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Willingness to Adopt and Apply Web 2.0 Technologies in Secondary Education – Case of Vojvodina

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Abstract

The rapid admission of information and communication technologies (ICT) into all the pores of social and economic life has (fortunately) included the education sphere: the ever-growing need for new knowledge acquisition methods unambiguously points to a need to step outside the established, analogue education systems into the digital, virtual educational space. Over the past few years, blogs, wikis, multimedia sharing and social networking sites have created a qualitatively new approach to knowledge, education and schooling. This article starts from the assumption that the advantages of Web 2.0 technologies can be channelled in favour of the common interest of all education process participants, and to that end, the authors have conducted empirical research into the level of willingness of key stakeholders (students, parents and teachers) in secondary education in Vojvodina to adopt contemporary, Web 2.0 based methods of knowledge transfer, sharing and adoption.

Key words: *social networking; Web portals; Web services and applications*

Introduction

Continuous changes in business operations aimed at enhancing business performance is an essential prerequisite for the survival of any corporate subject, including educational system entities. Changes in business operations, starting from the simplest, structured task related ones, down to the most complex, strategy and organization related changes are inconceivable without ICT. Introducing or raising the utilization level of the existing ICTs is an inevitable, but not a sufficient precondition for the improvement of business performance: what is necessary is a change in the thought patterns and business conduct

through "changing the shape of competition, the dynamics of the customer relationship, the speed of fulfilment, and the nature of leadership." (Kalakota & Robinson, 2002, xix). These prerequisites represent an imperative of e-business, as one of the most significant representative features of processes on the relation of replacing the analogue with the digital – not only in technical but also in socio-economic terms: the classical, market-based economy is being increasingly replaced by the network-based economy, with an increasing dominance of socio-economic relations based on network relations.

However, while e-business is gaining ground as the dominant business environment bound to face the contemporary students at the end of their education, schools still tend to use the traditional knowledge acquisition patterns, frequently disregarding the fact that modern high-school students have grown up with computers and the Internet, taking them for granted, just as TV or home stereo. Web 2.0 technologies and revolutionary information presentation and acquisition methods are easily adopted by the student population.

This article neither disputes nor confirms the downsides of the Web 2.0 phenomenon. Its focus is placed on the respondents' willingness to apply Web 2.0 technologies in education, starting from the hypothesis that the advantages of such technologies can be channelled in favour of the common interest of all participants in the education process. The foothold for the set hypothesis was sought in the attitudes, knowledge and habits of stakeholders featuring in educational institutions, i.e. students, teachers and parents. Research into the needs and wishes related to the introduction of Web 2.0 technologies was conducted within this triangle.

The article is structured as follows: having presented the research problems and structure, it expounds on the applied research methodology, and sets out the theoretical background of Web 2.0 technologies and their potential benefits. The Findings and Discussion section presents the results of conducted research, while the Conclusion provides the inferences and points to the future research paths.

Definition of Research Problem and Methodology

The ready availability of the Internet has rendered information more accessible than ever, and their dissemination speed has significantly multiplied over the past few years. Absurdly in this context, corporate subjects educating new generations and preparing them for entry into the business world neglect their own financial benefits, finding it hard to overcome traditional business methods. The educational system offers traditional information dissemination methods and articulation forms to young generations which possess knowledge necessary for multimedial and dynamic manners of presenting, forwarding and receiving information. This forces students to engage in daily switching between the digital and almost autistic world of school, where the Internet and Web 2.0 technologies are either excluded or reduced to rudimentary forms.

Research methodology is arranged into a set of sequential steps (Fig. 1):

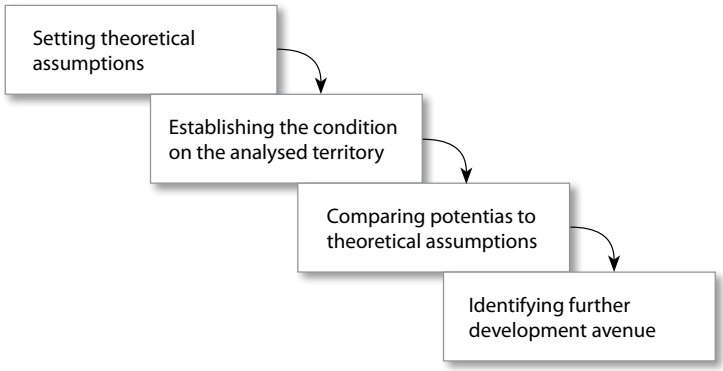

Figure 1. *Methodology map*

Setting theoretical assumptions - This methodological step was conducted through a desk-based analysis of theoretical resources. The establishment of theoretical ideals was preceded by the glossary selection, followed by the identification of Web 2.0 elements comprising the potential contents of educational portals.

Establishing the conditions on the analyzed territory – This stage included the field research into the willingness of stakeholders in education to use Web 2.0 technologies. The research was conducted via a questionnaire filled in by 523 students, parents and teachers in the Province of Vojvodina, followed by data integration and analysis.

Comparing the potentials to the theoretical assumptions – The research results were classified and matched to the previously established theoretical assumptions. The analysis identified the willingness of key educational process stakeholders to adopt and implement the theoretical assumptions.

Identifying further development paths – This step defined the methods of putting the obtained results in the function of realizing the set of theoretical assumptions.

Theoretical Background

The term "web portal" is over-used, and therefore not easy to define. The word "portal" usually denotes a door, entrance, gate to a building etc., but computing uses it to refer to special, so-called do-all, all-in-one, mega web sites serving as the Internet entry point aimed at providing systematized information on web sites with potentially useful contents, appealing to web portal visitors.

The article starts from the position that web portals (including educational ones) should enable personalized, consistent, customizable, and secure access to any relevant information and applications "providing a gateway not just to sites on the Web, but to all network-accessible resources" (Tatnall, 2005, p. 4).

In the context of learning seen as a participatory and social process, the above mentioned stakeholders should be active participants and co-producers rather than passive consumers of educational web portal contents.

The Key Ideas of Web 2.0 Technologies

Anderson (Anderson, 2007, p. 14) lists six key ideas leading to the explosion in the popularity of Web 2.0 applications:

1. Individual production and user-generated contents: Due to the proliferation of high-quality and reasonably priced audio-video recording gadgets (notably mobile and smart phones), and simple but sufficiently powerful open-source software, a growing number of people generate and share audio-video contents. This has resulted in the phenomenon of "citizen journalism" (Gillmor, 2004), i.e. "exposure culture" that "reflects the philosophy of the Web, in which getting noticed is everything" (Wu, 2005).

2. Harness the power of the crowd: This basic Web 2.0 idea refers to three sub-categories:

a. Wisdom of Crowds is the basic idea of Web 2.0-style thinking, where solutions to problems are proposed collectively but independently by individuals gathered in the so-called "Crowd", and are higher-quality than a solution possibly offered by the most intelligent group member – a specific form of collaborative cognitive decision-making.

b. Crowdsourcing is based on the idea of outsourcing where, however, the third-party role is taken over by numerous amateurs, to whom fee for their work is less rewarding than the fact that their work (a photo, a graphic or a video) has been selected among a mass of similar ones. This principle, for example, feeds the work of web-based stock photo agencies.

c. Folksonomy is a web service enabling web site description through tags (key words) allocated by their users, which results in a public, collaborative categorization of Internet locations, and thus making folksonomy an alternative to web search engines (such as www.delicious.com).

3. Data on an epic scale: The available amount of information has never been larger, especially since Web 2.0 technologies enabled mash-up through the use of Open API. This has led to a recombination of available information and datafication: real information is increasingly hard to get, and very often literally impossible, without web locations such as Google, Amazon, E-bay etc. A major problem brought about by mash-up is the issue of property rights over the "borrowed" information.

The remaining three principles listed by Anderson (Anderson, 2007) are Architecture of Participation, Network Effects, and Openness. These principles stem from Metcalfe's law and refer to the economic and social implications of adding new users to a service based on the Internet.

The Most Popular Web 2.0 Applications/Services

Blogs

Baker and Moore (2008) define weblogs (blogs) as "…personal Web pages, usually frequently modified, in which an individual posts information about himself or herself or about topics of interest" (p. 81). Baggetun and Wasson (2006) argue that blogs can also be viewed as a knowledge management system "where knowledge elements are annotated and augmented by the readers" (p. 455). Williams and Jacobs (2004) regard

blogs as an easy-to-use form of micro-publishing with a possibility of collaborative activity in knowledge sharing.

Blog entries can be textual or multimedial. The posts are in a reverse chronological order, with the earliest ones available through a menu and link system.

