reward or incentive to initiate or complete a task. This type of student is more likely to complete the chosen task and be excited by the challenging nature of an activity". Perhaps this helps explain why female students are performing better than male students. Finally, age can be seen as a proxy for ability. Older students have likely had more delays in pre-university education, and we can expect their suitability in terms of ability to be lower (Jansen 2004).

Quality of instruction

Slavin (1995) assumed that quality of instruction refers to the extent to which information or skills are presented to students clearly. Studies on the quality aspect of instruction have shown that knowledge and skills must be presented in an organised and structured manner (Feldman 1989; Slavin 1995). In courses, teachers can achieve structure and organisation by, e.g. presenting information in an organised and orderly way, noting transitions to new topics, using clear and simple language, using many vivid images and examples and rating essential principles (Slavin 1995). In addition to presenting content in an organised and structured manner, research has shown that it is important that students know how to complete and what to expect from a particular course (Feldman 1989; Creemers 1994; Finaly-Neuman 1994).

This feedback loop is one of the most important stimulating mechanisms; what is being assessed determines what students study, how many hours they spend studying, how many classes they attend, and the approaches they take to studying (Biggs 1996). Another important aspect pertaining to the quality of instruction is the pace of instruction. Whenever the teacher sets a pace appropriate to the needs of students with the required background knowledge, students lacking this required background will fall behind. On the other hand, setting the pace to suit the needs of students without the required background knowledge will result in a motivational loss (Slavin 1995). Another aspect pertaining to the quality of instruction is the stimulating effect of instruction. The student's motivation to study may come from the intrinsic value of the subject that is being studied, but it can also be enhanced by extrinsic incentives, such as positive feedback, stimulation of interest in the course and subject-matter, encouraging students to ask questions, discussion and openness to opinions, intellectual challenge, encouragement of independent thought and teacher's enthusiasm (Feldman 1989). Tuckman (1991) found that factors such as the scale of the task, informational feedback, encouragement, goal setting, group outcomes and preset versus normative standards had a considerable influence on effort and persistence.

Curriculum

There are many different conceptions of curriculum. The curriculum may include any educational experience. It may also be conceived of in a relationship, and it is this phenomenon that is the new paradigm view of the curriculum. The curriculum may relate to the range of courses that students can select from, but may also relate to a specific programme. In the latter context, the curriculum describes the collective teaching, learning and assessment materials available for a particular course. A crucial part of the curriculum is the definition of the course objectives, often expressed in terms of learning outcomes and normally including the assessment strategy for the programme. These learning outcomes (and assessments) are often grouped into units (or modules) and the curriculum, therefore, comprises a collection of such units, each concentrating on a specific part of the curriculum. So a typical curriculum would include units on communications, information technology, inter-personal skills together with more specialised provision (Curriculum, 2007). Cornbleth (1990) stated: "Curriculum construction is an ongoing social activity that is shaped by various contextual influences within and beyond the classroom and accomplished interactively, primarily by teachers and students. The curriculum is not a tangible product but the actual, day-to-day interactions of students, teachers, knowledge and milieu."

Jansen (2004) demonstrated in his research that scheduling fewer parallel courses helps improve study progress. Students adjust their study behaviour to the way the curriculum is organised. Students' study attitudes change when an exam or test is approaching. Having fewer courses and tests to contend with at the one time will lead to the optimal use of study time. Block teaching, i.e., where courses are taught one at a time and are immediately completed with a test, results in improved study progress (Vaughan and Carlson 1992; Nonis et al. 1998;

Jansen 2004). Starting from time management behaviour, they stated that exams, assignments and projects should be scheduled at short, regular intervals, and that major assignments and projects should be divided into smaller parts with separate deadlines. Furthermore, Jansen (2004) claims that it is far better not to spread re-tests over the whole year. Opinions gathered in his research differ as to when re-tests should be taken. They should almost certainly be taken as close as possible to the initial exam, in order to make full use of the knowledge already acquired. Once classes have resumed, it is unwise to also have re-tests, as almost invariably both will suffer.

Government

The last element of our study progress model in higher education is government. In Slovenia, regular education is free. There are no tuition fees yet, but the government is considering introducing them into the school system. Students claim that about 30.0% of today's students will be unable to study if tuition fees are introduced. In 2003 Slovenia set aside 130 million euros for scholarships, with 37.3% for secondary schools and the rest for university faculties. Slovenia provides 29 student residences containing 10,010 beds. Residences give priority to individuals with lower income (Annual Statistics of the Republic of Slovenia 2005).

3 Methodology

In our research we wanted to find out: (i) which elements influence study success and (ii) to which extent.

We tested the validity of the model through a questionnaire. The paper-and-pencil survey was carried out. We interviewed 1068 students at three universities in Slovenia: the University of Ljubljana, the University of Maribor, and the University of Primorska. We interviewed only students who had passed at least one year of study at university. Sampling was random.

The questionnaire comprised 45 questions relating to (1) data on the respondent (age, sex, year of study, study method etc.) and (2) elements described in the previous chapter. The questionnaire was of the closed type.

The characteristics of the sample compared to the whole student population are as follows (Table 1, Table 2):

The average age of those surveyed was 23 years 1 month. The youngest was 19 and the oldest 50.

In Slovenia there is still no report on research into membership of social classes, and so we were unable to compare the structure of the sample with the actual structure of the whole population with regard to membership of social classes. We did however compare the education of the fathers of those surveyed with the educational structure of the total population of employees in Slovenia. The results of the comparison are shown in the table 2.

Educational degrees: (I) did not finish primary school, (II) finished primary school (8 years), (III) secondary school (2 years), (IV) secondary school (3 years), (V) secondary school (4 years), (VI) two year study, (VII) higher education and (VII+) master's degree, doctorate degree.

Table 1. Comparison of the structure of the sample with the total student population

TOTAL STUDENT POPULATION IN SLOVENIA, 2005/6*		SAMPLE	
Total number of students	92.204	Number students surveyed	1068
Of which male	52,678 (40.1%)	Of which male	452 (42.3%)
Of which female	55,318 (59.9%)	Of which female	616 (57.7%)
Number part-time students	21,289 (23.0%)	Surveyed part-time students	254 (23.8%).
Number full-time students	70,915 (76.9%)	Surveyed full-time students	814 (76.2%),

* Statistical Yearbook of the Republic of Slovenia 2006

Table 2. Comparison of structure of the sample with regard to father's education and the educational structure of the total population of employees

		SAMPLE Education of father of surveyed students		Total population of employees in Slovenia *
		Frequency	Percent	Percent
	I	23	2.2	0.3
	II	63	5.9	12.4
	III	71	6.6	5.9
	IV	306	28.7	28.0
	V	353	33.1	28.3
	VI	86	8.1	7.2
	VII	122	11.4	16.9
	VII+	19	1.8	1.0
	Total	1043	97.7	100
Not known		25	2.3	0
Total		1068	100.0	100

* Statistical Yearbook of the Republic of Slovenia 2006

Educational degrees: (I) did not finish primary school, (II) finished primary school (8 years), (III) secondary school (2 years), (IV) secondary school (3 years), (V) secondary school (4 years), (VI) two year study, (VII) higher education and (VII+) master's degree, doctorate degree.

For questions 23 to 45 (where we offered respondents a scale of answers from 1 to 7) we calculated Cronbach's alpha coefficient. The value calculated is 0.944, which indicates great reliability of measurement. With regard to the composition and characteristics of the sample, we believe that it is representative.

4 Results

"Study success" was measured by asking students the following:

A – How many months did you take to complete your last study year? The survey asked students how long (months) they needed to successfully complete their previous study year.

B – Average grade for last completed year. We asked students what was their average grade for exams in their last completed year. A scale from 1 to 10 is used in Slovenia, where a

grade of 1 to 5 means that the student failed the exam, 6 means "satisfactory", 7 means "good", 8 and 9 mean "very good" and 10 means "excellent". We only surveyed students who had successfully completed at least one study year.

C – Grade (1 to 10) received at the last exam you sat. We asked students the grade they received at the last exam they sat.

D – Number of re-tests of the last exam. We asked students how many times they had taken the exam they last sat.

Variables A, B, C and D are dependent variables (Table 3).

Social elements

Our research measured the following "social elements" (Table 4):

E – Father's education and **F** – mother's education. The definitions used in Slovenia for level of education are ((I) did not finish primary school, (II) finished primary school (8 years), (III) secondary school (2 years), (IV) secondary school

Table 3. Frequency table for variables A, B, C, D

		A	B	C	D
N = 1068	Valid	1029	1053	1061	1052
	Missing	39	15	7	16
Mean		11.94	7.5745	7.26	1.74
Median		10.00	7.5000	7.00	1.00
Std. Deviation		5.391	.70121	1.494	1.121

A – How many months did you take to complete your last study year?

B – Average grade in last completed year.

C – Grade (1 to 10) received at the last exam you sat.

D – Number of re-tests of the last exam.

Table 4. Frequency table for variables E, F, G, H

		E	F	G	H
N = 1068	Valid	1043	1059	1009	1067
	Missing	25	9	59	1
Mean		4.67	4.72	4.64	3.54
Median		5.00	5.0	4.00	4.00
Std. Deviation		1.439	1.527	2.581	0.797

E- father's education

F- mother's education

G- social class

H- current financial-material conditions

Table 5. Pearson correlation coefficients (n=1068).

	A	B	C	D	E	F	G	H
A	1							
B	-.223(**)	1						
C	-.125(**)	.359(**)	1					
D	.164(**)	-.248(**)	-.277(**)	1				
E	.000	.046	-.001	.016	1			
F	-.013	.002	-.054	.029	.578(**)	1		
G	.005	-.021	.015	-.067(*)	-.514(**)	-.568(**)	1	
H	-.062(*)	.115(**)	.040	-.019	.155(**)	.188(**)	-.185(**)	1

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

(3 years), (V) secondary school (4 years), (VI) two year study, (VII) higher education, and (VII+).

G - Social class. In the questionnaire we used the Goldthorpe class schema (Goldthorpe, 1980).

H – We asked students about the financial and material conditions in which they live, and offered responses from 1 (socially at risk) to 5 (excellently provided-for).

Calculation of the Pearson correlation coefficients between the dependent variables and the variables from the “social elements” group is shown in Table 5.

We could conclude from Table 5 that there is no correlation between the dependent variables and the social elements (parental education, social origin and financial and material conditions). During detailed analysis of the results, we came to the following conclusions.

The level of risk of poverty in Slovenia in 2003 was 11.7%. Of the surveyed students, only 1.2% were “socially at risk”. In the whole sample, 15.3% came from families whose financial status was poor, 43.1% from the middle, 37.6 regarded their financial status as satisfactory, and 3.9% as excellent. From this we conclude that the “financial status of the family” greatly influences the decision to go to university. These findings match those of Bowles and Gintis (2001), which we have already cited in this paper.

We also observed very great differences in the structure of students with regard to the difficulty level of study. In Slovenia, faculties offer study at the more demanding, so-called university level and at the less demanding, so-called higher education professional level. Of students at university level, as many as 70.6% came from higher social classes (classes I, II, IIIa and IIIb in the Goldthorpe class scheme). We interpret this to mean that children from higher social classes have higher goals, which matches the findings of other authors, e.g. Hyman (1953), Van den Berg and Hofman (2005), Bevc (2003). However, our findings do not match those of Quinn (2004).

We draw the following conclusions:

1. We did not find any direct correlation between the dependent variables and the observed social elements.
2. “Social elements” in Slovenia indirectly influence the final educational outcome of the individual. Social elements influence whether someone will go to university, and the difficulty level at which they will study. Our findings are thus not inconsistent with those of Hyman (1953) and Phelps-Brown (1979), as well as Bowles and Gintis (2001) and Toličič and Zorman (1977).
3. An important limitation of our research is that, due to the protection of students’ personal data, we could not study those who had enrolled at university but had failed.

Student-related factors

We researched the influence of the following “student related factors” on the dependent variables (Table 6):

1. Gender, age.
2. Method of study (full-/part-time).

3. Time spent on study (we asked students how many hours a week they spend studying).
4. We asked students how often they attended lectures, offering the possible responses: 1-“I attend up to 20% of lectures”, 2-“I attend between 20 and 40% of lectures”, 3-“I attend between 40 and 60% of lectures”; 4-“I attend between 60 and 80% of lectures” and 5-“I attend between 80 and 100% of lectures”.
5. Pre-university education (we asked students how successful they were at secondary school, with the following options: 1-completed after re-tests; 2-satisfactory; 3-good; 4-very good and 5-excellent. We did not ask students what type of school (e.g. *gimnazija*, secondary technical school, ...) they attended.
6. We did not ask students questions relating to motivation for study. We did however ask students how satisfied they were with their educational achievements. We offered them options from 1 (“very unsatisfied”) to 5 (“very satisfied”).

It is clear from Table 7 that there is a weak correlation ($r=0.223$; *Correlation is significant at the 0.01 level (2-tailed)*) between the time taken to complete the year and the average grade for the year. Those who completed the year quicker generally have slightly better grades.

There is a correlation ($r=0.368$) between the average grade for the last completed year and success at secondary school. Van der Hulst and Jansen (2002), Lindblom-Ylänne et al. (1999) reported that ability or grade point average (gpa) in pre-university education affected achievement in higher education. We found that the sample included only 15 (1.4%) students who repeated at least once year in secondary school, and only 38 (3.6%) who had completed secondary school with only satisfactory results. We therefore also conducted correlation analysis on a stratified sample ($n=75$). The calculated Pearson correlation coefficient for the stratified sample is 0.350. This confirms the finding that there is a significant correlation between success at secondary school and success at university.

We did not directly measure the influence of motivation on success. We believe that an individual’s motivation cannot be directly measured using objective criteria. We therefore asked students how satisfied they were with themselves. The-

Table 6. Frequency table for variables I, J, K, L, M

		I	J	K	L	M
N = 1068	Valid	1059	1045	1065	1066	1035
	Missing	9	23	3	2	33
Mean		3.61	3.54	23.12	4.00	23.42
Median		4.00	4.00	22.00	4.00	20.00
Std. Deviation		0.819	0.773	4.870	1.1098	14.837

I – How successful were you at secondary school?

J – How satisfied in general are you with your success?

K – Age

L – How often do you attend lectures?

M – How many hours a week on average do you spend studying (attending lectures, practicals, learning, seminar papers etc.)?

Table 7. Correlations between dependent variables and certain factors from the “student” group (n=1068)

	A	B	C	D	I	J	K	L	M
A	1								
B	-.223(**)	1							
C	-.125(**)	.359(**)	1						
D	.164(**)	-.248(**)	-.277(**)	1					
I	-.161(**)	.368(**)	.088(**)	-.141(**)	1				
J	-.228(**)	.406(**)	.210(**)	-.222(**)	.180(**)	1			
K	.065(*)	.034	.174(**)	-.116(**)	-.079(*)	.057	1		
L	-.053	.134(**)	.148(**)	-.093(**)	.081(**)	.098(**)	.056	1	
M	-.065(*)	.208(**)	.003	-.007	.205(**)	.054	-.264(**)	.259(**)	1

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

re is a considerable positive correlation between self-image and average grade for the year ($r=0.406$). Through regression analysis ($\Delta R^2=0,166$) we confirmed the findings of Anderman and Midgley (1998), who emphasise the importance of motivation.

We found there is no correlation between the age of the student and the average grade for the year. Likewise, there is no correlation between attendance at lectures and average grade. This result surprised us somewhat. We interpret it to mean that many faculties have well organised distance study, and so many students are successful despite not actually attending lectures. In addition, many students also work. They organise their time in their own way, and are evidently fairly successful in doing so.

There is however a correlation between time spent studying and average grade ($r=0.208$). This confirmed the findings of Carroll (1963) and Jansen (2004) on the existence of this correlation. We find however that the correlation is less than we expected.

We further found that part-time students spend less time studying. We therefore calculated the Pearson correlation coefficient between time spent studying and average grade sepa-

rately for the sample of part-time students. Even in this case the correlation is fairly small ($r=0.278$). Our research did not examine the mental abilities of students and their IQs. Given the results of the correlation analysis between average grade and most factors from the student group, we suspect that the most important factor is in fact the mental abilities of students.

Shah and Burke (1999) reported better results in university for female students. We also investigated how the sex of students influences outcomes. The results are shown in Table 8.

We performed the mean difference test. We found:

1. There is no statistically significant difference ($t = -1.907$; $\alpha=0.05$; $p_\alpha=0.057$) between men and women at faculties in the average grade of the last completed year, although we found that women had completed secondary school with slightly better average results ($t = -4.984$; $\alpha=0.05$; $p_\alpha=0.00$).
2. The mean difference test showed that there were no statistically significant differences between men and women in the grade received at the last exam.
3. There are statistically significant differences between men and women in the time spent on study ($t = 4.267$; $\alpha=0.05$;

Table 8: Comparison of the state of dependent variables with regard to the sex of the student

	A		B		C		D	
	male	female	male	female	male	female	male	female
Valid	435	594	436	597	436	597	436	597
Missing	17	22	16	19	16	19	16	19
Mean	12.83	11.28	7.5313	7.6128	7.21	7.29	1.78	1.70
Median	11.00	10.00	7.5000	7.5000	7.00	7.00	1.00	1.00
Std. Deviation	6.770	3.977	0.70856	0.69469	1.532	1.477	1.186	1.054
Min	2	2	6.00	6.00	1	1	1	1
max	60	36	10.00	9.60	10	10	9	8

A – How many months did you take to complete your last study year?

B – Average grade in last completed year.

C – Grade (1 to 10) received at the last exam you sat.

D – Number of re-tests of the last exam.

Table 9: Comparison of time spent on study (hours weekly).

	N=1068		N=1064	
	men	women	Full-time	Part-time
Valid	436	595	792	239
Missing	16	21	19	14
Mean	21.63	24.76	26.33	13.85
Median	20.00	20.00	25.00	12.00
Std. Deviation	14.004	15.279	14.828	10.031

Table 10: Comparison of the state of dependent variables with regard to study method

N =1064	A		B		C		D	
	Full-time	Part-time	Full-time	Part-time	Full-time	Part-time	Full-time	Part-time
Valid	779	222	779	222	779	222	779	222
Missing	32	31	32	31	32	31	32	31
Mean	11.79	12.36	7.5751	7.6155	7.14	7.71	1.83	1.42
Median	10.00	12.00	7.5000	7.5000	7.00	8.00	1.00	1.00
Std. Deviation	5.523	5.051	0.70251	0.67579	1.454	1.540	1.129	1.016
Min	2	2	6.00	6.00	1	1	1	1
max	60	36	10.00	9.60	10	10	9	8

A – How many months did you take to complete your last study year?

B – Average grade in last completed year.

C – Grade (1 to 10) received at the last exam you sat.

D – Number of re-tests of the last exam.

$p_{\alpha}=0.00$). Women complete years faster than men, We see the reason for this in the fact that women spend more time per week studying than men.

Women spend more hours a week studying than men. This is clear at first glance from Table 9, and the conclusion is confirmed by the t-test ($t = -3.455$; $\alpha=0.05$; $p_{\alpha}=0.001$). According to Macan et al. (1990), women are better time managers than man and have higher work discipline.

Full-time students spend considerably more time studying than part-time, as can be seen from Table 10 and from the t-test ($t=14.929$; $\alpha=0.05$; $p_{\alpha}=0.00$).

We conducted the mean difference test. We found that there was no statistically significant difference ($t = 0.035$; $\alpha=0.05$; $p_{\alpha}=0.972$) between full-time and part-time students in the average grade for the last completed year. Likewise there was no statistically significant difference between full-time and part-time students in the time taken to complete the last completed year, which surprised us ($t = 1.385$; $\alpha=0.05$; $p_{\alpha}=0.166$).

Quality of instruction

We studied the influence of factors under the heading “quality of instruction” by determining the influence of 23 factors. On the basis of this factor analysis we obtained five new factors from 23 elements of quality.

We also conducted regression analysis, from which we found the influence of factors on the dependent variable (see

Table 11 and Table 12). The dependent variable was the grade received at the last exam.

We found that the five new variables can account for 12.3% of the variance of grades received at the last exam. The total influence of the factors from the “quality of instruction” group seems smaller than expected. Within this influence, we used regression analysis to investigate the influence of individual factors on the grade at the exam.

We found that the first four factors (1) organisation, (2) course outcomes, (3) course material, and (4) assignments, exams, grading were statistically significant. “Course outcomes” and “assignments, exams, grading” are particularly important.

Like Jansen (2004), we also believe that the type of testing can play an important role in achievement.

The factor “organisation” is not the most important. Its influence is in fact much less than we expected. In our research, we found that many students in Slovenia very rarely attend lectures. Only 62% attend at least 60% of lectures. The reason for this situation is that only 27.1% of students surveyed have no job outside study, while some 37.9% work 20 hours or more per week to pay for their upkeep. The system of work in faculties evidently enables this. The “frequency of attending lectures” and consequently also the “organisation” factor has therefore (statistically speaking) relatively little influence on study success. This means that many students study alone and prepare individually for exams. Materials replace professors. Elements such as accessibility of materials,

Table 11: Regression factor score

Model	R	R ²	ΔR^2	Std. Error of the Est.
1	.351(a)	.123	.118	1.405

a Predictors: (Constant), REGR factor score 5 for analysis 1, REGR factor score 3 for analysis 1, REGR factor score 1 for analysis 1, REGR factor score 2 for analysis 1, REGR factor score 4 for analysis 1

Table 12: Coefficients of the five new variables

	Unstandardised Coefficients		Standardised Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	7.356	.046		159.268	.000
Factor 1: “ Organisation ”	.187	.045	.125	4.134	.000
Factor 2: “ Course outcomes ”	.326	.046	.216	7.084	.000
Factor 3: “ Course material ”	.191	.045	.130	4.277	.000
Factor 4: “ Assignments, exams, grading ”	.302	.045	.203	6.673	.000
Factor 5: “ Communication ”	.003	.045	.002	.058	.954

a Dependent Variable: Grade received (1 to 10) at the last exam sat.

structure and content of materials therefore have an important influence on the success of students in studying individual subjects and preparing for exams.

In a similar way, we also investigated the influence of “quality of instruction” factors on the variable “number of re-tests of last exam”. Once again in this case factor analysis revealed factors in terms of content almost entirely matching the content elements shown in Table 1. We were surprised when we found that their influence on the number of re-tests was statistically similarly small as the influence on the grade received at the exam.

The research did not confirm the influence of the “communication” factor. This conclusion does not surprise us, since in practice we find that the tutorial method of study has not yet become established in Slovenia. There were 87,205 students enrolled in faculties in 2003/4, and 6137 full time teachers. Professors in numerous faculties are overburdened. In their studies, many students therefore never seek individual help from a professor. This is a weakness of the system of higher education in Slovenia.

Viewed as a whole, the research confirmed the previous conclusions of researchers mentioned in the first part of the paper. The influence of factors from the “quality of instruction” group seems small to us. We interpret this to mean that students have to adapt to the professor. They prepare for exams even if they are not satisfied with the quality.

Government

In our research we measured the following factors from the “government” group:

We asked students if they live in student residences. Of the students surveyed, 173 (16.2%) live in student residences, with the remainder living elsewhere. We did not ask students about the distance from their place of residence to school.

We asked students if they receive a grant. Of 1068 students surveyed, 322 (30.1%) received a grant, 80 (7.5%) had partly or fully paid tuition, and 666 (62.4%) received neither a grant nor tuition.

We found that living in a student residence is not a factor influencing the duration of study. This is also confirmed by the t-test ($t=-1.453$; $\alpha=0.05$); $p_\alpha=0.147$). Living in a student residence is likewise not a factor that influences the average grade of the last completed year (Table 13). This is again confirmed by the t-test ($t=1.105$; $\alpha=0.05$; $p_\alpha=0.269$).

On the basis of analysis of the results of the survey, we believe that living in a student residence is not a factor influencing study success. Of course we cannot speculate on how things would be if those living in student residences did not have this option.

We found that receipt of a grant is a factor influencing the duration of study (Table 14). We found that students not receiving grants on average took somewhat longer to complete the previous year. The difference is not great, but is statistically significant. This is confirmed by the t-test ($t=-1.933$; $\alpha=0.1$; $p_\alpha=0.054$). Receipt of a grant is also a factor that influences the average grade of the last completed year. Again in this case the difference is not great, but is statistically significant. This is also confirmed by the t-test ($t=4.206$; $\alpha=0.05$; $p_\alpha=0.000$).

Based on analysis of the results of the survey, we find that receipt of a grant is a factor that influences study success.

Table 13: Comparison of dependent variables with regard to place of residence (lives/does not live in student residence)

N =1065	A		B	
	yes	no	yes	no
Valid	161	841	161	841
Missing	12	51	12	51
Mean	11.30	12.04	7.6397	7.5728
Median	10.00	10.00	7.5000	7.5000
Std. Deviation	4.388	5.591	0.7008	0.69673

A – How many months did you take to complete your last study year?

B – Average grade in last completed year.

Table 14. Comparison of the state of dependent variables with regard to receipt of grants (yes/no receives grant)

N =1064	A		B	
	yes	no	yes	no
Valid	387	633	387	633
Missing	15	29	15	29
Mean	11.52	12.21	7.6907	7.5123
Median	10.00	10.00	7.6000	7.5000
Std. Deviation	4.333	5.956	0.74162	0.66507

A – How many months did you take to complete your last study year?

B – Average grade in last completed year.

Table 15. Influence of grants on the extent of student labour

CLAIM	Receive grant (n=403)	No grant (n=665)
In addition to study, I do no other work	35.2 %	22.1%
In addition to study, I work 20 hours a week or more	28.8%	43.5%

Those students who do not receive a grant spend more time earning money to live on. This is clear from Table 15.

Student labour is reflected in study success. Of course, we cannot in this case speculate on the situation if those receiving grants did not receive them.

5 Conclusion

Many authors, long before us, have asked which factors influence study success. Based on knowledge of the theories and results of previous research we established a “The model of study progress”. Through the empirical research presented, we wanted to investigate whether the model also applies in Slovenia. In principle we can claim that the findings of other authors regarding the factors that influence study success and study progress also apply in Slovenia.

The results of our research are in certain details somewhat different from other countries. Slovenia as a post-communist

country is undoubtedly different from West European countries such as the Netherlands or the UK.

Thus we found that there is no link between the “social elements” group and the average grade for the year or time taken to complete last year. We did however find that social elements influence whether someone even enrolls at university. They do not however influence exam results. As said previously, we were unable to determine why students drop out of the system, and what role social elements play in this. Research dealing with these issues will in future represent a major challenge.

Our research had certain limitations. One very important limitation of our research is that we were unable to study “survival” of students in the education system. Many authors have undertaken precisely such research. Slovenia is one of the countries with a very high drop out rate. Data on such students is sadly lacking in our research. In Slovenia we were unable to undertake very detailed research on a sample of these students due to legislation protecting students’ personal data. For the

same reasons, we were unable to study in greater detail how certain factors from the “student” group (e.g. IQ) influence success. Due to protection of confidential data on schools, we were unable to investigate the influence of factors from the “curriculum” group (e.g. organisation of lectures) on success.

We believe that the mental abilities and positive attitude and the related student motivation are still the most important factor in study success. We therefore believe that it is necessary to maintain access to education for talented students from lower social classes. We found that we will have to find a mechanism to ensure greater student attendance at lectures and to ensure greater influence of lectures on success. Given the situation we have found, we believe that at present something is not as it should be in this field. We thus advise professors and faculty management to pay considerable attention to ensuring “quality of instruction”.

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Enterprises and other Organisations, (ii) Office Organisation and, (iii) DEXi – a Computer-based System for Multi-attribute Decision Making.

Elementi, ki vplivajo na uspeh študentov

Na uspeh študentov lahko vplivajo naslednji elementi: (i) socialni elementi (socialni razred, izobrazba staršev, poklic staršev, dohodki staršev); (ii) elementi, vezani na študenta (motivacija, odnos, trud, inteligenčni kvocient, čas, porabljen za študij, možnosti za študij, srednješolska izobrazba); (iii) kakovost izvedne izobraževalnega procesa (organizacija, učno gradivo, komunikacija, naloge, izpiti, ocenjevanje, rezultati); (iv) kurikulum (število predmetov, zaporednost predmetov, urnik izpitov, sistem - blokovni ali paralelni); (v) država (štipendija, nastanitev). V prispevku je prikazan vpliv navedenih elementov na uspešnost študenta. Ugotovili smo, da socialni elementi vplivajo predvsem na odločitev posameznika za študij, na pa toliko na prejete ocene in čas trajanja študija. Uspeh je povezan tudi s prejemanjem štipendije. Presenečeni pa smo nad ugotovitvijo nizkega vpliva elementov kakovosti izvedbe izobraževalnega procesa na rezultate študentov.

Ključne besede: uspeh, študentje, socialni elementi, akademski elementi

The Importance of Perception and Consciousness for E-Learning

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The article presents the results of a research on perception during the learning process of adults in a virtual environment. The aim of the research was to determine why the process of e-learning introduction in Slovenia has been slowed down. Perception and its effects upon learning are important on the conscious as well as on the unconscious level but they have not been given as much attention as in the classical learning environment. Disturbed perception which results from the lack of expertise in preparation of the e-environment is a serious obstacle for learning. The objective of the research was to find solutions for the actual teaching practice but at the same time the research emphasizes that conclusions cannot always be made on the basis of former facts about students. We have to bear in mind that the impact of technology changes the students as well. Lack of professional arguments and of good practice leads to pedagogical conservatism which can cause the school's progress, also in the area of adult education, to be directed in the opposite direction from the one required by business processes in the organizations in which the adult students come from or in which the students are employed after they finish their education.

Key words: e-learning, e-education, virtual learning environment, perception, adults, remembrance

1 Introduction

1.1 Theses on causes of deceleration of e-learning development in Slovenia

Within the material¹ learning environment we pay a lot of attention to student's perception, meaning sensual perception and comprehension of the world, and therefore these aspects are well researched. Colors, interior design, sounds and order all matter to the learning process. We pay attention to how our senses are a medium for motivational and emotional factors and how we influence our cognitive processes. Intensive research into the brain brings new information that deepens our knowledge on learning. Teachers think of the material environment as of greatest significance regarding successful learning.

The Virtual environment gets far less attention. Since we think of classical learning and e-learning as complementary processes, the virtual learning environment plays a complementary role to the material learning environment. A rough

comment, that in a classical classroom a blackboard on the ceiling or pictures on the floor, puppies that poop around, putting down rakes or hanging out laundry would be hardly desired and no one demands that the students climb up a ladder and get the material they should later on read with a magnifier, usually astonishes the listener. But these sorts of »arrangements« are not unusual in a virtual learning environment. A possible reason for this is the poor involvement of humanistic professionals such as experts in education, adult education and psychologists and so cybernetic and technical criteria prevails – somewhat as if classic classrooms were a matter of the building and furniture industry exclusively. A lack of cognitive experts' contribution is also present. They could optimize the conditions for learning and thinking, though at the moment they have to few possibilities to transfer the fruits of extensive research into practice. Perhaps this is one of the reasons for the decrease of starting expectations of e-learning, while business environments are in the process of informatization and need people capable of e-learning².

During evaluation of e-materials and the e-environment we gather learners' reflections and participants call our atten-

¹ To point out the contrast and because of separate discussion, we will refer to the classical environment as *material* and the electronically created environment as *virtual*. A partial synonym for material is *real*. We use this term in the article when we are discussing the fruits of natural processes and when we are talking about the world itself, not its imitation. In the material world we can perceive in two different ways: *physically*, meaning by touch of the body or *from a distance*, by medium, e.g. joy-stick or keyboard. The material environment and learning will also be referred to as *classical*.

² *Learning* is a lifelong conscious or unconscious, organized or random process of attaining knowledge and development of the *personality*. Organized and intentional learning are called *education*. If they are supported by IT, they are called *e-learning* and *e-education*.

tion mostly to obstacles and disturbances in sensual perception and psychologically conditioned processing meaning perception of the objects and impressions that are important for learning. First place among disturbances goes to obstacles on the way to information (Rebolj and Globočnik 2007): stiff navigation, not easily assimilated content, chaotic screen, unwanted sounds, ergonomic obstacles and wrong solutions, and also lack of stimuli (protracted content, boredom, too long menus, getting lost on the learning path, »depressive« colors) and unsuitable stimuli (jokes and sounds that do not belong to the content, too much text, too few pictures, »disorganized« material). Indirectly we can sense the braking functioning of the unconsciousness, for instance decrease in motivation with no apparent cause.

To appropriately compare results we would also need to answer the question of how much an individual student has changed under the influence of information technology. We should not make any more conclusions on the basis of knowledge about the noninformatized³ student. Information technology does some tasks for the new-day student and this student accepts it as a biological characteristic – it can perceive instead of the student, process these perceptions and shows the first signs of artificial consciousness. We can ask ourselves in what measure are we dealing with a »new man« and a »new student«?

Teachers, during debates and surveys on various technologically supported forms of education, also bring our attention to the misleading and/or imperfect perceptions that lead to failure and this fills them with doubt. They understand their pupils less and less. Are the pupils in renovation? Are the pupils outrunning the teachers? Perhaps we just cannot understand and explain them by existing pedagogical concepts. For these reasons we place perception, from stimuli entrance to its processing and connecting it to the consciousness, at the center of the following research. The other pole of interest is the student, perhaps changed under the influence of IT (»new student«). Though we did not research this second pole, it calls for caution in judging by »old student's« standards.

1.2 Perception of learning environments and learning

Perception as defined in this article is an entrance activity in learning that continues after the reception of stimuli as processing of information in the central nervous system and then storing in the memory. Educators know how to arrange the classic learning environment in a way to support learning and can give good advice to self-learning students on how to arrange their learning environments. Care is taken of the right stimuli and appropriate intensity and synchronicity for a certain student. If

perception is not regulated, stimuli can get in each other's way and exhaust or even irritate the student. Perception includes the whole body moving around in space. Can we replace this physical experience of the body in the virtual environment? Merleau-Ponty (2000), who later wrote *Phenomenology of Perception*, in his early works as a fan of the Cartesian cogito claims that a thought about the world cannot replace the experience of the world. Critics opposed him, saying that it is not the being of the body that receives and sends out signals, but the participation of this body in space. Merleau-Ponty (2000) himself later on denied the cause and consequence relationship in perception. He sees the body in movement and considers it to be thinking and understanding. In this manner perception does not need the material environment.

The first virtual experiments brought out doubts. Can any experiment replace the experience the student would otherwise gain physically? Klahr et al. (2007) researched gaining experience in three situations: distance experimenting⁴ (student executes the material experiment from a distance, for example with the help of an artificial hand), virtual simulations⁵ (student sets the parameters, starts the film in a material environment and then watches it) and virtual experimenting (student experiments in a virtual environment with virtual means and a physical medium, e.g. keyboard. Parameters can be changed during the process).

Knott (2007) claims that we can gain experience in a virtual environment foremost if we have gained our primal experience, which is the basis for the following ones, in the material environment by the so-called hands-on learning. Some other researches confirm that virtual experiments and simulations can be used for widening or gaining experience which one would otherwise experience by coincidence (flying in an airplane) or are normally dangerous (radioactive radiation) or cruel (death incidence). Today's comprehension of virtually gained experience (e.g. on-line) sees them as a quality complement to material world experience. Since we can plan them and exclude anything inconvenient or nonessential and we can repeat them, they valuably contribute to the knowledge and shared experience of man. With the help of older technology some professions (pilots, captains, and skiers) have used such acquirement of experience for a long time.

The material environment does not enable ideal perception, especially if we consider the need for participation of the body. The latter is obstructed in a classic classroom. School regulations, presence of others, free use of surface, learning materials and physical obstacles are obstructing the student's perception more than the virtual environment does. Merleau-Ponty (2000) claims that the most important source of perception is the sense of touch and the second is eyesight, but most important for perception is movement of the body during perceiving. Can we touch without material touching? Heidi

³ The term *informatized* is used to determine a person who has internalized the concept of automatic information management and is skilled in working and learning on-line and/or in the virtual environment. In this article assimilation of this concept will be called *informatization* (at the level of individual, process, organization, etc.).

⁴ *Experimenting* is a procedure during which we change different parameters in a real situation section, observe the consequences and measure and analyze the effects.

⁵ *Simulation* is a synoptical imitation of working reality, if needed especially adapted for observation (e.g. decelerated or magnified) in which we direct the process with the intent of attaining experience and skills.

Cooley (Cooley, 2004) believes that human perception of the e-environment evolves by regular and motivated work behind the screen. When one starts to use the virtual environment, one sees it as a two-dimensional picture that later on becomes a 3D space of which the user becomes a part. More on the subject can be found in chapter 3.1.1. where we describe the perception of virtual environment in our sample. We emphasize here that these findings relate to non-mobile technology⁶, where a person is either in a material or in a virtual environment for a longer period of time. In our previous research, where we surveyed users on evaluation of the e-environment, we have also confirmed that perception of the virtual environment is developing and that it is probably dependent on the amount of time actively spent behind the computer (Rebolj, 2006). Adult students between the ages of 25 and 35, who have used the computer continuously since high-school, feel comfortable and homely in a virtual environment – the computer with all its capabilities becomes a part of the student, and the student's virtual and material environments unite. People who have used the computer for less than two years, »live« outside it and see the virtual environment flat as a board, picture or television, into which they also do not enter.

The sense of touch is very important for perception. Researchers like Marzano (1993) say that we touch when we are included and strongly involved in a situation, which equals body movement in the material world. Movement here represents a strongly interested exploration of space. In this way we can touch in the virtual environment. We touch with the cursor on the flat screen, but our eyes see a picture in space and our vision is drawn to details. It does not mirror but constructs, adds Strehovec (2006). He sees eyesight as more important for perception than the sense of touch. Feeling without touching has been known for a long time, a person can fumble in the dark with a stick or in troubled water, and an organ player who knows the organ like his own home explores the instrument with pedals and keyboards.

1.3 Issues on consciousness in light of man's informatization

When speaking of perception, i.e. receiving and processing information, we are often interested in human action resulting from this process. By observing action we can make conclusions about perception. Similar to perception, actions can be conscious or unconscious.

1.3.1 Perception and consciousness

Considering our problem, Cvetko (2002) offers a useful presentation of consciousness when saying that people have two kinds of stimuli receptors: one sort to preserve life and one sort to perceive their bodies. Stimuli transfer to the central nervous

system, where we process the information into a representation of ourselves. If we are aware of it, we are talking about consciousness. Consciousness is absent only during special states of the body, such as coma or sleeping. Peruš (2000) on the other hand defines consciousness as a dual community – the centre of the first part is »I« and of the other »pure consciousness«. Consciousness seems unified on the outside, but Peruš claims it is internally constructed. For studying e-learning Hoffstadter's (1979) definition is also interesting. He connects consciousness to intelligence and believes that consciousness has the ability to step out of an assignment on which it is working and see what it has done until that moment.

In learning consciousness plays an important role since it determines the direction, intensity and speed of effort. Many forms of adult learning that evolve in modern adult education practice are based on consciousness reinforcement (Brečko, 1999) as a basis for learning. A student should be aware of himself/herself and observe himself/herself during learning, analyze and take charge of his/her own learning process. We can also understand consciousness as the final result of perception.

Even lower technological levels actually even the first use of tools enabled man to expand his body physically when needed. In his consciousness he integrated himself with objects or devices, for example blind people using their canes, musicians and their instruments or typists with their typewriters. The network computer offers a lot more to the human race. It helps with perception and processing information, it supports the nervous system and in this way contributes to formation of consciousness. In comparison to simple tools, IT supports man in a stronger and more versatile way; you could say it is renovating people. Since informational technology is enforcing itself at the society level it is becoming a necessity. Without it people can lose their social networks or fall down the social ladder, learn slower or become (in comparison to others) intellectually impaired (Bakračević Lukman, 2000). One's position in the social network is on the other hand important for learning.