Blogs are tagged and thus characterized, and visitors can comment on blog entries, thereby establishing communication, exchanging ideas and confronting the attitudes of blog authors and blog readers. Highlighting the immense potential of educational blog use, Eide and Eide (2005) characterize blogs as ''an important and influential sociocultural force", listing the following most important advantages:

1. "blogs can promote critical and analytical thinking;
2. blogging can be a powerful promoter of creative, intuitive, and associational thinking;
3. blogs promote analogical thinking;
4. blogging is a powerful medium for increasing access and exposure to quality information;
5. blogging combines the best of solitary reflection and social interaction." (Eide, 2005)

Some of the potential uses of blogs in education are shown in Figure 2.

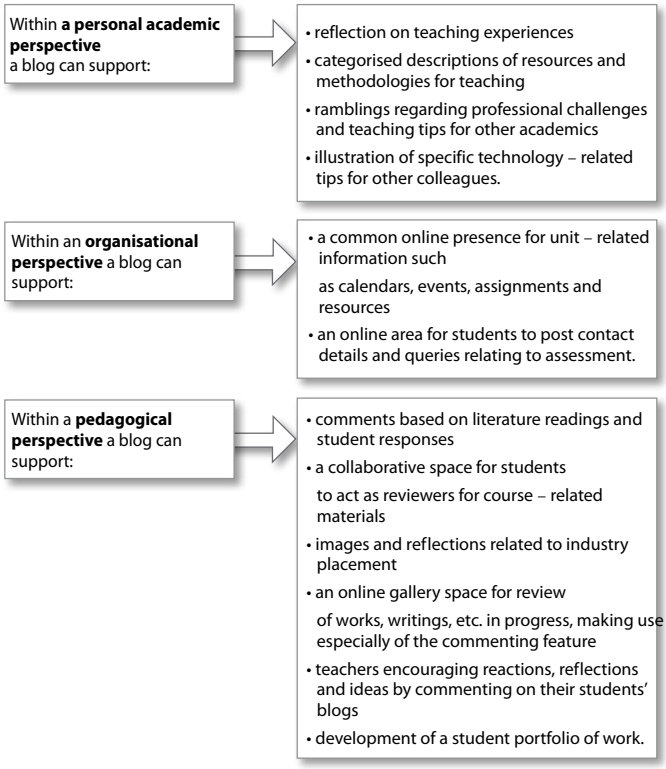

Figure 2. *Some possible uses of blogs in education*
Source: Duffy & Bruns (2006, p. 33)

Out of the fundamental ideas of Web 2.0 concept (Anderson, 2007), stated in section *The Key ideas of Web 2.0*, blogs (but wikis as well) confirm *Harness the power of the crowd.*

Wikis

Up to an extent, Wikis resemble blogs. Mattison (2003) argues that both wikis and blogs refer to collaborative work and are examples of groupware, but "a wiki can be a blog, but a blog does not have to be a wiki." The creators of the wiki concept, Leuf and Cunningham (2001), defined wiki as a "…freely expandable collection of interlinked web pages, a hypertext system for storing and modifying information - a database, where each page is easily edited by any user with a forms-capable Web browser client" (p. 14). In principle, any wiki visitor can also become a participant in the creation of wiki contents, thus keeping wikis, practically under permanent revision.

The advantages of blogs are present in wikis as well, serving, most often, as knowledge repositories "with the knowledge base growing over time" (Godwin-Jones, 2003, p. 15). Kokkinaki (2009) especially highlights their potentials in online personalized learning: "…they give students the opportunity to give an identity to their learning as they can customize what is to be learnt and how…students are able to sustain lifelong learning skills that can persist beyond their university careers", adding that "…Wikis improve teamwork skills, critical thinking skills, group processing and social skills… they promote better comprehension, active processing and positive interdependence while at the same time they can be used as a digital environment for 'problem sharing' and prompt feedback."

According to Evans (2010), Wikipedia has 16 million articles available.

Multimedia Sharing and Social Networking Sites (SNSs)

Anderson's (Anderson, 2007) ideas on which Web 2.0 is based, especially that of individual production and user-generated content, have undergone a high extent of proliferation through multimedia sharing (YouTube, Flicker etc.) and social networking sites (Facebook, MySpace, Twitter, LinkedIn etc.).

This argument is corroborated by the following statistics: according to information from Facebook Press Room (Facebook, 2010), Facebook has over 500 million users, 50% of whom are regular. An average user has 130 friends, is linked to 80 community pages and events, and posts 90 content entries a month. More than 30bn content entries (web links, news stories, blog posts, notes, photo albums etc.) are shared monthly. Evans (2010) states that Twitter had 75m users, hosting over 4bn images. The latest data, from 2010, report a growth in the number of Twitter accounts to 106m (Bianchi, 2010). In May the same year, over 2bn video posts were viewed daily, with the average length of site visit of 15 minutes, and 24h of video footage uploaded each minute (Metekohy, 2010). For comparison, the same author states that in May the previous year 20h of video footage was uploaded a minute, and 13 hours in May 2008. In Evans (2010), we find that LinkedIn has about 50 million members.

Considering the educational potentials of media sharing, Karimi (2006) maintains that multimedia aids have always been a strengthening component of many curricula, and argues in favour of educational utilization of business-tailored variety of online collaboration tools, as they encourage students' productive participation in the teaching process, resulting in benefits for both educators and students: "Homework lessons and projects that are teacher-endorsed 'clips', available online, could further help students stay in touch and stay attuned to progress in a class. A simple instructional video or step-by-step guide, available to students on a short video clip, has potential to keep them on track and motivate to learn more. They are engaging in learning with a multimedia format that they are comfortable and familiar with." (Karimi, 2006).

Roblyer (Roblyer et al., 2010) sees Facebook's educational potential in its applicability in supporting communication and collaboration with faculty and students. Gossage (2010) highlights Facebook's role in promoting the mission of educational institutions through paying attention to parental attitudes and ideas, and using it as a good alumni communication tool.

Findings and Discussion

Based on Web 2.0 services/applications and key ideas, it follows that the contents of school web portals should be generated and consumed by all key stakeholders – teachers, students, and parents. The research therefore included a sample of 523 respondents from all stakeholder groups in secondary schools on the territory of Vojvodina: 82 teachers, 186 parents, and 255 students. The gathered data was grouped as follows:

Group 1: attitudes to the desirability/necessity of individual school web portal content categories;

Group 2: respondents' willingness/unwillingness for their active participation in creating school web portal contents; and

Group 3: practising social networking.

Attitudes to Desirability/Necessity of Individual School Web Portal Content Categories

The contents and functionality of school web portals whose desirability was accessed within Group 1 were further broken down into the following sub-groups:

A. online teachers-parents and parents-parents communication tools (outside of school hours):

A_1. opinions on the opportunity for having online access to students' grades;

A_2. opinions on the opportunity for viewing course contents within the syllabus online;

A_3. opinions on the possibility of having online insight into students' obligations (homework, projects, home reading, test schedules etc.);

A_4. opinions on the opportunity for viewing teachers' remarks on students' academic performance and conduct online;

A_5. opinions on the opportunity for attending online parent-teacher meetings;
A_6. opinions on online parent forums.

B. teacher-generated online content (online learning through social networking and digital multimedia content sharing):
B_1. opinions on the possibility of uploading supplementary teacher- generated texts, as further clarification of course contents;
B_2. opinions on the possibility of setting up useful links;
B_3. opinions on the possibility of uploading multimedial contents;
B_4. opinions on the possibility of uploading online tests.

C. student-generated feedback with opinions on the teaching activities:
C_1. students could post anonymous comments on the quality of individual lessons and teachers' work;
C_2. students could post anonymous comments on what was insufficiently clear or unexplained in classroom-based sessions.

D. student-generated and parent-generated online wiki-like contents:
D_1. students and parents would supplement course materials taught in class with information generated by further work or research, but remaining anonymous;
D_2. students and parents would supplement course materials taught in class with information generated by further work or research, but only if credited for their contribution.

The desirability of individual categories of school group portal contents in Group 1 was rated on a scale from 1 to 10; completely undesirable features were marked with 1, highly desirable with 10, while mark 5 expressed a neutral position.

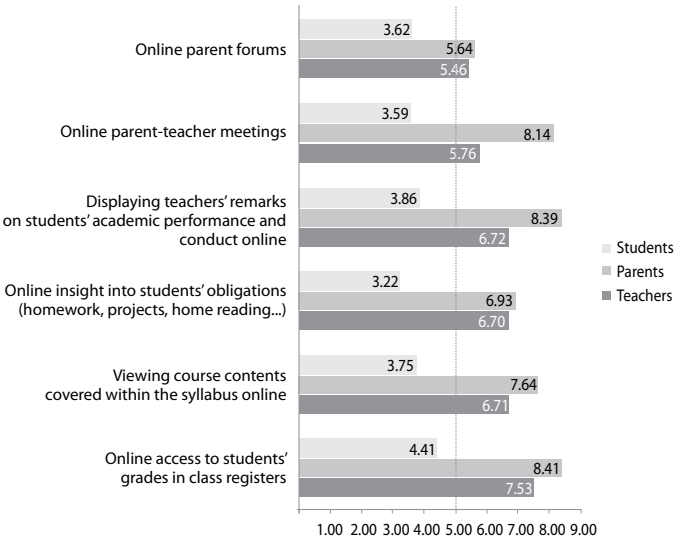

Figure 3. *Desirability of sub-group A contents/functionalities across stakeholder groups*

Research results have shown that sub-group A contents/functionalities are the most desirable for parents, less for teachers, and the least for students. Students' average ratings were under 5.00 for all contents/functionalities in this subgroup. The average contents/functionalities desirability rate for this sub-group was 6.48 among teachers, 7.52 among parents, and only 3.74 among students. All three respondent categories rated the possibility of online access to students' grades highest; students would like their parents to have insight into the current and forthcoming school obligations least, whereas teachers and parents rated the possibility of opening online parent forums lowest.