1.3.2 Meaning of the unconscious

During the learning process it is not important whether perception is conscious or unconscious, what matters is the effect of all perceptions⁷ that shows itself in action. Unconscious perception can be relieving. Students learn easily, they are in a good mood, filled with energy sometimes not knowing why; they do not have to invest in this state. On the other hand, unconscious perception can obstruct learning. The community of unconscious is built out of signals that are not perceived by human receptors, or else they are perceived, but the central nervous system does not process them to the level of consciousness. People react both to the conscious and the unconscious. The unconscious expresses itself in relations between two or

⁶ *Mobile technology* is a sort of ICT, that is mostly enabled by wireless internet and satellite navigation and is ergonomically adapted to people (size, weight, picture resolution) so they can carry it with them. It enables the merger of the material and the virtual environment within human perception. Opposite to it is *non-mobile technology*, where a person alternatively goes from the material into the virtual environment and back.

⁷ Perception includes receiving the stimuli.

more people, for example as influence of one person's actions on another person's actions (Merlau-Ponty, 2000) or in the relation between man and machine. The teacher's conscious actions can often be unconscious for the student. The teacher unconsciously sends out signals that can either facilitate or obstruct learning. This also goes for agents from the environment that can be advantageous or disadvantageous, which students describe with words like depressive, sad, restrictive, decrease in concentration...learning environment. These signals also come from the virtual environment. When learning with a teacher it is easier to see and correct the observed consequences of the unconscious learning destructors than in the virtual environment, where they are harder to spot. For example, many times students are not content with e-materials as can be seen during evaluation, but even they cannot describe exactly where the discontent comes from. Authors of the material are surprised by low evaluation results, since they were convinced the material was good. Sometimes users are checking out some hyperlinks for a longer time and they click on the others only once and never come back. Also in sorting learning elements by quality, which in reflection relates to popularity, the results of student evaluation are often surprising. We can only assume that the reason for this is that the authors measure with conscious criteria (objective measures of quality) and learners, on the other hand, mostly use unconscious criteria (effect of general satisfaction).

When dealing with the unconscious relating to informational technology it is logical to bring up *the information glove*, which became known in the 90s. To steer in 3-dimensional

virtual reality the hand is supposed to be of utmost importance, so tools have been mostly ergonomically adapted to the hand. Of course touch of skin and an object is not possible in virtual environment. The hand controls the interactive writer (key-board, number pad or joy-stick) connected to a machine (computer, phone) which is strongly connected to vision/eyesight, eyesight is connected to the brain and the brain directs the hand. This circle hand-writer-machine-eyes-brain-hand represents a very intensive according to Strehovec (2006) unconscious connection we can also call *the perception loop*. Along with the already mentioned intensity another characteristic is bound to this loop – inertia that maintains the intensity of reception and processing. Another important characteristic is a tendency to shrink the loop, which can be practically described as »less clicks to perception«. A person feels and negatively reacts to any disturbances in this flow.

The perception loop is - besides in e-learning - also established, for example, when using a cellular phone with a screen or other communication devices and when playing games in a virtual environment. We could talk about similar connections in the past when using a classical telephone or telegraph, but they did not seem important at the time. In the informatized environment connections are more intense, there is more »body« participation, and modern mobility is the cause that »not only eyes and one hand participate, the other hand and both legs are also involved« (Strehovec, 2006).

Experience of working with students shows that disturbances in the perception loop are a source of negative emotion and decrease in motivation. Deceleration of perception can

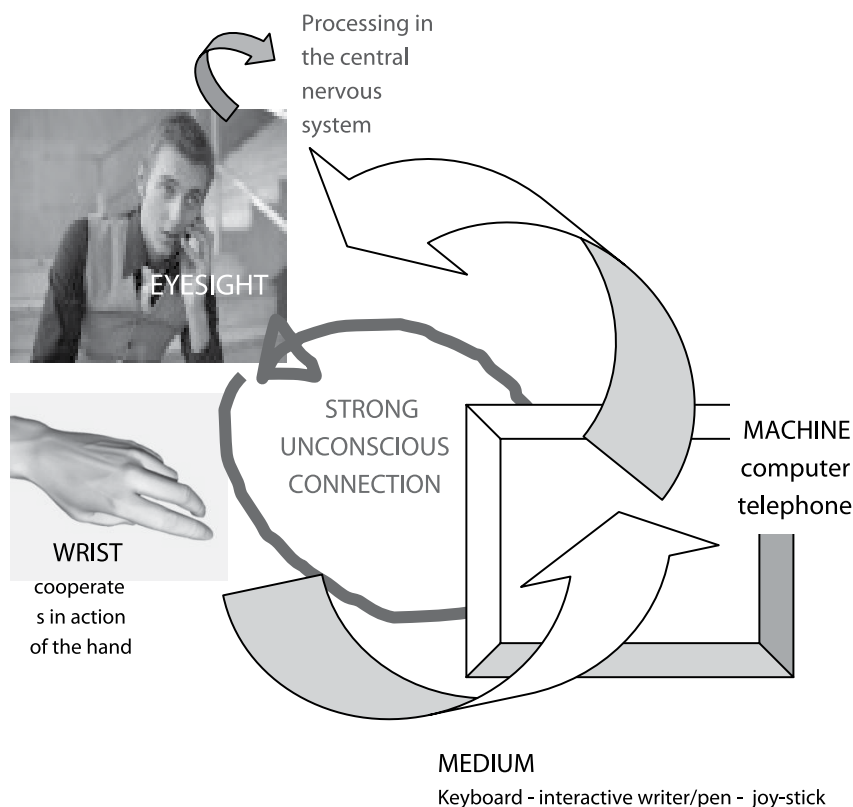


Figure 1: Touching in the virtual environment

be unpleasant, for instance because of searching for information on a disorganized or inconsistent screen view, or perhaps due to low readability. Researchers claim that reception and processing should be a matter of seconds and that everything that lasts more than three seconds (or sometimes less) can be disturbing. Obstacles in this connection can be various, sometimes it is the long path, straying about or jumping movement that the interactive writer has to go through because of badly organized menus, sometimes it is necessary to turn over screen pages, or else it is just strain of watching the screen. A small loop, movements that can be made in a second, short cursor paths and continuity of movement, on the other hand, have a facilitating effect.

Unconscious perception is important for learning since it takes less energy. One of the paths to unconscious actions is repeating of the conscious ones. Strehovec (2006) gives an example of unconscious writing text messages on cellular phones even though we cannot explain the letter order. We also do a lot of things in a virtual environment without knowing how to describe our actions. The virtual environment should be designed in a way that automation of repeated actions is possible, and this also goes for its changes due to updating.

1.4. Informatization and the learning man

The answers to the question of who is the new man as a product of informatization are different. Some say that man develops greater intellectual and physical capacities, others point out the common action of man and technology. Man takes on more pleasant tasks since technology can take care of the unpleasant ones. Some sociological debates bring us to the conclusion that people could be disburdened if they took advantage of this, but they commence more complex issues. In this way man is not disburdened but more efficient with the same energy investment. In the light of learning we are mostly interested in the answer to the question of whether it is easier to learn or whether people learn more, or perhaps, both and what this shift inversely contributes to people's intellectual abilities, social relations, self-image and social position. We need this answer also to estimate how much we can rely on existing truths about the adult learner in research. It is true that

technology, inventing tools, progress in science and mastering the material world have always influenced man. In view of this fact, man has always been renovated under the influences of technology, but informational technology accelerated this process and research can hardly keep up with the changes.

1.4.1 Man's consciousness and its branches

Consciousness is a process phenomenon, so it has no location in the brain. The definition varies among psychologists and so do their opinions on external signs of consciousness. The definition of these signs determines whether we can attribute consciousness only to humans or also to some animals or even intelligent machines.

There are programs that can validate execution of certain tasks by other programs, which is enough to determine consciousness according to Hoffstadter (1979). Computer processing of perception, similar to processing in the central nervous system and partial interpretation, is also possible. Peruš in 1999 (Peruš, 2000) names one of his chapters Speculation on Possible Consciousness of Computers... and expresses doubt. As the main obstacle, he points out the too small capabilities of computers of that time to grasp the complexity that would relate to the complexity of »self«. Besides, at that time he believed that the condition for this is integration of technology into people and their world. At the same time he mentions the possibility of merger of the natural and artificial, physical and psychological and that computer systems could become connected to people as co-processors. Computer consciousness could in this way become a branch of human consciousness,

Considering the fact that we can also perceive with the help of informational technology and that this technology can process this information and acts accordingly, can we deny the embryo of artificial consciousness?⁸ The question is what exactly the role of technology in the process of human consciousness is. What is the connection between artificial consciousnesses to the human biological one? Can technology with its better perception contribute to higher levels of consciousness? It is highly plausible that the relationship between biological

Table 1: Structure of the sample

age / regular use of computer	16-20 years	21- 35 years	36-45 years	46- 55 years	above 55 years	SUM
before year 1990	0	0	3	2	0	5
between years 1990 and 1995	0	4	14	6	0	24
between years 1996 and 2000	0	12	45	14	2	73
from year 2000 on	12	44	55	10	2	123
last 2 years	0	0	22	8	3	33
SUM	12	60	139	40	7	258

⁸ The term *manipulation* refers to directing another person without their will cooperation (in neutral meaning).

and artificial consciousness is still being formed and as a result forecasts are not reliable.

Human consciousness and self-confidence, as consciousness about one self in one's own abilities, are important for learning. Even though consciousness about learning is not a condition for learning it is important in the process of acquiring knowledge what the learner does consciously and what unconsciously, and if he/she is aware of improving his/her own learning.

2 Methodology

2.1 Research sample

As a research instrument we used a survey that included the answers of 258 people aged between 16 and 64, who were at the time included in formal secondary and tertiary education in 11 schools for adults. All participants have experience in learning in virtual environments, since this was organized by the schools as a complement to classical learning. Assistants who conducted the survey all took part in designing learning e-environments in participating schools, so they knew for sure that the basic conditions for e-learning were satisfied, which was the main condition for participation in the research. Surveying took place in March 2009.

The sample is socially and culturally heterogeneous. Due to generational, experiential, social and cultural diversity, which are factors of IT availability, it is appropriate for researching our problem. When preparing the questionnaire we relied on experience from the previous two years when we surveyed users during implementation of e-environment learning. These results and the results of some other researcher available on-line led us to the conclusion that perception of the virtual environment is in the highest correlation with the total amount of time spent on working with a network computer, and in lower correlation with age, sex and a person's social and cultural background.

2.2 Content of research

The survey included questions for which we had well grounded expectations that they would reveal some sources of standstill in e-learning development and therefore offer some answers to practice and guidance for further research. Some questions could be answered with the help of a 5- or 3-degree evaluation scale, which seemed reasonable since the participants could express the intensity of their observations in such manner. Considering this, the answers were ponderated from 1 to 5 (5-degree scale) and 1, 3 and 5 (3-degree scale), respectively. The questions were related to:

1. Perception support by e-learning environment optimization
2. Effect of the hybrid⁹ material/virtual environment, enabled by mobility of technology

3. Perception and remembrance
4. Consciousness of one's own learning/perception of perception of learning
5. Unconscious perception effects

2.3 Gathering data, processing and interpretation of results

Approximately half of the adult students filled out the surveys in the classroom and the other half got the survey by e-mail. The first group got the instructions orally and the other group in writing. Typing the data into Excel and statistical processing was done by economy students during a course on Business mathematics and statistics.

3 Results and discussion

3.1 Possibilities for support of perception with optimization of e-learning environment

Today comprehension of learning is going back to Piaget's thoughts (Labinowicz, 1989). This means that a student should be active and at the same time can regulate and direct his/her own learning. Learning should be close to authentic situations. Learning is a social process that takes the form of social exchange, which we also need to assure in every e-environment.

Heidi Cooley (Cooley, 2004: 133) explains how a person perceives the virtual environment framed with a screen. She writes about levels of perception a person climbs up with time spent behind the screen. First of all the image on the screen seems like a board or a picture. Later this perception evolves into »a view through the window«, a 3D picture in the distance while the person is still outside the picture. With further use the person steps into the virtual environment, it surrounds him/her. On the highest level known today the person lives, functions in and masters the virtual environment and this environment becomes a part of this person. For a person to function well in a virtual environment, the concepts and structures of the material environment have to be parted from.

Generations, born into the informatized society, do not have to let go of old concepts and they walk through the developmental phases of virtual environment perception with speed of light. They actually arrange their material environment according to the »new« concept. These generations have an advantage in e-learning. Others catch up with them when they assimilate automatic information management, the concept and structure of virtual environment, but they have to let go of the material environment concept. Besides the learning content perception, also wholesome perception of the learning environment where this content can be found is important for the learning process.

The question was interesting to the participants, though demanding, since they had not yet thought about it. If we

⁹ The term *hybrid* is used for products of mixing virtual and material elements in a learning environment or intertwining of virtual and material environment, and vice versa, in such a way that the learner conceives them as one.

Table 2: How do you perceive the virtual environment (e.g. classroom, created with IT) when you open it on your screen?

Answer	Number	%
1. Two-dimensional, like a board or a picture	3	1.2
2. Three-dimensional in the distance – like a view through the window	24	9.3
3. Like a three-dimensional environment in which you are entering	114	27.1
4. Like an environment that comes towards you and surrounds you	45	17.4
5. Like an environment that surrounds you and gives you energy	24	9.3
6. It sucks you in and you become a part of it	74	28.7
7. You take it in and it becomes a part of you	18	7.0
SUM	258	100

consider that the quality of perception is related to body participation, and if the body participates it also uses touch in the environment, then 61% of the participants (answers d-g) have perception of the virtual environment appropriate for learning. On the other hand, 39% of participants do not. Cooley’s claim on the development of virtual environment perception has been confirmed. Participants who have used the computer regularly and reasonably for the last two years perceive the e-environment as a board or a view through the window, long-term users on the other hand are sucked into it or they internalize it.

In education of adults we should evaluate the level of »informatization« of an individual who enrolls, which is already common practice in some schools, and pay more attention to the unskilled if they are part of a complementary classical education program. Attractive activities online, such as activities for interest groups, taking care of school admi-

nistration, web-communities, etc. can be reasonably used to facilitate student integration into the virtual environment.

One of the possible answers was a possibility that the environment »surrounds you and gives you energy«, which was offered on the basis of other researches (after opening the environment comes towards him/her like a projectile), but our participants did not express this feeling.

Participants evaluated learning contents to be the most important factor that influences their emotions and learning content is a factor that is less dependent on the environment. Content is followed by navigation – other surveys have already shown us that navigation can be a factor of emotion, but mostly negative ones when it is clumsy and not positive when it works well. Greater changes in navigation, even though maybe progressive, represent an obstacle for the learner. When we close up the virtual environment after education ends, students miss it. Some schools make use of this and enable former participants of the programs to access a virtual club, an adapted

Table 3: What in the virtual environment influences your emotions in a positive way? (Mean was calculated from an absolute number of answers with ponderation: absolutely not true = 1, mostly not true = 2, partially true = 3, mostly true = 4, absolutely true = 5)

STATEMENT	1	2	3	4	5	SUM	MEAN
Effects (pictures, cartoons, jokes, funny sounds...)	0	30	201	12	20	253	3.2 partially true
Interesting contents	0	11	12	131	87	241	4.2 mostly true
Multimedia (videos, sound records, animations...)	0	34	111	102	5	252	3.3 partially true
Electronic environment itself	56	79	96	4	17	252	2.4 mostly not true
Easy navigation through the environment	21	35	117	68	9	250	3.8 mostly true
Live and virtual praise	11	85	87	67	0	250	3.2 partially true
I GET ATTACHED TO THE VIRTUAL ENVIRONMENT AFTER USING IT FOR A LONGER TIME.	44	30	98	78	45	254	3.7 mostly true
EMOTIONALLY I DO NOT FEEL ANYTHING IN THE VIRTUAL ENVIRONMENT.	56	93	67	33	9	258	2.4 mostly not true

Table 4: What in the virtual environment makes you feel included in the group of fellow-people?
(Mean was calculated from an absolute number of answers with ponderation:
absolutely not true = 1, mostly not true = 2, partially true = 3, mostly true = 4, absolutely true = 5)

STATEMENT	1	2	3	4	5	SUM	MEAN
Lots of possibilities to communicate (e-mail, forum, blog...)	17	51	21	133	34	256	3.5 mostly true
Help, when something goes wrong	0	21	98	87	50	256	3.4 partially true
Feeling of commitment to the group	70	45	40	34	68	257	2.9 partially true
Effects: live drawings, voice response, animated characters...	4	76	160	17	0	257	2.7 partially true
Responses from fellow-students, mentor...	45	66	42	42	60	255	3.0 partially true
Opportunity to observe work of others	6	44	61	74	73	258	3.6 mostly true
Consciousness, that my fellow-students and mentor can see me at work	11	45	102	56	44	258	3.3 partially true
MOSTLY I FEEL LONELY.	86	80	37	5	13	251	1.8 mostly not true
MOSTLY I FEEL INCLUDED.	36	23	66	80	40	245	3.3 partially true

learning environment with possibilities for socializing. Few (16.3%) of the participants felt nothing in such an environment, yet most are emotionally touched.

In the times before the internet has established its value, limited opportunities for inclusion¹⁰ were an important obstacle for successful e-learning. Our surveys did not show this, as we have been introducing e-learning since year 2000 when internet had already been put into force. Inclusion is mostly enabled by on-line services. Participants in this research pointed out greater possibilities for communication and the opportunity to observe the work of others. Alternatives got different support from the participants but none were rejected. For some, e.g. creating a group sense, program support is not needed, since it they can be a consequence of pedagogical organization. Participants deny the feeling of loneliness, but they do not feel included. By increasing some agents of inclusion during planning the e-environment that we have already researched (Rebolj, 2008a) this important factor of effective learning can be improved.

3.2 The effect on learning of the hybrid virtual-material environment enabled by mobile technology

Alternation of the material and virtual environment takes energy. There has been a lot of research done on this subject all around the world. In Slovenia we implemented trial on-line self-directed learning in 2006, and researched this subject among students of elementary schools and high schools (Rebolj and Požlep, 2007) when they were asked about their

feelings during general e-learning and during learning in the virtual environment supported by mobile devices. Wireless internet, satellite communication and ergonomical mobile equipment enable the student to become a nomad who constantly »lives« in a network, except when he or she willingly turns it off. The student moves from the material to the virtual world and back again. In this manner the student becomes a crossroads of real and artificial worlds that eventually integrate themselves into one hybrid world. It is necessary to think about what is reasonable to offer to this student in a classical way and what in the form of e-learning. For example, why would we study the forest on-line if it is near to the school? When the student has a wholesome experience from nature, he/she can study it further in the virtual environment and observe accelerated processes, e.g. influence of seasons or effects of pest, consequences of planet destruction or simulation of its economical meaning. When the student comprehends the forest, he/she can go on virtual excursions of forests all over the world and thus construct wholesome knowledge.

Only about 10% of our participants believe they have had experience with the hybrid learning environment, while others just help themselves with certain information from another environment, but do not alternate. Perhaps this question came too early to our participants. Among their own answers the participants mentioned that mostly they do not have any influence on the choice of learning environment, since their learning environment is organized by the school, and therefore they have to adapt not choose. Computers frequently do their routine and math tasks. If a virtual environment is not well prepared, they have too much work to do on their own, so they avoid it. The virtual environment is comfortable if everything is in it not »a little bit in, a little bit out« or »don't know where

¹⁰ *Inclusion* is a feeling of being with fellow-people, regardless of their actual presence. A person can feel included even when alone or lonely, even if surrounded by people. Some feelings of inclusion can be virtually created. The opposite of inclusion is *exclusion*.

Table 5: How do virtual and material learning environments most frequently complement each other during your learning?

STATEMENT	SUM of answers	%
I learn either in the virtual or in the material environment and during intensive learning I do not alternate with them.	95	36.8
When I learn in one of the environments I help myself with information from the other from time to time.	75	29.1
I learn alternately in one or the other environment, but not in both at the same time and I do not alternate with them during learning.	22	8.5
I learn in both environments at the same time, e.g. I read a printed book and study virtual material.	7	2.7
I learn with my laptop, wherever I am (e.g. on the train, in nature...) without any other instruments.	26	7.9
Other.	45	17.4
SUM	258	100

it is«. Some prepare copies from the web to learn on a train or by the seaside, where they are not online. They added that it is reasonable to choose an environment that takes less effort, regardless of technological development. Someone wrote: »The future of all man's activities is a combination of material and virtual and we have to accept it, but I have no intention of extra practicing. «.

Mean was calculated from an absolute number of answers with ponderation: absolutely not true = 1, mostly not true = 2, partially true = 3, mostly true = 4, absolutely true = 5). Pondered means were converted back to answers. When they get an assignment on-line, they have to solve it in their notebooks or put data in web tables and then interpret them in front of the school blackboard. There is a possibility to solve the whole task in a virtual environment, where all the tools are available, but this takes special preparation. When paying more attention we could decrease the satiation with information during learning and add tools to filter and range. Students need general

knowledge on information management and instructions for the use of learning sources.

During »the stay« in the virtual environment, interruptions by people from the material environment are disturbing. When students in pairs worked in a virtual environment but in a common computer classroom with the teacher giving them instructions they frowned and tried to avoid his voice. Elementary school pupils chased away their classmates who joined them out of curiosity and are usually welcome during classical work. It is exhausting if they have to solve the task partially in the material and partially in the virtual environment: »It is somewhat as if someone from the street shouted remarks or instructions while they were concentrating on their work in a school classroom. «. On the other hand, it is not exhausting if they work on the assignment in the material world and use the computer for processing data, since they do not enter the virtual space.

Table 6: What is true for you when you are a mobile student, who moves around different locations and from virtual to material environment and back during learning?

STATEMENT	1	2	3	4	5	SUM	MEAN
I can learn in almost any material environment where there are not too many disturbances.	78	10	88	22	50	248	2.8 partially true
If I learn in a virtual environment instructions from a live person, like a teacher in the room, bother me.	0	3	123	114	10	250	3.5 mostly true
Learning with the help of mobile devices, for instance the mobile phone is a good acquisition for me.	80	117	18	40	3	258	2.1 mostly not true
Feeling that learning content is connected to you everywhere and every time is burdening.	31	65	86	72	0	254	2.8 partially true
I am very burdened because too much information obstructs me.	20	43	67	46	76	252	3.5 mostly true
Mobile learning (partially material, partially virtual environment) takes more energy than learning the same content classically.	18	22	32	105	45	222	3.6 mostly true

Mostly not true, say the participants about the positive acquisition of learning with a mobile phone, as the computer industry is trying to show us lately. This time we have no record of the causes, but in the past miniature devices that on the one side relieved the student ergonomically (pocket size), burdened him/her on the other (strain of eyes and fingers). People also like to separate devices used for fun and devices for »serious« activities such as learning.

3.3 Perception and remembrance

An important condition of successful learning is support to student's remembrance, meaning that he or she organizes and connects the perceptions. Information from the virtual world is related to information from the material world and student's experience. Penetrability of the stimulus is important for remembering, since it determines the intensity of perception (Rebolj, 2008b).

Other than perception as an event of meeting information, we also have to take care of the exclusion of unnecessary and the choice of preferential information. Each student has a unique memory structure and his/her own optimal way of remembering. Since it is not possible to please everyone at the same time, we must offer information and links in the virtual environment in various ways and enable students' choice.

When dealing with remembrance we are also interested in the duration of remembrance and recall of information. There is little possibility for drill in the virtual environment so we usually go around it. Often the whole learning process is oriented towards learning, and during this process the student makes sense of the content and uses it practically in various situations with various levels of skills needed. This design serves the retention of the student on the same content, as our participants confirmed.

We also asked them about the effect of a 3D mind map on remembrance, since the two-dimensional version is well researched. Regarding this we tested two statements. The first is related to a table of contents in the form of a tree, which clearly represents the content structure. The other refers to tree-structured material where there are links to additional

texts under the »major branches« (hypertext). We already know the advantages of a flat mind map. Our adult students mostly say that they remember the hyper texted content better. This is a tip for practice in preparing e-materials. If we add a tree-structure table of contents, remembrance will have additional support, since this enables an overview of the content.

As other research has shown, multimedia are important but not at the top of the facilitating factors of remembrance. One third of the surveyed participants say that multimedia mostly do not facilitate their remembrance. Based on other researches, we could presume that multimedia play a more important role in understanding content, maintaining motivation and as a choice for students with special learning styles, but this was not an issue research.

3.4 Consciousness of one's own learning and perception of perception

The intention behind this question was to find out how well adults know their own learning and whether sense important differences in their learning in the classical and virtual environments. Do they observe their own perception? Do they think about their own learning? Do they follow up on their own learning progress and their learning ability?

If we start with the last of the statements, we notice that only a few participants are burdened with the thought of being unsuitable for learning in the virtual environment. The prevalent answer confirms that learning in the virtual environment is substantially different than learning in the material world. Participants also know more about their own learning in the material environment. We can see the opposite regarding the virtual environment. Participants evaluated that it is »mostly true« that they learn more easily in virtual environments than in the material one, and »mostly true« that there are more facilitating factors present in the virtual world, but they know less about their process of learning than they do in the material environment. Factors are either conscious or unconscious but very hard to determine. While schools for adults mostly offer programs for learning about learning when someone enrolls, they have no programs for these new forms of education, there

Table 7: What do you remember better?

STATEMENT	1	2	3	4	5	SUM	MEAN
I mostly remember contents on printed material better than contents I read on the screen.	63	71	51	43	16	244	2.5 mostly not true
I better remember contents that are supported by multimedia (pictures, sounds, etc.).	1	83	99	22	45	250	3.1 partially true
I better remember contents that touch me personally.	12	60	61	57	64	254	3.4 mostly true
I better remember contents that demand more work that is also more versatile.	0	0	15	32	211	258	4.8 absolutely true
I better remember the contents that are represented in the form of a tree structure.	24	67	14	91	56	251	3.4 partially true
I better remember contents in multilayered texts, arranged as hypertext (with links to additional texts).	22	32	11	188	3	256	3.5 mostly true

Table 8: How well do you know yourself as a student?

STATEMENT	1	2	3	4	5	SUM	MEAN
I learn substantially differently in the virtual than in the material environment.	20	17	14	178	12	241	3.6 mostly true
I know well how I learn in the material (classical) environment.	0	11	125	34	4	250	3.2 partially true
I know well how I learn in the virtual environment.	44	111	62	15	30	236	2.8 partially true
I comprehend easier in the virtual than in the material (classical) environment.	13	14	76	77	78	258	3.7 mostly true
For me there are more facilitating factors for learning in the virtual than in the material environment.	2	61	10	181	12	255	3.8 mostly true
I frequently seek within me for more efficient ways of learning.	3	161	27	45	15	251	2.6 partially true
I perceive my learning progress during learning.	3	13	201	39	0	256	3.1 partially true
It is easier for me to follow up my learning in the virtual than in the material environment.	4	26	67	145	13	255	2.8 partially true
I think I am not suitable for learning in the virtual environment.	54	189	10	2	2	257	1.9 mostly not true

is also a lack of didactical theory and practice, not to mention staff with this kind of knowledge. Following up on one's own progress is usually technically supported in virtual environments. Students can take tests during studying or gather progress points for the progress collection. Thus it is understandable, that most participants find it easier to follow up on their progress in the virtual than in the material environment.

The answer to the question *What has positive influences on your learning in the virtual environment?* is known from reflection questionnaires participants fill out after finished studies. It seems that students are more perceptive of the negative influences than the positive. It is easier to range e-environments or e-materials according to their attraction, but students do not recognize details. Carefully prepared, organized environments have an advantage: structured content, aesthetical image, logical environment, short response time of the mentor and »everything to learn at reach of hand« are attractive, which is greatly in concordance with theoretical conclusions on perception, the information glove and perception loop.

3.5 Effects of the unconscious on learning and student activity

As we mentioned in the Introduction, the existence of the unconscious is often shown in evaluation of e-material or the learning process in the e-environment by the students. Even if there are big differences among answers, the students have a hard time explaining why something is so much better than something else or, for example, what puts them in a good mood in a certain environment and why the other environment does not. We have been asking educators about consciousness

and the effects of the unconscious in e-environments during e-learning didactical seminars¹¹. We also asked 38 IT experts from various Slovenian computer companies the same questions during the Days of Slovenian IT 2009, and these questions were also posed to participants of the first part of this research. In the survey for students and educators we named the people students, while the survey for IT experts employed the term users. Even with non-representative samples the differences are so obvious that they are worth mentioning. By valuating the answers (not true=1, partially true=3, true=5) we got the average values for each sample. We transformed them back to answers (under 2.5=not true; 2.6 to 3.5=partially true; above 3.6=true).

IT experts put the unconscious forward more than the other two groups, adult students are second. IT experts mention that marketing of computer products and services is based on the unconscious. There are some psychological studies in progress that are discovering many more unconscious factors, also some with short-term effect such as fashion. Adult students also wrote that they do not think about the unconscious. Sometimes, though, they have a hard time explaining why certain contents are so easy to learn and others that seem similar, so hard.

Everyone believes in the possibility of manipulating the user, though this is not necessarily non-ethical. Teachers and students believe that unconscious factors can be a relieving help to the learner, and IT experts believe this is even stronger. We can see the mirror image of this with the question of effects of the unconscious on dehumanization (turning people into machines, blocking their minds, emotionally paralyzing them) – teachers believe, that the most and IT experts do not believe that at all.

¹¹ Data are summarized from the survey questionnaire for participants of INTER-ES's seminars in August 2007 and September 2008 and the Andragogical institution Maribor in November 2007, 54 people altogether.

Table 9: According to your experience, how important do you think the unconscious is for the user/student in an e-environment?

Statement	Mean	Mean	Mean
	Teachers N = 54	IT expert N = 38	Adult students N = 25 ^e
Unconscious factors have important effects on the user (student) of the e-environment.	2.8 partially true	4.6 true	3.5 partially true
Efforts towards favorable unconscious influence over the user (student) in an e-environment are necessary.	1.2 not true	4.4 true	2.0 not true
Unconscious factors of the e-environment enable manipulating ¹² users (students).	3.8 true	3.2 partially true	3.4 partially true
Unconscious factors can be a relieving help to the user (student).	2.6 partially true	3.8 true	2.9 partially true
Unconscious factors can have a bad affect on the user, because they can, for example, turn him/her in a machine, block his/her mind or emotionally paralyze the user.	3.6 true	1.8 not true	3.0 partially true

Researching the unconscious directly is problematic. A better method than surveying would be systematic observation, and an experiment would be even better. A person can be aware of certain actions influenced by the unconscious, but does not know their origin. We recognize the unconscious better when looking back using our memory. Human mentality can suppress the unconscious, especially in relation to unpleasant things. The unconscious is affected by previous experience, which is very different especially when using IT. In the described circumstances, where survey was the only method available, we posed a question relating experience without any known cause.

Participants have attributed the following feelings without known cause (ordered by frequency):

1. Fear or embarrassment on how they are going to function in a virtual environment – 22 attributions
2. Concern that, the technology will not function or that the machinery is not capable enough – 21
3. General joy, satisfaction or feeling good - 19
4. General anxiety or worryment - 14
5. Lack of orientation, feeling of being lost in an unknown environment - 10
6. Not perceiving order, structure, rules - 10
7. A sense of a foreign, unknown world - 9
8. Feeling of being trapped, not free, routine demands, demands on behalf of demands - 9

Judging by the answers, virtual environments most frequently trigger emotions, but possibly some other feelings that can also be pleasant or unpleasant, that calm down or excite students. The »not true« answer is prevalent (54%) to the question about one's own integration in the virtual environment (»It can suck me in or throw me down. «). As the previous answers and theoretical conclusion suggest, integration in the environment is gradual and dependent on length of experience with IT.

Practitioners realize that students during learning focus on the main content and method, while other things are marginal, for example diagrams, illustrations, stories, metaphors, music curtains and extra information. These can facilitate or decelerate the learning process, but they do contribute to a richer stock of in-depth knowledge – with a time delay. It is reasonable to systematically invest in unconscious factors of learning and to study the effects.

4 Conclusions and challenges for research in adult education

The reinforcing constructivist approach to learning puts the learner in the center as a recipient who is active in this role. The penetration of informational technology into work and private life has brought greater and quicker changes than the earlier technological developments. This makes research more difficult, since not only the learning process changed but also the former student has disappeared.

In the light of learning perception this »new man« in general and the new man as student demand a different didactical treatment, and didactics need expansion. Even though a lot of didactics from past centuries is still useful - and we will not reject it out of pure technical vanity - new questions are being posed and the »old didactics« has no answers. It is hard to reliably answer the question of what we need more: comprehension of the new day student or a new didactical concept, but for sure there is a lack of non-commercial and relevant research.

We are probably at a point where a fatal decision has to be made. Do we reject technology as a disturbance that is also the fruit and symbol of human development, or do we build up didactics in such a way that we can use technology for

¹² The term *manipulation* refers to directing another person without their will cooperation (in neutral meaning).

Table 10: Which are the most frequent experiences in the virtual environment without known cause that you remember?
(Please, evaluate all experiences below or write down one or more of your own.)

EXPERIENCE	%		
	not true	par- tially true	true
Virtual environment can either give me or take away my will to learn.	26	28	46
I can get attached to the virtual environment.	41	32	27
I feel satisfaction or dissatisfaction with myself.	4	30	66
It can suck me in or throw me down.	54	26	20
Learning (work) by nature can be pleasant or unpleasant.	3	15	82
It can emotionally activate or block me.	18	14	78
It can calm me down or get me excited.	12	20	68
It affects my decisions, which would probably be different without it.	12	12	76

learning, education, human growth, career development and for ageing worthy of man? And study the learning all over ageing. Current circumstances leave an impression that we are in a dilemma over whether to put our foot on the gas or the brake relating to e-learning. The third option is to put it in neutral gear and wait for the future to bring us the answers, even though outside of education it is clear that e-learning and mastering virtual worlds are becoming a social necessity and an essential skill of the individual; lack of these skills, on the other hand, segregates and stigmatizes people.

Planning further research would probably be reasonable as a dichotomy: as research into didactics and research on the student and influences or lasting effects of IT on the learners, respectively. Due to the meaning of culturally different conditions in the process of learning, this mission cannot be accomplished through the mere transfer of foreign knowledge.

5 Final thoughts

Several times in the past we have faced attempts at modernization of the class, for example with school television or language laboratories that demanded great expenditure. Again the technology is available but the pedagogical concepts are missing. So the question of what to do with this technology puzzles us. Previous experience shows that the technology was sent to the attic and the teacher continued to teach without it. We can see this tendency also with IT, but it is becoming a necessity in the business world and it differs from the old phono-laboratories.

Besides the dilemmas related to technology, prevalent school tendencies are also important. Oriented towards the future or towards retention of the existing state. Our pedagogical discourse, according to Protner (Protner, 2008), frequently consists of two antinomies: the old and the new school, and the useful versus the shallow school reforms. Both have attributions of value. The concepts polarize when there are no expert arguments for determining what is progressive or what is back-

ward at a certain moment in time, what is good, what is bad, what is conservative and what liberal. If there are scientific arguments there will be no exhausting the process of progress. If there are not any, progressive takes the form of imaginary pedagogical practice that has its defenders in a certain political or otherwise defined moment, but there is no point in taking it seriously. There are some signs that we are going into such a state in the field of informational technology.

In order to determine and enforce progress in education, key polemics and reflections are necessary. Shifts, that would enable expert discourse on informatization of learning, have not been sufficiently present even though there has been time enough for them. Lack of pleasant reflection automatically brings forth an unpleasant one. In these cases, opposing innovation can become progressive. The business world on the other hand, which will put our adult learner's knowledge into practice, demands competent educated employees.

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Pomen percepcije in zavesti za učenje, podprto z informacijsko tehnologijo

V članku so predstavljeni rezultati raziskave o percepciji med učenjem odraslih v virtualnem okolju, ki je bila opravljena z namenom raziskati nekatere vzroke za upočasnitev napredka pri uvajanju e-učenja pri nas. Percepcija in njeni učinki na učenje so pomembni na zavedni in nezavedni ravni, vendar jim ne posvečamo toliko pozornosti kot v bolj raziskanem klasičnem učnem okolju. A motena percepcija, ki je posledica premalo strokovne priprave e-okolja, je pomembna ovira za učenje. Raziskava je bila namenjena odkrivanju nekaterih rešitev za učno prakso. Hkrati pa raziskava potrjuje tezo, da ne moremo vedno zaključevati na podlagi nekdanjih resnic o učencih, saj se tudi ti spreminjajo pod vplivom tehnologije. Pomanjkanje strokovnih argumentov in dobre prakse sproža pedagoški konzervativizem, ta pa lahko šolski napredek, tudi v izobraževanju odraslih, vodi v nasprotno smer, kot jo zahtevajo poslovni procesi v organizacijah, iz katerih prihajajo in v katere po šolanju odhajajo odrasli učenci.

Ključne besede: e-učenje, e-izobraževanje, virtualno učno okolje, percepcija, odrasli, pomnenje

Developing Soft Skills for Engineering: Experience with Student Team Projects

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While advanced technologies are entering schools at all levels, we claim that other skills required to deal with them in the complex modern world should not be neglected in the education system. In this article, a promising approach to interdisciplinary postgraduate education is described. The idea of the »Team project« course is to give the students the opportunity to gain experience in an extensive project where various skills are needed, e.g. teamwork, coordinating work, project management, research, problem solving, public presentations, time management, etc. The course is obligatory and held in the first year of the master study program at the School of Engineering and Management of the University of Nova Gorica. The main advantage of the course is to give the students hands-on experience of work on a project that is very close to reality. Students are forced to gain experience in teamwork and to overcome the uncertainties and obstacles that arise in such projects. Since the launch of the course, several improvements have been made with the aim of improving the performance of the course. Nevertheless, the course remains a challenge for both students and teachers.

Key words: teamwork, student project, engineering and management

1 Introduction

Solving problems in the complex modern world requires a lot of knowledge, creativity and collaboration. In the education system, the prevailing emphasis is on knowledge. To prepare students for the difficult challenges of tomorrow, just bringing more »ready-to-use« knowledge into the process might not be sufficient, because the amount of ever-changing specialized knowledge is too large. Therefore, it is important to teach students how to acquire newly developed and disseminated knowledge by themselves and equip them with knowledge technologies to support them in this process (Urbančič, 2007). It is also becoming imperative to bring the knowledge and creative potentials of individuals together through teamwork. The concept of network intelligence as the capability of going beyond a fixed individual identity through dialog, mutuality and trust (Palmer, 1998) is becoming more and more important. Consequently, the aspects of creativity and collaboration should also gain importance in education (Burns and Jordan, 2006). Therefore it is not surprising that training in communication, networking and team-work is explicitly listed among the necessary improvements suggested in the proposal of the European Commission on how to modernize Europe's universities (Europa Press Release, 2006).

In engineering study programs, the prevailing emphasis is of course on engineering knowledge and skills. Besides highly

specialized individuals, the industry and other employers also need professionals with the ability to connect the technological, economic and organizational aspects needed for the success of an enterprise. It is a big advantage for engineers to understand the connection between technical solutions and their economic aspects, and also to be prepared to work in interdisciplinary teams.

One of the study programs preparing students for this kind of job is Engineering and Management at the University of Nova Gorica. The lack of this profile may be indicated by the fact that the employability of graduates of this program within one year of graduation is over 96%.

Several good examples of introducing team-work projects into schools are known. Most early ones were from the United States, where some very successful forms of it have been developed - such as "d.school", originated at the Stanford Institute of Design (<http://www.stanford.edu/group/dschool>) and also introduced in Slovenia through the activities of Faculty of Economics at the University of Ljubljana. When designing team project work for students of engineering and management at the University of Nova Gorica, we were inspired by the team projects carried out at the International Space University (<http://www.isunet.edu>). The main elements of the course are learning by doing, combining knowledge from different backgrounds, fostering creativity and, most impor-

tantly, experiencing problem-solving and decision-making in an interdisciplinary team.

2 Methodology

The »Team project« course was launched in the 2006/2007 academic year. First the theme of the work was defined. The academic staff of the University of Nova Gorica was asked to make suggestions for the goals of the project. Of all the submitted suggestions, »Alternative uses of aluminium« was chosen as the project theme. The goals of the project were as follows:

- to propose new ways of using aluminium;
- to prepare a business plan for these new uses for potential investors;
- the presentation of the business plan to potential investors/users.

Twenty-four master students participated in the course. The participating students had various graduate backgrounds (4 engineering and 20 engineering and management). All of them were employed and had more than two years working experience on average. The course lasted for 18 weeks and the project was divided into 5 phases. The project plan is depicted in figure 1. In the first phase, an overview of aluminium production and usage was given. During this phase, a field trip was organized to an aluminium production plant and aluminium processing plant and an overview of the literature was presented to the students. This phase lasted 1 week. In the second phase, the students were divided into four groups. During that phase, each group conducted a study of

current state of the art in the field of aluminium use and prepared 3 ideas for alternative uses of aluminium in the future. This phase lasted 5 weeks and students had regular meetings once per week. They used different teamwork and problem solving techniques: brainstorming, weighted voting, Pareto analysis, etc. After the second phase, each group prepared a short presentation of 3 potential future uses for aluminium. The third phase lasted 2 weeks. During this phase all the participating students met twice. In the first meeting, each of the four groups from the second phase presented their 3 ideas for alternative future uses of aluminium. In the second meeting, 2 ideas were selected from the 12 presented for preparation into detailed business plans for potential investors. During the meeting, various decision making techniques were used, e.g. the definition of selection criteria, weighting the criteria and group voting. The fourth phase lasted 8 weeks. The purpose of this phase was the preparation of detailed business plans for the two selected ideas. During this phase, students were divided into 2 groups and each of the two groups was then further divided into 4 subgroups. Each of the 4 subgroups in each group prepared one section of the business plan: the market aspect, financial aspect, technological aspect and environmental aspect. At the beginning of the phase, four experts in the fields of marketing, business finance, materials and the environment gave the students an overview of their fields and guidelines for preparing the respective sections of the business plan. During this whole phase, the students had opportunity to consult these experts. In the fifth phase, the two groups prepared a final business plan and presentation for potential investors. The presentations were given to invited faculty staff.

Phase	Duration (weeks)	Groups and description of work				Output and comments
1	1	An overview of aluminium production and use, field trip to an aluminium production plant and aluminium processing plant				Output: a general knowledge of aluminium use as basis for further work
2	5	Group I.1: research and preparation of 3 ideas for alternative uses for aluminium in the future	Group I.2: research and preparation of 3 ideas for alternative uses for aluminium in the future	Group II.1: research and preparation of 3 ideas for alternative uses for aluminium in the future	Group II.2: research and preparation of 3 ideas for alternative uses for aluminium in the future	Output: 12 ideas for alternative uses for aluminium
3	2	Group I: Selection of one idea for the preparation of business		Group II: Selection of one idea for the preparation of business		Output: 2 ideas for alternative uses for aluminium
4	8	Group I.3: environmental aspect	Group I.4: technological aspect	Group II.3: Environmental aspect	Group II.4: technological aspect	Output: 2 business plans for alternative uses for aluminium
		Group I.5: market aspect	Group I.6: financial aspect	Group II.5: market aspect	Group II.6: financial aspect	
5	2	Groups I and II: preparation of final reports and presentation to potential investors				Output: 2 presentations of the business plans for potential investors

Figure 1: Project plan of the »Team project« course in the 2006/2007 academic year

The »Team project« course was conducted a second time in the 2007/2008 academic year. In this course, 17 postgraduate students participated (of these, 10 students finished engineering graduate schools and 7 finished engineering and management graduate schools). In this generation as well, most of the students already had at least two years of working experience. A business plan for the usage of a water source near Ajdovščina (Slovenia) was chosen as the theme for the project. The course lasted 8 weeks. Students were divided into 3 groups. Each group worked on the preparation of one aspect of the business plan: marketing, technology and finance. During the course, the students had 10 scheduled meetings. The project plan is presented in Figure 2. In the course, four tutors/consultants were available to the students: one industry expert with problem solving and project management skills, one industry expert in marketing, one industry expert in project management and finance, and one industry expert in the field of water treatment and water filling technology. During the course, the experts each held an introductory lecture in their field of expertise. In addition to that, students were given one lecture on final report preparation and public presentation. During the teamwork, the teams had the opportunity to consult each expert three times (see Figure 2). In the last session, the business plan was presented to a broad audience consisting of university staff, participating experts and invited potential investors. The students also prepared an official final report with a detailed business plan, which is available in the university library (Bizjak et al., 2008).

3 Results

In the 2006/2007 academic year, the students prepared two business plans for various alternative ways of using aluminium. The first idea was a do-it-yourself glass pavilion, which would have the following characteristics: light weight, low cost, flexible, expandable and ready for self-assembly (Stokelj et al., 2007). The second idea was a light and flexible greenhouse with the following characteristics: light weight, flexibility, modularity and multi functionality, also including a watering function, which brings additional added value for the user because no additional watering system is needed (Boškin et al., 2007).

In the 2007/2008 academic year, the students prepared one business plan for the idea of water filling at the Source Skuk near Ajdovščina (Slovenia). The main idea of the business plan was to create some extra value for the bottled spring water. It is known that there is fierce competition in the bottled water market segment. Therefore the students created an innovative idea for a brand called »Fortuna«, addressing the human desire for good luck and aiming to attract people looking for this at specific places, including casinos.

After the course, students were asked to fill in a feedback questionnaire. The main positive comments were related to the work in teams, the informal communication and socialization with their colleagues and the final presentation of the business plans.

The students' main complaints were related to the themes of the project (the students would like to choose their own the-

Session	Weeks lapsed	Description of work	Experts present
1	0	Introductory lecture: team work, problem solving, presentation of the theme, instructions for work, definition of groups	Problem solving
2	1	Introductory lecture: project management, business plan	Project mngt and finance
3	2	Introductory lecture: water filling technology; teamwork	Water filling technology, problem solving
4	2	Introductory: lecture marketing plan; teamwork	Marketing, problem solving
5	3	Teamwork	Project mngt, problem solving
6	4	Teamwork	Problem solving
7	5	Introductory lecture: public presentation; teamwork	Presentation, problem solving
8	6	Introductory lecture: report writing; teamwork	Problem solving
9	7	Teamwork	All
10	8	Final presentation	All

Figure 2: The project plan of the »Team project« course in the 2007/2008 academic year

mes for the project work), the management of the project (the students would like the project to be managed by the professor and not by one of them, or at least the organizational structure of the project should be arranged by the professor), scheduling (the students would like to locate the course in the second year of study, where the atmosphere would be more relaxed due to the better social relationships among the students) and the lack of analysis of the problems and experiences accumulated during the project.

4 Discussion

The idea of the »Team project« course was well accepted by both students and teachers. From the experiences so far, we can conclude that the course achieved its main aim – exposing the students to work on complex projects. The students that passed the course gained useful experience in research work, interdisciplinary teamwork, project management, problem solving, the presentation of business plans, and other »soft skills« needed in such projects. Even the students' complaints mentioned above actually indicated that the course succeeded in providing a simulation of a real situation, including typical problems with meeting dead-lines, taking personal responsibilities towards the team, learning about completely new things and looking for solutions without being told directly how to do it. It is important for students to have this training in a sufficiently complex, interdisciplinary and »almost real« but still controlled and safe situation.

During the courses, the teachers also gained precious experience of interdisciplinary work with students. The main lessons learned could be summarized as follows.

- The crucial elements of the project should be well defined at the beginning of the course, especially the goals, time frame, phases, goals for each phase and milestones.
- In the first execution of the course, the theme was rather difficult to understand for most of the students. While this offers an opportunity for students to develop skills in grasping new technologies, themes and problems, it might require too much effort, considering that the available time is rather limited. If the main goal is to develop teamwork and project management skills, the theme of the project should not be too complicated.
- The structure of the project should be as simple and logical as possible. In the first execution of the course, we planned too many phases and too many group reforms.
- Regular meetings should be scheduled during the course. Extended periods between meetings dilute the effort.
- Not too many other obligations should be planned for the students during the team project. In the first execution of the course, the students had two other courses running parallel to this one, which distracted their focus.
- The length of the course should be no longer than 10 weeks. This enables the right focus of the students and is close to the usual time frames of mid-complexity projects in the real business world.
- In some engineering studies, not much emphasis is placed on presentation skills. Therefore, instructions and guidelines on the preparation of final reports and presentations should be provided.
- Students were not very active in seeking help from the external experts provided, although this could be very useful. The role of the experts should be promoted.
- Students like using easy-to-use templates, such as templates for project plans, reports, minutes of meetings and other deliverables, which are created during the execution of the project. The use of templates leaves more time to spend on other, more important tasks and objectives.
- It is important that students are well informed about the objectives of the course in advance. It is also crucial that there is some time scheduled for discussions and analysis of problems, experiences and the lessons learned, which should also be summarized in a final discussion after the final report is given.
- Students prefer to be given specific instructions and want the team to be managed by the teacher. However, too much instruction and external control contradicts one of the important objectives of the course, which is the development of self-organization skills, personal initiative and responsibility. We believe that finding an appropriate balance in this respect is crucial for the success of the course.

In general, we can conclude that the »Team project« course brings added value to the study program by developing several important skills that cannot be obtained through the usual »Ex cathedra« learning style. In the future, some additional refinements to the course will be implemented in order to make it even more effective. However, no matter how successful such single courses at the university level might be, we strongly believe that the development of the skills needed for teamwork and for »open« problem solving without direct instruction or recipes should be supported throughout education at all levels.

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Razvijanje mehkih znanj na tehničnih fakultetah: izkušnje s študentskim delom na projektih

Medtem ko si sodobne tehnologije počasi utirajo pot v izobraževalne programe na vseh nivojih, ne smemo pozabiti tudi na razvijanje sposobnosti za uspešno uporabo teh tehnologij za reševanje kompleksnih problemov v sodobnem svetu. Članek predstavlja obetaven način pridobivanja kompetenc za delo v interdisciplinarnih projektnih skupinah. V predmetu »Skupinski projekt« na bolonjskem magistrskem programu Gospodarski inženiring študentje pridobivajo izkušnje in razvijajo sposobnosti timskega dela, koordiniranja, projektnega vodenja, raziskovanja, reševanja konkretnih problemov, predstavitev rezultatov javnosti in upravljanja s časom. Predmet je na programu v prvem letniku kot obvezna sestavina študijskega programa. Študentom nudi konkretno izkušnjo projektnega dela, podobnega tistemu v realnih poslovnih okoljih. Preizkusijo se v interdisciplinarnem timskem delu, pri čemer morajo premagovati negotovosti in težave, ki se pojavljajo pri tovrstnih projektih. Po prvih izvedbah se je nabralo že več izkušenj, s pomočjo katerih izboljšujemo izvajanje predmeta. Kljub temu še vedno predstavlja precejšen izziv tako za študente kot za profesorje.

Ključne besede: skupinsko delo, študentski projekt, gospodarski inženiring

Teaching Scrum in Cooperation with a Software Development Company

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The increasing use of agile methods for software development creates the need for these methods to become part of the education of future computer and information science engineers. On the other hand, teaching these methods gives us an opportunity to verify individual agile concepts and their effectiveness. For that reason, project work is an appropriate and frequently used form of teaching that enables students to get acquainted with agile methods and, at the same time, provides case studies for evaluating individual agile concepts. We describe our approach to teaching the Scrum agile method, within the software technology course, in cooperation with a software development company. Students were taught through work on a real project for which a list of requirements was submitted by the company. A co-worker of this company participated throughout the teaching period playing the role of customer's representative. During their work, students consistently used the Scrum method and at the end of each iteration they evaluated their experience by means of a questionnaire. In the article, the Scrum method is presented first, then a description of work on the project is given and finally the results of the survey are described.

Key words: agile methods, Scrum, software development, computer engineering education, university-industry co-operation

1 Introduction

The role of agile methods (Abrahamsson et al., 2002) in software development is increasing. The results of the survey published by Dr. Dobb's Journal in 2008 (Ambler, 2008) show that the introduction of agile methods increases productivity, quality and satisfaction of the software development stakeholders. A comparison between companies that use the agile approach to software development and companies that use traditional disciplined approach (Ceschi et al., 2005) showed that adopting the agile approach improves project management and customer relationships. Nevertheless, in spite of the positive experience, there are still doubts about the effectiveness of agile methods, as if by using a few typical practices in extreme measure they bring instability and increase risk.

It is very important for the future computer science engineers to receive knowledge about agile methods during their studies. Since there are often opposite opinions about the effectiveness of the agile approach, teaching these methods offers many opportunities to check individual concepts in practice. Therefore, courses that deal with software development often include practical project work on almost real problems, so that students can familiarize themselves with the advantages and disadvantages of the agile approach. The examples of such courses include teaching of extreme programming (Shukla and Williams, 2002; Dubinsky and Hazzan, 2003), testing the effectiveness of test driven development and

pair programming (Xu and Rajlich, 2006), and teaching the differences between agile and disciplinary approach to software development (Robillard and Dulipovici, 2008).

This was also the approach that we have chosen in the academic year 2008/09 for the final software technology course at the Faculty of Computer and Information Science at the University of Ljubljana. The course is taught to Computer Science students in the last (eighth) semester of their studies. We have selected the Scrum agile method (Schwaber, 2004), since it is one of the most widespread agile methods. Our goal was to test this method in circumstances which reflect reality and to monitor development process performance by using metrics, defined in (Mahnič and Vrana, 2007).

In order to enable students to work on an almost real project we have contacted the company SRC, one of the leading Slovenian software development companies. For the purpose of our course, SRC presented the students with the requirement specifications for the project "General Hospital Information System" and also provided an employee (a post-graduate student) who played the role of *Product Owner*. In Scrum terminology this is the customer's representative or domain expert responsible for functionality of the new software. Students' task was to implement the given requirements by using the Scrum method and at the same time provide measurements used for calculating the indicators of the development process performance.

In the next section we shall briefly present the main features of agile methods and give a short description of Scrum. In the third section we shall present in detail the students' project which was used as a case study for teaching Scrum and implementation of measurements used for performance monitoring and building the repository in line with CMMI requirements (Mahnič and Žabkar, 2007). The fourth section will be dedicated to the results of the survey for the analysis of students' satisfaction with the Scrum method and project work. At the end, we shall state the most important results and experience gained by the described approach.

2 Agile methods and Scrum

2.1 The main features of agile methods

Agile methods have emerged as an alternative to the traditional, heavily documented and disciplined approach to software development. The features of agile methods are simplicity, little documentation and fast response to changes requested by the user. At the same time, the user is more actively involved in development of the new product.

The foundations of agile movement were established in 2001, when a group of 17 consultants and practitioners gathered and published the four basic values of agile methods (Manifesto, 2001):

- individuals and interactions over processes and tools,
- working software over comprehensive documentation,
- customer collaboration over contract negotiation, and
- responding to change over following a plan.

Since then the usage of agile methods has been constantly increasing. The aforementioned survey (Ambler, 2008), in which 624 information technology experts have taken part (71% from North America, 17% from Europe and 4.5% from Asia), shows that 69% of the participants have worked on the projects managed by agile methodology. We can also see that the success rate of these projects is 77.5%, which is much higher than the traditional approach.

In the literature we can find many agile methods, such as:

- XP-Extreme Programming (Beck, 2000),
- FDD-Feature-Driven Development,
- Crystal,
- Scrum etc.

According to data referenced by Schwaber, Leganza and D'Silva (2007), the most popular agile methods are Extreme Programming and Scrum.

2.2 The Scrum method

The Scrum method emerged in the first half of the 1990s. The origin of its name is in rugby and means bringing the ball back into the game. It is the software development approach which directs as iterative and incremental way of work.

The project is divided into iterations named Sprints. Each iteration (Sprint) takes 30 calendar days and must result in the working software code which presents a new (additional) software functionality. Software code must be completely tested so that the customer can use it. In this way, the customer gradually receives individual parts of the solution that he/she can

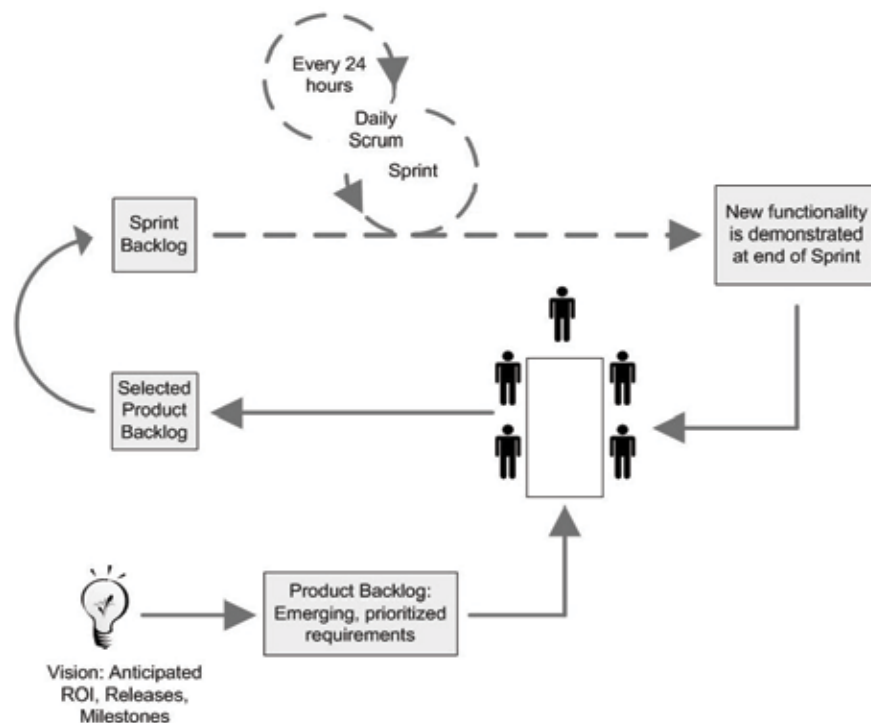


Figure 1: Scrum software development process (Schwaber, 2004)

immediately use. The Scrum method development process is shown in Figure 1.

The development is based on the list of the customer's requirements named Product Backlog. This list is maintained by the customer's representative (Product Owner) who represents users' needs and takes care of project financing. He/she adds new requirements if necessary and sorts them by priority determined by the present users' needs.

At the beginning of each iteration the customer's representative (Product Owner) meets with the development team (Team) so that they can together determine the subset of requirements to be developed in the next iteration. The meeting (Sprint Planning Meeting) takes 8 hours and consists of two parts, 4 hours each. In the first part the Product Owner and the Team agree which requirements from the list will be included in the next iteration. In the second part the development team builds the list of tasks necessary for implementation of the agreed requirements (Sprint Backlog). During the Sprint the bigger tasks are further divided, so that implementation of each task takes 4 to 16 hours of work.

During the iteration team members meet every day at a short 15-minute meeting (Daily Scrum Meeting) where each member answers three questions:

- What did you do yesterday?
- What are you planning to do today?
- What impediments stand in the way of meeting your commitments to this *Sprint* and this project?

In this way the project progress is transparent and immediate actions are taken when necessary.

At the end of each iteration the development team presents the results of its work to the *Product Owner* and all interested users. The presentation takes place at a special meeting named *Sprint Review Meeting* which enables users to comment on the work done and give their suggestions for the requirements to be developed in the next iteration.

Before the next iteration the development team meets with *ScrumMaster* (a person responsible for the Scrum process) in order to assess the work in the previous iteration and agree on the improvements that would increase performance and software quality in the next iteration.

Id	Product Backlog Item Description	Priority	Initial Estimate	Adjustment Factor	Adjusted Estimate
1	Creating new electronic medical record	1	40	1.3	52
2	Displaying electronic medical record	1	32	1.2	38
3	Searching electronic medical record	1	32	1	32
4	Changing electronic medical record	1	16	1	16
5	Dialog box for patient appointment reservation	2	40	1.3	52
6	Choosing a doctor	2	24	1	24
7	Displaying free terms of the doctor	2	24	1.2	29
8	Displaying the type of patient's appointment	2	24	1	24
9	Applying for an appointment	2	40	1.2	48
Sprint 1			272		315
10	Connection to the insurance company	2	24	1.3	31
11	Inserting an anamnesis	2	8	1	8
12	Displaying a list of medicaments	2	16	1	16
13	Displaying a list of diagnostics	2	16	1	16
14	Displaying a short CV of the doctor	2	8	1	8
15	Displaying a list of patients for an appointment	2	16	1	16
16	Inserting a new medical examination	2	16	1.5	24
17	Personnel records	2	32	1.2	39
18	Updating the status of the patient appointment and showing data for current patient	2	16	1.3	21
19	Operative interventions	2	40	1.3	52
20	Printing a prescription	3	24	1	24
21	Printing a medical certificate	3	24	1	24
22	Printing a doctor's note	3	24	1	24
23	Project documentation	3	20	1	20
Sprint 2			284		323
Release 1			556		638

Figure 2: List of requirements (Product Backlog)

The role of *ScrumMaster* is to a certain extent similar to the role of the project manager, but instead of determining and delegating individual tasks, he makes sure that the Scrum method is being followed in the most effective way. His important role is to provide the development team with optimal working conditions and to take care of immediate problem solutions.

The *Team* responsible for implementation of the required functionality has an interdisciplinary structure and is self organized. Team members delegate tasks by themselves and are collectively responsible for the success or failure of the project.

It is stated at the Scrum Community Wiki web page (2009) that Scrum is used by the biggest world companies, such as IBM, Microsoft, Oracle, Yahoo, Google, Toyota,

BMW, etc. as well as many small and medium sized companies. Scrum is used for all types of projects including financial, web and health-care projects.

3 Student project case study

The aim of the student project at the final software technology course was to teach students to use the Scrum method on an almost real project based on real requirements of a specified customer. In order to find this kind of project the SRC company was contacted, which prepared the list of requirements and provided an employee who played the role of customer's representative (*Product Owner*).

Task ID	Task Description	Responsible	Task Status	Hours Spent					Hours Remaining					
				1	2	3	...	13	0	1	2	3	...	13
T-2-01	Updating the data model	Patrik	Completed	5	2	0	...	0	10	5	1	1	...	0
T-2-02	Connection to the insurance company	Patrik	Completed	0	0	10	...	2	10	10	10	0	...	0
T-2-03	Inserting a type of insurance for a patient	Patrik	Completed	0	0	5	...	2	5	5	5	0	...	0
T-2-04	Displaying a list of medicaments	Rok	In Progress	0	0	0	...	2	10	10	10	10	...	0
T-2-05	Displaying a short CV of the doctor	Jure	Completed	0	0	0	...	0	5	5	5	5	...	0
T-2-06	Interface for the appointment list of the chosen date	Matevž	Completed	0	0	0	...	0	15	15	15	15	...	0
T-2-07	Updating the status of the patient appointment	Rok	Completed	2	0	2	...	1	10	8	8	6	...	0
T-2-08	Interface for measurements	Rok	Completed	0	0	0	...	1	10	10	10	10	...	0
T-2-09	Interface for diagnostics	Rok	Completed	0	0	0	...	0	10	10	10	10	...	0
T-2-10	Inserting operative interventions	Patrik	In Progress	0	0	0	...	0	15	15	15	15	...	0
T-2-11	Updating the status of the operative interventions	Patrik	In Progress	0	0	0	...	0	15	15	15	15	...	0
T-2-12	Printing a prescription	Matevž	Completed	0	0	0	...	2	10	10	10	10	...	0
T-2-13	Printing a medical certificate	Matevž	Completed	0	0	0	...	2	10	10	10	10	...	0
T-2-14	Printing a doctor's note	Matevž	Completed	0	0	0	...	0	10	10	10	10	...	0
T-2-15	Administrative interface for adding new doctors	Patrik	Completed	0	0	0	...	0	15	15	15	15	...	0
T-2-16	Administrative interface for adding new medical technicians	Patrik	Completed	0	0	0	...	0	15	15	15	15	...	0
T-2-17	Administrative interface for managing the scheduler	Patrik	Completed	0	0	0	...	0	15	15	15	15	...	0
T-2-18	SQL class->data planning	Matevž	Completed	1	0	2	...	0	10	9	9	7	...	0
T-2-19	Authentication and connection with insurance database	Matevž	Completed	1	4	0	...	0	10	9	8	8	...	0
T-2-20	Implementation of control classes	Matevž	Completed	0	0	0	...	0	10	10	10	10	...	0
T-2-21	Updating the WEB interface	Jure	Completed	0	0	2	...	2	10	10	10	8	...	0
T-2-22	Updating the status of the patient appointment	Jure	Completed	0	0	0	...	0	10	10	10	10	...	0
Total				9	6	21	...	12	240	231	226	205	...	0
									240	222	203	185	...	0

Figure 3: Example of the Sprint Backlog form

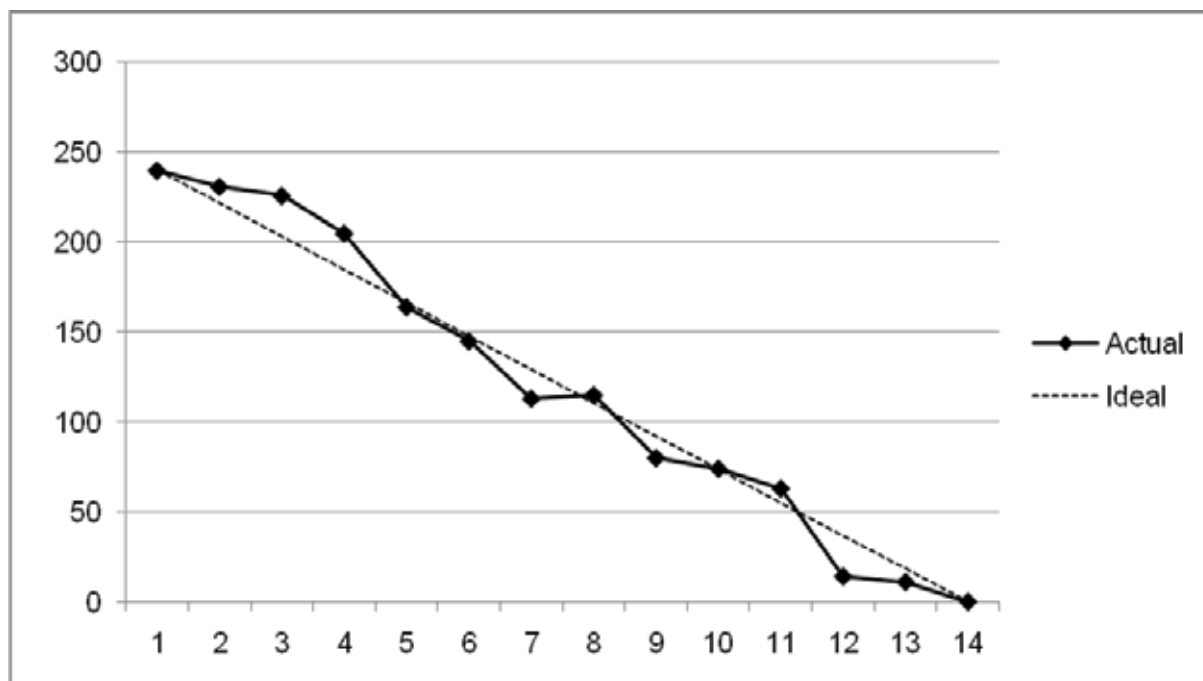


Figure 4: Graphical presentation of the amount of remaining work (in hours) – Sprint Burndown Chart

SRC is one of the leading Slovenian companies in the area of IT technologies and since its beginning has been supporting new ideas and project management methods with the aim of improving the internal working environment, quality of work and customer satisfaction. They have already implemented several projects using agile methods and intend to gain more experience and knowledge in this area. Therefore, the company has accepted the offer from the Faculty of Computer and Information Science in order to improve its knowledge about the theoretical and practical background of the Scrum method. On the other hand, the students have gained the opportunity to use the method on a real project provided by the company.

Since SRC and its company Infonet Kranj, d.o.o. have been offering solutions in the health area for a long time, the project was related to the development of the information system of a general hospital. The SRC company played the role of the customer, represented by their employee as a *Product Owner*. In order to make sure that the development would be in line with the Scrum method, we have precisely defined other roles on the project: the teacher played the role of *ScrumMaster* and students were grouped in three teams with four members. Each team independently developed the required software.

At the beginning, the *Product Owner* prepared the list of requirements (*Product Backlog*) shown in Figure 2. The requirements were grouped in several modules which included preparing and maintaining electronic medical records for each patient, patient appointment reservations and medical examination management, connection to the insurance company which provided personal data about patients and their insurance, and recording data on operative interventions. He

also prepared a rough data model and code tables, such as the code table of medicaments.

The project has been divided into two iterations. As required by Scrum, each iteration started with the *Sprint Planning Meeting*, at which the *Product Owner* presented requirements, and ended with the *Sprint Review Meeting* at which development teams have presented the results of their work. At the end of each iteration we have organized a *Sprint Retrospective Meeting* at which we analyzed advantages and disadvantages in the previous *Sprint* and agreed on the improvements in the next iteration.

Because of the obligations that students had with other courses it was impossible to expect that *Daily Scrum Meetings* would take place every day, as requested by Scrum. In order to follow the Scrum method requirements as closely as possible we have asked students to have meetings twice a week: on Mondays and on Thursdays. On Mondays the meetings took place during lab hours, at which the teacher (as *ScrumMaster*) and SRC employee (as *Product Owner*) were present. On Thursdays the students had meetings on their own. There were 11 meetings during the first iteration, which lasted from 2nd March 2009 until 6th April 2009 and 13 meetings during the second iteration, which lasted from 9th April 2009 until 1st June 2009.

For each iteration every development team maintained its own task list (*Sprint Backlog*). For each task the team determined the team member responsible for the implementation and estimated the number of remaining working hours necessary for the task implementation. At the *Daily Scrum Meeting* students recorded the number of hours spent on each task and estimated the number of hours remaining until completion of the task. The Scrum method requires only recording the

amount of work remaining, but recording the amount of work spent also enabled us to monitor performance indicators of the development process in the model described in (Mahnič and Vrana, 2007) and (Mahnič and Žabkar, 2007). In this way the project presented also the case study for the implementation of this model.

We have prepared a special form for maintaining the *Sprint Backlog*. The completed form for one of the development groups is shown in Figure 3. Students sent the filled form to *ScrumMaster* after each *Daily Scrum Meeting*. The data about hours spent and remaining enabled the *ScrumMaster* and development team to regularly monitor the work progress.

The total amount of work remaining was shown after each *Daily Scrum Meeting* as a chart named *Sprint Burndown Chart* which enabled comparison between the actual project progress and an ideal situation with the amount of work remaining decreasing linearly across time. *Sprint Burndown Chart* for the task list in Figure 3 is shown in Figure 4.

4 Questionnaire Analysis

After each iteration the students were asked to answer a questionnaire in order to get the response on their satisfaction with the project progress and their opinion on the Scrum method. 30 students participated – besides the students working on the hospital information system also the students working on the tool for project management based on Scrum. The questionnaire had 14 questions, for each question answers ranged from 1 to 5. Grade 1 was the worst and grade 5 was the best. For each question the students could write their comments and explain the grade.

4.1 List of Requirements

The first two questions were related to the list of requirements (*Product Backlog*).

Question 1: Clarity of initial *Product Backlog* (Was the *Product Backlog* for the current *Sprint* clearly determined?)

Did you understand the *Product Owner* requirements from the short description for each requirement?)

The general response was that the description of individual requirements was too short and not specific enough. But the majority of questions were answered at the meetings where *Product Owner* participated. As shown in Table 1 the average grade for this question improved significantly after the second iteration. The reason might be that we have prepared additional user cases for both projects, which gave students a better understanding of the requirements.

Question 2: Time estimate for the individual requirements from *Product Backlog* (Were the time estimates for the working hours required appropriate?)

The majority of students answered that the initial estimates agreed with the *Product Owner* were correct. The grade for this question also improved significantly in the second iteration.

4.2 The task list maintenance

Question 3: Administration of the Scrum method (Were the spreadsheets clear and easy to understand?)

Question 4: Administration workload

Maintaining the task list (*Sprint Backlog*) and recording the number of hours spent and remaining required additional administrative work from the members of the development team. Therefore, we were interested to find out how students evaluate this additional workload. The answers have shown that the students had problems at the beginning, because the procedure of filling the *Sprint Backlog* form was not clear, especially for the cases when bigger tasks had to be split into smaller ones and the initial estimate of work remaining had to be replaced with estimates for the new tasks. But later the students got used to the principles of entering data so that there were no special problems. This is reflected in the average grade shown in table 2 which rose in the second iteration from 3.7 to 4.3. Regarding question 4 we can see from the average grade that the students were equally satisfied with the administration workload, since the average grade 3.3 did not change.

Table 1: Average grades for the questions related to the list of requirements

Question	Sprint 1	Sprint 2
Clarity of initial <i>Product Backlog</i>	3.2	3.9
Time estimate for the individual requirements from <i>Product Backlog</i>	3	3.8

Table 2: Average grades for the questions related to the *Sprint Backlog* maintenance

Question	Sprint 1	Sprint 2
Administration of Scrum method	3.7	4.3
Administration workload	3.3	3.3

4.3 Technical and content problems

Question 5: Technical problems at the beginning of the *Sprint*

Question 6: Technical problems at the end of the *Sprint*

Members of each development team made the choice of development technology by themselves. A few groups selected familiar technologies, already used by some members of the team. Some groups decided to use new technologies and wanted to gain additional experience and knowledge, so they had more problems at the start. Technical problems were also related to integration of code written by different developers.

We can see from the answers that in the first iteration there were more problems at the beginning of the *Sprint* (average grade 3.3) and fewer at the end (average grade 3.9). By contrast, in the second iteration there were fewer technical problems at the beginning of the *Sprint* (average grade 4.1) and more at the end (average grade 3.7). This can be explained by the fact that at the beginning of the second iteration the students had already established the required technical infrastructure, but were coping with integration of the code into operational solution at the end. The details are shown in Table 3.

Question 7: Content problems (understanding required functionality) at the beginning of the *Sprint*

Question 8: Content problems (understanding required functionality) at the end of the *Sprint*

Regarding the content problems it was important that the development teams had no user representative who could promptly answer the developers' questions. Even though the Scrum method demands an interdisciplinary development team (including the user representatives), we could not organize it since all team members were developers. Therefore, the students suggested that it would be better if the customer's representative would test the software during the iteration and give comments promptly (and not at the end). In the first iteration the average grade for question number seven was 3.5 and for the eighth question 4.1. Similarly to the questions related to the technical problems, we can see that the content problems increased at the end of the second iteration, when individual programs had to be integrated in the operational solution. The average grades are shown in Table 3.

4.4 Cooperation with other project stakeholders

Question 9: Scrum Master Cooperation

Question 10: Product Owner Cooperation

Question 11: Cooperation with other team members

Regarding questions number 9 and 10 the students were satisfied with the *ScrumMaster* and *Product Owner* cooperation. Regarding question 11 many students made comments that they knew each other very well from before and this made their working together easier. With more heterogene-

Table 3: Average grades for questions about technical and content problems

Question	Sprint 1	Sprint 2
Technical problems at the beginning of the <i>Sprint</i>	3.3	4.1
Technical problems at the end of the <i>Sprint</i>	3.9	3.7
Content problems at the beginning of the <i>Sprint</i>	3.5	3.8
Content problems at the end of the <i>Sprint</i>	4.1	3.7

Table 4: Average grades for the questions about cooperation with other project stakeholders

Question	Sprint 1	Sprint 2
Cooperation with <i>ScrumMaster</i>	4	4.3
Cooperation with <i>Product Owner</i>	3.8	4
Cooperation with other team members	4	4.1

Table 5: Average grades for general questions

Question	Sprint 1	Sprint 2
Appropriateness of the scope of project work	3.8	3.7
General estimate of satisfaction with project work	3.7	3.8
General estimate of the Scrum method	3.8	3.9

ous groups there were more problems in this area. All grades improved in the second iteration, which shows that the Scrum method positively affects relationships and teamwork. Average grades for each question can be seen in Table 4.

4.5 General questions

Question 12: Appropriateness of the scope of project work (Was the scope of project work appropriate?)

Question 13: General estimate of satisfaction with project work

Question 14: General estimate of the Scrum method (Was this method useful for the development team? Would you recommend it to other developers?)

The answers to question number 12 show that the scope of the project work was appropriate, so that the majority of students were not overloaded and they could fulfill other student obligations at the faculty. The students were rather satisfied with the project progress and the method. We can see from their comments that they consider the Scrum method appropriate for work in bigger teams and on bigger projects. Their opinion was that the method importantly increases the transparency of development progress without demanding a lot of administration, which is difficult for the developers. Average grades for this group of questions are shown in table 5.

5 Conclusion

The approach to teaching the final software technology course described in this paper represents a continuation of our efforts to ensure closer cooperation with software companies, already presented in one of our previous papers (Mahnič, 2008). The experience has shown that this kind of co-operation benefits everyone involved in the pedagogical process.

While working on a real project the students obtained knowledge of the advantages and disadvantages of the Scrum method, and were introduced to the problem of quantitative monitoring of the development process, which is an important research challenge for agile methods. They also gained practical experience and increased their transferrable skills like teamwork, communication, planning and task delegating, presenting the solution etc. This kind of knowledge cannot be communicated through formal lectures, but only in a professional working environment.

The involvement of SRC in teaching this course enabled the company to test one of the potentially interesting agile methods without risk and additional workload for its employees, so that it could use that method in its operations. The SRC employee who was involved in the project could estimate the advantages and disadvantages of Scrum on the basis of experience and could find the way of implementing this method in the regular procedure of the company. In this way we have transferred the knowledge from the academic world to the practice, which does not happen as often as we hope and need. Based on the practical experience gained, SRC will improve its internal method of software development.

Co-operation with industry enabled the teacher to expose students to one of the agile methods in a practical way.

The experience has shown that students' learning motivation increases if they can test their knowledge in practice. At the same time this project had an important research component: it was used as a case study for evaluation of the measurement model developed at the faculty. This project helped us to gather the real data necessary for calculating the performance indicators for software development using the earned value method.