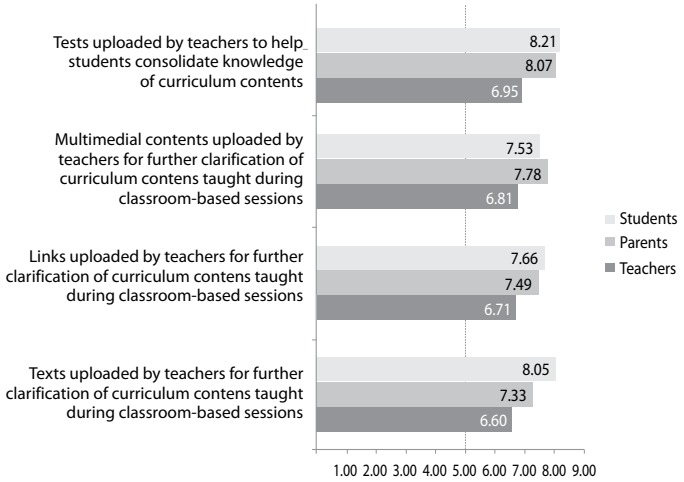

Figure 4. *Desirability of sub-group B contents/functionalities across stakeholder groups*

Contents from sub-group B can be desirable for all three stakeholder groups, especially students (Fig. 4). The average contents/functionalities desirability rate for this sub-group was 6.76 among parents, and 7.86 among students. This sub-group of contents acquires special significance in the context of forming a virtual teacher community. Digitalized materials are easy to store and disseminate, easy to supplement and complement from the aspect of intellectual property rights.

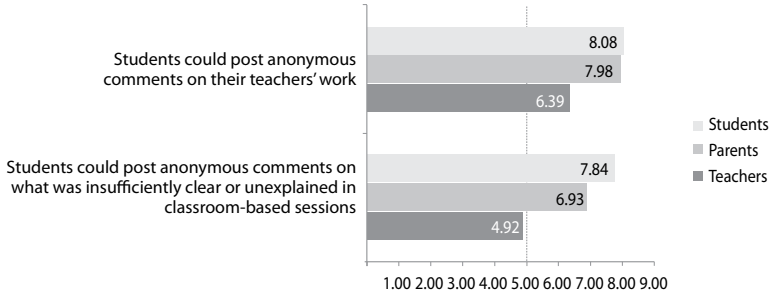

Figure 5. *Desirability of sub-group C contents/functionalities across stakeholder groups*

As it can be expected, student-generated feedback with opinions on the teaching activities (sub-group C) is a functionality most desired by students and parents, unlike teachers, who are reluctant, especially when it comes to the possibility of posting

anonymous comments on the quality of lessons and their work (Fig. 5). The average contents/functionalities desirability rate for this sub-group was 5.65 among teachers, 7.46 among parents, and 7.96 among students. Generating these contents offers numerous options to teachers, as well as to school management, to monitor their ratings by students, self-evaluate, and enhance their own teaching qualities.

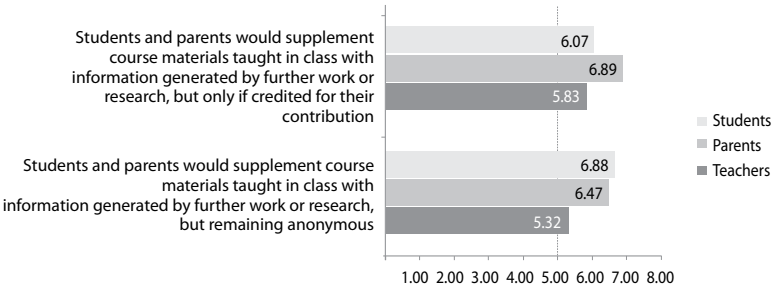

Figure 6. *Desirability of sub-group D contents/functionalities across stakeholder groups*

Student-generated and parents-generated online wiki-like contents (sub-group D) is regarded as more desirable by parents and students than teachers, but students prefer anonymity whereas parents prefer visibility of names of persons uploading contents. The average contents/functionalities desirability rate for this sub-group was 5.75 among teachers, 7.63 among students, and 6.68 among parents.

Willingness /Unwillingness for Active Participation in Creating the Contents of School Web Portal

Data from Group 2 do not speak in favour of all three stakeholder groups to actively participate in generating the contents of school web portals. The average willingness rates are low – 5.50 among teachers, 5.36 among parents, and 5.47 among students. Unwillingness to contribute to the functioning of school web portals is notably present in parents and students when it comes to uploading supplementary materials into a wiki-like system. Teachers are the least willing to read students' and parents' comments on their lesson and work quality.

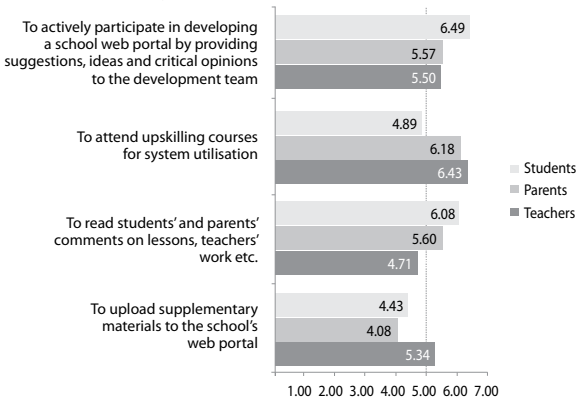

Figure 7. *Stakeholders' willingness to actively participate in using and developing Web 2.0 based school web portal*

Practising Social Networking

The aim of gathering this group of data was to gain insight into the respondents' willingness to adopt and practise the key ideas of Web 2.0 in schools, by respondents who are Web 2.0 consumers outside of school on the one hand, and respondents abstaining from Web 2.0 contents on the other.

Figure 8 shows the share of Facebook, Youtube, Wikipedia, blog, forum and chat room users in various stakeholder categories. Responses from those who know nothing or have never heard of Web 2.0 services/applications were disregarded. The percentage of such respondents in individual categories is 4.54% (parents), 2.44% (teachers), and 1.02% (students).

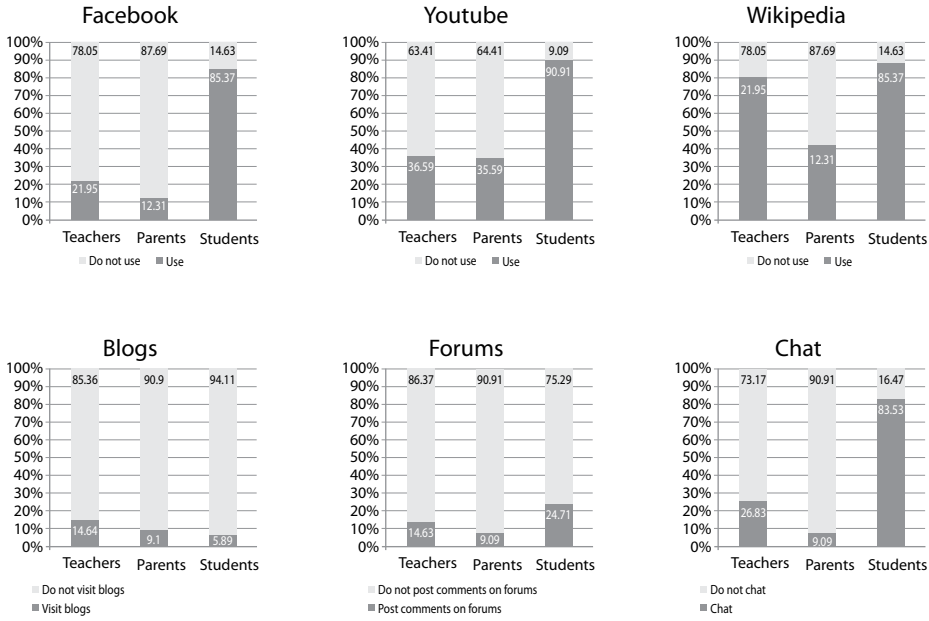

Figure 8. *Use of Web 2.0 services/applications by teachers, parents and students*

As the Figure shows, students are the most prominent Web 2.0 content consumers, whereas parents use them the least. The use of Wikipedia is typical of both students and teachers. The most used Web 2.0 contents come from Youtube and Wikipedia, while blogs are the least popular.