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Poučevanje metode Scrum v sodelovanju s podjetjem za razvoj programske opreme

Vse večja uporaba agilnih metodologij za razvoj programske opreme zahteva, da učenje teh metodologij postane sestavni del izobraževanja bodočih inženirjev računalništva in informatike. Po drugi strani pa je možno skozi poučevanje teh metodologij preveriti tudi posamezne agilne koncepte in poiskati natančnejše odgovore na vprašanja o njihovi učinkovitosti. Zato se kot najprimernejša oblika poučevanja pogosto uporablja delo na projektih, ki omogočajo, da študenti v praksi spoznajo značilnosti agilnega pristopa, obenem pa služijo kot študije primera za ovrednotenje posameznih agilnih konceptov. V članku opisujemo, kako smo v sklopu predmeta Tehnologija programske opreme izpeljali učenje agilne metode Scrum v sodelovanju s podjetjem za razvoj programske opreme. Učenje je potekalo ob delu na realnem projektu, za katerega je seznam zahtev posredovalo podjetje, sodelavec tega podjetja pa je ves čas sodeloval s študenti kot predstavnik naročnika. Študenti so pri svojem delu dosledno uporabljali metodo Scrum in na koncu vsake iteracije s pomočjo ankete ocenili svoje izkušnje. V članku je najprej na kratko predstavljena metoda Scrum, nato sledi opis poteka dela na projektu, na koncu pa so predstavljeni rezultati ankete.

Ključne besede: agilne metodologije, Scrum, razvoj programske opreme, izobraževanje inženirjev računalništva, sodelovanje univerze z gospodarstvom

Challenges of Advanced Technologies and School of the Future

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The era of advanced technology claims a different individual. The individual that would undisturbed function in the era of digitalization and would better perceive and protect our environment with the help of accomplishments and benefits of advanced information and communication technology (ICT). There is no better time for learning and concretization of these values as in school. Nowadays pupils, the pupils of digital era, are more and more experienced in the usage of contemporary media and networks. That is why they require the modification of conditions and teachers' role in the school. Will new information and multimedia or hypermedia support for classrooms and new didactical ideas improve learning results, and stimulate innovation and greater pleasure towards learning and knowledge? All these questions will be answered in our contribution.

Key words: traditional school, school of the future, computer classroom, multimedia classroom, hypermedia classroom, education networks.

1 Introduction

Sociological and pedagogical-psychological researches (Gerlič, 2000) show us that there are more and more changes in the area of Slovene education lately, and the interest for school reforms strengthens in the education of developed countries. Political, economical and technical conditions, and also the development of social democracy require essential changes in existing education, which is frequent also in social, pedagogical and financial crisis. Today the most developed countries firmly step in the stage of development, which is called **highly developed information society**. That kind of society solves problems of industrial production deadlock with increasingly use of robotization, massive introduction of information and communication technologies and with impetuous science development and education. That kind of society strongly emphasizes the importance of **educational system informatization** in the area of contemporary information and communication technologies introduction and also the search of **contemporary-innovative forms** for learning and teaching (Keegan, 1993). In the last fifty years, innovations were against the old educational system rigidity. They should rather modernize school, forms and methods of work. They should concretize educational content and adapt to the interests and capability of pupils. They should solve current problems more successfully, which is an outcome of knowledge "explosion", contemporary technology, electronics, automatization and cybernetics. Hierarchical relations between teachers and pupils should be exceeded. Innovations and development should create an atmosphere, where a pupil could say "I am

learning" instead of "They teach us". They should assure team work for teachers, integrity of subjects and common responsibility of every item in educational work for the quality of school work as a whole. They should assure work and pedagogical conditions in the way pupils would not participate actively only at class, but they would also contribute to their own development as much as possible. Teacher's functions should be changed, so there would be less and less "walking encyclopedias" or "talking textbooks". A teacher would rather be a strategist, researcher, planner, pedagogical diagnostician, work organizer, counselor, pedagogical therapist and tutor of young generations.

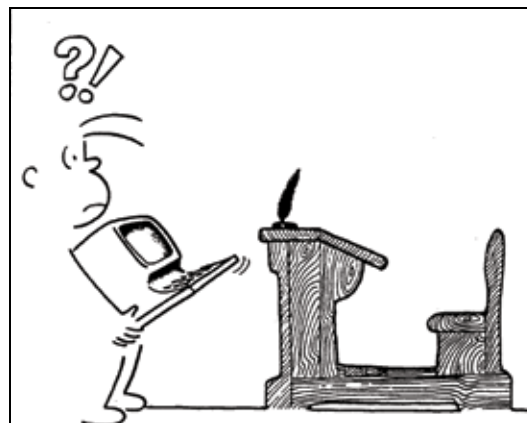


Figure 1: School and computer – problems with communication (Gerlič, 2000)

Nowadays, there are a lot of novelties in technics and school technologies, which are more or less familiar to teachers. They look at them rather modestly and use them inconsequentially. It is absolutely true that a lot of teachers do not know the function and pedagogical power of older and especially of contemporary ICT technologies. That is why they have negative attitude or they use them didactical unsuitably or even incorrectly. The many times heard statement that the research of common ICT technologies use effect in education is still in its early phase is certainly true. Because there are too few supposed researches and mainly they study the use of contemporary ICT technologies in didactical traditional (social) teaching forms and not in new ones, where their use is more perspective. Figure 1, entitled as *School and computer – problems with communication*, published in Italian magazine GOLEM, felicitously exposes indicated problems!

2 Didactical characteristic of historical era for ICT use in education

Historical review of ICT use in education and analysis of recent time era confirm the viewpoints of several authors that two factors had a deciding impact on the development of computer use in education:

- Programmed sequence learning with so called machines for learning and
- Quick development and improving the quality of computer and information technology.

The analysis (Gerlič, 2007) indicated how suitable can be the division of historical development of ICT use in education on the three important and didactic characteristicly eras (Figure 2):

- Early era of ICT use in education or the era before microcomputers – PC,
- Microcomputer – PC era and
- The era of computer educational networks.

The initial situation of computer introduction or ICT can be graphically presented as corrected didactic triangle (it contains four basic factors of a lesson: a teacher, a pupil, a teaching content and an ICT with educational function – Figure 2a). Because of the initial enthusiasm and success of computer use during lessons it was annotated too big role and reduced teacher’s role. This is soon shown as a strategic mistake and corrected didactic triangle (Figure 2b) gets a new essence. The teacher gets his leading role back and ICT is used in every field of education, where it is pedagogical possible and logical (monomedia era). In the further development (the initial monomedia era) some defectiveness were soon shown of such approach and consequentially, the necessity for didactic triangle transformation into didactic square (Figure 2c), where all mentioned elements equally influence on the quality of educational system. Multimedia accession in education means an optimal use of several different media accessions and technologies simultaneously, in educational and didactic sense it means a big step ahead. With the help of multimedia we incorporate text, pictures, video, sound, animations etc. into a lesson interactively. With multimedia we can, for example, take a walk through history, fly between planets in the solar system, search the micro world of live and inanimate nature, search

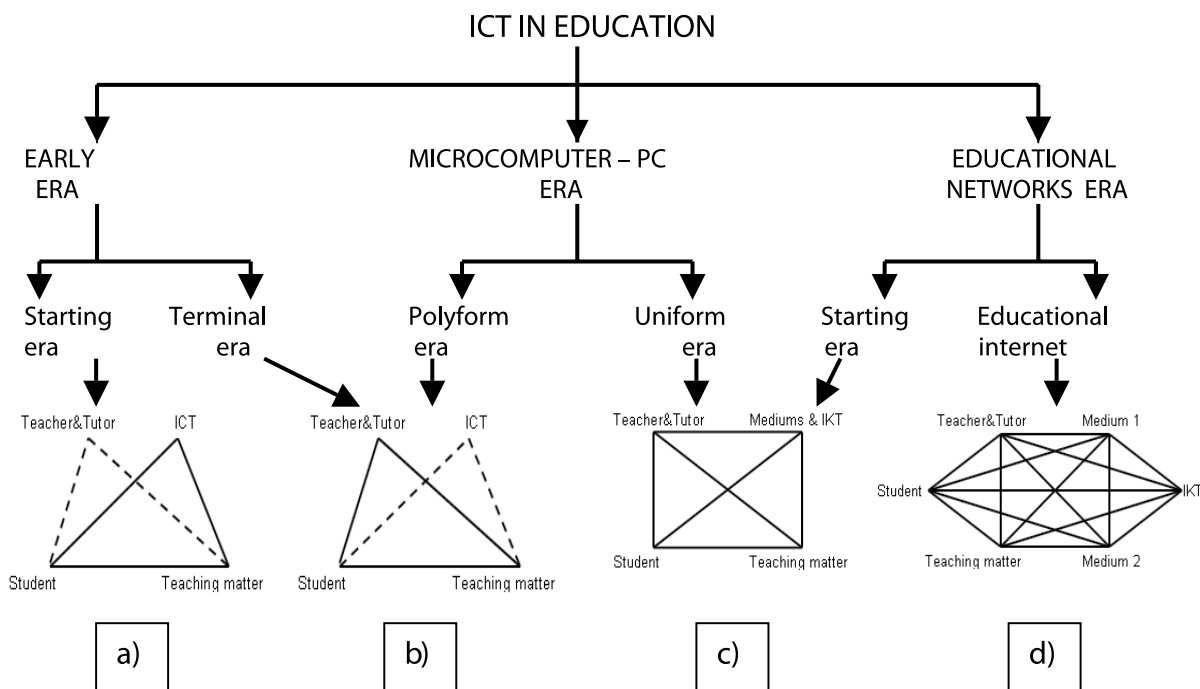


Figure 2: Didactical characteristic of historical era for ICT usage in education

for chemical structure of substances, listen to the music, learn language etc. With technological development of interactive possibilities and especially the most contemporary network technologies and accessions, simultaneous linking-selective use of ICT and the latest media (responder, interactive boards – tablets) didactic square is expanded into didactic polygon (Figure 2d), which in our opinion well illustrates didactic side of contemporary multimedia accession – hypermedia accession (hypermedia era).

Researches, which were performed under UNESCO, confirm so called Hebenstreit's division of countries into high developed, developed and developing countries in our analysis of development use of ICT in education (Gerlič, 2000). Three phases of ICT introduction in schools (Roblyer et al., 2007) are characteristic for all these countries:

- The first – experimental phase (monomedia era), which has already began in high developed countries before 1970, in developed countries before 1980 and in developing countries after 1980. For this phase less national oriented projects are characteristic, which were performed by small groups under leadership of higher education institutions and with the financial aid of region and state school authorities. They studied the possibilities of ICT incorporation into traditional school organization with very expensive and unsuitable hardware.
- The second - developmental phase (multimedia era) presents the intensity search of ICT incorporation into traditional educational forms and the search of connections with new didactic movements or educational system – reform experiments. ICT in schools understands this era as didactic innovation that is why it is studied according to many national and international projects. Characteristics for this era are many strategies of ICT introduction into educational process, greater adaptation of hardware and software for school needs and emphasizing the sense of suitable preparing of didactic equipment and teacher's education.
- The third – stabilization phase (hypermedia era) presents the degree of ICT use development in education where it losses “aureola” of innovation and starts to use as a normal, but very efficient system of the most contemporary education technology in every field of life and school work.

3 Didactic – technological example of development use trends of ICT in education

If we make some analysis and apply discussing issues on an example (for a set time) of didactic-technological designed classrooms we see that with the quick development of automatization and electronics technological achievements were quickly applied in school

work, which should improved organization and quality. In the sense of classrooms, the first response was the system of **electronic classrooms**, usually for performing linear or branch programmed learning. In the didactic sense it represents the corrected didactic triangle, which with decreased teacher's role (Figure 3) and with the help of picture, sound and simultaneous feedback (Interactive Response System) reaches bigger motivation, individualization, differentiation and greater pupils' activity. Technological and didactic weaknesses of electronic classrooms improve **computer classrooms** (monomedia era), which in the didactic sense present corrected didactic triangle (Figure 3) with less or more rendered teacher's role and linking role of ICT, which is used in educational system as individual (demonstration computer) or mass form (computer classroom for individuals or team work). With more and more efficient ICT and multimedia technology so called **multimedia classrooms** are being formed. They incorporate hyper interactive text, pictures, video, sound, animation etc., and in didactic sense present the transformation of didactic triangle into didactic square (multimedia era). With technological development of interactive possibilities and especially the most contemporary interactive ICT technologies, which incorporate educational presentational (Interactive Whiteboard Systems, Interactive Display Frames, AirLiner Wireless Slates, Interactive Tables, Document Cameras, Interactive response systems etc.), videoconference, mobile and interactive video technology (technologies of virtual reality also undergo the development) into whole-class learning or small-group and individual learning we get **hypermedia classrooms** (figure 4), which expand the didactic square into didactic polygon (hypermedia era).

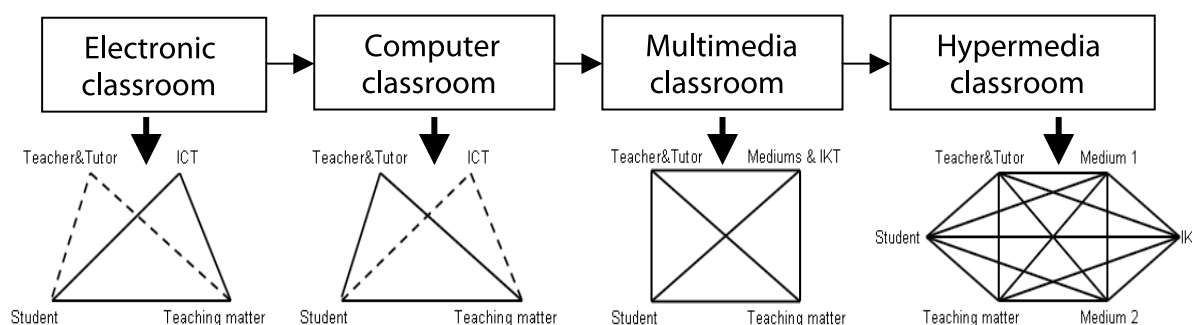


Figure 3: Didactic – technological characteristic eras on the example of the electronic-computer classroom development



Figure 4: Hypermedia classroom

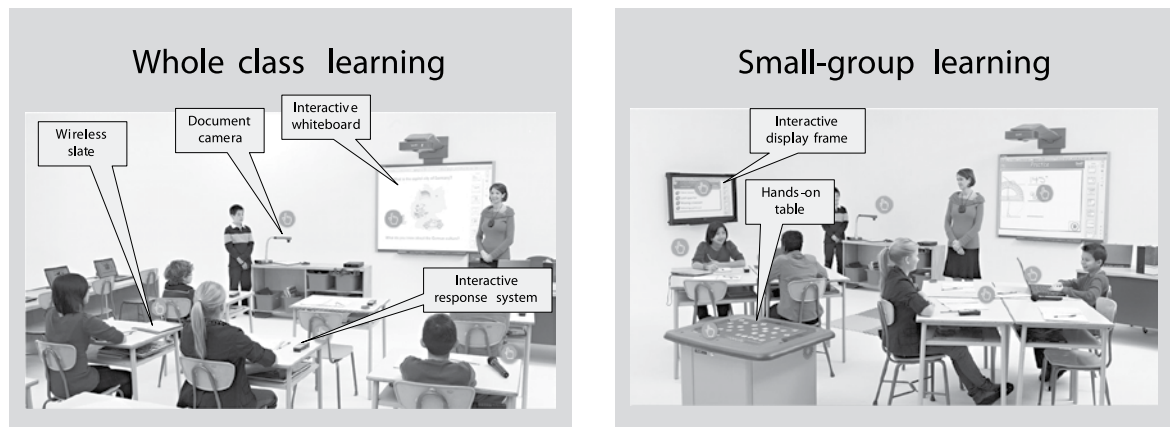


Figure 5: Contemporary information and communication technologies in school

4 Conclusion

It is obvious, that advanced technology claims a different individual. The individual that would undisturbed function in the era of digitalization and would better perceive and protect our environment with the help of accomplishments and benefits of advanced information and communication technology. It is also obvious, that there is no better time for learning and concretization of these values as in school. Nowadays pupils, the pupils of digital era, are more and more experienced in the usage of contemporary media and networks. That is why they require the modification of conditions and teachers' role in the school. The new information and multimedia or hypermedia supported classrooms and new didactic ideas will certainly improve learning results and stimulate innovation and greater pleasure towards learning and knowledge. That is why we have to arrange that kind of learning environment, teachers, and especially understandable school leadership and school

political institutions. The results will certainly not disappoint us!

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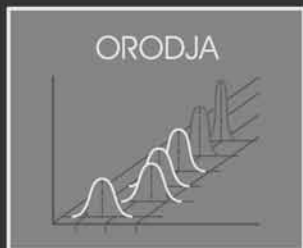
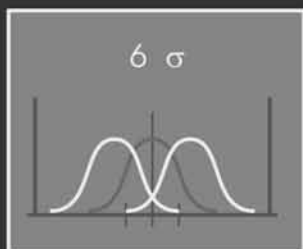
interest are didactic of physics, didactics of computers in education – ICT, educational technology, computer video production (video production, coding), multimedia (didactic and design), distance education and tele learning, internet application design, new video technologies (internet; VOD, cable TV), IKT technology for handicapped persons, electronic designing.

Izzivi novih tehnologij in šola bodočnosti

Doba napredne tehnologije zahteva drugačnega posameznika; takšnega, ki bo lahko nemoteno deloval v dobi digitalizacije in bo lahko s pomočjo znanj in prednosti napredne informacijsko komunikacijske tehnologije bolje spoznal in varoval okolje. Ni boljšega časa za učenje in konkretiziranje takih vrednot kot v šoli. Današnji učenci, učenci digitalne dobe, so vse bolj veščji v uporabi sodobnih medijev in mrež, s čimer zahtevajo spreminjanje razmer v šoli kot instituciji in tudi spremenjeno vlogo učiteljev. Bodo nove informacijsko in multimedijško oz. hipermedijško podprte učilnice in nove didaktične ideje izboljšale učne rezultate in spodbudile inovativnost in večje veselje do učenja in znanja? To se sprašujemo in na to bomo skušali v našem prispevku odgovoriti.

Ključne besede: tradicionalna šola, šola prihodnosti, računalniška učilnica, multimedijška učilnica, hipermedijška učilnica, izobraževalna omrežja

UNIVERZA V MARIBORU - FAKULTETA ZA ORGANIZACIJSKE VEDE



Janez Marolt
Boštjan Gomišček

Management kakovosti



Založba Moderna organizacija

E-izobraževanje z naprednimi učnimi kockami – NAUK.si

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Avtorji učnih e-gradiv, namenjenih učiteljem, vse prevečkrat pripravijo le-te v obliki monolitnih blokov, sestavljenih na način, kot so običajni tekstovni delovni zvezki. To zahteva, da jih učitelj uporabi kot celoto, na točno predpisan način. A ker je učitelj posrednik med učnim gradivom in učencem, je on tisti, ki mora narediti izbor gradiv in jih kombinirati na ustrezen način. E-gradiva naj bodo zato pripravljena na fleksibilen način. Zakaj ne izrabiti možnosti, ki jih ponujajo nove tehnologije in učitelju vsaj ponuditi možnost, da gradiva pripravi ustrezno svojim in učenčevim potrebam.

V procesu izdelave izobraževalnih e-gradiv, ki je v Sloveniji v zadnjih letih močno poraslo zaradi različnih razpisov na to tematično, se je vedno bolj zapostavljalo učitelja in vpeljevalo dvosmerno relacijo med avtorjem gradiva ter uporabnikom – učencem. Cilj projekta NAUK je zato izgradnja naprednih učnih vsebin, ki učitelju dajejo možnost prilagajanja, saj le-ta najbolj ve kaj potrebuje pri pouku. V prispevku tako srečamo izkušnje iz preteklih let, predstavimo možne scenarije uporabe repozitorijev učnih gradiv ter na teh osnovah zgrajenega portala nauk.si.

Ključne besede: e-izobraževanje, e-gradiva, Slovenija, atomarna gradiva, učitelj

1 Uvod

O tem, kaj je učenje, obstajajo različne definicije. Tako Možina v (Možina, 2000) piše, da:

»splošno veljavnega odgovora na to, kaj je učenje ni, saj znanost ni uspela v celoti razkriti zakonitosti človekovih učnih in miselnih procesov. ... Na splošno lahko govorimo, da je učenje vsaka oblika aktivnosti posameznika, s katero dosežemo spremembo obnašanja oziroma vedenja ...«.

Učenje je torej proces, ki nastopa v različnih oblikah. Ko bomo govorili o učnih gradivih, se bomo omejili na tista učna gradiva, ki jih uporabljamo v učnem procesu, ko se učenec uči ob pomoči učitelja. Osnovni namen vsakega izobraževanja je ta, da se učeči se čim več naučijo. Večina učečih mlajših generacij (današnji osnovnošolci in srednješolci – t.i. “digitalni domačini”) ima raje grafične in vizualne prikaze kot besedilo. Navajeni so pridobivati hitre in jasne odgovore na zastavljena vprašanja, potrebujejo takojšnje pohvale in nagrade za dobro opravljene naloge, povezujejo informacije (uporabljajo povezave na sorodna gradiva), igre so jim bolj všeč kot “resne” vsebine, želijo čim več interaktivnosti in večpredstavnosti, radi uporabljajo sodelovalne načine dela; glej (Prensky, 2001). Digitalni domačini vse svoje življenje uporabljajo računalnike, z njimi živijo, in zato pričakujejo, da bodo gradiva iz katerih se bodo lahko učili dobili tudi v digitalni obliki.

Tudi zaradi teh razlogov je e-izobraževanje področje, ki se v zadnjih letih pospešeno razvija (Varlamis, 2006). Razvija se tako v tehnološkem smislu (z razvojem standardov in orodij), v pedagoškem smislu (predvsem z razvojem novih učnih pristopov in preko prenosa primerov dobre prakse v učni proces) ter v vsebinskem smislu (ob izdelavi kvalitetnih e-gradiv). Ker morajo kvalitetna e-gradiva učeče motivirati za učenje, morajo avtorji e-gradiv upoštevati pričakovanja učečih in zato čim bolj izkoriščati sodobne pristope, interaktivnost in večpredstavnost. Samo kvalitetna e-gradiva pa niso dovolj; integrirana morajo biti v virtualna učna okolja, ki med drugim omogočajo vsaj sledenje napredka in znanja učečih.

Ob tem ko razmišljamo o učencih, ne smemo pozabiti tudi na druge končne uporabnike (učitelje), ki lahko z uporabo e-izobraževanj učni proces bistveno izboljšajo. S pomočjo sodobnih tehnologij lahko e-izobraževanje: pripomore k vzpostavitvi oziroma povečevanju sodelovanja med učečimi se in učitelji, omogoči izvajanje izobraževanja na daljavo, interaktivno izvajanje poskusov, dinamično preverjanje znanja (Preložnik, 2008) in sprotno nagrajevanje, omogoči lažje sledenje napredka ter znanja učečega se in podobno; glej tudi (Horvat et al., 2008).

Predvsem pomanjkanje primernih orodij, ki so enostavna za uporabo in hkrati omogočajo funkcionalnosti, ki jih potrebujemo za izdelavo primernih e-gradiv ter zagotavljanje kvalitetnega izobraževanja, ter preveč sistemsko-tehničnega znanja, ki je potrebno za podporo izvajanju elektronsko podprtih izo-

brazhevanj, sta glavni oviri, ki danes v Sloveniji onemogočata širšo uporabo e-izobraževanja (tako v šolskem prostoru kot zunaj njega).

2 Na splošno o učnih gradivih

Med priprave učitelja na poučevanje sodita tudi pregled in izbor učnih gradiv, ki jih bo uporabljal. Tako na spletnih straneh Inštituta za interaktivne medije in učenje Univerze za tehnologijo v Sydneyju v sklopu priročnika za učno osebo¹ med drugim piše, da je ena od pomembnih lastnosti dobrega učitelja ta, da vedno uporablja učna gradiva na način, ki najbolj ustrezajo razredu, ki ga trenutno poučuje.

Če premislimo, kako pravzaprav učitelji uporabljajo »klasično« učno gradivo kot so knjige, zbirke vaj in podobno, ugotovimo, da z gradivi ves čas kombinirajo. Učencem zelo pogosto naročijo, naj si ogledajo »te in te strani v učbeniku«, nato naj rešijo določen izbor nalog iz zbirke, nato naj spet nekaj preberejo itd. Ta navodila se zelo pogosto spreminjajo; v enem razredu je kombinacija takšna, v drugem nekoliko drugačna. Učitelj iz gradiva naredi kombinacijo – lekcijo oziroma zgodbo, ki kar se da najbolj ustreza učencem, ki jih uči. Zato ni čudno, da med najpogosteje uporabljenimi tehnološkimi pripomočki sodobnega učitelja najdemo škarje in kopirni stroj.

Razlog za tako ravnanje je povsem naraven. Avtorji učnih gradiv si zamislijo neko hipotetično učno situacijo in hipotetičnega učenca, učitelj pa je tisti, ki se mora prilagoditi dejanskemu stanju v učnem procesu. In to stanje največkrat vsaj nekoliko odstopa od s strani avtorja učnega gradiva zamišljenega procesa. Glede na to, da dostopnost gradiva praviloma ni problematična, je prav ta izbor, prilagajanje in rekombiniranje gradiv eno od poglobitnih učiteljevih opravil.

3 Kako dobra (e-)gradiva imamo?

S podporo Ministrstva za šolstvo in šport (MŠŠ), projektov financiranih iz evropskih sredstev (najpogosteje iz sredstev evropskih socialnih skladov ESS), odprtokodnih projektov in projektov financiranih iz naslova nadgradnje odprte kode, smo v Sloveniji do danes na področju e-izobraževanja poskrbeli

predvsem za razvoj e-gradiv. Najpomembnejši (celo osnovni) namen množice projektov izdelave e-gradiv je bil seveda izdelati dovolj veliko e-gradiv, na katerih bo mogoče izgraditi novo generacijo Slovenskega izobraževalnega omrežja SIO (Čač et al., 2007). Drugi (in ne le skriti) namen pa je bil motivirati učitelje, da so začeli razmišljati o tem, kako e-izobraževanje vpeljati v izobraževalni proces, kako izdelati kvalitetna e-gradiva, kako motivirati učeče in podobno. E-izobraževanje pa je veliko več kot le kopica zbranih e-gradiv.

Dobro je, da smo se v Sloveniji razvoja šolskih e-gradiv lotili dovolj široko, razumno in ne enoumno. Nastalo je več centrov e-znanj^{2,3}, ki ponujajo brezplačno dostopna e-gradiva s šolsko tematiko. Obstoječa gradiva so bila recenzirana in so na prvi pogled povsem primerna za poučevanje. Ob tem, ko je nastalo več centrov e-znanj, smo v Sloveniji identificirali probleme, ki se pojavijo pri vpeljavi e-izobraževanja (Babić, 2006; Sajovic, 2006) in ob izdelavi e-gradiv dobili različne ideje kako jih rešiti (Horvat et al., 2007a, 2007b in 2007c; Lukšič et al. 2007; Božeglav et al., 2009; Lokar, 2009a).

Pri pregledu zbirk e-gradiv⁴ in ostalih zbirk e-gradiv dosegljivih v našem šolskem prostoru vse prevečkrat ugotovljamo, da so gradiva (vsaj v večji meri) sestavljena tako kot običajni tiskani učbeniki oziroma tiskani delovni zvezki. Tako pripravljena e-gradiva upoštevajo le potrebe učečega se in še to v vlogi končnega in samostojnega uporabnika.

Kot taka so uporabna v glavnem le pri samoučenju, kljub temu da je bila osnovna predpostavka pri razvoju teh gradiv, da se bodo uporabljala tudi v učnem procesu v katerem nastopa tudi učitelj. In če na tako pripravljena gradiva pogledamo iz stališča uporabe v učnem procesu v katerem nastopa tudi učitelj, je učitelj v resnici še na slabšem kot je bil, ko je uporabljal le klasični učbenik. Pogosto so namreč ta e-gradiva tehnološko tako »zaprta«, da učitelj nima ustreznega nadomestka za škarje, s katerimi bi »kombiniral« klasično tiskano gradivo.

Učitelji tako pogosto naletijo na veliko oviro že, če želijo uporabiti le del učnega gradiva, da o možnosti, da bi želeli prilagoditi del gradiva svojim potrebam, sploh ne govorimo. Vsi učitelji seveda ne potrebujejo gradiv v enaki obliki, enakem vrstnem redu, z enakimi zgledi in enakimi nalogami.

Po drugi strani pa avtorji e-gradiv na vlogo učitelja računajo, saj le malo gradiv učenca vodi avtomatsko (mu izbira primerne naloge, zaporedje tem, dodatne razlage itd.),



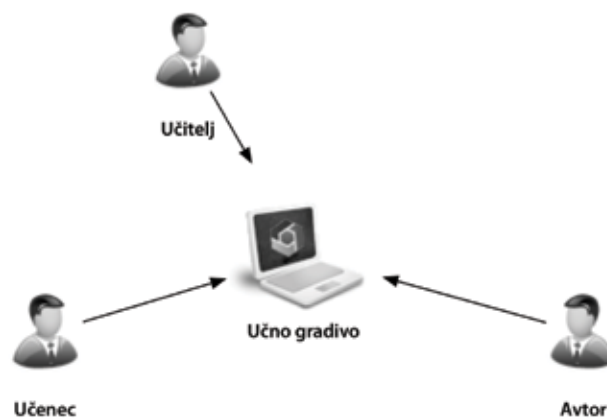
Slika 1: e-gradivo, ki ne upošteva vloge učitelja je primerno le za samoučenje

¹ IML Teaching Matters: A handbook for UTS academic staff; <http://www.iml.uts.edu.au/learn/teach/resources/tm/teacherprep.html>

² Zbirka povezav e-gradiv izdelanih v okviru projektov MŠŠ in ESS, http://www.mss.gov.si/si/delovna_podrocja/ikt_v_solstvu/e_gradiva

³ Centri e-znanj: <http://www.nauk.si>, <http://www.egradiva.si>, <http://profutura.scv.si>, <http://www.e-um.si>, <http://www.praktik.si>, <http://am.fmf.uni-lj.si>, <http://up.fmf.uni-lj.si>

⁴ Slovensko izobraževalno omrežje SIO2, <http://www.sio.si> in slovensko izobraževalno omrežje SIO, <http://sio.edus.si>



Slika 2: Odnosi med učnim gradivom in vsemi udeleženci učnega procesa

ampak se posredno zanašajo na dejstvo, da bo pri učenju ob učencu navzoč tudi učitelj.

Kljub dobro izpeljanim "prvim korakom" pri izgradnji slovenskega izobraževalnega omrežja⁴ je torej potrebno pošteno oceniti trenutno stanje na področju e-gradiv. Podroben pregled vsebin namreč pokaže, da so nekatera e-gradiva kljub opravljeni recenziji za poučevanje žal neprimerna (Prensky, 2001) in so primerna le kot dopolnilna gradiva pri klasičnem izobraževanju. Avtorji tega prispevka dobro poznamo e-gradiva iz matematike, fizike in računalništva. Na teh področjih je mogoče najti več projektov, ki vsebujejo za poučevanje neprimerna e-gradiva, taka e-gradiva pa je brez težav mogoče poiskati tudi na drugih področjih. Naštejmo najpomembnejše slabosti (in predloge izboljšav) povprečnega že izdelanega e-gradiva; te so večinoma:

■ *konceptualne narave*

- *monolitnost* (e-gradivo je najpogosteje izdelano iz enega velikega kosa in kot tako neprimerno za drobljenje); e-gradivo mora biti sestavljeno iz elementarnih kosov, ki so dovolj majhni, osredotočeni in kratki, da jih je mogoče sestavljati v različne celote,
- uporabljene so *tehnologije*, ki jih ni mogoče popravljati in dopolnjevati (recimo celotno e-gradivo je ena velika datoteka Flash); uporabljati je potrebno primerne dobro dokumentirane (odprte) formate, tako da je mogoče posodabljanje tudi dele vsebin,
- *povezovanje* med e-gradivi je oteženo; e-gradiva morajo biti opremljena s kvalitetnimi meta podatki, ki omogočajo hitrejšo iskanje takšnih gradiv v velikih repozitorijih, učitelji bi morali imeti možnost preiskovanja repozitorijev e-gradiv, tam najti manjše elementarne vsebine, ki jih zanimajo, zato da bi iz njih lahko sestavili večje skupke – lekcije,
- *pretesna povezanost vsebine, funkcionalnosti in izgleda* (koncept "vzemi ali pusti"); e-gradiva bi morala biti shranjena v obliki, ki učitelju omogoča posodabljanje in popoln nadzor, sestavljena bi morala biti v elementarni obliki, ki ločuje vsebino od oblike,

- upravljanje z e-gradivi mora biti *enostavno* – poudarek mora biti na učenju; učitelj bi moral imeti prost sistem za popraviljanje in upravljanje z e-gradivi, ki poskrbi za oblikovanje, strukturo in funkcionalnost; tako se lahko osredotoči na vsebino in način prikaza – na poučevanje,
 - *dinamičnost* je izredno slabo vgrajena v e-gradiva; vsebovane naloge, če obstajajo, so najpogosteje "zapisane" v samem e-gradivu (boljša e-gradiva vsebujejo naloge, ki variirajo vhodne parametre, vendar je nabor vhodnih parametrov in možnih rešitev pogosto zelo omejen); potrebna bi bila povezava s sistemom za dinamično generiranje nalog, premešanje nalog, kontekstna odvisnost ...; s tem dosežemo, da ob ponovni uporabi istega e-gradiva dobimo podobno, a drugačno vsebino,
 - rešitve nalog, če obstajajo, so skoraj vedno v e-gradivu *vnaprej definirane*, učečim se celo predpisujejo način, v katerem morajo odgovoriti na zastavljeno vprašanje; odgovori učečih se so lahko pravilni, pa jih računalnik ne zazna (recimo odgovor $x + 1$ je sprejet kot pravi, $1 + x$ pa kot napačen), zato bi bilo potrebno imeti bistveno močnejšo evaluacijo vnesenih odgovorov, še posebej, ker je to možno (npr. z uporabo tehnik računalniške algebre pri matematičnih odgovorih),
 - prilagajanje različnim skupinam uporabnikov (otroci s posebnimi potrebami, slabovidni, starejši, ...) in scenarijem uporabe e-gradiva (interaktivna tabla, projekcija, računalnik, uporaba, ko dostop do omrežja ni možno – recimo uporaba zgoščenke itd),
- *vsebinske oziroma pedagoške narave*
- pogosto so e-gradiva realizirana kot *digitalizirani učbeniki* (čeprav imajo dodane video vsebine to še ne pomeni, da so prava e-gradiva); e-gradivo je povsem drug medij kot papir (oz. z računalnikom izdelana predstavitev, elektronski dokument),
 - slaba interaktivnost in omejena *večpredstavnost*; opazno je pomanjkanje resnično interaktivnih nalog, pri katerih učeči sodeluje (recimo z odgovori v obliki

- risbe, načrta, uporaba video kamere in mikrofona, aktivno sodelovanje pri izvajanju poskusov, reševanje problema skozi igro); na primer: interaktivna uporaba zvezdne karte ("hands-on" koncept) je veliko boljša interaktivnost kot le pasivno opazovanje filma, ki prikazuje uporabo take karte,
- pomanjkanje *kontekstne odvisnosti*; praktično ni e-gradiva, ki bi na trenutnem koraku znalo prikazati vsebino glede na aktivnosti uporabnika pri pregledovanju tega gradiva do tega trenutka (ta funkcionalnost je zelo uporabna, ko želimo učečega podučiti o njegovi napaki, ki jo je naredil nekaj korakov nazaj in posledicah, ki iz te napake izhajajo),
 - avtorji uporabijo *premalo sodobnih pristopov*; tukaj so mišljeni predvsem interaktivni poskusi (nekatera gradiva sicer vsebujejo video posnetke opravljenih poskusov, vendar učeči pri takih poskusih ne sodelujejo); "učenje skozi igranje oz. interaktivnost" je zelo pomembno za t.i. "digitalne domačine"; glej (Prensky, 2001),
 - e-gradiva vsebujejo premalo *sprotnega preverjanja znanja, motivacij s pohvalami in sprotnega nagrajevanja* ob pravilno rešenih "problemih",
 - opazna je pomanjkljiva uporaba *novih učnih pristopov*; učeči se bodo e-gradiva pogosto uporabljali tudi takrat, ko učitelj ne bo prisoten, zato je zelo pomembna

večkratna razlaga istega pojma, motivacija s primerom pred razlago, postopno nadgrajevanje znanja, preverjanje znanja po razlagi, nagrajevanje ob pravilno rešenih problemih ipd.,

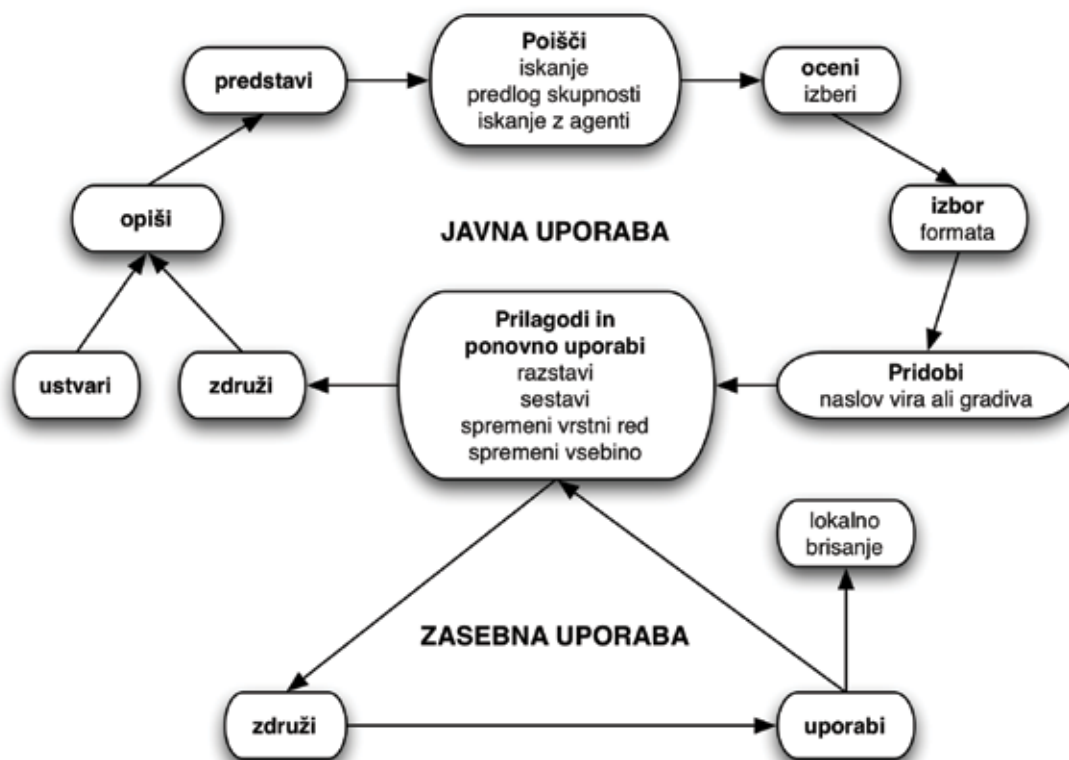
- manjkajo *navodila za učitelja* – kako poučevati s tem gradivom, kaj je cilj oziroma namen vsebine na posameznem koraku itn.

3.1 Kako do boljših e-gradiv?

Ob pripravi e-gradiva je pomembno, da upoštevamo njegov celotni življenjski cikel. Ta zajema proces izdelave, uporabe in spreminjanja e-gradiva. Celoten proces upravljanja z e-gradivom je lepo opisan v (van Assche in Vuorikari, 2006), od koder je povzeta slika 3.