Information shown in Figure 8 was used as a criterion for dividing the three categories into two sub-categories each. The first is comprised of respondents characterized as Web 2.0 users. This respondent group uses at least 2 Web 2.0 services/applications from Figure 8. Respondents using one or none Web 2.0 service/application were grouped among non-consumers. Then we calculated the average desirability ratings for individual school web portal contents/functionalities, and willingness of all respondent subcategories to actively participate in the functioning of school web portals. Figures 9, 10 and 11 graphically present a difference in the average ratings by consumer and

abstinent groups for any respondent category – teachers, parents, and students. The contents/functionalities of school web portals were marked on the X axis as follows:

A_1. online access to students' grades in school registers;
A_2. online insight into course contents within the syllabus;
A_3. online insight into students' obligations (homework, projects, home reading, test schedules etc.);
A_4. online insight into teachers' remarks on students' academic performance and conduct;
A_5. online parent-teacher meetings;
A_6. online parent forums.

B_1. texts uploaded by teachers for further clarification of curriculum contents taught during classroom-based sessions;
B_2. links uploaded by teachers for further clarification of curriculum contents taught during classroom-based sessions;
B_3. multimedial contents uploaded by teachers for further clarification of curriculum contents taught during classroom-based sessions;
B_4. tests uploaded by teachers to help students consolidate their knowledge of curriculum contents;

C_1. students could post anonymous comments on their teachers' work;
C_2. students could post anonymous comments on what was insufficiently clear or unexplained in classroom-based sessions;
D_1. students and parents would supplement course materials taught in class with information generated by further work or research, but remaining anonymous;
D_2. students and parents would supplement course materials taught in class with information generated by further work or research, but only if credited for their contribution.

E_1. to upload supplementary materials to school web portals;
E_2. to read students and parents' comments on lessons, teachers' work etc.;
E_3. to attend upskilling courses for the system utilization;
E_4. to actively participate in the development of school web portals by providing suggestions, ideas and critical opinions to the development team

Marks A-D refer to school web portal contents/functionalities, whereas E refers to the respondents' willingness to actively contribute to the functioning of school web portals.

Teachers

Out all school web portal contents/functionalities, unlike abstaining teachers, teachers-consumers only prefer the possibility for students and their parents to anonymously supplement, into a wiki system, materials taught in classroom-based sessions. The highest difference in rating (in favour of teachers-consumers) is found

in their willingness to upload supplementary materials, and the lowest one in the opportunity to provide parents with insight into teachers' remarks on student work and conduct through school web portals. The average rating by teachers-consumers is higher by 1.33 than the corresponding average of abstaining teachers.

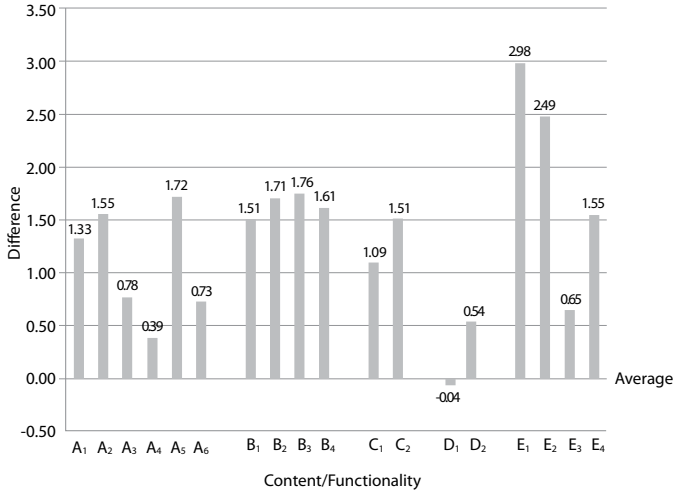

Figure 9. *Difference in average desirability rates of individual school web portal contents/functionalities in consumers and abstaining teachers, i.e. their willingness to actively contribute to school web portal functioning*

Parents

Compared to abstaining parents, parents-consumers rated three school web portal opportunities/functionalities lower: the opportunity for students to post anonymous comments on what was insufficiently clear or unexplained in classroom-based sessions (C_2), and to supplement course materials taught in class into a wiki system, whether

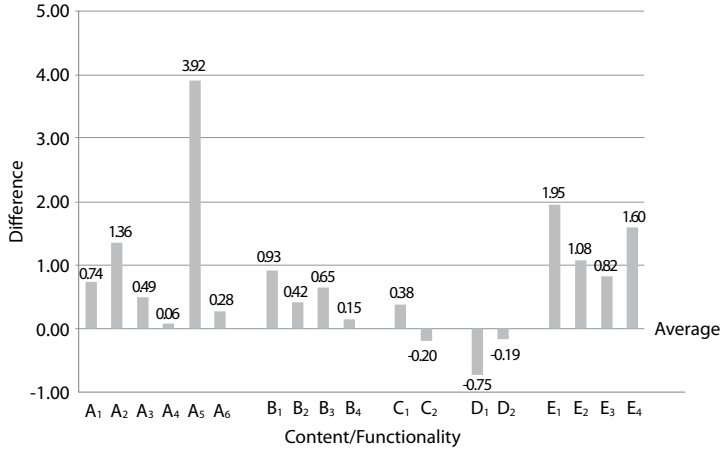

Figure 10. *Difference in average desirability rates of individual school web portal contents/functionalities in consumers and abstaining parents, i.e. their willingness to actively contribute to school web portal functioning*

anonymously or transparently (D_1, D_2). The highest difference in rating (in favour of parents-consumers) is found in their willingness to attend online parent-teacher meetings, and the lowest one in the opportunity for online viewing of teachers' remarks on student work and conduct. The average rating by parents-consumers is higher by 0.76 than the corresponding average of abstaining parents.

Students

Compared to abstaining students, students-consumers rated two school web portal opportunities/functionalities: online insight into students' obligations (homework, projects, home reading, test schedules etc.), and online viewing of teachers' remarks on student work and conduct as desirable. The highest difference in rating (in favour of students-consumers) is found in their willingness to comment on their teachers' work, and the lowest one in the opportunity for online access to their grades. The average rating by students-consumers is higher by 0.75 than the corresponding average of abstaining teachers.

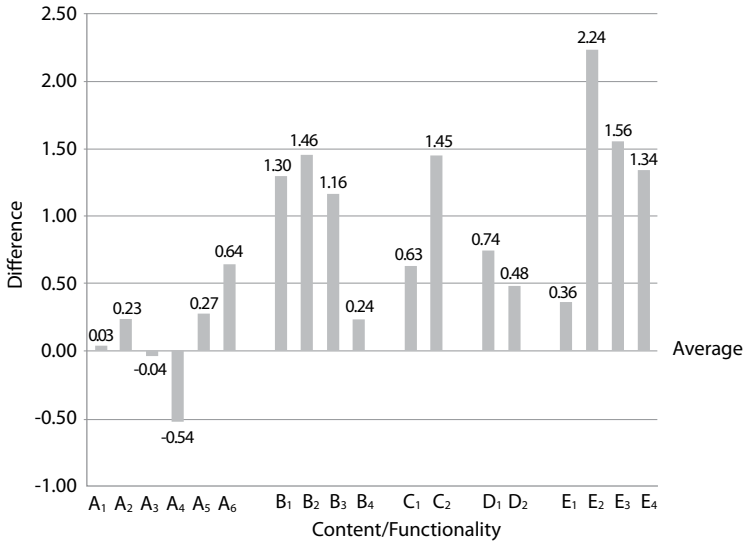

Figure 11. *Difference in average desirability rates of individual school web portal contents/functionalities in students-consumers and abstaining students, i.e. their willingness to actively contribute to school web portal functioning*

Conclusions

Introduction of ICT into the educational process is inevitable, and the results of the conducted research have pointed to the awareness of all three involved stakeholder categories of its importance, but also to their merely declarative and insufficient willingness to actively participate in the real ICT implementation. Reasons for this should be sought in the problems within schools in Vojvodina, resulting from the current economic problems.

The results show that these schools are attended by "digital" children turning into "analogue" students. The minds of "digital" children are tuned for absorbing dynamic information which is multimedially presented, through image, film, sound and digital text. Having entered the "analogue" world of traditional schools, students receive mostly static information.

All the stakeholders demonstrate an evident resistance to Web 2.0 technologies demanding additional engagement. Such results can be expected as the introduction of Web 2.0 content would increase the amount of obligations. In the authors' opinion, the results of repeated research would be significantly favourable if, in the meantime, stakeholders were given more detailed information about the possible benefits of Web 2.0 technologies.

In a situation when providing material resources required for the economic survival of families is increasingly time-consuming, despite the fact that often it is not even known what these are, parents have recognized Web 2.0 technologies as some serious help in monitoring their children's activities and obligations. The parents' role in implementing Web 2.0-based school portals is vital as they can exert pressure on school management, especially considering the fact that schools in Vojvodina are faced with a serious problem of attrition resulting from negative population growth over the past ten years, and have started thinking in market terms, in order to attract as many students as possible.

Implementing the above described contents in a Web 2.0-based school web portal would provide the three categories of respondents with free access to information, which they would further upgrade through multilateral online collaboration. This would result in preconditions for an essentially different and enhanced method of knowledge acquisition and sharing. Of course, such school portals would still have education as its core activity, and technology only as a new method of its realization.

There are significant obstacles to introducing Web 2.0 technologies into schools. One of the most complex problems refers to setting up infrastructures, through the interaction of hardware, software, network and human resources. Each of these resources is problematic, primarily for economic reasons. Funds allocated by the state for the education, including secondary education, in Serbia, are nowhere near sufficient for acquiring the necessary hardware equipment, software support, network equipment, and especially hiring IT professionals and training staff in the sector of education. It is much more realistic to expect the application of Web 2.0 technologies in experimental schools, and their subsequent use on a massive scale only in distant future. Until then, students will be crossing the invisible bridge between the "digital" and the "analogue" world on a daily basis.

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Spremnost na usvajanje i primjenu tehnologija web 2.0 u srednjem obrazovanju – slučaj Vojvodine

Sažetak

Brzi ulazak informacijsko-komunikacijskih tehnologija (IKT) u sve pore društvenog i ekonomskog života obuhvatio je (srećom) i obrazovnu sferu: rastuća potreba za novim metodama usvajanja znanja neupitno ukazuje na potrebni iskorak iz dobro utvrđenih, analognih obrazovnih sustava u digitalni, virtualni obrazovni prostor. Proteklih nekoliko godina blogovi, wikiji, stranice za multimedijsko dijeljenje i društveno umrežavanje stvorili su kvalitetno novi pristup znanju, obrazovanju i školovanju. Ovaj rad polazi od pretpostavke da se prednosti tehnologija Web 2.0 mogu usmjeriti k zajedničkom interesu svih sudionika obrazovnog procesa i s tim su ciljem autori proveli empirijsko istraživanje o tome koliko su ključni sudionici (učenici, roditelji i nastavnici) u srednjem obrazovanju u Vojvodini spremni usvojiti suvremene metode prenošenja, podjele i usvajanja znanja na načelima tehnologija 2.0.

Ključne riječi: *društveno umrežavanje; web portali; web usluge i aplikacije*

Uvod

Stalne promjene u poslovnom svijetu, usmjerene na poboljšanje poslovnih rezultata, ključni su preduvjet za opstanak bilo kojeg korporacijskog subjekta, uključujući i entitete u sklopu obrazovnog sustava. Promjene u poslovanju, od onih najjednostavnijih povezanih s nekim strukturnim zadatkom pa sve do najsloženijih povezanih sa strategijama i organizacijom, nezamislive su bez IKT. Uvođenje ili podizanje uporabne razine postojećih IKT neizbježan je, ali ne i dostatan preduvjet za unapređenje poslovanja: potrebna je promjena u načinu razmišljanja i vođenju poslova putem „novog oblika natjecanja, dinamičnog odnosa s korisnikom, tempa izvršenja i načina vođenja." (Kalakota i Robinson, 2002, xix). Ovi su preduvjeti imperativ e-poslovanja

kao jednog od najvažnijih obilježja procesa koji se odnose na prelazak s analognog na digitalno – ne samo u tehničkom nego i u društveno-ekonomskom smislu: klasičnu, tržišnu ekonomiju sve više zamjenjuje mrežna ekonomija u kojoj sve više prevladavaju društveno-ekonomski odnosi zasnovani na umrežavanju.

Međutim, dok se e-poslovanje učvršćuje kao glavno poslovno okruženje s kojim se suvremeni učenici trebaju suočiti na kraju svoga obrazovanja, škole još uvijek nastoje primjenjivati tradicionalne oblike stjecanja znanja i pritom često zanemaruju činjenicu da su suvremeni srednjoškolci odrasli s računalima i internetom te da ih shvaćaju kao TV aparat ili kućni stereo uređaj. Učenici lako prihvaćaju Web 2.0 tehnologije i revolucionarne načine predstavljanja, odnosno usvajanja informacija.

U ovom se radu ne osporavaju niti potvrđuju nedostatci fenomena Web 2.0. Njegovo je središnje pitanje spremnost obrazovnih subjekata na korištenje Web 2.0 tehnologija, s polazištem u pretpostavci da se prednosti Web 2.0 tehnologija mogu usmjeriti u korist zajedničkog interesa svih onih koji sudjeluju u obrazovnome procesu. Uporište navedenoj pretpostavci pronađeno je u stajalištima, znanju i navikama strana koje karakteriziraju obrazovne institucije, to jest učenika, nastavnika i roditelja. Istraživanje o potrebama i željama povezanim s uvođenjem Web 2.0 tehnologija provedeno je unutar ovoga trokuta.

Rad je strukturiran na sljedeći način: prvo su predstavljeni problemi i struktura istraživanja, zatim je opisana metodologija primijenjena u istraživanju te iznesena teorijska podloga u vezi s navedenim tehnologijama i njihovim mogućim prednostima. U dijelu o rezultatima i raspravi prikazani su rezultati istraživanja, dok Zaključak donosi završna razmišljanja i ukazuje na smjer budućih istraživanja.

Definicija problema i metodologije istraživanja

Jednostavna prihvatljivost interneta učinila je informacije dostupnijim nego ikada, a brzina se njihova širenja višestruko povećala proteklih nekoliko godina. U tom je kontekstu apsurdno da korporativni subjekti koji obrazuju nove generacije i pripremaju ih za ulazak u poslovni svijet zanemaruju vlastite financijske prednosti i smatraju da je teško prevladati tradicionalne poslovne metode. Obrazovni sustav nudi tradicionalno širenje informacija mladima koji raspolažu znanjem potrebnim za multimedijske i dinamične načine predstavljanja, slanja i primanja informacija. To primorava učenike da se svakodnevno prebacuju iz digitalnog u takoreći autistični svijet škole, gdje su Internet i Web 2.0 ili isključeni ili svedeni na najmanju moguću mjeru.

Metodologija istraživanja slijedi nekoliko koraka (Slika 1):

Slika 1.

Određivanje teorijskih pretpostavki – Ovaj je metodološki postupak proveden desk analizom teorijskih izvora. Utvrđivanju teorijskih ideala prethodio je odabir glosara, nakon čega su utvrđeni Web 2.0 elementi koji obuhvaćaju mogući sadržaj obrazovnih portala.

Određivanje uvjeta na analiziranom području – Ova je faza obuhvaćala provedbu istraživanja uporabe Web 2.0 tehnologija među ključnim sudionicima u obrazovanju. Istraživanje je provedeno putem upitnika koji su popunila 523 učenika, roditelja i nastavnika u Pokrajini Vojvodini, a nakon toga su rezultati objedinjeni i analizirani.

Uspoređivanje mogućnosti s teorijskim pretpostavkama – Rezultati istraživanja su klasificirani i uspoređeni s prethodno postavljenim teorijskim pretpostavkama. Provedena je analiza utvrdila spremnost ključnih obrazovnih subjekata na prihvaćanje i primjenu teorijskih pretpostavki.

Utvrđivanje daljnjih razvojnih postupaka – U ovom su postupku određene metode kojima bi se dobiveni rezultati stavili u funkciju ostvarenja zacrtanih teorijskih postavki.

Definicija problema i metodologije istraživanja

Pojam „web portal" se previše rabi pa ga nije jednostavno definirati. Riječ „portal" obično znači vrata, ulaz, prolaz u neku zgradu, itd., ali se u računalstvu koristi da bi označio posebne, takozvane univerzalne, sve-u-jednom, mega web stranice koje služe kao internetska ulazna točka za pružanje usustavljenih informacija na web stranicama s potencijalno korisnim sadržajem koji će odgovarati korisnicima web portala.

Rad polazi sa stajališta da web portali (uključujući i obrazovne) trebaju omogućiti personaliziran, konzistentan, korisniku poželjan i siguran pristup svim važnim informacijama i aplikacijama „pružajući prolaz ne samo stranicama na Web-u nego i svim mrežno dostupnim izvorima " (Tatnall, 2005, str. 4).

U kontekstu učenja kao sudioničkog i društvenog procesa, gore bi spomenuti subjekti trebali aktivno sudjelovati i zajedno stvarati sadržaje na obrazovnim web portalima umjesto da ih pasivno koriste.