Raziskava, ki so jo naredili v Južni Koreji (Hwang, 2008) glede zadovoljstva učiteljev z e-gradivi, je dala zanimive rezultate. Po njej je eden glavnih faktorjev, ki vpliva na zadovoljstvo učiteljev z e-gradivom in s tem tudi na dejansko uporabo e-gradiva v razredu, obstoj možnosti, da je gradivo mogoče prilagajati svojemu načinu poučevanja.

Če poskusimo izdelavo e-gradiv primerjati s priljubljenimi lego⁵ kockami, je osnovna zahteva, da morajo avtorji e-gradiv na uporabo ponuditi: osnovne gradnike, izdelane modele,



Slika 3: Življenjski cikel učnega e-gradiva (van Assche in Vuorikari, 2006)

⁵ <http://www.lego.com>



Slika 4: Osnovni gradniki;
vir:
<http://www.turbosquid.com>



Slika 5: Izdelani modeli (ki jih je moč "popraviti");
vir: <http://www.track7.org>



Slika 6: Načrti izdelav novih modelov;
vir: <http://www.lego.com>

ki jih je mogoče popraviti in načrte (navodila) za izdelavo novih modelov, glej slike 4-6.

Seveda pa v praksi potrebujemo še več. Tudi osnovne kocke je včasih potrebno prilagajati. Tako mora učitelj med drugim imeti možnost spremeniti besedilo posameznega vprašanja ali naloge, spremeniti razlago, v povratni informaciji pri evalvaciji odgovora dodati povezavo na drugo učno gradivo, dodati nove pogoje vejitve (na primer: če se odgovor na vprašanje od pravega (pričakovanega) razlikuje samo v predznaku, potem se učitelj lahko odloči, da doda pogojni skok, izpiše novo opozorilo in v gradivu poskrbi za preusmeritev na pravi korak) itd.

Tako "fleksibilno" upravljanje z e-gradivi je v današnjem času tehnološko mogoče podpreti. Potreben pogoj pa je, da avtorji e-gradiva upoštevajo vlogo učitelja že v fazi načrtovanja e-gradiva.

Prav tako je zelo smiselno, da ima učitelj možnost pripravljeni učni gradnik uporabiti v različnih oblikah (v verziji za samoučечеga, za učitelja, primerno za ponavljanje, kot gradivo primerno za tisk – na primer izpitni list). Glede na to, da izvoz primerno pripravljenega e-gradiva v več oblik iz tehničnega stališča ne predstavlja večjega problema, je smiselno, da bi učitelju omogočili možnost, da isto nalogo (vprašanje) izvozi v tekstovno obliko (npr. za uporabo v testu, ki ga pripravlja v urejevalniku besedil), v obliki vprašanja v spletni učilni Moodle, v obliki (z JavaScriptom podprtega) interaktivnega vprašanja na spletni strani ...).

3.2 Prvi rezultati – projekta UP in AM

Koncepti in ideje omenjene v tem prispevku so bili delno preizkušeni v sklopu dveh projektov: Kako poučevati začetni tečaj programskega jezika⁶ (UP) in Aktivno učenje matematike v obliki učnih listov in resnično interaktivnih kvizov⁷ (AM). Pri pripravi obeh projektov smo sodelovali tudi avtorji tega prispevka. Izhajali smo iz izkušenj, ki smo jih dobili pri sodelovanju pri različnih EU projektih⁸ o repozitorijih učnih

gradiv (Batagelj et al., 2007 in 2009) in pri sodelovanju pri izgradnji SIO2 (Čač et al., 2007).

Temeljni cilji projektov AM in UP so tako bili:

- Gradiva predstaviti kot *množico gradnikov*, ki jih je moč *enostavno spreminjati* in s tem ponuditi čim bolj »surovo« obliko gradiva, ki se ga da zato prilagoditi učiteljevi potrebi, tj. spremeniti zgled, odstraniti kak primer, zamenjati vrstni red vprašanj, ...
- Gradnike narediti *majhne, prilagodljive* in čim bolj *neodvisne od orodij*, tako da je npr. neko gradivo, ki sicer kot zgled uporablja programski jezik Java enostavno spremeniti v gradivo, ki kot zgled uporablja npr. jezik Python. Še vedno pa dosegamo isti cilj - dijaka naučiti nek programski / algoritmični / idejni konstrukt!
- Odgovornost za *kombiniranje gradnikov* naložiti učitelju samemu. On je namreč tisti, ki se bo na podlagi svojega pedagoškega znanja odločil, katere gradnike bo uporabil v določenem pedagoškem kontekstu in v kakšnem vrstnem redu.
- Gradnike narediti *splošno uporabne*, tj. uporabne kot samostojne spletne strani, znotraj spletnih učilnic, na nosilcih informacij (CD, DVD), na mobilnih napravah ...

Skozi izvajanje projektov ter iz odzivov učiteljev so bile izpostavljene tudi določene pomanjkljivosti omenjenega uporabljenega pristopa. Čeprav s takim pristopom učitelj dobi možnost kombiniranja ter prilagajanja učnih vsebin, je to še vedno zanj precej zahtevno opravilo. Kombiniranje je od učitelja zahtevalo uporabo specifičnih (tehničnih) znanj o naprednejši uporabi spletnih učilnic, poznavanje jezika HTML, poznavanje specifikacije SCORM itd. Za zmotno se je izkazalo tudi pričakovanje, da bodo učitelji e-gradiva le uporabljali; zelo hitro so imeli tudi didaktične in tehnične pripombe. Kot takrat največje presenečenje pa se je pokazalo dejstvo, da večina učiteljev e-gradiv ne želi zlagati v celoto, ampak le dopolnjevati že narejene predloge. Najsi je bil vzrok v nemotiviranosti, zahtevnosti postopka, ali pa v pomanjkanju

⁶ Projekt Učenje programiranja (UP), <http://up.fmf.uni-lj.si>

⁷ Projekt Aktivna matematika (AM), <http://am.fmf.uni-lj.si>

⁸ ASPECT, projekt EU, <http://aspect-project.org>; CALIBRATE, projekt EU, <http://calibrate.eun.org>; EdReNe, projekt EU, <http://edrene.org>; MELT, projekt EU, <http://info.melt-project.eu>

kvalitetnih vsebin, v vsakem primeru je bilo potrebno odkriti težave in jih popraviti.

Tako neformalni razgovori s številnimi učitelji, kot tudi prve reakcije uporabnikov že pripravljenih e-gradiv pa so pokazali tudi, da učitelji menijo, da je omenjen pristop dober in jim bo ob upoštevanju njihovih pripomb omogočal kvalitetnejše poučevanje; ocenili smo, da se izplača v omenjene koncepte vložiti dodaten trud.

3.3 Nadgradnja ideje v praksi: NApredne Učne Kocke – NAUK.si

Tako je nastala skupina NAUK.si⁹, v okviru katere sodelujemo tudi avtorji tega prispevka. Skupina nadaljuje in nadgrajuje paradigmo, ki je bila predstavljena v projektih UP in AM, vendar v širšem kontekstu. Namesto matematike za srednje šole in učenja programiranja v okviru skupine razvijamo e-gradiva iz matematike (SŠ), logike, fizike (OŠ in SŠ) ter računalništva in informatike (vse ravni). Izpostavljene pomanjkljivosti poskušamo odpraviti, do sedaj omenjene koncepte in e-gradiva še nadgraditi ter jih izboljšati. Izpeljava petih projektov obljublja večji krog uporabnikov, hkrati pa skupini nalaga večjo odgovornost.

Na portalu skupine NAUK.si je implementirana enotna vstopna točka, kjer so na voljo novice in prihajajoči dogodki, izobraževanja ter natečaji za izdelavo e-gradiv. Zanimanje učiteljev za izdelavo kvalitetnih e-gradiv name-

ravamo povečati, jim ponuditi orodja za izdelavo e-gradiv ter jih aktivno vključiti v proces izdelave in uporabe e-gradiv. Predvsem zadnja faza je pri večini podobnih projektov v Sloveniji izpuščena, čeprav je jasno, da se tudi najboljša gradiva ne bodo uporabljala, če za učitelje ne bodo uporabna.

V okviru portala bo namenjen poseben poudarek dobremu iskalniku gradiv. Poleg iskanja po naslovih in vsebini bo podprta tudi avtomatizirana izdelava kazal, ki bodo vsebino urejala po učnih načrtih glede na v e-gradivih podane meta podatke, tipu gradiv, njihovi namembnosti, obsegu, priljubljenosti itd. Dober sistem klasifikacije in zmogljiv iskalnik po e-gradivih sta ključna koraka pri izgradnji portala, ki ne smeta biti izpuščena, če želimo, da bo zbirka e-gradiv resnično uporabna.

Učitelji, ki želijo kombinirati gradnike, potrebujejo pri posameznem gradniku tudi povezave na sorodne gradnike tako po vrsti kot po učni vsebini. Povezave jim bodo pomagale pri tem, ko bodo gradili (sestavljali) celotno učno vsebino ali preverjanje znanja. Nekaterim so dovolj le osnovna izbirna vprašanja, drugi pa npr. želijo vprašanja, ki bodo vsakokrat drugačna (parametrizirana). Sistem za avtomatsko generiranje dinamičnih nalog ter avtomatsko ocenjevanje (Preložnik, 2008) je bil kot prvi tak sistem v Sloveniji implementiran že v okviru projektu AM (Kavkler et al., 2008). V sklopu projekta NAUK.si bo sistem uporabljen in nadgrajen. S tem bo učiteljem močno olajšana sestava

Slika 7: Vstopna točka skupine NAUK - NApredne Učne Kocke, vir: <http://www.nauk.si>

⁹ NApredne Učne Kocke (NAUK.si), <http://www.nauk.si>

preverjanja znanja iz iste tematike, z različnimi podatki za vsakega učenca.

Na koncu pa je potrebno učno enoto še zgraditi. Zato se je vzporedno z izvajanjem projektov UP in AM začel razvoj orodja za izdelavo učnih enot oziroma lekcij. Orodje omogoča uvoz različnih gradnikov, izbor, preurejanje ter izvoz v obliki celotne učne enote (v formatu SCORM oziroma klasični obliki HTML). Z razvojem orodja za izdelavo lekcij bomo v skupini NAUK.si nadaljevali, hkrati pa bo ponujena tudi možnost uvoza drugih vsebin, ki niso nastale v sklopu projektov skupine NAUK.si. S tem bo omogočena vsestranska uporabnost orodja, saj je v zadnjih letih nastalo veliko število e-gradiv, ki jih je mogoče ponovno uporabiti pod licenco Creative Commons.

E-gradiva bo mogoče s portala prenesti v spletne učilnice, jih natisniti in uporabiti v papirnati obliki, jih objaviti na drugih nosilcih informacij itd. Oblika SCORM je, kljub temu, da je ena redkih standardov za delo z e-gradivi, premalo uporabna, da bi učiteljem omogočala vse predstavljenе možnosti (Varlamis in Apostolakis, 2006). Zato nameravamo gradiva ponuditi v njihovih izvornih oblikah (XML, WIKI format), v s slogi opremljenih oblikah (HTML + CSS, PDF, DOC, itd.) ter seveda v standardiziranih formatih (kot sta na primer SCORM, IMS QTI ipd). Različni izvorni formati so uporabni v primeru, ko želi učitelj prenesti zbirko vprašanj iz portala NAUK.si v svojo spletno učilnico. Če uporablja na primer okolje Moodle in XML izvorni format, lahko vprašanja iz NAUK.si portala uporabi na enak način kot vprašanja, ki jih sestavi v svojem Moodle okolju. Čeprav bi učitelj lahko vprašanja v Moodle uvozil tudi prek formata SCORM, bi v nekaterih primerih zaradi izbire formata SCORM izgubil možnost statistične obdelave odgovorov in ocenjevanja, ki jo ponujajo učna okolja itd.

Izkazalo se je, da je za kvalitetna in uporabna e-gradiva zelo pomembno sodelovanje učiteljev z ustvarjalci e-gradiv. V ta namen nameravamo znotraj portala zgraditi podporo spletnim skupnostim, kjer bo mogoče oddajati svoja mnenja, recenzirati in komentirati že obstoječa gradiva. Na izvedenih seminarjih se je namreč izkazalo, da imajo učitelji željo po objavi svojih gradiv, še več pa imajo idej po spremembah in posodobitvah obstoječih e-gradiv, ki pa jih zaradi pomanjkanja časa ali znanja ne uspejo realizirati. E-skupnosti bodo namenjene reševanju tega problema, saj bodo nudile skupno komunikacijsko točko za učitelje in razvijalce gradiv.

4 Kako naprej? Orodja in storitve za podporo kvalitetnemu e-izobraževanju v Sloveniji

Pogosto je prva naloga, ki jo opravi učitelj, objava e-gradiva (navadno tujega avtorja) v sistemu za upravljanje z učnimi vse-

binami (LMS). V slovenskem šolskem prostoru najpogosteje srečamo odprtokodno virtualno učno okolje Moodle.¹⁰

V okviru Dodatnih izobraževanj iz računalništva in informatike¹¹ za učitelje srednjih in osnovnih šol (Lukšič et al., 2007) so udeleženci izobraževanj (učitelji na srednjih in osnovnih šolah) izrazili željo po tem, da potrebujejo pomoč pri izbiri, namestitvi, upravljanju ter administriranju LMS in dodatkov, ki razširjajo njegove funkcionalnosti. Najpogosteje omenjeni težavi sta bili: neustrezno opremljena šola (šola nima dovolj zmogljivega strežnika, šola nima računalnikarja - systemskega administratorja, ki bi znal izbrati, namestiti in prilagoditi LMS) in da imajo sami neustrezen nivo znanja za upravljanje z LMS okoljem in življenjskim ciklom spletnih učilnic. Učitelji, ki so obiskovali dopolnilni izobraževanje DIRI¹³ in IPI¹², so od organizacije Arnes pričakovali, da jim bo pomagal pri njihovih težavah; glej (Horvat et al., 2008).

Dobro organizirana Moodle skupnost v Sloveniji je poskrbela za popularizacijo in prilagoditve okolja Moodle za slovenske potrebe. Učitelji v Sloveniji so Moodle dobro sprejeli in predvsem zaradi pogosto omenjenih pozitivnih izkušenj njihovih kolegov, ki so orali ledino, se je izoblikovalo skupno mnenje, da je Moodle v tem trenutku najboljša izbira za slovenske šole. Arnes je zato v letu 2008 v okviru projekta SIO začel s pripravo naprednega gostovanja spletnih učilnic Moodle. Arnes je podprl tudi prilagoditev sistema Moodle in jo bo v okviru ene izmed svojih storitev ponudil svojim uporabnikom; glej (Božeglav et al., 2009). Arnesovo gostovanje gre v tem primeru korak dlje, saj uporabnike razbremenjuje tudi vzdrževanja aplikacije same, tako da se lahko le ti v celoti posvetijo vsebini oziroma izobraževalnemu procesu.

Učitelji potrebujejo tudi orodje za izdelavo e-gradiv, saj ima vsak učitelj kakšno gradivo, ki bi ga želel objaviti. V slovenskem prostoru so avtorji najpogosteje uporabljali program eXe¹³. Ker uradna distribucija ni bila spremenjena že od začetka maja 2008, smo avtorji tega prispevka v okviru odprtokodnega projekta (Lukšič, 2009) eXe posodobili, do konca lokalizirali in mu dodali nove funkcionalnosti¹⁴.

Orodje, ki bo nadgradilo program eXe in bo primerno za izdelavo naprednih učnih kock ter sestavljanje le-teh v učne enote, bo moralo znati iz več virov, zbrati gradiva na isto temo, zbrati gradnike, ki jih sestavljajo in omogočiti učitelju, da si sam sestavi tako e-gradivo, kot mu ustreza. Kvizi in domače naloge bodo morali biti pripravljene tako, da bo omogočena prijava na strežnik za avtomatsko generiranje nalog in evalvacijo rezultatov. Orodje za delo z učnimi kockami bo moralo znati shraniti učne kocke v vsaj enem izmed standardov za e-gradiva. Sestavljeno bo moralo biti modularno, omogočalo naj bi uporabo različnih tipov e-gradiv, od navadnih spletnih strani, video animacij, kvizov, dinamično generiranih nalog, nalog z namigi itd. Omogočalo naj bi vodenje enostavnih lokalnih repozitorijev pri uporabniku ter sestavljanje standardiziranih e-gradiv in paketov SCORM. Delovati bo moralo tudi brez povezave na internet.

¹⁰ <http://www.moodle.org>

¹¹ Lokar, M. et al., Dopolnilna izobraževanja iz računalništva in informatike (DIRI), <http://ucilnica.fmf.uni-lj.si>

¹² Lokar, M. et al., Izbrana poglavja iz informatike (IPI), <http://vesna.fmf.uni-lj.si/ipimoodle>

¹³ <http://exelearning.org>, (maj 2008), eXe Version 1.04 (r3532)

¹⁴ Slovenska nadgradnja orodja eXe, <http://exe.imfm.si>

Avtorji tega prispevka predlagamo, da bi v Sloveniji zagotovili ponudnika storitve, ki bi gostil strežnike sistema za podporo dinamičnim nalogam, učitelji pa bi imeli omogočen dostop do sistema, kjer bi lahko gradili svoje naloge ter jih vključevali v svoje spletne učilnice. Primer dobre prakse je recimo repozitorij vsebin AM, ki uporablja svoj interni sistem za generiranje in evaluacijo dinamičnih nalog. Podobna storitev bo podprta tudi v okviru projektov skupine NAUK.si.

5 Zaključek

Najpomembnejša naloga slovenskega centra za e-šolstvo je torej, da vzpostavi okolje, ki bo omogočalo izvajanje vseh zgoraj omenjenih nalog, predvsem na naslednjih področjih:

- *e-gradiva*: razvoj manjših povezljivih gradnikov, upravljanje, uredništvo, preiskovanje, urejanje, spreminjanje, povezovanje, kombiniranje, objava, primeri dobrih (zaključenih) lekcij in gradiv, navodila za uporabo gradnikov in njihovo sestavljanje,
- *orodja*: izbira pravih orodij, razvoj novih orodij, tehnična prilagoditev, podpora standardom, podpora SIO2, prilagoditve, lokalizacija, podpora uporabnikom,
- *repozitorij vsebin SIO2*: zagon, vzdrževanje, prilagoditve standardom, nadgradnje, različni formati vsebin, razvoj (spletnih) storitev, različni izvozni formati,
- *LMS sistemi*: storitev, vzdrževanje in nadgradnje, lokalizacija, pomoč uporabnikom,
- *razvoj novih konceptov in paradigem*.

V prihodnje bo potrebno več časa nameniti tudi razvoju e-gradiv, ki bodo prirejene prikazu na manjših zaslonih pametnih mobilnikov (majhni prenosni računalniki, mobilni telefoni in pametni dlančniki) – t.i. *mobile learning*.

Cilj projektov skupine NAUK.si je **ponovno postaviti učitelja v vodilno mesto** pri pripravi in uporabi e-gradiv, saj je on tisti, ki mora odločati kako in kje bo gradiva uporabljal. Z dobro premišljenimi koncepti in orodji, ki nastajajo v okviru skupine NAUK.si e-gradivom zagotavljamo obstojnost, prilagodljivost ter vsestranskost in dajemo učitelju možnost izbire. S tem pa ga postavljamo »nazaj v igro«!

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Boris Horvat je bil med prvimi avtorji sistema spletnih učilnic, ki se uporablja na Fakulteti za matematiko in fiziko že od leta 2004 naprej ter eden prvih uporabnikov tega sistema. Njegovo delo obsega preučevanje standardov ter kvalitete e-izobraževanja v Sloveniji in po svetu. Je soavtor več znanstvenih in strokovnih prispevkov s tega področja in eden od vodilnih sodelavcev v projektu izdelave e-gradiv NAUK – napredne učne kocke.

Matija Lokar je zaposlen na Fakulteti za matematiko in fiziko Univerze v Ljubljani kot vodja računalniškega centra in kot višji predavatelj. Je avtor več knjig in člankov s področja računalništva in uvajanja računalniške tehnologije v pouk. Sodeloval je pri številnih domačih in mednarodnih projektih na temo uporabe IKT v izobraževanju in je tudi eden od vodilnih sodelavcev v projektu izdelave e-gradiv NAUK – napredne učne kocke.

Primož Lukšič je bil med prvimi avtorji sistema spletnih učilnic in wikijev, ki se uporabljajo na Fakulteti za matematiko in fiziko Univerze v Ljubljani. Bil je sodelavec projektov »Učenje programiranja« in »Aktivna matematika«, ki sta potekala v okviru razpisa MŠŠ za izdelavo e-gradiv. Bil je vodja projekta nadgradnje in lokalizacije programa eXe. Je eden izmed vodilnih sodelavcev v projektu izdelave e-gradiv NAUK – napredne učne kocke. Je avtor več prispevkov s področja e-izobraževanja, ki pokrivajo tako teoretična izhodišča kot tudi primere dobre prakse.

Evalvacija izobraževalnega procesa s poudarkom na vojaških vsebinah

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Evalvacija kot proces vrednotenja je eden izmed elementov izobraževanja, ki pomembno vplivajo na njegovo kakovost ne glede na število njegovih ponovitev. Celovitost vrednotenja prinaša dodano vrednost v obliki novih usmeritev za celoten izobraževalni proces, ki jih lahko z vsako ponovitvijo implementiramo in sproti nadgrajujemo. V Slovenski vojski se zavedamo pomena kakovosti v izobraževalnih procesih. Zanimiv izziv predstavlja organizacija izobraževanja Višje štabnega šolanja v sodelovanju z javnimi izobraževalnimi institucijami. O razlogih za organizacijo takega izobraževanja, njegovem pomenu za Slovensko vojsko in evalvaciji izobraževalnega procesa bo predstavljeno v prispevku.

Gljučne besede: evalvacija, vojaško izobraževanje in usposabljanje, evalvacija vojaških vsebin, Višje štabno šolanje.

1 Uvod

O pomenu izobraževanja, usposabljanja in izpopolnjevanja v javni upravi je bilo napisanega že veliko. Zaposleni in njihovi nadrejeni naj bi stalno spremljali novosti na svojem področju dela hkrati naj bi bili odprti za nove aktualne trende v bližnji in daljni okolici. Vse to zato, da bi lahko bolje in več delali in tako prispevali k razvoju in dobrobiti družbe. S pojavom globalizacije je svet postal mala velika vas, na katero vpliva veliko najrazličnejših dogodkov. Tako se svet spreminja hitreje in mi z njim. Odzivnost na spremembe je posledično postala temeljni postulat sodobne družbe.

Države članice Evropske unije (EU) so se na spremembe kot posledico globalizacije odzvale z Bolonjsko strategijo, kjer so si zadale cilj, da EU »ohrani globalno konkurenčnost in postane najbolj konkurenčno in dinamično, na znanju zasnovano gospodarstvo na svetu, sposobno trajnostne gospodarske rasti z več in boljšimi delovnimi mesti ter večjo socialno kohezijo«, kar je bilo sklenjeno na zasedanju Evropskega sveta v Lizboni leta 2000 (Černoša, 2004: 211).

Evropska unija se je v prenovljeni Lizbonski strategiji iz leta 2005 usmerila na dva ključna cilja zagotavljanje višje gospodarske rasti in povečanje zaposlenosti. Kako navedeno doseči?

Izobraževanje v najširšem pomenu besede je na vsak način ena izmed mnogih oblik za doseg navedenih ciljev. Temu ustrezno se je spremenil celoten šolski sistem z namenom postati bolj dostopen, bolj ciljno usmerjen in bolj odziven na spremembe v svetu, na trgu delovne sile itn.

Spremembe v svetu so vplivale tudi na Slovenijo. Postala je samostojna država, ki je članica EU in zveze NATO ter nekaterih drugih mednarodnih organizacij. Z vstopom v veli-

ki svet so se pojavile tudi nove prednosti in obveznosti. Ena izmed njih je sodelovanje z oboroženimi silami najrazličnejših držav. Da bi pripadniki oboroženih sil, v Sloveniji je to Slovenska vojska (SV) kot organ v sestavi Ministrstva za obrambo (MO), lahko kompetentno zastopali svojo državo, morajo biti ustrezno izobraženi in usposobljeni.

Pripadniki SV splošno izobrazbo pridobijo v javnem šolskem sistemu, vojaška znanja pridobivajo v organizaciji vojaških šol znotraj SV. V SV je organizirano Poveljstvo za doktrino, razvoj, izobraževanje in usposabljanje (PDRIU) v katerem so vojaške šole kot npr. Šola za podčastnike, Šola za častnike, Poveljniško štabna šola, Šola za tuje jezike in drugo.

Večina držav članic EU in zveze Nato, kot npr. Španija, Belgija, Nizozemska, Avstrija, Velika Britanija in Portugalska, ima vojaško izobraževanje organizirano kot del javnega izobraževalnega sistema zato zanj veljajo enaka merila in standardi kot za druge javne šole. V Sloveniji takega načina šolanja po vojaških vsebinah, z izjemo vojaškega modula po prvi Bolonjski stopnji na Fakulteti za družbene vede, nimamo.

Neodvisno od načina izobraževanja je pomembno, da so pripadniki SV ustrezno izobraženi in usposobljeni tako po vojaških in nevojaških vsebinah. Pri opravljanju nalog v tujini in domovini je bistveno, da so slovenski pripadniki primerljivi po izobraženosti in usposobljenosti pripadnikov drugih oboroženih sil in lahko enakovredno sodelujejo v mednarodnem okolju.

Zaradi neumeščenosti vojaškega izobraževanja v javni izobraževalni sistem je MO razvilo različne programe izobraževanja z izobraževalnimi institucijami v Sloveniji in tujini, kjer pripadniki SV in drugi zaposleni lahko pridobijo znanja iz vojaških in nevojaških vsebin.

Razlogi za evalvacijo izobraževanja po vojaških vsebinah so torej jasni. Izobraževanje po vojaških vsebinah je potrebno spremljati in vrednotiti zato, da bi dosegli ustrezno kakovost in zastavljene cilje. S tem namenom je evalvacija potekala od decembra 2008 do marca 2009.

In kakšna je kakovost izobraževanja po vojaških vsebinah v SV?

2 Pomen evalvacij v izobraževalnem procesu

Beseda »evalvacija« v slovenskem jeziku pomeni ocenitev, vrednotenje, medtem ko slovar angleškega jezika besedo pojasnjuje tudi kot preračunavanje, določitev vrednosti. V literaturi se pojavlja tudi oblika besede »evaluacija«, vendar je zelo redka.

Evalvacijo bi lahko opisali kot analitično preiskavo, ki temelji na zbiranju in analizi dokazov, rezultat česar je izdelava zaključkov in priporočil iz konkretnih dokazov (Valovirta, 2002).

Kot najpreprostejšo definicijo evalvacije omenja Rihterjeva, ugotavljanje doseganja ciljev določenega programa, lahko pa vsebuje tudi oceno izvedbe, procesa, nepričakovanih učinkov in vplivov. Izraz evalvacija uporablja tudi širše, in sicer »kot vsak poskus povečanja človeške učinkovitosti preko sistematične raziskave, ki je osnovana na zbiranju podatkov«. Ravno tako razume evalvacijsko raziskavo kot raziskavo, ki »uporablja sistematične, standardizirane metode družboslovnih znanosti za ocenjevanje družbenih intervencij in socialnih programov«.

Rihterjeva pravi, da je iz zgodovinski dejstev mogoče razbrati, da je prepoznavanje pomena evalvacij pogosto odvisno od političnih in ekonomskih razmer. Začetki evalvacij segajo v leto 1845. Dolgo obdobje je bila evalvacija socialnih programov in politik »obrobni del lokalnih zdravstvenih, socialnih in izobraževalnih birokracij« (Rihter, 2004: 83). V Združenih državah Amerike je bilo zlato obdobje evalvacijskih raziskav, ki jih je financirala država, v 60-ih letih. Po navedenem obdobju je država začela krčiti sredstva, namenjena socialnim politikam, evalvacije so tako prevzele vlogo ugotavljanja uspešnosti, učinkovitosti in racionalnosti posameznih programov.

Tendenco po zmanjševanju finančnih sredstev na področju socialnih politik, v zdravstvu in izobraževanju je še vedno prisotna, oziroma je s spreminjanjem javnih politik v trendu zmanjševanja sredstev vedno bolj opazna. Dejstvo je, da morajo zaposleni v javnem sektorju pri sodelovanju v izvajanju različnih javnih politik izkazovati vedno več znanja, strokovnosti in inovativnosti, da pri kandidiranju na različne aktivnosti lahko zraven sodelujejo oziroma pridobijo dodatna sredstva.

Tako so npr. v Švici evalvacijske raziskave predpisane v 170. členu Ustavnega zakona iz leta 1999, in sicer z namenom ugotavljanja učinkovitosti izvajanja javnih politik. Po vedenju avtorjev (Widmer in Neunschwander, 2004) je Švica edina država, ki ima evalvacije v ustavi. Razlog za navedeno spremembo v zakonodaji je bil porast strukturnih reform, na podlagi katerih so javne institucije zahtevale pregled ne samo nad vloženi sredstvi, temveč tudi nad rezultati, doseženimi

z javnimi finančnimi sredstvi, ki naj bi se odražali v konkretnem kakovostnejšem delu javnih institucij.

Evalvacija zajame integralen družbeno politični proces, ki vključuje mnenja in interese udeležencev in evalvatorjev, predvsem pa širše kulturno, politično in socialno okolje. Zahteva proces sodelovanja vseh udeležencev, pri čemer mora biti dosežen splošni konsenz o končni odločitvi oziroma stališču. Na ta način naj bi našli najboljšo skupno opcijo, ki bi bila za vse prisotne optimalna. V procesu evalvacije se v sodelovanju z vsemi udeleženci vsi učijo od drugih, sami poučujejo druge in z aktivnim sodelovanjem pridobivajo na širjenju lastnega znanja, pri čemer se porajajo nove rešitve. Gre za kontinuiran, ponavljajoč se in močno divergenten proces. Program ali ukrep, ki ga evalviramo, je kljub temu, da teče v okviru začrtanega načrta, dovzeten za stalne spremembe in izboljšave, ki so potrebne za doseg aktualnih ciljev. Ima svoj začetek in konec, vendar ob ponovnem začetku stečejo ne iste, a podobne aktivnosti.

Evalvacije kot postopka ni možno vnaprej načrtovati do te mere, da bodo vse aktivnosti natančno po časovnici. V program, ki ga evalviramo, je vključenih toliko različnih dejavnikov, npr. udeleženci, okolje, različne vsebine, posebnosti posameznega dogodka, ki se dejansko lahko ves čas spreminjajo. Hkrati ne moremo zagotoviti okoliščin, kjer bi se isti proces lahko ponovil z istimi pogoji. Vsak proces evalvacije je unikačen (Macur, 2000; Huebner in Betts, 1999).

2.1 Evalvacije na področju vojaškega izobraževanja

Evalvacije so kot proces vrednotenja v teoretičnem in praktičnem smislu povsem ustrezne in primerne za izvajanje na področju vojaškega izobraževanja iz dveh temeljnih razlogov. Prvi je, da vojaško izobraževanje poteka na identičnih zakonitostih kot vsako drugo izobraževanje bodisi, da imamo v mislih javno veljavno izobraževanje ali druge organizacijske oblike izobraževanja, ki so bolj poznane kot usposabljanje in izpopolnjevanje. Drugi razlog je, da v Sloveniji vojaško izobraževanje predstavlja enega izmed procesov izobraževanj, ki so sestavni del javne uprave in ne sodi v sistem javnega šolstva. Slovensko vojaško izobraževanje tako ne deluje po principu in v soodvisnosti konkurenčnosti med posameznimi fakultetami ali univerzami, kjer bi lahko s številom vpisanih, diplomiranih ali s kako drugo metodo pridobivali povratne informacije v smislu doseganja kakovosti izobraževanja kot izobraževalnega procesa. Navedeno je samo razlog več, da se naložba v tako izobraževanje vrednoti.

Kot primer uporabe evalvacije na področju vojaškega izobraževanja naj navedemo Evropsko univerzitetno združenje (European University Association), ki je v letu 2007 izvedlo evalvacijsko poročilo na Portugalski vojaški akademiji kot redno obliko zunanje evalvacije na vojaški izobraževalni instituciji. Ugotovitve evalvacijskega poročila pomenijo pomembno usmeritev organizatorjem in nosilcem izobraževalnega procesa za nadaljnji razvoj le tega.

Herman Kuipers in Rudy Richardson, redna profesorja na Kraljevi vojaški akademiji (Royal Netherlands Military Academy) na Nizozemskem, sta uporabila evalvacijo kot metodo

za reorganizacijo vojaške akademije kot izobraževalne institucije (Kuipers in Richardson, 1999).

Evalvacija kot oblika vrednotenja izobraževalnega procesa v izobraževalnih sistemih predstavlja eno izmed najpomembnejših metodoloških pristopov pri zagotavljanju njihove kakovosti. Zaradi navedenega pomeni evalvacija pomemben metodološki pristop pri vrednotenju izobraževanja na področju vojaških vsebin.

2.2 Poveljniško štabna šola kot del vojaškega izobraževalnega procesa

Poveljniško štabna šola (PŠŠ) je nosilec nadaljevalnega vojaškega izobraževanja in usposabljanja častnic in častnikov ter višjih vojaških uslužbencev SV, ob določenih pogojih tudi vodilnih in vodstvenih delavcev v državni upravi na dolžnostih v varnostno obrambnem področju ter častnikov članic zveze Nato in Partnerstva za mir (Partnership for Peace - PZM) (Zabukovec, 2008: 138 – 140).

Z vsebinami programov je primerljiva s šolami držav članic zveze Nato, na zahtevnosti ravni pa programom podiplomskega študija v javnem izobraževalnem sistemu oziroma študiju po 2. Bolonjski stopnji (Zabukovec, 2008; 140 – 149; Žabkar in Svete, 2008: 198 - 199).

Šolanje na PŠŠ zagotavlja akademske pogoje za poglobljen študij in osebni razvoj slušateljev obenem pa pripravljajo udeležence za dinamičen odziv na zahteve in izzive prihodnosti pri razvoju, uporabi, poveljevanju in podpori enot SV, pri izvajanju operacij v rodovskem¹, združenem², skupnem³ in mednarodnem okolju (Zabukovec, 2008: 139 – 140). PŠŠ je mesto intelektualne izmenjave razvojnih konceptov, idejnih rešitev in njihove evalvacije.

Za datum ustanovitve PŠŠ šteje 1. februar 1993, ko je šola začela z delom na podlagi jeseni 1992 sprejete odločitve kolegija ministra za obrambo naj se, kot del nastajajočega Izobraževalnega centra MO, ustanovi šola, ki bo sistematično vojaško - strokovno usposabljala častnike stalne⁴ in vojne⁵ sestave.

V začetku je PŠŠ izvajala kratke, pretežno aplikativne tečaje za častnike novo nastajajoče SV. Namenjeni so bili obnovi strokovnih in tudi večinskih znanj iz taktike, poveljevanja, mobilizacijskih postopkov in logistične podpore. Poleg strogo vojaško strokovnih tem so bili v predmetnike vključeni tudi predmeti kot mednarodno vojno in vojaško pravo, vojaška psihologija, informatika in telekomunikacije, vojaška topogra-

fija, vojaška didaktika in metodika, metodologija znanstvenega dela, kultura ustnega izražanja.

Danes PŠŠ opravlja najzahtevnejši del nadaljevalnega vojaško-strokovnega izobraževanja in usposabljanja častnikov stalne in vojne sestave SV za opravljanje upravno strokovnih, štabnih⁶ in poveljniških⁷ dolžnosti.

Pri tem šola načrtuje, organizira in izvaja večmesečna izobraževanja in usposabljanja poveljnikov, poveljstev in štabnih častnikov za poveljevanje enotam in opravljanje štabnih funkcij v Generalštabu in poveljstvih SV, pa tudi v poveljstvih združenih operativnih sestavov mirovnih sil. Temeljni poudarek je na nacionalni in mednarodni varnosti, taktiki, operatiki, strategiji in štabnem delu. Pri zahtevnejšem vojaško-strokovnem izobraževanju poveljnikov in častnikov v poveljstvih in štabih prihaja do hitrih sprememb. Spremembe nastajajo kot posledica spreminjajočih se obrambno-doktrinarnih in strateških opredelitev, v učnih programih, pa tudi v metodah in pristopih izobraževanja. Zlasti informacijska tehnologija je ob manjših stroških in v krajšem času bistveno povečala učinkovitost in kvaliteto izobraževanja. Oboje je vgrajeno tudi v šolanje na PŠŠ. Programi izobraževanja in usposabljanja obsegajo znanja in standarde, ki omogočajo interoperabilnost⁸ SV z vojskami držav članic zveze Nato.

Pri sodelovanju PŠŠ s tujino je potrebno posebej omeniti, da je v začetku svojega delovanja šola najbolj sodelovala z najvišjimi vojaškimi šolami Nemčije in Avstrije. Razvoj mednarodnega sodelovanja jo je povezal s Führungsakademie iz Hamburga na področju operatike in doktrine zveze Nato, strateškega načrtovanja ter evalvacije, danes pa šola ima vzpostavljene dobre stike z Royal Defence College v Bruslju, v razvoju je sodelovanje z Ratno šolo »Ban Jelačić« in Zapovedno stožerno šolo »Blago Zadro« iz Republike Hrvaške. Šola aktivno sodeluje na konferenci poveljnikov vojaških šol zveze Nato in PZM ter mediteranske iniciative in znotraj pričakovanih aktivnosti v organizaciji Nato Defence College iz Rima. Vključuje se v sodelovanje PZM Konzorcija na področju programov, učenja na daljavo, evalvacij in simulacij.

Današnje mednarodne aktivnosti šole najbolj izpostavlja aktivno sodelovanje z Združeno štabno šolo (ISSMI) Republike Italije v Rimu, kjer posebno velja omeniti v letu 2007 izvedeno prvo skupno vajo operativnega načrtovanja, hkrati v Rimu in Ljubljani. V vaji so na obeh straneh sodelovala mešana poveljstva, skupno sliko pa smo ustvarili s pomočjo videokonferenčne povezave. Danes delavnice na vaji potekajo v angleškem jeziku in sicer v obliki predavaj in skupinskega dela. Slušatelji, razdeljeni v skupine, razpravljajo o izbrani

¹ Podsistem (del) zvrsti: artilerija, inženirstvo, pehota itn...

² Joint: označuje dejavnost, delovanja, organizacije itd., v katerih sodelujejo elementi več kot ene zvrsti iste države (glej Brinc idr., 2006).

³ Combined: opis aktivnosti, operacij ali organizacij, v katerih sodelujejo elementi več držav (glej v Brinc idr., 2006).

⁴ Stalna sestava vojske je formacija, ki jo sestavljajo poklicni pripadniki vojske, to so vojaki, podčastniki, častniki in vojaški uslužbenci (v nadaljnem besedilu: vojaške osebe) ter civilne osebe, ki delajo v vojski, vendar civilne osebe ne opravljajo vojaške službe (več v Zakonu o obrambi).

⁵ Vojna sestava vojske je formacija, ki jo sestavljajo pripadniki stalne sestave, vojaški obvezniki na služenju vojaškega roka in pripadniki rezervne sestave, ki so razporejeni v vojno sestavo vojske (več v Zakonu o obrambi).

⁶ Dolžnosti v vojaški organizaciji, kjer skupina vojaških in civilnih oseb podpira poveljnika pri izvajanju vseh funkcij (glej v Brinc idr., 2006).

⁷ Dolžnosti oz. pristojnosti, ki jih ima posameznik v oboroženih silah za usmerjanje in koordinacijo vojaških sil, ali kontrolo nad njimi (glej v Brinc idr., 2006).