Ključne ideje povezane s Web 2.0 tehnologijama

Anderson (Anderson, 2007, str. 14) navodi šest ključnih ideja koje dovode do eksplozije popularnosti Web 2.0 aplikacija:

1. Individualna proizvodnja i sadržaj koji korisnik kreira: Zahvaljujući širenju iznimno kvalitetnih i po cijeni pristupačnih gadgeta za audio-video snimanja (misli se na mobilne i pametne telefone) te jednostavnih ali dovoljno snažnih programa otvorenog koda, sve je veći broj ljudi koji proizvode i dijele audio-video sadržaj. To je dovelo do pojave „građanskog novinarstva" (Gillmor, 2004), odnosno „kulture izlaganja" koja „odražava filozofiju Web-a u kojoj je biti zapažen sve" (Wu, 2005).

2. Okvir moći gomile: Temeljna se ideja Web 2.0 tehnologija odnosi na tri potkategorije:

a. Razum gomile je ključna ideja o mišljenju u stilu Web 2.0, gdje rješenja problema predlažu zajedno, ali neovisno jedan o drugome, pojedinci okupljeni u takozvanu „Gomilu" i ta su rješenja kvalitetnija od rješenja koje može pružiti najinteligentniji član neke skupine – specifičan oblik suradničkog kognitivnog odlučivanja.

b. Crowdsourcing zasniva se na ideji korištenja potencijala gomile kada, međutim, ulogu treće strane preuzimaju brojni amateri kojima je naknada za rad manje

vrijedna od činjenice da je njihov rad (fotografija, grafika ili video) odabran u mnoštvu sličnih. Navedeno načelo, na primjer, potiče rad fotografskih web agencija.

c. *Folksonomy* predstavlja web uslugu koja omogućuje opis web stranice putem oznaka (ključnih riječi) koje im dodjeljuju korisnici, što dovodi do javne, zajedničke kategorizacije internetskih lokacija i tako društveno označivanje čini alternativom mrežnim pretraživačima (kao što je www.delicious.com).

3. Podatci epskih razmjera: Dostupna količina informacija nikada nije bila veća, osobito nakon što je Web 2.0 omogućio mash-up uz pomoć sučelja Open API. To je dovelo do ponovne kombinacije dostupnih podataka i datafikacije: pravu informaciju sve je teže dobiti i vrlo često doslovno nemoguće bez web lokacija kao što su Google, Amazon, E-bay, itd. Glavni problem nastao zbog toga jest pitanje prava vlasništva nad „posuđenom" informacijom.

Preostala tri načela koja navodi Anderson (Anderson, 2007) obuhvaćaju Arhitekturu sudjelovanja, Mrežne učinke i Otvorenost. Ta načela proistječu iz Metcalfeovog zakona, a odnose se na ekonomske i društvene posljedice dodavanja novih korisnika nekom internetski zasnovanom servisu.

Najpopularnija Web 2.0 aplikacija/usluge

Blogovi

Baker i Moore (2008) definiraju weblogove (blogove) kao „…osobne mrežne stranice, obično često mijenjane, na koje pojedinac postavlja informacije o sebi ili temama koje ga/nju zanimaju" (str. 81). Baggetun i Wasson (2006) tvrde da se blogovi mogu također promatrati kao sustav upravljanja znanjem „u kojemu elemente znanja bilježe i umnožavaju čitatelji" (str. 455). Williams i Jacobs (2004) smatraju da su blogovi oblik mikro-izdavaštva koji se lako koristi i omogućuje zajedničku podjelu znanja.

Blogovski unosi mogu biti tekstni ili multimedijski. Postavljaju se kronološki obrnutim redoslijedom, oni najraniji su dostupni putem menija i sustava veza.

Blogovi se označavaju i, samim time, obilježavaju, a korisnici mogu komentirati unose i tako uspostavljaju komunikaciju, razmjenu ideja te konfrontiraju stajališta autora i čitatelja blogova. Ističući ogroman potencijal obrazovnih blogova, Eide i Eide (2005) obilježavaju blogove kao „važnu i utjecajnu društveno-kulturološku snagu", navodeći najvažnije prednosti kako slijedi:

1. „blogovi mogu promicati kritičko i analitičko mišljenje;
2. blogiranje može biti snažan promicatelj kreativnog, intuitivnog i asocijativnog mišljenja;
3. blogovi promiču analogično mišljenje;
4. blogiranje je snažan medij za jačanje dostupnosti i izloženosti kvalitetnim informacijama ;
5. blogiranje povezuje najbolje strane individualnih refleksija i društvene interakcije."

Neki mogući korisnici blogova u obrazovanju prikazani su na Slici 2.

Slika2.

Temeljne ideje koncepta Web 2.0 (Anderson, 2007), navedene u Point *Key Ideas Web 2.0*, blogova (wikiji, također) potvrđuju *Okvir moći gomile.*

Wikiji

Wikiji donekle podsjećaju na blogove. Mattison (2003) tvrdi da se i wikiji i blogovi odnose na suradnički rad te da su primjeri groupware-a, ali ,,wiki može biti blog, ali blog ne mora biti wiki." Tvorci wiki koncepta, Leuf i Cunningham (2001), definiraju wiki kao „zbirku međusobno povezanih mrežnih stranica koje se slobodno proširuju, hipertekstni sustav za pohranu i promjenu informacija – bazu podataka u kojoj svaku stranicu lako uređuje bilo koji korisnik uz pomoć „Web preglednika" (str. 14). Svaki posjetitelj wikija može načelno i sudjelovati u stvaranju sadržaja wikija i tako ga održavati praktično pod stalnim nadzorom.

Prednosti blogova također vrijede za wikije i najčešće služe kao spremišta znanja ,,u kojima se osnova znanja povećava s protokom vremena" (Godwin-Jones, 2003, str. 15). Kokkinaki (2009) osobito ističe potencijale wikija u online personaliziranom učenju: ,,…oni pružaju učenicima mogućnost da svom učenju daju identitet budući da se mogu prilagoditi onome što treba naučiti i kako … učenici su sposobni održavati vještine cjeloživotnog učenja koje može trajati poslije sveučilišnog obrazovanja", te dodaje ,,…Wikiji usavršavaju vještine timskog rada, kritičkog mišljenja, grupnog procesiranja i društvene vještine … promiču bolje razumijevanje, aktivno procesiranje i pozitivnu međuovisnost dok se u isto vrijeme mogu koristiti kao digitalno okruženje za „zajedničko sudjelovanje u problemu" i brzu povratnu informaciju."

Kako tvrdi Evans (2010), Wikipedia ima dostupnih 16 milijuna članaka.

Multimedijsko dijeljenje i društvene mreže

Andersonove (Anderson, 2007) ideje na kojima se temelji Web 2.0, osobito ona o individualnoj proizvodnji i sadržaju što ga kreira sam korisnik, značajno su se proširile multimedijskim dijeljenjem sadržaja (YouTube, Flicker, itd.) i stranica za društveno umrežavanje (Facebook, MySpace, Twitter, LinkedIn, itd.).

Navedena se tvrdnja potkrepljuje sljedećim statističkim podatcima: prema podatcima prikupljenim od Facebook Press Room-a (Facebook, 2010), Facebook ima više od 500 milijuna korisnika, od kojih je 50% redovitih. Prosječni korisnik ima 130 prijatelja, povezan je s 80 lokacija i događaja i mjesečno postavlja 90 unosa. Više od 30 bilijuna unosa (web linkovi, news priče, blog postovi, bilješke, foto albumi, itd.) razmjenjuje se svakog mjeseca. Evans (2010) tvrdi da je Twitter imao 75 milijuna korisnika, s više od 4 bilijuna slika. Najnoviji podatci iz 2010. godine pokazuju rast broja Twitterovih korisničkih računa na 106 milijuna (Bianchi, 2010). U svibnju iste godine više od 2 bilijuna video prikaza pregledavano je svakodnevno, prosječno trajanje posjeta lokaciji iznosilo je 15 minuta, a 24 sata video materijala postavljano je svake minute (Metekohy, 2010). Usporedbe radi, isti autor navodi da je u svibnju prethodne godine 20 sati video

materijala postavljano svake minute, a 13 sati u svibnju 2008. Kod Evansa (2010) pronalazimo podatak da LinkedIn ima oko 50 milijuna članova.

Razmatrajući mogućnosti dijeljenja informacija u obrazovanju putem medija, Karimi (2006) spominje da su multimedijska pomagala oduvijek bila snažna komponenta kurikula za mnoge predmete te se zalaže za obrazovnu iskoristivost raznih online suradničkih alata jer potiču produktivno sudjelovanje učenika u nastavi te donose korist kako nastavnicima tako i učenicima: „Domaće lekcije i projekti koji predstavljaju „isječke" što ih nastavnik odobrava, dostupni online, mogu dodatno pomoći učenicima da ostanu u kontaktu i da se prilagode onome što se događa na satu. Jednostavan video snimak koji sadrži upute ili vodič korak po korak, dostupan učenicima na kratkom video snimku, može ih zadržati na tragu i motivirati da još više uče. Angažiraju se učeći uz pomoć multimedijskog formata koji im je poznat i ugodan za uporabu." (Karimi, 2006)

Roblyer (Roblyer i sur., 2010) vide obrazovni potencijal Facebooka u njegovoj primjenjivosti na pružanje potpore komunikaciji i suradnji s fakultetom i studentima. Gossage (2010) naglašava ulogu Facebooka u promidžbi misije obrazovnih institucija tako što pridaje pozornost stajalištima i idejama roditelja i što ga koristi kao dobar komunikacijski alat za učenike.

Rezultati i diskusija

Polazeći od Web 2.0 usluga/aplikacije i ključnih ideja povezanih s Web-om 2.0, proizlazi da sadržaj školskih web portala trebaju proizvoditi i koristiti svi ključni sudionici – nastavnici, učenici i roditelji. Istraživanje je stoga obuhvatilo 523 ispitanika iz svake od tih skupina u srednjim školama na području Vojvodine: 82 nastavnika, 186 roditelja i 255 učenika. Prikupljeni su podaci podijeljeni u skupine kako slijedi:

Skupina 1: stajališta prema poželjnosti/potrebi kategoriziranja sadržaja školskih web portala;

Skupina 2: spremnost/nespremnost sudionika na aktivno sudjelovanje u kreiranju sadržaja školskih web portala; i

Skupina 3: vježbanje društvenog umrežavanja.

Stajališta prema poželjnosti/ potrebi za kategorijama školskih web portala

Sadržaj i funkcionalnost školskih web portala, čija se poželjnost procjenjivala u Skupini 1, dalje su podijeljeni na sljedeće podskupine:

A. online nastavnici-roditelji i roditelji-roditelji komunikacijski alati (izvan nastave):

A_1. mišljenja o mogućnosti online pristupa učeničkim ocjenama;

A_2. mišljenja o mogućnosti online uvida u nastavni sadržaj unutar silabusa;

A_3. mišljenja o mogućnosti online uvida u obveze učenika (domaća zadaća, projekti, čitanje kod kuće, raspored polaganja testova, itd.);

A_4. mišljenja o mogućnosti uvida u nastavnikova zapažanja o učenikovim akademskim postignućima i ponašanju;

A_5. mišljenja o mogućnosti online nazočnosti roditeljskim sastancima;
A_6. mišljenja o online roditeljskim forumima.

B. online sadržaj koji je nastavnik kreirao (online učenje putem društvenog umrežavanja i dijeljenja digitalnog multimedijskog sadržaja):
B_1. mišljenja o mogućnosti postavljanja dopunskih tekstova koje su pripremili nastavnici kao dodatno pojašnjenje nastavnom gradivu;
B_2. mišljenja o mogućnosti uspostavljanja korisnih linkova;
B_3. mišljenja o mogućnosti postavljanja multimedijskog sadržaja;
B_4. mišljenja o mogućnosti postavljanja online testova.

C. povratna informacija od učenika s njihovim mišljenima o nastavnim aktivnostima:
C_1. učenici bi mogli postavljati anonimne komentare o kvaliteti pojedinih lekcija i radu pojedinih nastavnika;
C_2. učenici bi mogli postavljati anonimne komentare o onome što im nije sasvim jasno ili im nije objašnjeno tijekom učioničke nastave.

D. učenički i roditeljski online sadržaj tipa wiki:
D_1. učenici i roditelji bi dopunjavali nastavni materijal predstavljen u učionici s podacima proizašlim iz daljnjeg rada ili istraživanja, ali bi ostali anonimni ;
D_2. učenici i roditelji bi dopunjavali nastavni materijal predstavljen u učionici s podacima proizašlim iz daljnjeg rada ili istraživanja, ali taj bi im se doprinos priznavao.

Ispitanici su procjenjivali poželjnost pojedinih kategorija sadržaja, objavljenih na školskim portalima u Skupini 1 na skali od 1 do 10; potpuno nepoželjni elementi označeni su brojem 1, vrlo poželjni brojem 10, dok broj 5 označava neutralni položaj.

Slika 3.

Rezultati su istraživanja pokazali da je podskupina A najpoželjnija među roditeljima, manje među nastavnicima, a najmanje među učenicima. Učenici su ovdje u prosjeku birali manje od 5.00 za svaki sadržaj/funkcionalnost. Prosjek nastavnika o poželjnosti sadržaja/funkcionalnosti za ovu podskupinu iznosi 6.48, 7.52 kada su roditelji u pitanju i samo 3.74 u slučaju učenika. Sve tri su kategorije ispitanika najviše ocijenile mogućnost online pristupa učeničkim ocjenama; učenici bi voljeli da njihovi roditelji imaju najmanje uvida u sadržaj i nadolazeće školske obveze, dok nastavnici i roditelji najslabije vrednuju mogućnost otvaranja foruma za roditelje na internetu.

Slika 4.

Sadržaj iz podskupine B može biti poželjan svim trima skupinama sudionika, osobito učenicima (Slika 4). Prosjek poželjnosti sadržaja/funkcionalnosti za ovu podskupinu iznosi 6.76 kod roditelja i 7.86 kod učenika. Ova podskupina zahtijeva posebnu važnost u kontekstu stvaranja virtualne zajednice nastavnika. Digitalni materijal lako se pohranjuje i distribuira, lako ga je dopuniti i nadograditi u smislu prava na intelektualno vlasništvo.

Slika 5.

Kao što se može očekivati, povratna informacija od učenika s mišljenima o nastavim aktivnostima (podskupina C) predstavlja funkcionalnost koju najviše žele učenici i roditelji za razliku od nastavnika koji nisu skloni tome, osobito kada se radi o mogućnosti postavljanja anonimnih komentara o kvaliteti nastave i nastavnikova rada (Slika. 5). Prosjek za ovu podskupinu iznosi 5.65 među nastavnicima, 7.46 među roditeljima i 7.96 među učenicima. Proizvodnja tih sadržaja pruža brojne mogućnosti nastavnicima i školskoj upravi da prate učeničke prosudbe o sebi, sami vrednuju svoj rad i unaprijede vlastite nastavne aktivnosti.

Slika 6.

Online sadržaj wiki tipa što ga učenici i roditelji pripremaju (podskupina D) poželjniji je među roditeljima i učenicima nego među nastavnicima, ali učenici preferiraju anonimnost dok su roditelji skloniji prikazu imena osoba koje postavljaju materijal. Prosjek za ovu podskupinu iznosi 5.75 među nastavnicima, 7.63 među učenicima i 6.68 među roditeljima.

Spremnost/ nespremnost ispitanika na aktivno sudjelovanje u stvaranju sadržaja za školske web portale

Podatci iz Skupine 2 ne idu u prilog svim trima skupinama sudionika kada je riječ o kreiranju sadržaja za školske web portale. U prosjeku ta je spremnost na niskoj razini – 5.50 kod nastavnika, 5.36 kod roditelja i 5.47 kod učenika. Nespremnost na doprinos funkcioniranju školskih web portala itekako je primjetna među roditeljima i učenicima kada se radi o postavljanju dopunskog materijala na wiki sustav. Nastavnici su najmanje spremni čitati komentare roditelja i učenika o kvaliteti nastave i njihovu radu.

Slika 7.

Vježbanje društvenog umrežavanja

Cilj prikupljanja ove skupine podataka bio je steći uvid u spremnost na usvajanje i uvježbavanje ključnih ideja Web 2.0 u školama uz pomoć ispitanika koji se koriste Web 2.0 izvan škole kao i onih koji se tim tehnologijama ne koriste.

Slika 8 pokazuje udio korisnika Facebooka, Youtubea, Wikipedije, bloga, foruma i chat roomova u različitim kategorijama. Odgovori onih koji ne znaju ništa o Web 2.0 uslugama/aplikacijama ili nikada o njima nisu čuli nisu uzeta u razmatranje. Postotak takvih ispitanika u pojedinim kategorijama iznosio je 4.54% (roditelji), 2.44% (nastavnici) i 1.02% (učenici).

Slika 8.

Kao što Slika prikazuje, učenici su najistaknutiji korisnici Web 2.0 sadržaja, dok se roditelji njime najmanje koriste. Korištenje Wikipedije tipično je i za učenike i za nastavnike. Najkorišteniji sadržaj toga tipa potječe s Youtubea i Wikipedije, a blogovi su najmanje popularni.