⁸ Povezljivost, sposobnost sistemov, enot ali sil, da zagotavljajo storitve drugim sistemom, enotam ali silam in sprejmejo storitve od njih, ter izmenljivost storitev, ki omogoča učinkovito skupno delovanje (glej v Brinc idr., 2006).

temi in predstavijo svoje stališče do problema. Pomemben del srečanja je tudi spoznavanje obeh držav in prijateljsko druženje s pripadniki oboroženih sil sosednje države, vaja operativnega načrtovanja pa ostaja del načrtovanih stalnih dejavnosti, s katerimi PŠŠ želi slušatelje ustrezno pripraviti za delo v mednarodnih strukturah (kot zanimivost: edini tuji častnik, ki se je do sedaj šolal na PŠŠ (na Višjem štabnem tečaju) je bil prav iz Republike Italije).

Skladno s pričakovanimi trendi razvoja vojaškega šolstva v svetu se PŠŠ aktivno vključuje tudi v iniciativo vojaških šol srednjeevropskih držav na področju razvoja in poenotenja programov, učenja na daljavo, evalvacije, skupnih vaj in simulacij.

Temeljne oblike vojaškega izobraževanja in usposabljanja (VIU), ki jih načrtuje, pripravlja, organizira in izvaja Poveljniško štabna šola so:

1. Štabno šolanje (ŠŠ)
2. Višje štabno šolanje (VŠŠ)
3. Generalštabno vojaško izobraževanje in usposabljanje (GŠ VIU - redni in ob delu) (Zabukovec, 2008).

2.3 Višje štabno šolanje Poveljniško štabne šole

Program je namenjen častnikom SV, ki že najmanj tri leta uspešno opravljajo poveljniške ali štabne dolžnosti v poveljstvih bataljonov, brigad ali v vojaških teritorialnih poveljstvih ter imajo osebni čin najmanj stotnika in končan Štabni tečaj/šolanje. Na tečaju pridobijo slušatelji vojaško strokovno znanje, potrebno za poveljevanje enoti na ravni bataljona, za delo v vojaškem teritorialnem poveljstvu in poveljstvu brigade ter pridobijo temeljna znanja za vključevanje v delo taktičnih poveljstev mednarodnih mirovniških sil. VŠŠ od šolskega leta 2006/07 poteka po novem programu, vezano na vzporedno izobraževanje častnikov na izbranih fakultetah. Slušatelji ob uspešnem zaključku šolanja pridobijo diplomu VŠŠ in strokovni naziv magister stroke (odvisno od izbrane fakultete), s čimer opravijo obveznosti iz izbirnega dela programa VŠŠ. Z uvedbo programa VŠŠ so v sistem VIU častnikov SV uvedeni standardi, ki veljajo v javnem izobraževalnem sistemu in so primerljivi s podobnimi šolanji v zavezniških državah. Izobraževanje na VŠŠ traja 12 mesecev oziroma eno šolsko leto (Zabukovec, 2008).

3 Evalvacija Višje štabnega šolanja

VŠŠ od šolskega leta 2006/2007 poteka v sodelovanju z dvema fakultetama in od šolskega leta 2007/2008 s tremi fakultetami in sicer s Fakulteto za družbene vede iz Ljubljane (FDV), Fakulteto za logistiko iz Celja (FL) in Fakulteto za management iz Koprja (FM) tako, da so le-te na pobudo PŠŠ in

v sodelovanju s PŠŠ razvile nove programe iz obstoječih izbranih vsebin, ki se dopolnjujejo z vsebinami VŠŠ (Zabukovec, 2008). Posameznik, ki se navedenega šolanja udeleži pridobi vojaška in civilna znanja, ki sestavljajo smiselno celoto. Na ta način izpolni pogoje za napredovanje v činu in pridobi dodatno znanje po javno veljavnem izobraževalnem programu.

Predmet evalvacije so bili cilji programa VŠŠ, vsebina (predmeti VŠŠ in predmeti fakultet), predavatelji, študijsko gradivo, znanja in veščine po končanem šolanju, ki so jih ocenjevali udeleženci šolanja, organizacija šolanja ter znanja in veščine po končanem šolanju, ki so jih ocenjevale nadrejene osebe tistih, ki so šolanje končali.

Z namenom zajeti čim boljši vzorec vprašanih je bilo izdelanih pet različnih vprašalnikov:

- Anketni vprašalnik za pripadnike SV – vpisane na VŠŠ v sodelovanju s FDV, (vprašalnik FDV);
- Anketni vprašalnik za pripadnike SV – vpisane na VŠŠ v sodelovanju s FL, (vprašalnik FL) ;
- Anketni vprašalnik za pripadnike SV – vpisane na VŠŠ v sodelovanju s FM, (vprašalnik FM);
- Anketni vprašalnik za nadrejene⁹ in potencialne kandidate¹⁰ za šolanje na VŠŠ, (vprašalnik VNPk)¹¹;
- Anketni vprašalnik za predavatelje¹² in zaposlene v PŠŠ, (vprašalnik PZ);

Evalvacija VŠŠ je bila izvedena na vzorcu 78 vprašanih, pri čemer so se predavatelji in zaposleni v PŠŠ odzvali predvsem v pisni obliki in večinoma niso odgovarjali na vsebine iz vprašalnika ampak so podali svoja videnja šolanja.

Anketni vprašalniki so bili vprašanim prilagojeni tako, da npr. ciljna skupina nadrejeni in potencialni kandidati niso ocenjevali študijskega gradiva, ciljna skupina že vpisanih na FDV, FL in FM pa ni odgovarjala na vprašanja o organizacijski umestitvi šolanja in podobno.

Vsi vprašani so ocenjevali cilje izobraževanja, vojaške vsebine in vsebine posamezne fakultete glede na njihovo aktualnost in uporabnost povezano z zahtevami, ki izhajajo iz delovnega mesta. Kot pomemben element v izobraževalnem procesu je bilo del vprašanj namenjenih tudi učnemu gradivu VŠŠ in fakultet, organizacijskim vidikom izobraževanja in končnemu cilju procesa t.j. znanjem, ki naj bi jih pridobili.

Vprašani, ki so v izobraževalnem procesu, so ocenjevali predavatelje po različnih kriterijih kot npr. verodostojnost predavatelja, možnost tvornega sodelovanja, uporaba ustreznih učnih pripomočkov, organizacija izvedbe predmeta, časovni okvir za izvajanje itn.

Potencialni kandidati za šolanje in nadrejeni ter predavatelji in zaposleni na PŠŠ so imeli na voljo dodatne vsebine za ocenjevanje. Med te vsebine nedvomno sodijo predlogi in mnenja glede prihodnosti na področju izobraževanja po vojaških vsebinah.

Vsi vprašalniki so bili pripravljeni po metodi v naprej pripravljenih kvantitativnih kazalnikih, kjer se je vprašani zgolj odločal med ponujenimi možnostmi razvrščenimi praviloma

⁹ Z izrazom nadrejeni so mišljeni vsi vodje, ki po vsebinskem smislu lahko tvorno prispevajo k oblikovanju oziroma posodobitvi izobraževalnega procesa.

¹⁰ Potencialni kandidati so vsi tisti zaposleni, ki se bodo šolanja v bodoče morali udeležiti zaradi zahtev, ki izhajajo iz delovnega mesta.

¹¹ Razdeljeno je bilo 120 anketnih vprašalnikov.

¹² Anketni vprašalnik so prejeli vsi predavatelji vojaških vsebin in predavatelji fakultet, ki sodelujejo v izobraževalnem procesu.

od vrednosti 1 do 5 oziroma od 1 do 3 pri čemer je 1 zavzemala najnižjo in 5 oziroma 3 najvišjo vrednost na lestvici razen v primerih rangiranja posameznih vrednosti po njihovi pomembnosti.

Vsak vsebinski sklop je imel možnost kvalitativnega sodelovanja vprašanega, ki je bil opredeljen zgolj kot »vaše mnenje« ali »vaš predlog« in je omogočal posamezniku, da je lahko po lastni presoji vpisal svoja opažanja, predloge in kritiko.

Ob dejstvu, da so bili vprašalniki po vsebini in obsegu različni (od 15 do 25 strani) je bil delež kvalitativnega sodelovanja s strani vprašanih velik in je predstavljal pomemben element pri oblikovanju zaključnega evalvacijskega poročila.

Posebno dodano vrednost so predstavljali vprašalniki namenjeni zaposlenim na PŠŠ ter predavateljem vojaških vsebin in fakultet. Zaposleni na PŠŠ in predavatelji vojaških vsebin so dejansko izvedli samoevalvacijo medtem, ko so predavatelji fakultet prispevali svoje poglede v obliki zunanje evlavacije. Slednji v večini primerov niso izpolnjevali predvidenega vprašalnika ampak so se odločili za posredovanje lastnega videnja predmetnega izobraževanja, kjer so posebej pohvalili organizacijske vidike izobraževanja in izrazili presenečenje nad kakovostjo in raznolikostjo znanja po vojaških vsebinah.

4 Ugotovitve ob zaključku evalvacije

Vprašani, udeleženci v izobraževalnem procesu, so ocenjevali vojaške vsebine in vsebine fakultet. Vojaške vsebine so bile

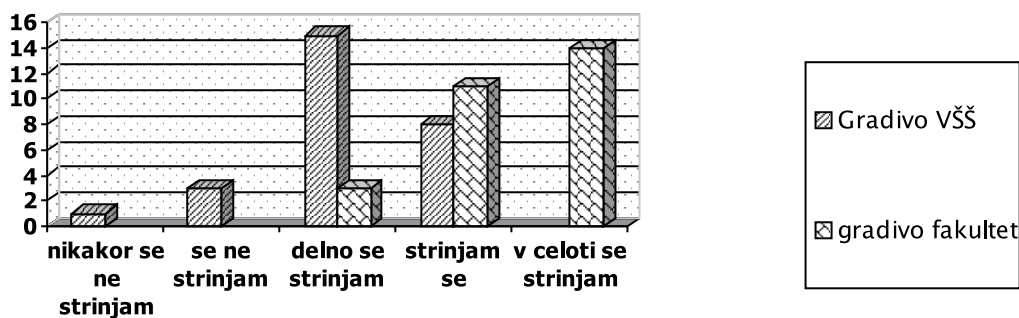
ocenjene kot zelo aktualne in po pomembnosti razvrščene po naslednjem vrstnem redu; vojaško voditeljstvo kot najpomembnejša vsebina, sledijo ji mednarodne vojaške operacije, delovanje enot SV, nacionalna in mednarodna varnost, tehnični sistemi in koncepti kot podpora delovanj ter zaključna naloga.

62 odstotkov vprašanih je menilo, da vojaških vsebin ni potrebno spreminjati. Ostali so predlagali bolj aktivne metode dela po obstoječih vsebinah.

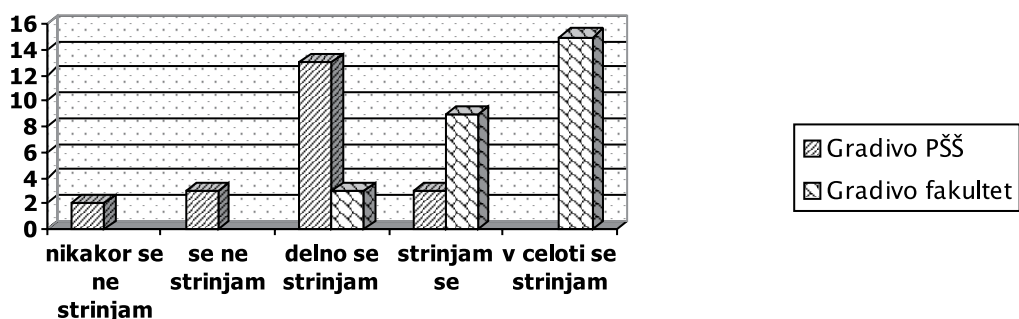
30 odstotkov vprašanih je menilo, da je obstoječi izbor fakultet, ki so vključene v sodelovanje s PŠŠ, pravi izbor in sodelovanje z drugimi fakultetami ni potrebno. Dejstvo, da je trenuten izbor fakultet ustrezen, so potrdili odgovori na vprašanje na katero od fakultet bi se vpisali v primeru, če bi se ponovno odločali. Vprašani so na prvo mesto za vpis izbrali FM, na drugo mesto FL in na tretje FDV pri čemer so bile razlike minimalne.

70 odstotkov vprašanih v vzorcu nadrejeni in potencialni kandidati za šolanje meni, da je sodelovanje s fakultetami potrebno razširiti in sicer s fakultetami na področju naravoslovnih vsebin. Navedeni predlog podpirajo tudi rezultati kadrovske analize.

V procesu smo ocenili, da gradiva predstavljajo pomemben element izobraževalnega procesa zato so vprašani na šolanju ocenjevali tudi gradivo PŠŠ in fakultet po naslednjih trditvah: gradivo je estetskega videza, pripravljeno po enotni metodologiji, je funkcionalno, ima optimalno število strani, bo uporabno na delovnem mestu, je aktualno v teoretičnem smislu, avtorji gradiva izhajajo iz najnovejših spoznanj - odgovori so prikazani na sliki 1 in iz virov in literature izhaja, da so



Slika 1: Gradivo VŠŠ in fakultet. Trditev: avtorji gradiva izhajajo iz najnovejših spoznanj.



Slika 2: Gradivo PŠŠ in fakultet. Trditev: iz virov in literature izhaja, da so nosilci predmetov aktivni na področju pisanja in objavljanja v svoji stroki.

nosilci predmetov aktivni na področju pisanja in objavljaja v svoji stroki - odgovori so prikazani na sliki 2.

Gradivo PŠŠ je bilo s strani udeležencev v izobraževalnem procesu ocenjeno kot dobro vendar je bilo gradivo fakultet ocenjeno veliko boljše iz česar izhaja, da bi morala PŠŠ več pozornosti nameniti kakovosti učnega gradiva. Navedeno je potrebno razumeti tudi z vidika umeščenosti PŠŠ v okvir SV oziroma MO. Kakovosti učnega gradiva fakultet je bistveno bolj podprta glede na njihovo institucionalno umestitev in sistem napredovanja predavateljev, ki ni primerljiv z zaposlenimi v javni upravi, kamor sodijo predavatelji PŠŠ.

Organizacija šolanja predstavlja pomemben dejavnik njegove uspešnosti zato so bili v evalvacijo vključeni naslednji elementi kot merilo vrednotenja: dolžina programa šolanja, knjižnica PŠŠ, študijsko potovanje, prevozi, tajništvo šole, informacijska podpora, družabno življenje, opremljenost predavalnic, lokacija šolanja, sodelovanje tujih predavateljev, objavljane kakovostnih pisnih materialov kot rezultat šolanja, spletna stran šole, motivacija predavateljev, namen in poslanstvo šole ter kadrovska zasedba šole. Odgovori na nekatere od izbranih elementov ter ocene vprašanih so prikazani na sliki 3).

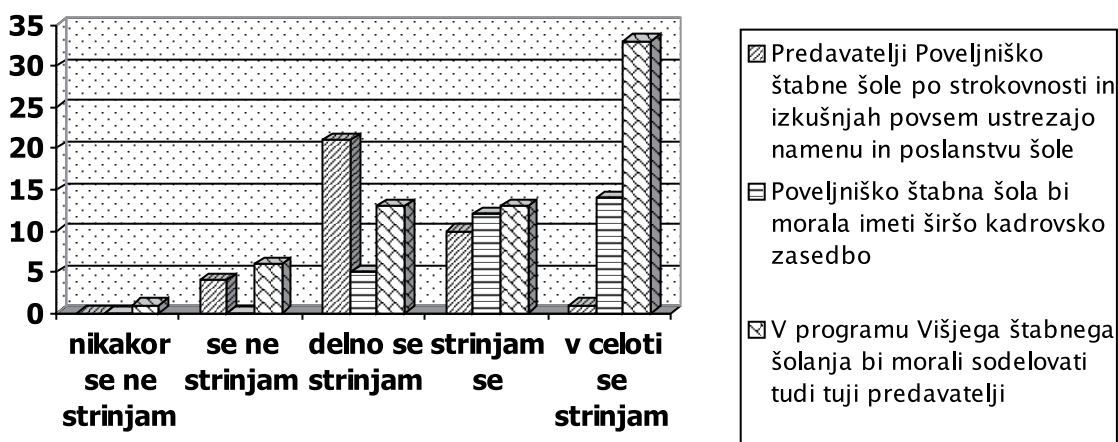
Izbor nekaterih možnosti v vprašalniku ob navedbi »Znanja in veščine pripadnic in pripadnikov SV po končanem šolanju naj...«.

Pri vsebinah povezanih z znanji in veščinami, ki naj bi jih pridobili na šolanju, so se vprašani v vseh skupinah osredotočali predvsem na povezljivost šolanja z opravljanjem svojega dela neodvisno od tega ali delo opravljajo v domovini ali v tujini.

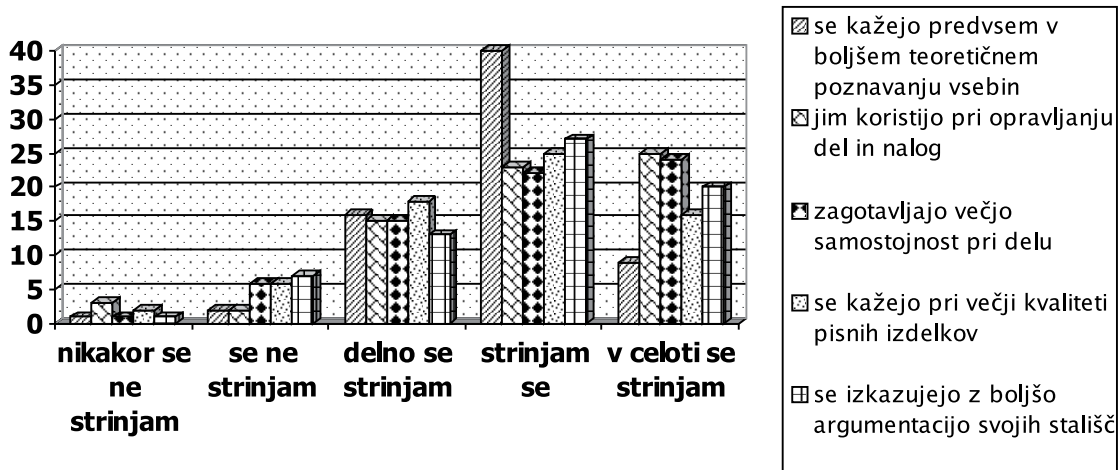
Gre za opravljanje poklicev, ki so zelo razgibani, še posebej če upoštevamo napotitve na različne dolžnosti v tujino v okviru slovenskih predstavništva v EU, zvezi Nato, OZN ter na operacijah in mirovni misijah. Kljub temu, smo uspeli po pridobljenih znanjih vprašati nekatere nadrejene.

Vzorec nadrejenih, ki so bili nadrejeni udeležencem na izobraževanju pred in po šolanju, je zelo majhen, vendar v celoti proporcionalno potrjuje, da udeleženci pridobijo znanja in veščine v razmerjih, ki so prikazani na sliki 4 kot tista znanja in veščine, ki naj bi jih pridobili.

Ne glede na dejstvo, da gre za šolo, ki ne predstavlja klasične izobraževalne institucije v smislu umestitve v javni izobraževalni sistem in hkrati ne sodi v oblike izobraževanj, ki nastopajo na trgu, je kakovost izvajanja izobraževanja PŠŠ



Slika 3. Organizacija PŠŠ. Nekateri vidiki



Slika 4. Znanja in veščine.

izrednega pomena. Znanja, ki jih pridobijo pripadniki SV, zaposleni v MO in ostali udeleženci, pomenijo pomemben dejavnik na področju izobraževanja tako v civilnih kot tudi vojaških strukturah. Šolanje mora zagotavljati znanja, ki so primerljiva z drugimi tovrstnimi šolami v državah članicah EU in zveze Nato. Tako je kakovost izobraževalnega procesa enakega pomena kot v javnih izobraževalnih institucijah. Upoštevati je potrebno enaka merila in kriterije pri načrtovanju, organiziranju, izvedbi in vrednotenju izobraževalnega procesa s poudarkom na razvoju predavateljskega kadra in učnega gradiva. Predavateljski kader mora sodelovati z zunanjimi izobraževalnimi institucijami, zato je sodelovanje in organizacija šolanja v povezavi s fakultetami izrednega pomena za razvoj zaposlenih v obrambnem resorju in za razvoj vojaških vsebin.

Po pregledu vseh materialov in vsebin, ki so bili pridobljeni v procesu evalvacije VŠŠ je pomembno upoštevati nekatere okoliščine, ki so pomembne za interpretacijo zbranih rezultatov in gradiv.

Udeleženci izobraževanja na VŠŠ imajo ob vstopu v izobraževanje zelo različno pred izobrazbo in različne delovne izkušnje, predvsem pa zelo različna pričakovanja, kar velja za potencialne kandidate za šolanje in vodstvene kadre, ki so v evalvaciji sodelovali. Iz navedenega lahko lažje razumemo nekatera nasprotna si stališča, ki so se v procesu evalvacije pojavljala. S tega vidika so toliko bolj pomembna nekatera strokovna stališča zaposlenih na področju izobraževanja po vojaških vsebinah, nekaterih strokovnjakov interne javnosti v SV in nekaterih zunanjih strokovnjakov sodelavcev v izobraževalnem procesu v okviru VŠŠ. Le-ti lahko sodelujejo in bi morali sodelovati pri oblikovanju in usmerjanju nekaterih pomembnih vsebin, ki vplivajo na širše področje obrambnega resorja in njegovih aktivnosti v mednarodnem okolju. V okviru vojaškega izobraževanja in usposabljanja pa se določene vsebine v izobraževanje vnašajo z namenom aktualizirati izobraževanje tako, da bodo pridobljena znanja lahko podprla aktivnosti in naloge resorja v prihodnosti.

5 Zaključek

Dejstvo, da je slovensko vojaško šolanje organizacijsko umeščeno v strukturo MO oziroma SV, ne pomeni, da gre za izobraževalne oblike nepovezane z izobraževalnimi in drugimi institucijami.

Vloga zaposlenih v MO in pripadnikov SV se je s pridružitvijo Slovenije EU in zvezi Nato bistveno spremenila. Navedeno pomeni, da morajo oboji predstavljati svojo državo najmanj tako kot drugi predstavniki držav članic ali celo bolje. Biti primerljiv z pripadniki oboroženih sil držav članic z dolgoletno tradicijo na področju izobraževanja po vojaških vsebinah včasih ni enostavno. Ni pa nemogoče.

Izobraževanje na Višjem štabnem šolanju v povezavi z različnimi fakultetami nedvomno pomeni velik napredek za SV in za razvoj vojaških ter drugih vsebin, ki so pomembne pri zagotavljanju nacionalne varnosti.

Na ta način se krepi sodelovanje med fakultetami kot nosilkami bogatega teoretičnega znanja in SV kot organizacijsko strukturo z obilo praktičnega znanja in izkušnjami doma in na mednarodnih dogodkih v mnogih pojavnih oblikah

(opravljanje del in nalog v predstavništvih SV v tujini, misije in mednarodne operacije, itn).

Spremljanje kakovosti izobraževalnih procesov pomeni za SV povsem enako obveznost kot za katerokoli drugo institucijo, ki izobražuje in jo financira država. Po vojaških vsebinah izobražuje SV. Ker gre za izobraževanje po specifičnih vsebinah je skrb za njihov razvoj toliko večjega pomena. Evalvacija je najpogosteje uporabljena metoda za zagotavljanje kakovosti izobraževalnih procesov. Njeni rezultati so idealno vodilo za nadaljnje delo na različnih področjih. Z evalvacijo Višjega štabnega šolanja v povezavi s fakultetami je SV dobila vzpodbudo za nadaljevanje sodelovanja z zunanjimi izobraževalnimi institucijami in njegovo nadgradnjo.

Rezultati evalvacije so vodilo za nadaljnje delo po VŠŠ a so hkrati tudi vodilo za evalvacije po drugih oblikah izobraževanja. Pri zasnovi evalvacijskega procesa bi lahko kot osnovno vodilo v naslednja generacijah šolanja bili predmet evalvacije samo posamezni vsebinski sklopi. Predstavljena evalvacija je bila zelo obsežna, trajala je štiri mesece. Pozitivna izkušnja je nedvomno pridobitev obsežnega nabora kvalitativnih in kvantitativnih podatkov, ki bodo v prihodnje pripomogli h kasnejšim primerjalnim analizam. Hkrati obsežen nabor podatkov lahko povzroči zasičenost z množico usmeritev med katerimi je težko prepoznati bistvene. Določitev prioritete za posamezno šolsko leto se tako zdi smiselna, še posebej, če je v kontekstu vključevanja aktualnih trendov tako na področju evalvacij kot po vsebinskem področju.

Metodološki pristop, ki bi po mnenju avtorjev bistveno pripomogel h kakovosti predstavljene evalvacije, je nedvomno organizacija skupinskega vodenega srečanja z udeleženci na šolanju pred šolanjem, med šolanjem in po šolanju. Poudarek razprave na srečanju bi nedvomno bil na znanjih, za katere ocenjujejo, da jih potrebujejo, na znanjih za katere ocenjujejo, da so jih pridobili v času šolanja in tistih za katere ocenjujejo, da so jih po npr. šestih mesecih pridobili, jih dejansko uporabljajo in katera so tista znanja, ki jih potrebujejo, a jih na šolanju niso pridobili.

Evalvacijski proces v skladu s teorijo evalvacij neprestano nastaja in se sproti spreminja iz česar sledi, da bi ugotovitve takih srečanj vplivale na ugotavljanje potreb po izobraževanju, cilje izobraževanja, kasneje na njegovo načrtovanje, izvajanje in se strnile v evalvacijo naslednje generacije.

Povezovanje z izobraževalnimi institucijami po vojaških vsebinah v državah EU in zveze Nato po evalvacijah bi bilo zelo dobrodošlo. S krepitvijo sodelovanja s slovenskimi fakultetami morda postanejo izobraževanja po vojaških vsebinah predmet evalvacije katere izmed tujih institucij, ki evalvacije izvajajo širom Evrope na fakultetah, ki izobražujejo na področju civilnih in vojaških vsebin.

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Dušan Sušnik je diplomiral na vojaški akademiji v Sarajevu, smer telekomunikacije. Zaključil specialistični študij Managementa v izobraževanju na Fakulteti za Management, Univerza na Primorskem. Posveča se aktualnim temam na področju izobraževanja, managementa in vodenja (leadership).

Viri

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Medosebna vloga ravnatelja - managerja v procesu dela in funkciji humanistično-antropocentričnega managementa človeških virov

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Prispevek se osredotoča na medosebno vlogo ravnatelja in definiranje ključnih dejavnikov v procesu dela in funkciji humanistično – antropocentričnega managementa. Pri tem je ključnega pomena humanizacija managementa, kjer ravnatelj – manager prevzema več vlog: sodelovalna, razvojno – raziskovalna, koordinacijska – povezovalna, svetovalna, organizacijska ter vloga aktivnega stratega. Predstavljen je model medsebojne vloge ravnatelja v funkciji humanistično-antropocentričnega managementa človeških virov na področju vzgoje in izobraževanja.

Ključne besede: človeški viri, medsebojni odnosi, medosebna vloga, kompetenca, humanistično-antropocentrični management, kreativna obzirnost, vodenje

1 Uvod

Spremembe, ki smo jim danes priča na vseh področjih življenja in dela, se kažejo ne samo v drugačnem stilu življenja in novih vrednotah, temveč tudi v spremenjenem odnosu do dela, zlasti pa v medsebojnih odnosih in vlogah na delovnem mestu.

Na osnovi spoznanj raziskav vezanih na medosebno vlogo ravnatelja – managerja v funkciji humanističnega managementa dela s človeškimi viri na področju vzgoje in izobraževanja in proučevanja teoretičnih izkustev na področju mehkega antropocentričnega managementa je temeljni cilj le – tega sprememba, vzdrževanje ali izboljšanje kakovosti medsebojnih odnosov in vlog za učinkovito in uspešno delovanje posameznika in skupine. Je proces, v katerem ustvarjamo pogoje za uresničitev zelenih ciljev, vlog in odnosov z vlogo, s poslanstvom, soglasjem o prioritetah, z delom s sodelavci in s pravilno izbiro vsebin in sredstev skozi proces ugotavljanja stanja.

2 Medsebojne vloge ravnatelja v procesu dela in funkcijah humanistično antropocentričnega

managementa človeških virov na področju vzgoje in izobraževanja

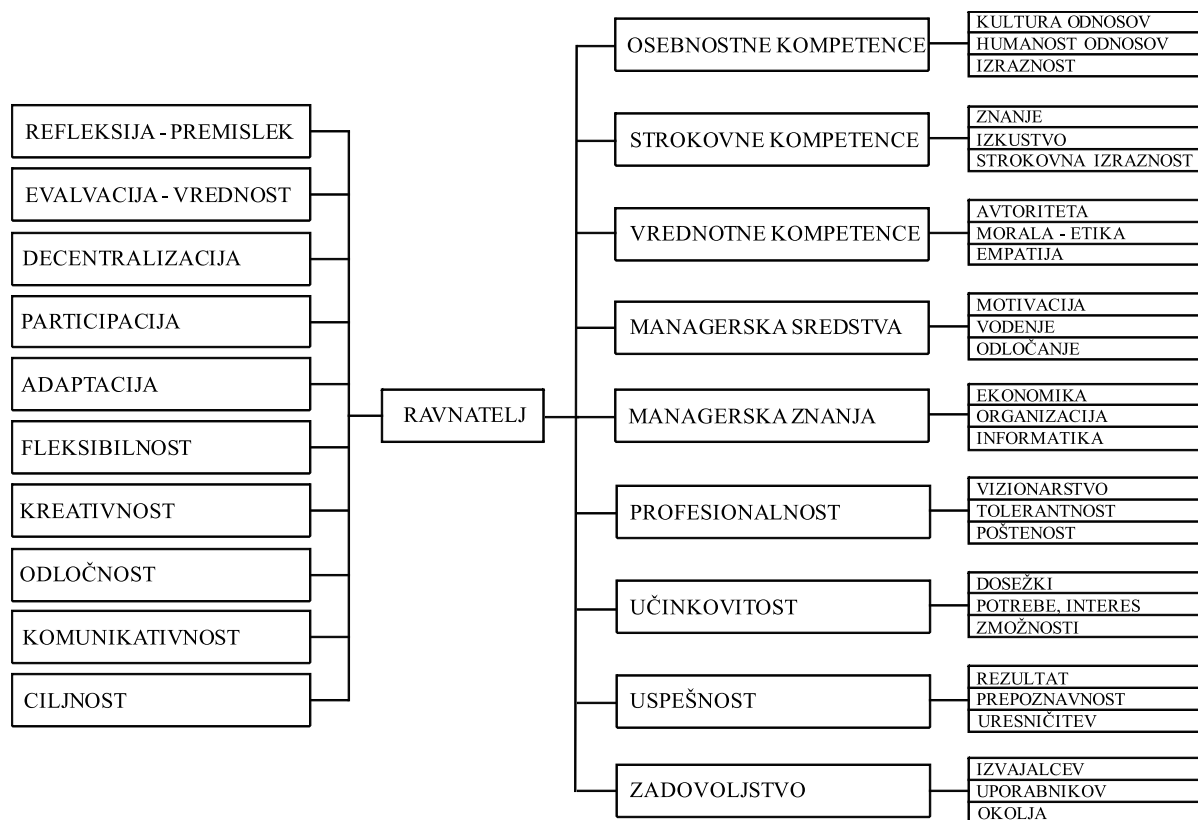
Iz raziskave (Burgar, 2006) izhaja, da humanizacija odnosov, ki jo vzpostavlja ravnatelj preko različnih vlog v medsebojnih odnosih z zaposlenimi, pozitivno vpliva na posodabljanje dela. Zaposleni vidijo humani odnos in posodabljanje dela z jasno odprtostjo dela, izbirnostjo dela, individualnostjo dela, fleksibilnostjo dela, s poudarjanjem osebnostnih in strokovnih kompetenc, z avtonomnostjo kot preneseno odgovornostjo, s participacijo pri odločanju, s prenosom pooblastil, s profesionalizacijo kot izkušnjskim delom in z vseživljenjskim učenjem z integriranim pristopom k odnosom in delu kot s poudarjeno vlogo samousmerjanja in samopotrjevanja s tehniko samoevalvacije z merili uspešnosti in učinkovitosti. Zaposleni so skozi raziskavo jasno podčrtali potrebno izvirno avtoriteto ravnatelja, kajti le ravnatelj s priznano izvirno avtoriteto bo uspel vzpostaviti posodobljene načine izvajanja dela po predhodni vzpostavitvi organizacijske kulture kot ključnega dejavnika fleksibilne, ohlapne in situacijsko naravnane strukture, s prilagojenimi in osmišljenimi izvajanjem funkcij managementa kot interdisciplinarni pristop strokovnih in osebnostno-izraznih kompetenc. Jasno se je izkristaliziralo spoznanje, da lahko ravnatelj svoje vloge in notranjo izvirno avtoriteto ohrani le s svojo osebnostjo, ki sprošča ustvarjalnost in spodbuja radovednost skozi medosebni odnos topline, odprtosti, doslednosti,

razumnosti, splošne širine, skratka skozi human odnos osebnih in družbenih spretnosti emocionalne in socialne inteligentnosti popolnega melanholika in s pozitivnimi lastnostmi ostalih treh tipov osebnosti, ki jih je raziskava jasno izpostavila.

Navedeno zahteva, da spodbujamo vpogled v lasten miselni proces vseh udeležencev in posameznika, s čimer podžigamo intuitivni svet posameznika in vseh oz. sposobnost nadgrajevati ustvarjalno notranjo in zunanjo podobo skozi proces potrebnih sprememb in njihovo zavestno poustvarjanje preko empatičnega vstopa v notranje in zunanje okolje. Skozi pokazan proces lahko vnašamo v uporabni svet posameznika ali tima tudi druge možne osebnostne vrednote, kot so prilagodljivost, vztrajnost, priljudnost, uvidevnost, iznajdljivost, duhovitost, doslednost, samozavestnost, odločnost, odličnost, strpnost, premišljenost, perfekcionizem, odprtost, komunikativnost, kulturnost, etičnost in urejenost, ki lahko pozitivno vplivajo na celostno delovanje posameznika ali tima preko vlog, v katere vstopajo kot sodelavci v ustvarjalnem procesu uresničevanja zastavljenih ciljev (Podjed, 2006). Enostavno lahko rečemo, da je izrednega pomena za oblikovanje osebnosti na delovnem mestu pridobitev potenciala posameznikov skozi posebljanje vrednot v procesu medsebojnih odnosov, v katere vstopamo kot partnerji v isti organizacijski ravnini zastavljenih ciljev, z močjo volje in z različnimi stopnjami odgovornosti do rezultatov skozi proces uresničevanja in evalvacije. S tem podčrtujemo nujnost videnja vodenja skozi vloge medsebojnih odnosov posebljanja ciljev z voljo, motivacijo in znanjem. Tako bomo videli v stvaritvi vrednost, ki ji bomo dodelili ceno v osebnem in skupnem vrednostnem

prispevku osebnosti in organizacije. Spoznanje, ki ga podčrtujejo zaposleni in priznavajo oz. nakazujejo potrebo številne organizacijske teorije in management skozi razvojni čas (Drucker, 2004, Florjančič et al., 2004; Elmore, 2006). Tako ravnatelj – manager kot ključni dejavnik enakih med enakimi vstopa v razvojno-raziskovalno vlogo z spodbujanjem ustvarjalnosti s predhodno oblikovanostjo etičnosti zaposlenih, da bodo videli pomembnost skupnih ciljev in povezovanje materialnih in nematerialnih potencialov, uspešnost sodelovanja in konstruktivnega reševanja konfliktov, ki pomenijo spremembo in razvoj. S tem razvija etiko dolžnosti, ki vodi k zavestnemu delovanju posameznika in vseh proti cilju. Doseči to, pomeni graditi skupino – kolektiv s strokovno in osebnostno potrjenostjo, ki jo odlikujejo strokovnost, sposobnost organizatorja, načrtovalca, usmerjevalca in ocenjevalca – evalvatorja ter strpnost, doslednost, empatičnost, socialnost, emocionalnost do skupnih in individualnih potreb, saj razvoj lahko gradimo le na zadovoljnem, identificiranem, integriranem zaposlenem z znanjem, izkustvi in avtonomno odgovornostjo, adaptacijo in participacijo do nalog in odločitev. Brez priznavanja prispevkov in rasti osebne kariere pa tudi ne gre.

Ciljnost je eno izmed vodil ravnateljstva s spoštovanjem analize stanja, definiranja problemov, predvidevanja alternativnih rešitev, določanja verjetnosti njihove rešitve in rešitve problemov, ki dajejo zelene rezultate (Florjančič et al., 2002). To zahteva integrativni pristop pri vodenju, strokovnost in izrazno osebnost z emocionalno, socialno in organizacijsko inteligenco, ki mu omogoča preudarno presojanje, razmišljanje, usmerjanje in zaključevanje z uvidom v zadovoljstvo kot



Slika 1: Kakovostni dejavniki medsebojne vloge ravnatelja v procesu dela in funkcij humanistično-antropocentričnega managementa človeških virov

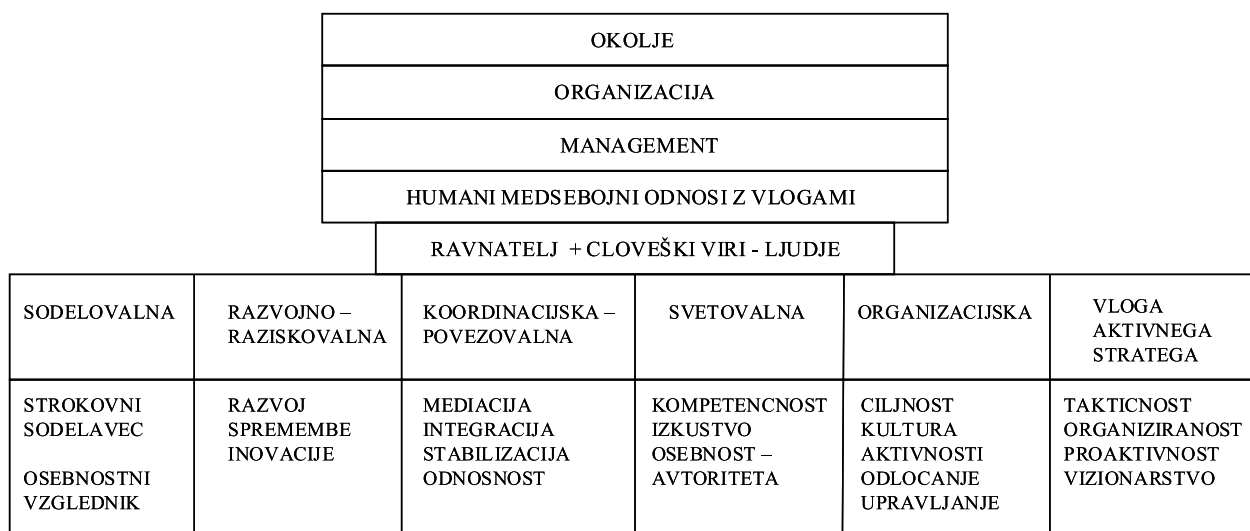
interes, potrebo in zmožnost za učinkovito delovanje. Le-to ravnatelj, na osnovi spoznanj raziskave, garantira možnost uvajanja organizacijskih in strokovnih sprememb, in s tem izvajanje nalog s strokovnostjo in osebnostjo, kar omogoča tudi kvaliteto storitve in kakovostno osebno rast zaposlenega in organizacije. To zahteva od ravnatelja vodenje z enakim videnjem dela kot odnosov na eni strani in drugi strani avtonomno odgovornost s pooblastili, participacijo zaposlenega pri odločanju o načrtih, programih, projektih na osnovi profesionalizacije in prilagojenosti le-teh zmožnostim, interesu in potrebam organizacije in zaposlenega še posebno tistega, ki nalogo in odgovornost s pooblastilom prevzema. Ob humanizaciji odnosov vstopa integracija odnosov in dela, participacija in adaptacija s profesionalizacijo kot izkušenskim delom, ki prinašajo dodano vrednost intelektualnega kapitala posameznika in organizacije k novi vrednosti, to je rezultat kot učinkovitost z močjo volje.