Podaci su na Slici 8 korišteni kao kriterij podjele svih triju kategorija na dvije podskupine u svakoj. Prvu čine ispitanici obilježeni kao korisnici Web 2.0 tehnologija. Njezini članovi koriste najmanje 2 Web 2.0 usluge/aplikacije sa Slike 8. Ispitanici koji se koriste s jednom ili nijednom takvom uslugom, odnosno aplikacijom u skupini su apstinenata. Nakon toga izračunali smo prosječne vrijednosti poželjnosti za pojedine sadržaje/funkcionalnosti školskih web portala te spremnost ispitanika u svakoj podskupni na aktivno sudjelovanje u funkcioniranju školskih web portala. Slike 9, 10 i 11 grafički predstavljaju razliku u prosjeku između korisničke i apstinentske skupine za sve tri kategorije ispitanika – nastavnike, roditelje i učenike. Sadržaj/funkcionalnosti školskih web portala obilježeni su na osi X kako slijedi:

A_1. online pristup učeničkim ocjenama u dnevnicima;
A_2. online uvid u sadržaj predmeta unutar silabusa;
A_3. online uvid u učenikove obveze (domaća zadaća, projekti, čitanje kod kuće, raspored polaganja testova, itd.);
A_4. online uvid u nastavnikova zapažanja o učenikovim akademskim postignućima i ponašanju;
A_5. online roditeljski sastanci;
A_6. online roditeljski forumi.

B_1. tekstovi koje nastavnici postavljaju radi daljnjeg pojašnjenja gradiva predstavljenog tijekom nastave u učionici;
B_2. linkovi koje nastavnici postavljaju radi daljnjeg pojašnjenja gradiva predstavljenog tijekom nastave u učionici;
B_3. multimedijski sadržaj koji nastavnici postavljaju radi daljnjeg pojašnjenja gradiva predstavljenog tijekom nastave u učionici;
B_4. testovi koje nastavnici postavljaju da bi učenicima pomogli konsolidirati znanje o sadržaju nastavnih predmeta;

C_1. učenici bi mogli postavljati anonimne komentare o radu svojih nastavnika;
C_2. učenici bi mogli postavljati anonimne komentare o onome što im nije sasvim jasno ili im nije objašnjeno tijekom nastave u učionici;

D_1. učenici i roditelji bi dopunjavali nastavni materijal o kojemu su učenici poučavani u učionici informacijama nastalim zahvaljujući daljnjem radu ili istraživanju, ali bi ostali anonimni;
D_2. učenici i roditelji bi dopunjavali nastavni materijal korišten na satu u učionici informacijama nastalim zahvaljujući daljnjem radu ili istraživanju, ali samo ako bi im se taj doprinos priznao.

E_1. dodavati novi materijal školskim web portalima;
E_2. čitati učeničke i roditeljske komentare o nastavi, radu nastavnika, itd.;
E_3. pohađati tečajeve o usvajanju novih vještina za korištenje sustava;
E_4. aktivno sudjelovati u razvoju školskog web portala davanjem prijedloga, ideja i kritičkih mišljenja radnom timu

Ocjene se od A do D odnose na sadržaj/funkcionalnosti školskih web portala, dok se E odnosi na spremnost ispitanika da aktivno doprinesu funkcioniranju školskih web portala.

Nastavnici

Od svih sadržaja/funkcionalnosti školskih web portala, za razliku od nastavnika-nekorisnika, nastavnici-korisnici jedino preferiraju mogućnost da učenici i roditelji anonimno u wiki sustavu dopunjuju materijal o kojem poučavaju na satu u učionici. Najveća je razlika (u korist nastavnika-korisnika) pronađena u njihovoj spremnosti na dodavanje novog materijala, a najmanja u mogućnosti da roditeljima pružaju uvid u svoja zapažanja o učenikovom radu i ponašanju putem školskih web portala. Prosječna je vrijednost među nastavnicima-korisnicima veća za 1.33 od odgovarajuće vrijednosti među nastavnicima-nekorisnicima.

Slika 9.

Roditelji

Kada se usporede s roditeljima-nekorisnicima, roditelji-korisnici vrednovali su slabije tri mogućnosti/funkcionalnosti školskih portala: mogućnost učenika da anonimno komentiraju ono što im nije bilo sasvim jasno ili nedostatno objašnjeno tijekom nastave u učionici (C_2) te da u wiki sustav dodaju nastavni materijal objašnjavan u učionici, anonimno ili ne (D_1, D_2). Najveća razlika (u korist roditelja-korisnika) pronađena je u njihovoj spremnosti da prisustvuju online roditeljskim sastancima, a najmanja se odnosi na mogućnost online uvida u nastavnikova zapažanja o učenikovom radu i ponašanju. Prosječna vrijednost za roditelje-korisnike veća je za 0.76 od odgovarajućeg prosjeka za roditelje-nekorisnike.

Slika 10.

Učenici

U usporedbi s učenicima-nekorisnicima, učenici-korisnici vrednovali su kao poželjne dvije mogućnosti/funkcionalnosti školskih web portala: online uvid u učenikove obveze (domaća zadaća, projekti, čitanje kod kuće, raspored polaganja testova, itd.) i online uvid u nastavnikova zapažanja o učenikovom radu i ponašanju. Najveća se razlika (u korist učenika-korisnika) odnosi na njihovu spremnost da komentiraju rad nastavnika, a najmanje na mogućnost online pristupa vlastitim ocjenama. Prosječna vrijednost za učenike-korisnike veća je za 0.75 od odgovarajuće vrijednosti za učenike nekorisnike.

Slika 11.

Zaključak

Neizbježno je uvoditi IKT u obrazovni proces; rezultati provedenog istraživanja ukazuju na svjesnost svih triju kategorija sudionika/ispitanika o važnosti uvođenja IKT u obrazovni proces, ali i na njihovu samo deklarativnu i nedostatnu spremnost na aktivno sudjelovanje u stvarnoj primjeni IKT. Razloge tome treba tražiti u problemima s kojima se suočavaju škole u Vojvodini, što pak proizlazi iz trenutnih ekonomskih poteškoća.

Rezultati pokazuju da sve škole u Vojvodini pohađaju ,,digitalna" djeca koja se pretvaraju u ,,analogne" učenike. Umovi ,,digitalne" djece podešeni su tako da im omoguće usvajanje dinamičnih informacija koje su predstavljene multimedijski, putem slike, filma, zvuka i digitalnog teksta. Nakon ulaska u ,,analogni" svijest tradicionalne škole, učenici primaju uglavnom statične informacije.

Svi sudionici pokazuju očit otpor prema Web-u 2.0 koji zahtijeva dodatni angažman. Takvi se rezultati mogu očekivati jer bi uvođenje Web 2.0 sadržaja povećalo količinu obveza. Po autorovu mišljenju, rezultati bi ponovljenog istraživanja bili značajno povoljniji ako bi se u međuvremenu sudionicima dalo više informacija o mogućim prednostima Web 2.0 tehnologija.

U situaciji kada pružanje materijalnih resursa, potrebnih za ekonomsko preživljavanje obitelji, zahtijeva sve više vremena, unatoč tome da se često čak ni ne zna koji su to resursi, roditelji su prepoznali Web 2.0 tehnologije kao ozbiljnu pomoć pri nadgledanju aktivnosti i obveza svoje djece. Uloga roditelja u primjeni školskih portala koji se zasnivaju na Web 2.0 tehnologijama od vitalne je važnosti jer oni mogu izvršiti pritisak na školsku upravu, osobito ako nam je poznata činjenica da su škole u Vojvodini suočene s ozbiljnim problemom odumiranja zbog negativnog populacijskog rasta proteklih deset godina pa su počele marketinški razmišljati da bi privukle što veći broj učenika.

Uporaba gore opisanih sadržaja na Web 2.0 školskim web portalima omogućila bi svim trima kategorijama ispitanika slobodan pristup informacijama, koje bi dalje nadograđivali multilateralnom online suradnjom. To bi zatim dovelo do stvaranja preduvjeta za jednu u osnovi drukčiju i bolju metodu usvajanja i podjele znanja. Školski portal temeljen na Web 2.0 tehnologijama i dalje bi, naravno, imao obrazovanje kao ključnu aktivnost, a tehnologiju samo kao novu metodu svoje realizacije.

Postoje značajne prepreke za uvođenje Web 2.0 tehnologija u škole. Jedan od najsloženijih problema tiče se postavljanja infrastrukture, putem interakcije između sklopovlja, programa, mreže i ljudskih resursa. Svaki je od tih resursa problematičan, prije svega zbog ekonomskih razloga. Sredstva koja srpska država doznačuje obrazovanju, uključujući i ono srednjoškolsko, nisu ni približno dostatna za nabavku potrebne opreme, programsku podršku, mrežnu opremu te, osobito, za angažman IT profesionalaca i stručnjaka za obuku u obrazovnom sektoru. Mnogo je realističnije očekivati Web 2.0 aplikacije prvo u eksperimentalnim školama, a zatim njihovu masovnu primjenu tek u daljnjoj budućnosti. Sve do tada učenici će svakodnevno prelaziti nevidljivi most između „digitalnog" i „analognog" svijeta.