Ob tem je ključnega pomena pri načinu izvajanja funkcij managementa integrativno sprejemanje zaposlenih in preko povezovalne vloge dosegati stabilnost medsebojnih in drugih delovnih odnosov med zaposlenimi (Mulej et al., 2004). To je vstop v zaposlenega s humanimi neodvisnimi spremenljivkami okolja, odnosa in organizacije, preko katerih vzpostavljamo ustrezno organizacijsko kulturo in klimo, ki posebej poudarja pomembnost, koristnost in potrebnost vsakega in vseh zaposlenih. Za to je potrebno biti tudi posebno pozoren pri oblikovanju skupin za določeno nalogo in pri dodeljevanju nalog glede na potrebna znanja, da resnično zadostimo zahtevi tudi na osnovi priznavanja kompetenc vseh zaposlenih. S tem se izognemo slepi pegi organizacije, ki lahko negativno vpliva na želeno organizacijsko in vsebinsko kakovost realizacije naloge. Znotraj povezovalne vloge ravnatelja skozi procese vodenja ne smemo pozabiti pomembnosti povezave med strokovnimi organi in podporno službo znotraj vzgojno-izobraževalne organizacije za zagotavljanje integritete in s tem kakovosti institucije kot celote ter pomembnosti sodelovalnega dela kot sodelavcev (Cimerman, 2004). Kajti dober sodelavec pomeni biti vztrajen ter ohranjati voljo in moč do realizacije

skupno določenega cilja. Z realizacijo pa dokazovati opravičenost vztrajnosti vsem nasprotnikom brez očitkov ampak samo z dokazi uspešnosti in učinkovitosti. Tako bomo pridobili sodelavce tudi s strani nasprotnikov. To zmore le ravnatelj – manager s strokovno in osebnostno izraznostjo, prepleteno z izkustvi dobre prakse. Skratka s kompetencami vzglednika in sodelavca, ki zna združevati svoje vloge v medsebojnih odnosih glede na situacijo. Tako ga mora voditi prepričanje, da si vsi želimo gotovosti na poti do zelenega cilja, z zadostnimi strokovnimi informacijami, alternativnimi rešitvami kot tudi s predvidenimi možnimi posledicami. To nam daje ob strokovni še moralno podporo kot voljo, da dobro opravimo zastavljeno nalogo. Svetovanje ravnatelja mora biti vedno naravnano motivacijsko s spoštovanjem interesa in pričakovanj izvajalcev ob ustreznih kulturi in etiki. Omogočati mora nevsiljeno, vzajemno osebno in strokovno rast, ki kaže karierno pot posameznika na priznani kakovosti s strani ravnatelja. Priznavanje uspešnosti s karierno začrtano potjo je ključ za vzpostavljanje ustvarjalnega in humanega vzdušja v odnosih in s tem se odpirajo vrata spremembam in razvoju organizacije (Mayer, 2004). Ravnatelj v svoji svetovalni vlogi mora biti strokovno potrjen, tako na teoretičnem kot izkustvenem področju in seveda osebno izrazen ter sprejet kot strpen igralec vlog in kompetenc.

To usmerja vloge medosebnih odnosov ravnatelja v pomembnost participacije zaposlenih pri odločanju o viziji, poslanstvu, programih, projektih, nalogah in z aktivnim sodelovanjem pri izvajanju funkcij procesa managementa s potrebnimi znanji. V fazi odločanja je nujno potrebno spoštovati stališča in mnenja ter pričakovanja sodelujočih, saj je to ključno izhodišče za motivacijsko dejavnost vodje. V strateški vlogi mora priti pri ravnatelju do izraza moralna moč, moč prepričevalne komunikacije in jasnost posredovanja glavne ciljnosti. To mora biti izvorna moč, ki temelji na strokovnosti sprememb in razvoju organizacije ter osmišljeni taktiki sodelovalnega dela, s spoštovanjem interesov, potreb in zmožnosti zaposlenih za neučinkovito realizacijo dogovorjenega.

Za uspešno vzpostavljanje vlog medsebojnih odnosov ravnatelj kot upravljalec in pedagoški vodja ne sme spregle-



Slika 2: Ključne neodvisne spremenljivke medosebnih vlog ravnatelja za humanizacijo managementa

dati organiziranja kot skupno aktivnost vlog, nalog, pooblastil, razvojnega načrtovanja kot organizacijsko kulturo interesov, potreb in zmožnosti; vodenja kot adaptivno, implicitno-participativno ter profesionalno izvajanje nalog skozi voden proces z delom in odnosom ter nazadnje nadzorovanja kot evalvacijo z usmerjanjem za spremembe in razvoj. To pomeni, da ne sme spregledati humanistično-antropocentrične funkcije managementa z neformalno, ohlapno in fleksibilno strukturo skozi proces aktivnosti z živeto ciljnostjo in voljo. Skratka ne more in ne sme prezreti kreativnosti posameznika kot strokovnjaka in osebnosti. Za to potrebuje kreativno obzirnost in odprt stil vodenja tako pri izvajanju poslovodne vloge, kot vloge pedagoškega vodje skozi ravnateljstvo, vzgojno-svetovalne-usmerjevalne vloge do animacijsko opazovalne vloge, ki vstopa v medsebojni odnos ravnatelja skozi hodniško načelo sprehajalnega vodenja ravnatelja.

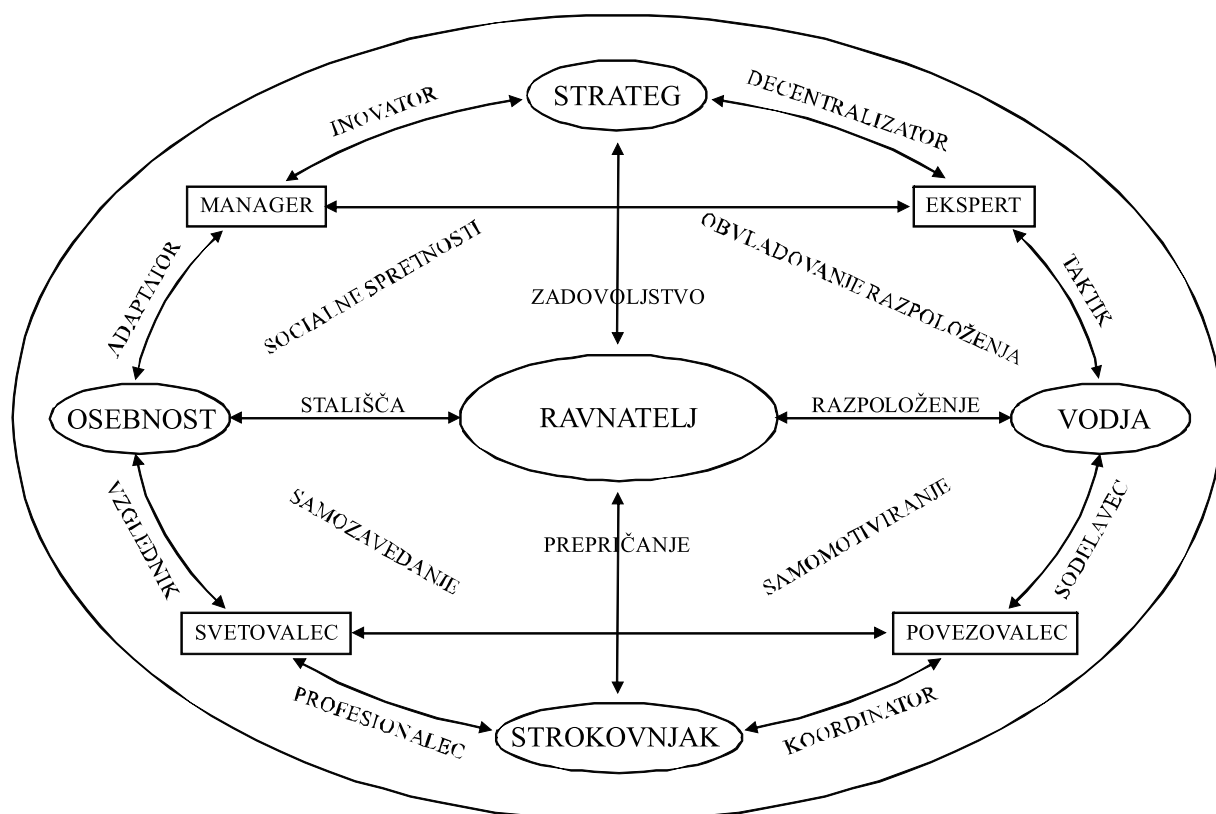
3 Zaključek

Tisti, ki se ukvarjamo s človeškimi viri in potenciali, bi morali razvijati in vzgajati najprej človeške vrednote in zmožnosti glede na organizacijo, saj bomo tako sprostili poti po potrjevanju in dokazovanju v sproščeno a hkrati ustvarjalno delovno organizacijsko ozračje za vzpostavitev kakovostnih medsebojnih odnosov in vlog v procesu dela in funkcijah managementa. Tako vstopa v ospredje čutenje strokovne in osebnostne vrednosti zaposlenega kot razpoložljivega človeškega vira –

potenciala s potrebo po samouresničitvi in samopotrditvi skozi proces del, odnosov in vlog s katerimi preko poudarjenega partnerskega odnosa na višji stopnji samozavesti in samospoštovanja uresničuje pričakovane cilje v funkcijah humanistično antropocentričnega managementa. Za to pa so ključnega pomena osebnostne in strokovne medosebne vloge s katerimi vstopa v proces dela in funkcijah managementa ravnatelj kot poslovodni in pedagoški vodja - ravnateljstvo.

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Slika 3: Medsebojna vloga ravnatelja v funkciji humanistično-antropocentričnega managementa človeških virov na področju vzgoje in izobraževanja

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Bojan Burgar je ravnatelj OŠ Ormož od 1980 leta. Diplomiral je iz specialne pedagogike, geografije in organizacije dela, magistriral iz kadrovske izobraževalnega managementa in doktoriral iz kadrovskega managementa. Objavlja v strokovnih revijah, praktikumih in zbornikih. Osnovno vodilo raziskovalnega področja je vpliv zadovoljstva kot posledične kakovostne razsežnosti neodvisnih spremenljivk in njihovih izvedenk za strokovno in osebno učinkovitost posameznika in skupine na področju javnih zavodov.

Jože Florjančič je redni profesor za področje kadrovskega managementa. Raziskovalno se ukvarja s problematiko globalnega in operativnega managementa v povezavi s strateškim načrtovanjem kadrovskih virov znotraj posameznih organizacij. Njegovi raziskovalni dosežki so razvidni tako iz domačih kot tudi tujih publikacij, znotraj katerih je objavil več kot 180 avtorskih del.

Mojca Bernik je docentka na Univerzi Maribor, Fakulteti za organizacijske vede. Je predstojnica katedre za kadrovske sisteme in deluje na področju organiziranja kadrovskih procesov. Raziskovalno se ukvarja s problematiko kadrovskih procesov v povezavi z informacijskimi sistemi. Objavila je številne strokovne in znanstvene članke v domačih in tujih revijah in bila večkrat soavtorica publikacij, izdanih pri mednarodni založbi Peter Lang.

Izbira šolskih in obšolskih dejavnosti otrok s pomočjo odločitvenega modela

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Aktivnosti, s katerimi se ukvarjamo iz lastnega veselja, nam nudijo sprostitev, pomagajo razvijati različne spretnosti, širijo znanje in pomagajo pri pridobivanju novih izkušenj. Hkrati spoznavamo ljudi s podobnimi interesi in razvijamo svojo osebnost. Šole in druge organizacije ponujajo čedalje več raznovrstnih interesnih dejavnosti, starši in otroci pa se morajo odločiti in izbranim dejavnostim nameniti svojo energijo, čas in denar. Odločitev o izbiri interesne dejavnosti ni enostavna, saj temelji na presoji številnih kriterijev. Poleg tega je odločevalcev več in ti imajo lahko povsem različne interese. Pri tako kompleksnih odločitvah nam lahko pomaga strokovno pripravljen večparametrski odločitveni model. Uporaba le-tega omogoča kvalitetnejše svetovanje otrokom in staršem pri izbiri najprimernejših interesnih področij za otroka v okviru šolskih in obšolskih dejavnosti in nadaljnjo kvalitetno izbiro konkretne dejavnosti, ki se je bo otrok rad udeleževal ter bo vsaj delno v interesu staršev in v okviru njihovih finančnih in časovnih zmožnosti.

Ključne besede: osnovne šole, interesne dejavnosti, sistem za podporo odločanju, DEXi.

1 Uvod

Starši se zavedamo, kako pomembno je spodbujati otrokov razvoj, in to počnemo, kolikor pač znamo in zmoremo. Z odrasčanjem otroka se začnejo spreminjati tudi spodbude, ki jih otrok potrebuje, in pride čas, ko ga začnemo postopoma vključevati v dejavnosti, ki naše spodbude nadgrajujejo (Skalar, 1992; Stoppard, 1998). Otrok začne odkrivati lastne sposobnosti in želje ter s tem pripomore k zavednemu načinu razvijanja svojih sposobnosti in spretnosti.

Osnovna šola v okviru izbirnih vsebin v tretjem triletnju omogoča učencem izbor predmetov glede na njihov interes, z interesnimi dejavnostmi pa jim zagotavlja kvalitetno preživljanje prostega časa tako, da skrbi za bogatenje programov teh dejavnosti ter zagotavlja materialne, finančne in kadrovske pogoje zanje. Učenci v njih najdejo prostor za prostovoljno zbiranje ter druženje (ZRSS, 2007).

Odločitev o izbiri interesne dejavnosti za otroka se ponavadi sprejme na začetku šolskega leta, vendar vsakoletna odločitev ni rutinska. Odločitev je dvostopenjska, kajti sprva se je potrebno odločiti za vrste interesnih dejavnosti, nato pa za konkretno šolsko oziroma obšolsko dejavnost. Otrok in njegovi starši se največkrat odločajo na podlagi pogovora. Hitreje se odločijo, če so njihovi interesi glede vrste dejavnosti skladni. Skupaj pregledajo ponudbo šolskih interesnih dejavnosti ter morebiti še obšolskih in ko starši pretehtajo še možnosti realizacije, se skupaj z otrokom odločijo, koliko interesnih dejavnosti bo otrok obiskoval in katere (Schwartz, 1996).

Ko se otrok odloča, v katere interesne dejavnosti naj se vključi, mu lahko starši pomagajo tako, da ga usmerjajo k raz-

misleku o tem, kaj si želi, kaj ga resnično zanima (Greenleaf, 1993). Pomembni nalogi staršev sta, da razlikujejo dejavnosti, ki otroka sproščajo, in tiste, ki ga dodatno obremenjujejo, ter da poskrbijo, da interesnih dejavnosti ne bo preveč. Otrok naj največ prostega časa preživi sproščeno v krogu družine ter s prijatelji (Horvat in Filipič, 2000; Južnič Sotlar, 2007).

2 Opredelitev odločitvenega problema

Prvo stopnjo v procesu odločanja predstavlja identifikacija problema. Opredelitev problema je rezultat spoznanja, da je nastopil odločitveni problem, ki je dovolj težak, da ga je smiselno reševati na sistematičen in organiziran način (Bohanec in Rajkovič, 1995).

Predmet odločanja je izbor najprimernejših vrst interesnih dejavnosti za učenca v šolski in obšolski obliki. Učencu morajo biti všeč, da jih bo z veseljem obiskoval, in zanje mora imeti ustrezne sposobnosti, da bo lahko pri njih uspešen. Prav tako morajo biti do neke mere všečne staršem, da bodo lahko v okviru svojih časovnih in finančnih zmožnosti omogočili otroku obisk le-teh.

Nekateri učenci in starši znajo opraviti kvaliteten izbor interesnih dejavnosti, pri nekaterih pa je le-ta zaradi različnih vzrokov otežen. V vsakem razredu je nekaj otrok, ki niso vključeni v nobeno interesno dejavnost. Horvat vidi razloge v tem, da ti otroci niso nikjer uspešni, da ne znajo najti nečesa, kar bi jih veselilo, ter da jih doma k temu ne spodbujajo (Horvat in Filipič, 2000). Vključitev v ustrezne interesne dejavnosti bi imela zanje veliko vzgojno vrednost, počutili bi se sprejete,

razvijali bi svojo ustvarjalnost in postajali notranje motivirani (Gomboc, 2007), toda predhodno je potrebno odkriti njihova močna interesna področja ter v ta proces aktivneje vključiti tudi starše.

V zadnjem triletju osnovnošolskega izobraževanja je opaziti manjši obisk interesnih dejavnosti. Razlogi se kažejo v tem, da učenci že z izbirnimi predmeti zadovoljijo svoj interes, da so v tem obdobju učno bolj obremenjeni (Drol Novak, 2007) ter da imajo nekatere interesne dejavnosti neustrezen termin.

Obstajajo tudi otroci, ki so zasičeni z interesnimi dejavnostmi. Starši jih preveč spodbujajo, pa tudi sami otroci si jih prizadevajo obiskovati čim več, ker imajo vzgled pri starših (Horvat in Filipič, 2000). Ti otroci imajo ponavadi veliko želja glede izbire interesnih dejavnosti in se skupaj s starši znajdejo pred dilemo, katere izbrati in katerih ne. Potrebno se je namreč odločiti, koliko interesnih dejavnosti naj bi obiskovali, da bi ob vsem še vedno imeli dovolj časa za sprostivne dejavnosti.

Begavčkom, otrokom, ki nimajo obstanka in se preizkušajo na veliko področjih, je prav tako potrebno pomagati odkriti njihova močna področja, njihovim staršem pa svetovati, da se z otrokom dogovorijo za redno obiskovanje izbrane dejavnosti ter da določijo čas, ko jo bodo smeli prenehati obiskovati, če si bodo to želeli. Na ta način bodo otroci prevzeli odgovornost za svoj interes ter se učili avtonomnosti. Je pa potrebno vedeti, da imajo otroci do desetega ali dvanajstega leta zelo raznolike interese, hkrati pa je vpliv njihovih vrstnikov na izbiro interesne dejavnosti zelo močan (Horvat in Filipič, 2000).

Izbor najprimernejše interesne dejavnosti ni preprost odločitveni problem, ker je pri tem potrebno upoštevati otrokove želje in sposobnosti, želje ter časovne in finančne zmožnosti staršev ter ponudbo šol in drugih organizacij. Uporaba odločitvenega modela za izbiro šolskih in obšolskih dejavnosti omogoča staršem in otroku sprejeti kvalitetnejše odločitve.

3 Interesne dejavnosti

V šoli so se postopoma oblikovale in razvijale različne oblike šolskih in obšolskih dejavnosti. Že v obdobju pred prvo svetovno vojno so v šolah obstajale dodatne dejavnosti, še bolj so se razmahnile med obema vojnama, posebno velik razcvet teh dejavnosti pa predstavlja obdobje po drugi svetovni vojni (Komljanc, 2004).

V začetku petdesetih let 20. stoletja so v šole začeli uvajati tako imenovane svobodne in prostočasne dejavnosti. Izraze za te dejavnosti so postopoma spreminjali. Temeljno vodilo pedagogike prostega časa je *prostost, samoodločanje* in *samouresničitev* človeka v aktivnosti, ki jo opravlja. Skozi čas je tudi šola sprejela dejavnosti prostega časa za svojo nalogo. V prostovoljnih ali interesnih dejavnostih so učenci širili in poglobljali znanja in različne interese, predvsem v kulturnih in športnih dejavnostih (Balkovec Debevec, 2007).

Šolska zakonodaja, ki je nastala v samostojni Sloveniji po letu 1991, določa obvezni in razširjeni program. Slednji za učence in učenke ni obvezen, šola pa ga je dolžna ponuditi. Obvezni program za učence in učenke vključuje pouk obveznih in izbirnih predmetov, dneve dejavnosti ter ure oddelčne skupnosti. Razširjeni program pa obsega jutranje

varstvo, podaljšano bivanje, dodatni in dopolnilni pouk, interesne dejavnosti in šole v naravi (Zakon o osnovni šoli, 1996). Sodobna pedagoška večsmerna komunikacija v obveznem izobraževanju omogoča usklajevanje potreb družbe s potrebami in željami posameznika.

V osemletni osnovni šoli so imele interesne dejavnosti jasno vlogo in pomen, z uvedbo devetletke se je njihov pomen zmanjšal. Prednost so dobile novosti: nivojski pouk in izbirni predmeti. V zadnjem triletju so tudi organizacijske možnosti za izvajanje interesnih dejavnosti bistveno slabše. Sestava urnika je že brez njih povezana s precejšnjimi težavami (Gomboc, 2007).

3.1 Vrste interesnih dejavnosti glede na vsebino

Šole danes ponujajo različne vrste interesnih dejavnosti. Ponudba je odvisna od materialnih, kadrovskih in prostorskih pogojev šole. Po pregledu ponudbe interesnih dejavnosti številnih osnovnih šol po Sloveniji sem oblikovala pet interesnih področij. To so: glasbene dejavnosti, družboslovno-jezikovne dejavnosti, miselne dejavnosti, naravoslovno-tehnične dejavnosti in športne dejavnosti.

Glasbene interesne dejavnosti vzbujajo veselje in pozitivna čustva do glasbe, omogočajo petje, igranje, poustvarjanje in ustvarjanje glasbenih vsebin, zbujejo zanimanje za različne oblike glasbenega udejstvovanja ter oblikujejo pozitiven odnos do slovenske in svetovne glasbene kulture (Oblak idr., 2002). Najbolj razširjeni glasbeni dejavnosti sta zborovsko petje in učenje igranja na inštrument. Otroci pojejo v okviru šolskega zbora, cerkvenega zbora ali zborov ostalih ustanov. Vključujejo se tudi v vokalne skupine. V šoli se največkrat učijo igrati na Orffove inštrumente, na ostale pa v glasbeni šoli, kjer obiskujejo tudi nauk o glasbi. Tam lahko tudi skupno muzicirajo v komornih zasedbah ter orkestrih.

Ljubezen do jezika ter njegove sporočilnosti učenci spretno gojijo v jezikovnih interesnih dejavnostih. Na razredni stopnji so najpogosteje izvajane dejavnosti bralna značka, angleška bralna značka (The Reading badge) ter pravljlični krožek, na predmetni stopnji pa so zelo pogoste recitacijski, literarni, novinarski in dramski krožek ter šolski radio in šolska revija. Najpogosteje izvajane družboslovne interesne dejavnosti so zgodovinski, geografski in turistični krožek. Slavistično društvo Slovenije in Zavod Republike Slovenije za šolstvo vsako leto razpisujeta tekmovanje v znanju slovenščine, Zavod Republike Slovenije za šolstvo pa tudi tekmovanja v znanju angleškega in nemškega jezika ter geografije in zgodovine, zato se učenci na nekaterih šolah pripravljajo nanje v okviru družboslovno-jezikovnih interesnih dejavnosti.

Ena izmed najstarejših miselnih interesnih dejavnosti na šolah je šah, ki je vsebinsko neizčrpna, zgodovinsko dovršena strateška miselna igra. Tudi logika ima v prostoru miselnih interesnih dejavnosti dolgo tradicijo. S svojimi metodami in postopki uči ločevati pravilno sklepanje od napačnega. V obliki interesnih dejavnosti se učenci na nekaterih šolah pripravljajo tudi na tekmovanja v znanju: pod okriljem otroške revije Ciciban na tekmovanje Cici Vesela šola, z najstniško revijo PIL na tekmovanje Vesela šola, ki se je žal s šolskim

letom 2008/09 končalo, ter na medijsko znano tekmovanje v znanju – Sive celice.

Pri naravoslovnih interesnih dejavnostih učenci poglobljeno spoznavajo naravoslovne vsebine in se seznanjajo z raziskovalnimi metodami. Razvijajo svoje eksperimentalne sposobnosti in eksperimentalne pristope, kar vključuje postavljanje hipotez, opazovanje pojavov, preizkušanje, zbiranje, beleženje opažanj in rezultatov, sposobnost osmišljanja, predstavitev opažanj in rezultatov ter prepoznavanje soodvisnosti in povezovanje s teorijo in življenjskim okoljem (Ferbar idr., 2003). Pri tehničnih interesnih dejavnostih pa učenci iz različnih gradiv konstruirajo, načrtujejo, izdelujejo in vrednotijo uporabne predmete, modele tehničnih predmetov in makete (Florjančič, 2007). Na razredni stopnji sta najpogosteje organizirani naravoslovno-tehnični dejavnosti likovni krožek ter ročna dela, na predmetni stopnji pa likovni, računalniški, modelarski, fotokrožek ter interesne dejavnosti z vsebinami biologije, fizike, matematike in kemije, pri katerih se učenci pripravljajo na tekmovanja v znanju.

Športne interesne dejavnosti omogočajo razvoj motoričnih sposobnosti in spretnosti ter so pomembno gibalno oblikovanje osebnosti in odnosov med posamezniki. Prispevajo k skladnemu psihosocialnemu razvoju mladega človeka, sprotitvi in kompenzaciji negativnih učinkov večurnega sedenja s telesno aktivnostjo. Na razredni stopnji so športne interesne dejavnosti organizirane v obliki gibalnih uric oziroma športnega krožka. Poudarek je na usvajanju naravnih oblik gibanj in zadovoljevanju otrokove potrebe po gibanju in igri. Pogosto so organizirane tudi plesne dejavnosti. Na predmetni stopnji pa prevladujejo interesne dejavnosti moštvenih iger, kot so odbojka, nogomet, rokomet in košarka, pa tudi ples, gimnastika in športno plezanje. Učenci lahko svoje znanje in sposobnosti pokažejo tudi na šolskih športnih tekmovanjih in prireditvah.

3.2 Vrste interesnih dejavnosti glede na kraj izvajanja

Interesne dejavnosti glede na kraj izvajanja delimo na šolske in občolske dejavnosti. Šolske interesne dejavnosti organizira šola izven šolskega pouka, z namenom, da omogoči odkrivanje in razvijanje učenčevih interesov, da učence praktično uvaja v življenje in jih s tem usposablja za koristno in zdravo preživljanje prostega časa. Šola jim s pomočjo mentorjev pomaga pri izboru dejavnosti. Učenci se vanje vključujejo prostovoljno in pri njih niso ocenjevani. Za posamezni razred sta za izvajanje interesnih dejavnosti v predmetniku določeni dve uri tedensko. Financiranje je zagotovljeno iz sredstev državnega proračuna. V primeru, da šola v dogovoru z občino ponudi učencem večje število ur interesnih dejavnosti, se to obravnava kot nadstandard in te dodatne ure financira občina. Del stroškov za nadstandardni program lahko krijejo tudi starši, če to želijo (ZRSS, 2006).

Število ponujenih šolskih interesnih dejavnosti se od šole do šole razlikuje. Nekatere šole ponujajo širok izbor, druge ožjega. Interesne dejavnosti se izvajajo pred poukom ali po njem, so brezplačne, prevoz učencev vozačev pa je največkrat urejen s šolskim prevozom. Na vrsto in število interesnih dejavnosti v veliki meri vpliva interes učiteljev in učencev ter tradicija šole in šolskega okolja. Na razredni stopnji prevladuje ponudba jezikovnih dejavnosti, športnih in tehničnih dejavnosti, na predmetni stopnji pa so močno zastopane športne, jezikovne ter naravoslovno-tehnične dejavnosti. Miselne dejavnosti so enakomerno zastopane na obeh stopnjah ter največkrat potekajo v obliki priprav na tekmovanja.

Obšolske interesne dejavnosti se izvajajo v popoldanskem času v prostorih šole ali izven nje. Ponavadi so plačljive, starši morajo sami poskrbeti za prevoz otrok na dejavnost ter kupiti potrebne pripomočke. V mestih je ponudba raznovrstnih

Tabela 1: Pregled kriterijev ocene otrokovih sposobnosti za posamezne dejavnosti

OTROKOVE SPOSOBNOSTI ZA				
GLASBENE DEJAVNOSTI	DRUŽBOSLOVNO-JEZIKOVNE DEJAVNOSTI	MISELNE DEJAVNOSTI	NARAVOSLOVNO-TEHNIČNE DEJAVNOSTI	ŠPORTNE DEJAVNOSTI
ritmične sposobnosti	sposobnosti sprejemanja besedil	sposobnosti miselnih predstav	miselne sposobnosti	informacijska komponenta motoričnih spretnosti
melodične sposobnosti	sposobnosti tvorjenja besedil	sposobnosti pomnjenja in priklica znanj	raziskovalne spretnosti	energijska komponenta motoričnih spretnosti
	ustvarjalnost	sposobnosti ustvarjalnega mišljenja	motorične spretnosti	
		sposobnosti izražanja	spretnosti sporočanja	

obšolskih dejavnosti zelo pestra, v večjih krajih se ponudba iz leta v leto povečuje, na podeželju pa še vedno prevladujejo kulturno- umetniška in pevka društva ter gasilstvo.

4 Izgradnja odločitvenega modela

Odločitveni model za izbiro šolskih in obšolskih interesnih dejavnosti je zgrajen s pomočjo slovenskega računalniškega programa DEXi, ki omogoča kvalitativno večparametrsko modeliranje.

4.1 Opredelitev, strukturiranje in opis kriterijev

Da bi izbrali najprimernejše vrste interesnih dejavnosti, moramo opredeliti vse dejavnike, ki vplivajo na to odločitev (Bohanec, 2006). Sprva je bil sestavljen spisek kriterijev, ki jih je potrebno upoštevati pri odločanju. S pomočjo programa DEXi je nato sledila hierarhična ureditev kriterijev, ki je upoštevala medsebojne odvisnosti in vsebinske povezave. Nepomembni kriteriji so bili zavrženi, prav tako tisti, ki so bili izraženi z ostalimi kriteriji. Rezultat ureditve je nastanek drevesa kriterijev, ki ga sestavljajo trije najpomembnejši kriteriji: otrokove sposobnosti, otrokov interes in interes staršev.

Prvi glavni kriterij otrokove sposobnosti se deli na *podkriterije*, ki so vezani na posamezno vrsto interesnih dejavnosti. Prikazani so v spodnji tabeli. Otrokove sposobnosti oceni učitelj s pomočjo različnih nalog, ugotovitve pa poda z izpolnitvijo izdelanega vprašalnika za učitelje.

Drugi glavni kriterij odločitvenega modela je otrokov interes. Oceno otrokovega interesa za posamezno dejavnost izpeljemo s pomočjo štirih podkriterijev. To so: *dejavnost*, *čas*, *druženje* in *kraj*. Ocena posameznega podkriterija je pridobljena s primerjavo otrokovih želja ter dejanskih zahtev posamezne dejavnosti glede časa, kraja in načina izvedbe ter socialnega udejstvovanja.

Podatke o otrokovem interesu pridobimo s pomočjo izdelanega vprašalnika za učence ter priloge za lažje prepoznavanje sklopov interesnih dejavnosti. Ker učenci prve triade niso sposobni samostojno izpolniti vprašalnika, ga izpolnijo z učiteljevo pomočjo.

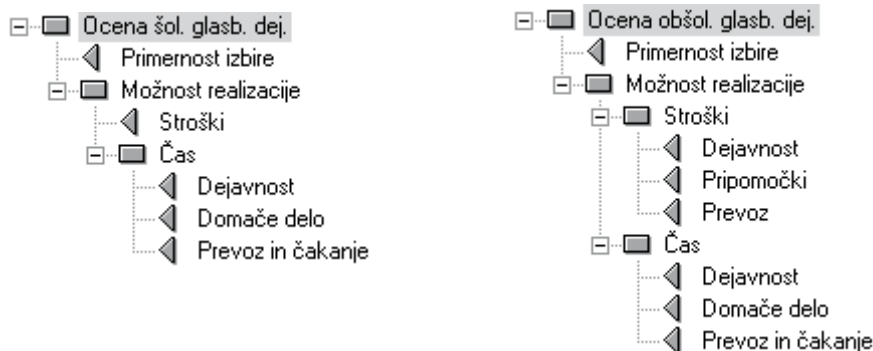
Tretji glavni kriterij pa je interes staršev. Starši s pomočjo vprašalnika in priloge opredelijo svoj interes za otrokovo obiskovanje posamezne interesne dejavnosti. Ta kriterij zaradi večje časovne in finančne obremenitve staršev močno vpliva na oceno izbire otrokovih obšolskih dejavnosti.

Ocena izbire posamezne vrste interesnih dejavnosti je osnovana na podlagi 12 osnovnih kriterijev ter 6 izpeljanih. Primer drevesa kriterijev za oceno izbire ene izmed petih skupin interesnih dejavnosti prikazuje slika 1.

Drevo kriterijev

Kriterij	Opis
Ocena glasbenih dejavnosti	Učenje igranja na inštrumente, petje, spoznavanje nauka o glasbi, poustvarjanje glasbe v skupinah in orkestrih.
Glasbene sposobnosti	Ocena otrokovih glasbenih sposobnosti.
Ritmične	Zaznavanje dolžin tonov, zmožnost pravilnega ponavljanja in zaključevanja ritmičnih fraz, zaznavanje razlik med ritmičnimi vzorci.
Melodične	Zaznavanje višin tonov, zmožnost pravilnega ponavljanja in zaključevanja melodičnih fraz, zaznavanje razlik med melodičnimi vzorci.
Otrokov interes	Ocena otrokovega interesa za obiskovanje glasbenih dejavnosti.
Dejavnost	Otrokova ocena dejavnosti.
Želja	Otrokova želja za ukvarjanje z glasbenimi dejavnostmi.
Zahtevnost	Otrokova želja glede zahtevnosti programa glasbenih dejavnosti.
Način dela	Otrokova želja glede načina dela pri glasbenih dejavnostih.
Čas	Otrokova ocena časa.
Dejavnost	Prosti čas, ki ga je otrok pripravljen nameniti za obiskovanje glasbenih dejavnosti.
Domača obveznost	Prosti čas, ki ga je otrok pripravljen nameniti za domače delo.
Druženje	Otrokova ocena druženja.
Prijateljica	Otrokova želja glede načina vključevanja v glasbene dejavnosti.
Srečanja	Otrokova želja glede udeleževanja srečanj z otroki s podobnimi interesi.
Tekmovanja	Otrokova želja glede sodelovanja na različnih tekmovanjih.
Kraj	Otrokova ocena kraja izvedbe.
Interes staršev	Interes staršev za otrokovo obiskovanje glasbenih dejavnosti.

Slika 1: Pregled in opis kriterijev za oceno izbire glasbenih interesnih dejavnosti



Slika 2: Pregled kriterijev za oceno izbire šolskih in obšolskih glasbenih dejavnosti

Zaloga vrednosti

Kriterij	Zaloga vrednosti
Ocena glasbenih dejavnosti	neprimerne; delno primerne; primerne; zelo primerne
Glasbene sposobnosti	šibke; majhne; ustrezne; odlične
Ritmične	šibke; zmerno; zelo dobre; odlične
Melodične	šibke; zmerno; zelo dobre; odlične
Otrokov interes	ga ni; majhen; večji; zelo velik
Dejavnost	neprimerna; primerna; zelo primerna
Želja	je ni; majhna; velika; zelo velika
Zahtevnost	majhna; zmerno; velika
Način dela	v večji skupini; v manjši skupini; individualen
Čas	premalo; dovolj; odličen
Dejavnost	nič; eno šolsko uro na teden; dve šolski uri na teden; več kot dve šolski uri na teden
Domača obveznost	nič; do ene ure na teden; od ene do dveh ur na teden; več kot dve uri na teden
Druženje	neprimerno; manj primerno; primerno; zelo primerno
Prijatelj/ica	je potreben/na; dovolj je znanec/ka; ni nujen/a
Srečanja	ne bi udeleževal/a; redko obiskoval/a; pogosto obiskoval/a
Tekmovanja	ne bi udeleževal/a; redko obiskoval/a; pogosto obiskoval/a
Kraj	v naravi; delno v naravi; v zaprtem prostoru
Interes staršev	ga ni; majhen; večji; zelo velik

Slika 3: Pregled zalog vrednosti kriterijev za oceno izbire glasbenih dejavnosti

Tabele odločitvenih pravil

	Glasbene sposobnosti	Otrokov interes	Interes staršev	Ocena glasbenih dejavnosti
	37%	44%	19%	
1 šibke		<=večji	*	neprimerne
2 šibke		*	<=majhen	neprimerne
3 *		ga ni	*	neprimerne
4 šibke		zelo velik	>=večji	delno primerne
5 majhne		majhen:večji	<=majhen	delno primerne
6 majhne:ustrezne		majhen	*	delno primerne
7 >=majhne		>=majhen	ga ni	delno primerne
8 majhne		>=večji	>=večji	primerne
9 majhne:ustrezne		večji	>=večji	primerne
10 majhne:ustrezne		>=večji	večji	primerne
11 majhne		zelo velik	>=majhen	primerne
12 majhne:ustrezne		zelo velik	majhen:večji	primerne
13 >=majhne		zelo velik	majhen	primerne
14 ustrezne		večji	>=majhen	primerne
15 ustrezne		>=večji	majhen:večji	primerne
16 >=ustrezne		>=večji	majhen	primerne
17 odlične		majhen	>=majhen	primerne
18 odlične		>=majhen	majhen	primerne
19 >=ustrezne		zelo velik	zelo velik	zelo primerne
20 odlične		>=večji	>=večji	zelo primerne

Slika 4: Pregled agregiranih pravil za oceno izbire glasbenih dejavnosti

V nadaljevanju sta bili oblikovani drevesi kriterijev za oceno izbire šolskih in obšolskih interesnih dejavnosti. Ocena izbire šolskih interesnih dejavnosti je osnovana na podlagi 5 osnovnih kriterijev ter 3 izpeljanih, ocena izbire obšolskih pa na podlagi 7 osnovnih kriterijev ter 4 izpeljanih.

4.2 Zaloga vrednosti in odločitvena pravila

Pri metodi DEX so zaloga vrednosti sestavljene iz besed ali numeričnih intervalov. Merska lestvica je urejena od manj zaželene do bolj zaželene vrednosti. Pri metodi DEX to sicer ni nujno, je pa dobrodošlo za lažjo kontrolo konsistenčnosti odločitvenih pravil in lahko bistveno pohitri postopek zajemanja funkcij koristnosti (Bohanec in Rajkovič, 1995).

Štiristopenjska merska lestvica je bila uporabljena pri oceni izbire posamezne vrste interesne dejavnosti, pri zalogah vrednosti glavnih kriterijev ter pri nekaterih podkriterijih, npr. želja, trajanje dejavnosti, domača obveznost. Pri ostalih kriterijih je bila uporabljena tristopenjska merska lestvica.

Naslednja faza odločitvenega procesa je definiranje funkcij, ki opredeljujejo vpliv nižje ležečih kriterijev na tiste, ki so višje v drevesu, prav vse do korena drevesa, ki predstavlja končno oceno variant. Funkcije koristnosti so predstavljene s preprostimi odločitvenimi pravili tipa »če – potem« v obliki tabele. Tabela je bila izpolnjena s pomočjo utežne vsote. Za vsako kombinacijo zalog vrednosti podkriterijev je bila določena ocena.

Slika 4 prikazuje tabelo agregiranih odločitvenih pravil za glavne kriterije, ki je enaka za vse vrste interesnih dejavnosti.

Iz nje je razvidno, da je ne glede na interes staršev posamezna vrsta interesnih dejavnosti za učenca neprimerna, če zanj nima interesa. Prav tako je neprimerna, če ima učenec šibke sposobnosti in manjši interes. V primeru učenčevega zelo velikega interesa ter večjega interesa staršev pa postane delno primerna. V kolikor starši ne pokažejo interesa za posamezno vrsto dejavnosti, je za učenca le delno primerna. Zelo primerna pa postane že ob ustreznih sposobnostih učenca ter zelo velikem interesu učenca in staršev.

Potem ko so bila določena odločitvena pravila za oceno posamezne vrste interesne dejavnosti, so bila oblikovana še za **oceno šolskih ter občolskih dejavnosti**. Pri obeh modelih so uporabljena enaka odločitvena pravila za glavna kriterija ter podkriterija *finančni stroški* ter *čas*.

Modela se razlikujeta le v tem, da se pri oceni občolskih interesnih dejavnosti podkriterij *finančni stroški* nadalje deli na tri kriterije, pri oceni šolskih interesnih dejavnosti pa nadaljnja delitev ni potrebna.

Iz pregleda agregiranih odločitvenih pravil je razvidno, da so finančni stroški za obiskovanje občolske interesne dejavnosti preveliki, če so stroški za plačilo dejavnosti, stroški za nakup pripomočkov ali stroški prevoza preveliki. V primeru, da so stroški posameznih kriterijev le delno sprejemljivi, se otrok in starši odločijo za cenejšo obliko.

5 Rezultati vrednotenja

Model je bil preizkušen dvakrat in sicer na vzorcu 26 otrok, starih od 9 do 11 let. Pri tem smo ocenili:

1. Glasbene dejavnosti so za 7 učencev zelo primerne, za 5 pa primerne.
2. Družboslovno-jezikovne dejavnosti so za 4 učence zelo primerne, za 5 pa primerne.
3. Miselne dejavnosti so za 2 učenca zelo primerne, za 8 pa primerne.
4. Naravoslovno-tehnične dejavnosti so za 5 učencev zelo primerne, za 8 pa primerne.
5. Športne dejavnosti pa so za kar 19 učencev zelo primerne, za 4 pa primerne.
6. Glasbene dejavnosti so neprimerne za 12 učencev, družboslovno-jezikovne dejavnosti ter miselne dejavnosti za 9 učencev in naravoslovno-tehnične dejavnosti za 4 učence. Športne dejavnosti niso neprimerne za nikogar.

Natančneje si oglejmo rezultate vrednotenja in analizo rezultatov za štiri učence.

Za *Učenca 7* so primerne športne dejavnosti, zato je priporočljiva vključitev v šolsko športno dejavnost (Slika 7). Model je ocenil, da so glasbene, miselne in naravoslovno-tehnične dejavnosti zanj neprimerne, družboslovno-jezikovne pa le delno primerne.

Po oceni modela so za *Učenca 8* vse vrste interesnih dejavnosti zelo primerne, zato so zanj vse šolske interesne dejavnosti zelo primerne, delno primerne pa so občolske dejavnosti iz glasbenega, družboslovno-jezikovnega in športnega področja.

Za *Učenca 12* so zelo primerne športne interesne dejavnosti. Primerne dejavnosti pa so miselne dejavnosti. Ti dve vrsti interesnih dejavnosti sta zelo primerni v šolski obliki, v občolski pa le delno primerni.

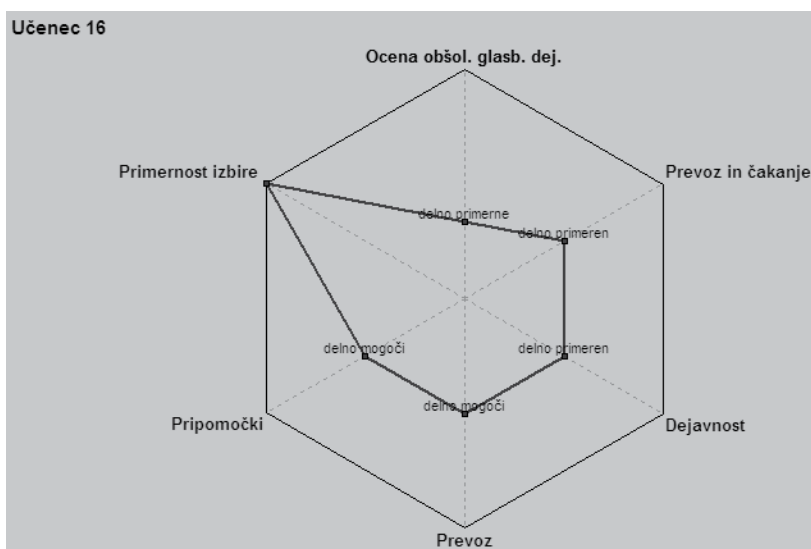
Tabele odločitvenih pravil

	Primernost izbire	Možnost realizacije	Ocena šol. glasb. dej.
	44%	56%	
1	neprimerna	*	neprimerne
2	*	ni možna	neprimerne
3	>=delno primerna	delno možna	delno primerne
4	delno primerna	>=možna	primerne
5	delno primerna:primerna	možna	primerne
6	>=primerna	odlična	<u>zelo primere</u>
7	<u>zelo primerna</u>	>=možna	<u>zelo primere</u>

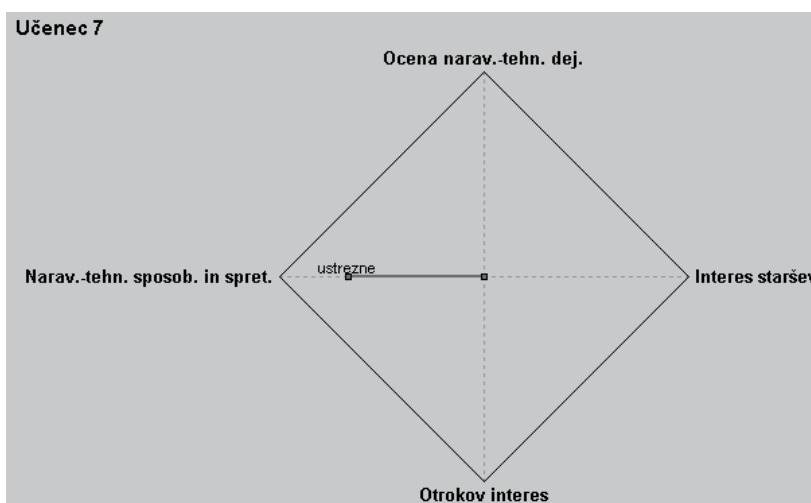
Slika 5: Pregled agregiranih pravil za oceno izbire šolskih glasbenih dejavnosti

	Dejavnost	Pripomočki	Prevoz	Stroški
	35%	29%	35%	
1	preveliki	*	*	preveliki
2	*	preveliki	*	preveliki
3	*	*	preveliki	preveliki
4	delno mogoči	>=delno mogoči	>=delno mogoči	delno mogoči
5	>=delno mogoči	>=delno mogoči	delno mogoči	delno mogoči
6	<u>niso ovira</u>	>=delno mogoči	<u>niso ovira</u>	<u>niso ovira</u>

Slika 6: Pregled agregiranih pravil za oceno finančnih stroškov pri obiskovanju občolskih interesnih dejavnosti



Slika 7: Rezultati vrednotenja ocene šolskih športnih dejavnosti za Učenca 7



Slika 8: Rezultati vrednotenja ocene obšolskih glasbenih dejavnosti za Učenca 16

Zelo primerne dejavnosti za Učenca 16 so iz vrst glasbenih in družboslovno-jezikovnih dejavnosti. V šolski obliki sta obe vrsti zelo primerni, glasbena dejavnost je delno primerna tudi v obšolski obliki (slika 8). Primerna dejavnost pa je šolska miselna dejavnost.

6 Analiza rezultatov

Rezultati vrednotenja nam služijo kot pomoč pri sprejemanju odločitev. Če se želimo odločiti čim bolje, pa je potrebno dobljene rezultate vrednotenja analizirati in razložiti. Program DEXi nam to omogoča s pomočjo »kaj če« analize.

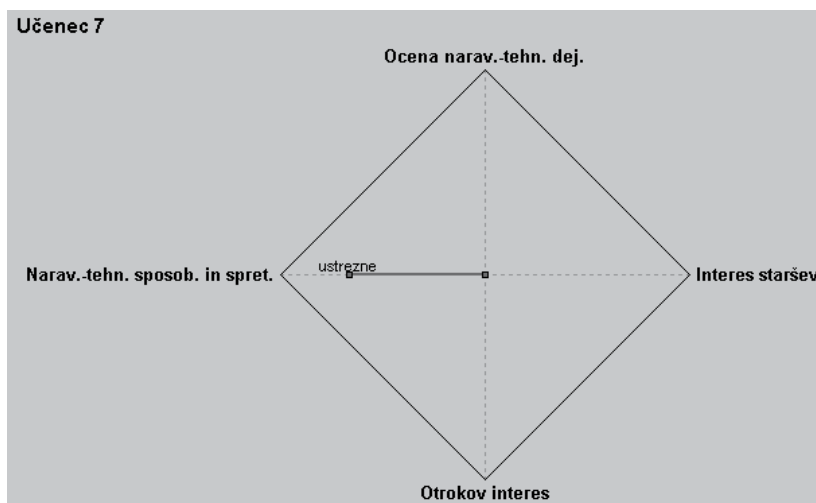
Učenec 7 ima slabše motorične sposobnosti, vendar zelo velik interes za obiskovanje športnih dejavnosti. Model je ocenil, da je šolska športna interesna dejavnost zanj zelo primerna, ker bo pripomogla k izboljšanju teh njegovih sposobnosti.

Glede na to, da je model ocenil, da ima ustrezne sposobnosti za miselne in naravoslovno-tehnične dejavnosti (slika 9), ga je smiselno navdušiti za katero izmed njih.

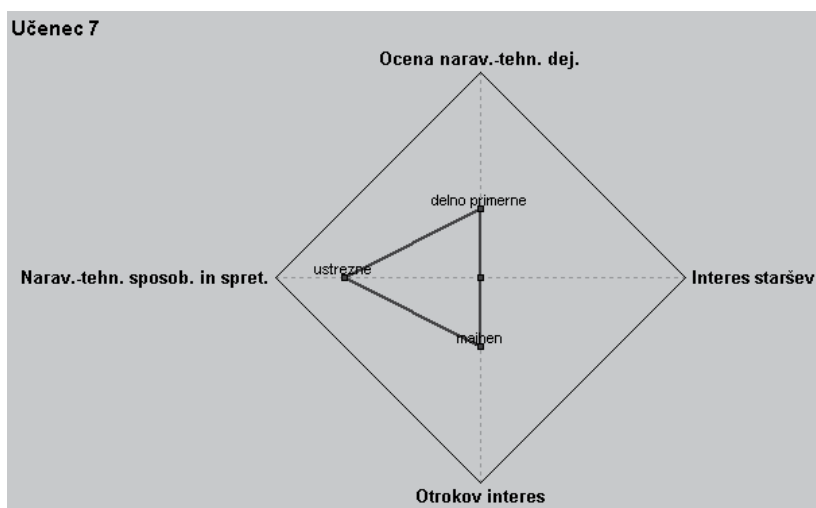
Žal ima večjo podporo staršev le pri športnih dejavnostih. V kolikor bi pokazal vsaj manjši interes za obiskovanje šolske naravoslovno-tehnične dejavnosti, bi zanj postala delno primerna (slika 10).

Zanj se predlaga vključitev v šolsko športno dejavnost. Ker ima dobro razvito finomotoriko in si želi delati v manjši skupini, bi ga lahko spodbudili tudi k obiskovanju tehnične interesne dejavnosti.

Učenec 8 je primer učenca, ki je na vseh področjih odličen, zanimajo ga različna interesna področja in ima veliko podporo staršev. V takem primeru je potrebno učencu in staršem pomagati zožiti interesna področja in učenca usmeriti v obšolsko interesno dejavnost. Model je ocenil, da so zanj zelo primerne šolske interesne dejavnosti z vseh petih področij,



Slika 9: Rezultati vrednotenja ocene narav.-tehn. dejavnosti za Učenca 7



Slika 10: Izboljšani rezultati vrednotenja ocene narav.-tehn. dejavnosti za Učenca 7

delno primerne pa občolske glasbene (slika 11), družboslovno-jezikovne in športne dejavnosti.

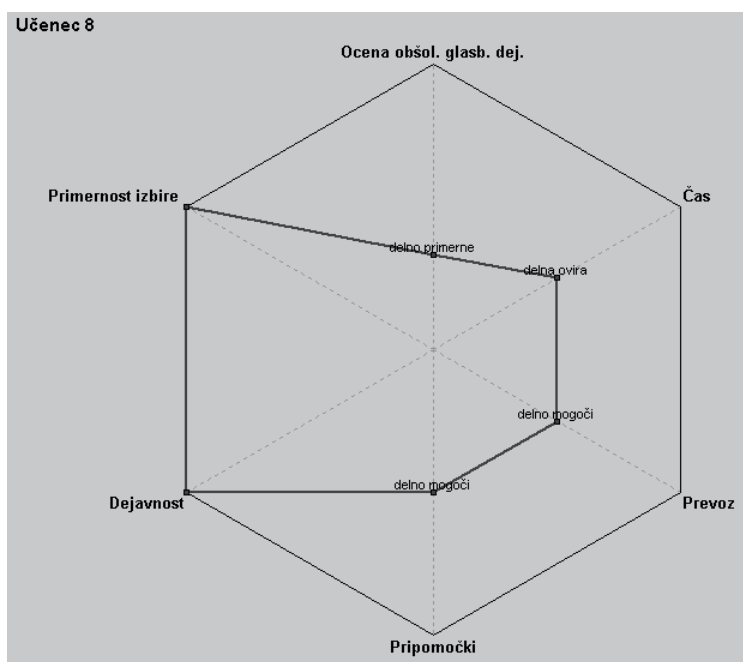
Zelo velik interes za obiskovanje glasbenih dejavnosti so pokazali tako starši kot učenec. V primeru, da stroški za prevoz otroka na interesno dejavnost ne bi več predstavljali ovire, postane občolska glasbena dejavnost zanj zelo primerna (slika 12).

Za športne dejavnosti imajo starši malce manjši interes kot za glasbene dejavnosti. Toda tudi v tem primeru lahko občolska športna dejavnost postane zelo primerna, če stroški prevoza ne bi več predstavljali ovire. Glede na to, da je v bližnjem večjem kraju glasbena šola in da je število prevozov na to dejavnost manjše kot število prevozov na treninge in tekme, če bi učenec izbral občolsko športno dejavnost, je primernejše, da učenec obiskuje občolsko glasbeno dejavnost. *Učenec 8* lahko poleg nje izbere še šolsko športno dejavnost ter eno izmed ponujenih družboslovno-jezikovnih in miselnih dejavnosti.

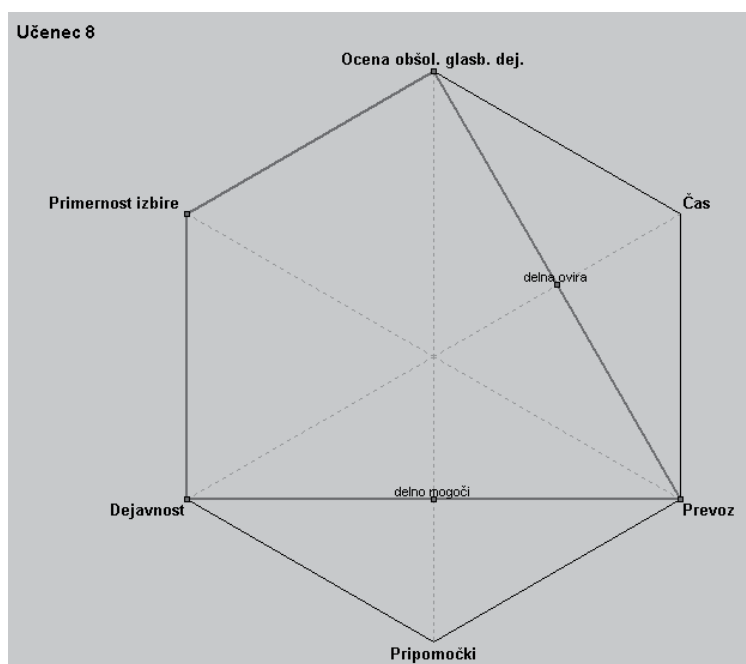
Učenec 12 ima odlične sposobnosti in spretnosti za ukvarjanje z vsemi vrstami interesnih dejavnosti razen z glasbenimi. Zelo velik interes kaže za športne dejavnosti, večjega pa za družboslovno-jezikovne dejavnosti (slika 13). Starši se bolj navdušujejo za športne in miselne dejavnosti.

Model ocenjuje, da so zanj zelo primerne šolske športne in šolske miselne dejavnosti. Zaradi večjega interesa staršev za ti dve vrsti dejavnosti sta delno mogoči tudi v občolski obliki. Ker *Učenec 12* kaže zelo velik interes za športne dejavnosti in večjega tudi starši, bi bilo smotno ponovno premisliti glede finančne in časovne obveze v primeru obiskovanja občolske športne dejavnosti. Zaradi premajhnega interesa otroka se ne priporoča občolska miselna dejavnost.

Če naredimo »kaj če« analizo v primeru družboslovno-jezikovnih dejavnosti, ugotovimo, da v kolikor bi starši pokazali vsaj manjši interes za družboslovno-jezikovne dejavnosti, bi postala ta dejavnost za *Učenca 12* primerna (slika 14).



Slika 11: Rezultati vrednotenja ocene obšolskih glasbenih dejavnosti za Učenca 8



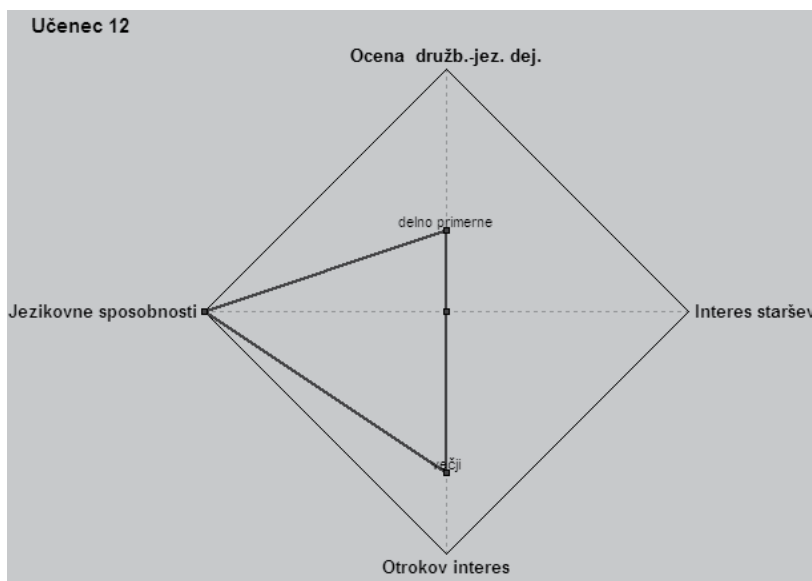
Slika 12: Izboljšani rezultati vrednotenja ocene obšolskih glasbenih dejavnosti za Učenca 8

Vsekakor je zelo primerno, da se *Učenec 12* vključi v športno interesno dejavnost. Če pa si želi obiskovati še eno interesno dejavnost, se priporoča, da izbira med šolskimi družboslovno-jezikovnimi in miselnimi dejavnostmi.

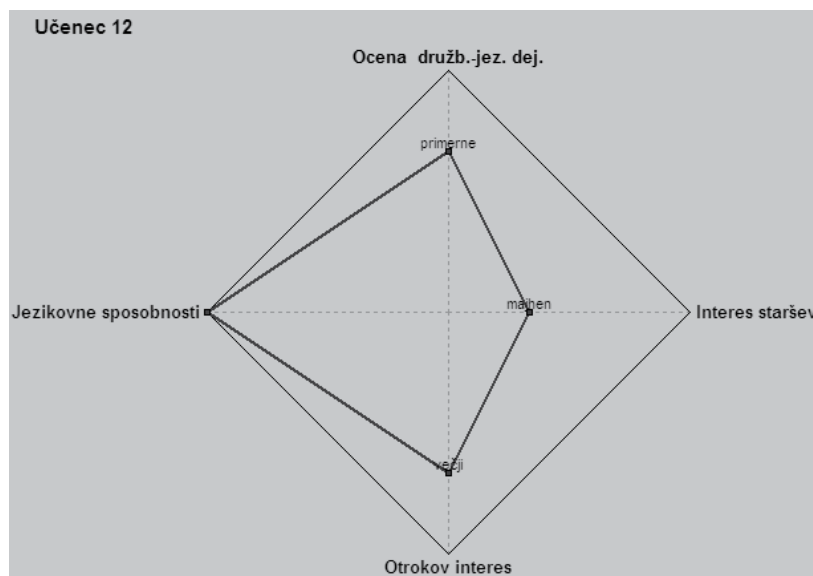
Učenec 16 ima odlične glasbene sposobnosti in zelo velik interes za obiskovanje glasbenih dejavnosti. Model je ocenil,

da je zanj obiskovanje šolskih glasbenih dejavnosti zelo primerno, obšolskih pa le delno primerno (slika 15).

Prav tako so zanj zelo primerne družboslovno-jezikovne interesne dejavnosti. Za obe vrsti ima tudi večjo podporo staršev. Miselne dejavnosti so zanj primerne. Predlaga se ponovni premislek glede vključitve *Učenca 16* v obšolsko glasbeno



Slika 13: Rezultati vrednotenja ocene družboslovno-jezikovnih dejavnosti za Učenca 12



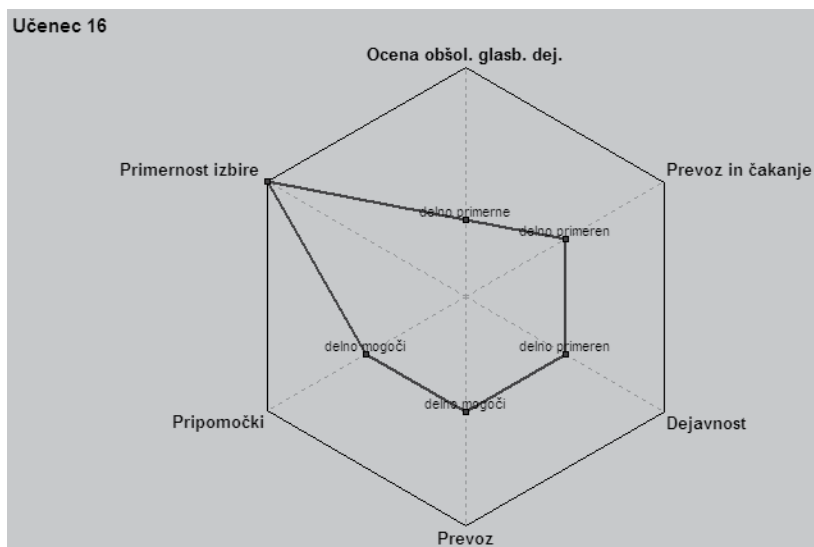
Slika 14: Izboljšani rezultati vrednotenja ocene družb.-jez. dejavnosti za Učenca 12

dejavnost. V kolikor bi stroški prevoza postali sprejemljivi, model ocenjuje, da lahko ta vrsta dejavnosti zanj postane zelo primerna (slika 16).

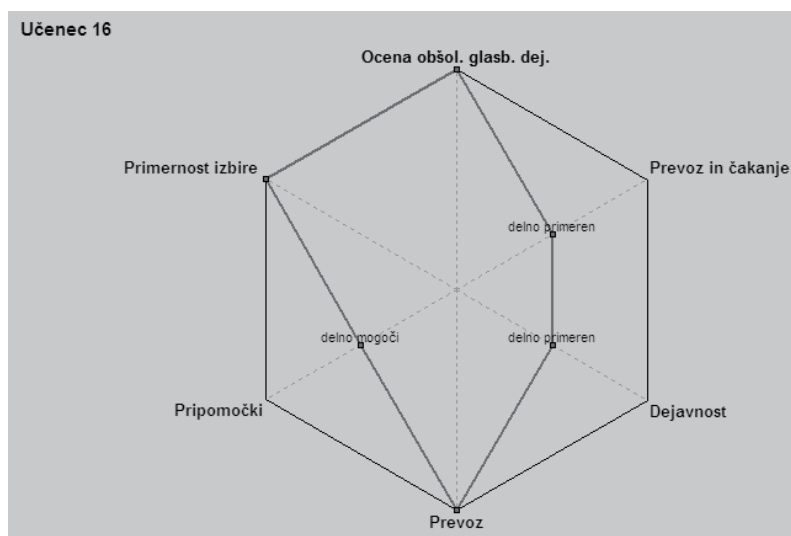
V primeru, da se starši z otrokom odločijo za obiskovanje šolske glasbene dejavnosti, je zelo primerno, da se *Učenec 16* vključi še v družboslovno-jezikovno interesno dejavnost ter, v kolikor želi, izbere še miselno ali športno dejavnost. Model je sicer ocenil, da je zaradi nezainteresiranosti staršev športna dejavnost zanj le delno primerna, toda *Učenec 16* je zanj pokazal večji interes.

7 Uporaba rezultatov v praksi

Učenec 7 je v šolskem letu 2005/06 obiskoval 4. razred osemletke. Obiskoval je le družboslovno-jezikovno dejavnost, ki ima na šoli že dolgoletno tradicijo in jo obiskujejo vsi učenci razredne stopnje. Ker v tistem letu ni bilo ponudbe šolskih športnih dejavnosti za njegovo starost, jih ni mogel obiskovati. Podobno je bilo tudi naslednje šolsko leto, vendar se to leto ni vključil v nobeno interesno dejavnost. V 7. razredu si je izbral



Slika 15: Rezultati vrednotenja ocene obšolskih glasbenih dejavnosti za Učenca 16



Slika 16: Izboljšani rezultati vrednotenja ocene obšol. glasb. dejavnosti za Učenca 16

le izbirni predmet s področja športa, v šolskem letu 2008/09 pa se je vključil še v šolsko športno dejavnost.

Učenec 8 je kot tretješolec v šolskem letu 2005/06 obiskoval obšolsko glasbeno dejavnost ter družboslovno-jezikovno dejavnost. V naslednjem letu se je vključil v prej omenjeni dejavnosti in še v obšolsko športno dejavnost. V petem razredu se je vključil še v šolsko športno dejavnost in tako obiskoval štiri interesne dejavnosti. V šolskem letu 2008/09 pa je opustil obšolsko športno dejavnost in jo nadomestil še z eno šolsko družboslovno-jezikovno dejavnostjo.

Učenec 12 je v šolskih letih 2005/06 in 2006/07 obiskoval obšolsko športno dejavnost ter šolsko družboslovno-jezikovno dejavnost. V petem razredu je družboslovno-jezikovno dejavnost nadomestil s šolsko športno dejavnostjo, ker je bila za

njegovo starostno obdobje ponujena. S tem izborom je nadaljeval tudi v sedmem razredu devetletke.

Učenec 16 je v petem razredu devetletke izbral šolsko glasbeno in kar dve šolski družboslovno-jezikovni dejavnosti. Čeprav je model ocenil, da so športne dejavnosti zanj le delno primerne (nezainteresiranost staršev), se je vključil tudi v šolsko športno dejavnost. V šolskem letu 2008/09 je eno izmed družboslovno-jezikovnih dejavnosti opustil.

8 Zaključek

Kot je razvidno iz uporabe rezultatov odločitvenega modela za izbiro šolskih in obšolskih interesnih dejavnosti, je ta model pokazal, da pripomore h kvalitetnejši odločitvi otroka in star-

šev glede izbire interesnih dejavnosti. Pomaga odkrivati otrokove nadarjenosti in želje. Vključuje interes staršev ter njihove finančne in časovne zmožnosti. Tudi učitelju kot svetovalcu daje večjo vlogo. Z njegovo pomočjo je možno otrokom in staršem svetovati najustreznejše vrste interesnih dejavnosti za kvalitetno preživljanje prostega časa. Računalniška obdelava podatkov s programom DEXi pa omogoča grafično prikazovanje rezultatov in kritičen pogovor s starši in otrokom ob »kaj če« analizi.

Interesne dejavnosti predstavljajo pomemben del vseživljenjskega učenja in šole se morajo tega zavedati. Vsebinsko-organizacijski model interesnih dejavnosti (ZRŠŠ, 2007) priporoča, da naj bi šola imenovala vodjo interesnih dejavnosti, ki bi svoje delo začel s pripravo anketnega vprašalnika, s katerim je mogoče ugotoviti interesna področja učencev. Anketo bi opravil ob koncu šolskega leta za naslednje leto. Po mojem mnenju to fazo na škodo učencev v marsikateri šoli preskočijo. Temu sledi ugotavljanje prostorskih in kadrovskih možnosti za izvedbo, nato pa predstavitev ugotovljenega stanja na občini ter iskanje rešitev in možnosti sodelovanja tako z materialnega, prostorskega kot kadrovskega vidika. Pri iskanju rešitev bi se bilo potrebno v večji meri povezovati s šolami v bližnji okolici.

Menim tudi, da bi šole v prihodnje morale ponuditi več takih interesnih dejavnosti, pri katerih bi se otroci lahko sprostili, družili z otroki s podobnimi interesi ter se ustvarjalno izražali. Večina interesnih dejavnosti ne bi smela vključevati elementov storilnosti, ki se v sedANJI družbi žal pogosto vtihotapijo in vtkejo tudi v interesne dejavnosti. In ne pozabimo – kvalitetno preživljanje prostega časa omogoča posamezniku osebnostno rast, spodbuja k vzpostavljanju kvalitetnih vzajemnih odnosov ter hkrati nudi vzvod za preprečevanje negativnih oblik vedenja in za odpravljanje različnih oblik zasvojenosti.

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Matea Curkova je profesorica razrednega pouka. Dvanajsto leto poučuje na OŠ Ferda Vesela v Šentvidu pri Stični. Trenutno je mentorica bralne značke in interesne dejavnosti Izrazni ples. Na območni reviji plesnih skupin se je z učenci prej omenjene interesne skupine dvakrat uspešno predstavila. Vodila je tudi glasbeni, računalniški in prometni krožek, sodelovala v projektu Knjigobube ter v mednarodnem projektu Pasavček. Na Fakulteti za organizacijske vede v Kranju nadaljuje s podiplomskim študijem.

Vladislav Rajkovič je redni profesor in predstojnik Laboratorija za odločitvene procese in ekspertne sisteme na Fakulteti za organizacijske vede, Univerze v Mariboru ter raziskovalni sodelavec Odseka za inteligentne sisteme na Inštitutu »Jožef Stefan«. Njegovo področje so računalniški informacijski sistemi s posebnim poudarkom na uporabi metod umetne inteligence v procesih odločanja ter vzgoje in izobraževanja.

**Dejan Dinevski,
Samo Fošnarič, Tanja Arh**

Open Educational Resources in E-Learning

Open educational resources in e-learning are the future source of information for lifelong learners. Open source and open standards are defined as the basis of the "Open educational resource movement" that is beginning to form on a global level in the last decade. The characteristics of the OS are investigated in the relation to e-Learning, existing and new pedagogical principles and copyright issues. Several good practices, ideas and existing initiatives are presented and the vision of the future of open educational resources is introduced.

Keywords: e-Learning, Open Source, Open educational resources

Eva Jereb

Elements Influencing Study Success

Study success can be influenced by following factors: (i) social elements (social class position, parents' education, parents' profession, parents' income); (ii) student-related factors (motivation, aptitude, effort, IQ, time spend on study, opportunity to learn, pre-university education); (iii) quality of instruction (organisation, course material, communication, assignments, exams, grading, course outcomes); (iv) curriculum (number of courses, sequence of courses, test schedule, system-block or parallel); (v) government (grant, student accommodation). In the paper the influence of these factors on study success is presented. Social and academic integration are central aspects. In the research we found out that "social elements" greatly influence the decision to enrol, but have less influence on marks received and the duration of study. Grants also greatly influence study success. We were surprised when we found out that factors from the "quality of instruction" group can only explain 12.3% of the variance of exam results.

Keywords: study success, students, social elements, academic elements

Vanda Rebolj

The Importance of Perception and Consciousness for E-Learning

The article presents the results of a research on perception during the learning process of adults in a virtual environment. The aim of the research was to determine why the process of e-learning introduction in Slovenia has been slowed down. Perception and its effects upon learning are important on the conscious as well as on the unconscious level but they have not been given as much attention as in the classical learning environment. Disturbed perception which results from the lack of expertise in preparation of the e-environment is a serious obstacle for learning. The objective of the research was to find solutions for the actual teaching practice but at the same time the research emphasizes that conclusions cannot always be made on the basis of former facts about students. We have to bear in mind that the impact of technology changes the students as well. Lack of professional arguments and of good practice leads to pedagogical conservatism which can cause the school's progress, also in the area of adult education, to be directed in the opposite direction from the one required by business processes in the organizations in which the adult students come from or in which the students are employed after they finish their education.

Key words: e-learning, e-education, virtual learning environment, perception, adults, remembrance

Franc Gider, Tanja Urbančič

Developing Soft Skills for Engineering: Experience with Student Team Projects

While advanced technologies are entering schools at all levels, we claim that other skills required to deal with them in the complex modern world should not be neglected in the education system. In this article, a promising approach to interdisciplinary postgraduate education is described. The idea of the »Team project« course is to give the students the opportunity to gain experience in an extensive project where various

skills are needed, e.g. teamwork, coordinating work, project management, research, problem solving, public presentations, time management, etc. The course is obligatory and held in the first year of the master study program at the School of Engineering and Management of the University of Nova Gorica. The main advantage of the course is to give the students hands-on experience of work on a project that is very close to reality. Students are forced to gain experience in teamwork and to overcome the uncertainties and obstacles that arise in such projects. Since the launch of the course, several improvements have been made with the aim of improving the performance of the course. Nevertheless, the course remains a challenge for both students and teachers.

Key words: teamwork, student project, engineering and management

**Viljan Mahnič, Strahil Georgiev,
Tomo Jarc**

Teaching Scrum in Cooperation with a Software Development Company

The increasing use of agile methods for software development creates the need for these methods to become part of the education of future computer and information science engineers. On the other hand, teaching these methods gives us an opportunity to verify individual agile concepts and their effectiveness. For that reason, project work is an appropriate and frequently used form of teaching that enables students to get acquainted with agile methods and, at the same time, provides case studies for evaluating individual agile concepts. We describe our approach to teaching the Scrum agile method, within the software technology course, in cooperation with a software development company. Students were taught through work on a real project for which a list of requirements was submitted by the company. A co-worker of this company participated throughout the teaching period playing the role of customer's representative. During their work, students consistently used the Scrum method and at the end of each iteration they evaluated their experience by means of a questionnaire. In the article, the Scrum method is presented first,

then a description of work on the project is given and finally the results of the survey are described.

Key words: agile methods, Scrum, software development, computer engineering education, university-industry co-operation

Ivan Gerlič

Challenges of Advanced Technologies and School of the Future

The era of advanced technology claims a different individual. The individual that would undisturbed function in the era of digitalization and would better perceive and protect our environment with the help of accomplishments and benefits of advanced information and communication technology (ICT). There is no better time for learning and concretization of these values as in school. Nowadays pupils, the pupils of digital era, are more and more experienced in the usage of contemporary media and networks. That is why they require the modification of conditions and teachers' role in the school. Will new information and multimedia or hypermedia support for classrooms and new didactical ideas improve learning results, and stimulate innovation and greater pleasure towards learning and knowledge? All these questions will be answered in our contribution.

Key words: traditional school, school of the future, computer classroom, multimedia classroom, hypermedia classroom, education networks.

**Boris Horvat, Matija Lokar,
Primož Lukšič**

E-learning with Advanced Learning Blocks – NAUK.si

The authors of e-learning content, meant for the use of teachers, all too often prepare it as monolithic blocks, constructed in the way an ordinary workbook would be. This demands that the teacher takes them as a whole, precisely in the order they were

written in. As the teacher usually serves as an intermediate between the teaching materials and the students, he/she should make the choices regarding the content and how to combine it new ways. E-learning content should therefore be designed in a flexible way. Why not use the possibilities offered by the new technologies and at the very least give teachers the chance to adapt the content to their own and their students' needs.

Key words: e-learning, e-learning content, Slovenia, atomized content, teacher

Liliana Brožič, Dušan Sušnik

Education Process Evaluation with Emphasis on Military Contents

Evaluation as a process of validity is one of the education elements with high important influence of quality no matter of the number of its repetition. Entirely of validity brings new extra value as a form of aim towards to complete education process. They can be implemented each time process is on again and upgrade them at same period. The significant of quality in education process is something we are very aware of in Slovenian Armed Forces. Senior Staff Course with cooperation with public education institutions offers interesting challenge. The article presents reasons for organizing military education process as mentioned, its importance for Slovenian Armed Forces and evaluation of a process.

Keywords: Evaluation, Military Education and Training, Military Contents Evaluation, Senior Staff Course.

**Bojan Burgar, Jože Florjančič,
Mojca Bernik**

Principal Manager's Interacting Role in the Process of Work and the Function of Humanistic-Antrophocentric Human Resources Management

The paper represents principal's interacting role and definition of key factors in the process of work and function of humanistic – anthropocentric management. The

essence is humanization of management, where principal - manager assume more roles: cooperational, research and development, coordination – integrational, advisory, organizational and active strategic role. The model of principal's interacting in the process of work and function of humanistic – anthropocentric management in education area is represented.

Key words: Human resources, mutual relationships, interacting role, competence, humanistic – anthropocentric management, creative tactfulness, leadership.

**Matea Curkova,
Vladislav Rajkovič**

Selecting Children's Curricular and Extracurricular Activities with a Support of a Decision Model

The activities that we engage in out of our own pleasure offer us relaxation, help us develop skills, broaden our knowledge and give us new experiences. At the same time we meet people with similar interests and develop our personality. With those benefits in mind, schools and external youth organizations offer increasing number of extracurricular activities. It is up to the parents and their children to decide in which activity or activities they will invest their energy, time and money. This decision may not be easy as it is based on simultaneous judgement based on multiple criteria. Furthermore, involved may be multiple parties with different interests. Competent multiple attribute decision making model may help with such complex decisions thus help parents and their children to recognize suitable areas of interest and the right activity. Namely the activity that will bring joy to the child and be in accordance with parents' financial and time constrains.

Key-words: elementary schools, supplementary activity, decision-making support system, DEXi.

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- Smith, S.I. (2003). *Interpreting Information Systems in Organizations*, Elsevier Publishing, New York.

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- Zupan, N. & Leskovic, R. (2002). Pričakovanja v zvezi z elektronskim poslovanjem v malih organizacijah. *Organizacija in management – izbrana poglavja*. Uredila: Florjančič J., & Paape, B. Kranj: Založba Moderna organizacija.

Referat objavljen v zborniku konference:

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