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Innovation Opportunities Offered by Wikis in Higher Education Courses: Implementation Modelling

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Abstract

Research results point to the great innovation potentials of Wikis in the university teaching process, but also to problems arising in the course of their implementation. This article proposes a model for implementing a wiki within the course of Innovation Management, based on the experiences of some university wiki systems implemented earlier, and the results of a survey conducted among the students of the Faculty of Economics in Subotica.

Key words: *collaborative learning; innovation management; Net Generation; Web 2.0.*

Introduction

One of the most prominent prerequisites for long-term competitive survival posed before the existing companies by the knowledge-founded globalised economy relates to collaboration in the field of finding existing knowledge, creating new knowledge, acquiring new knowledge, storing and retrieving new knowledge, applying and re-using (leveraging) knowledge (Pervaiz & Shepherd, 2010, pp. 512-514). If not the only one, knowledge has become the single most essential factor of production. The foundation of an enterprise's competitive advantage will be based on its ability to find, employ and enable lifelong individual and organizational learning for its workforce. In view of the acquired technological levels, the efficient attainment of this imperative is practically inconceivable without the productive use of Web 2.0 technologies. Web 2.0 literacy has therefore become a key item in the CV of any candidate for a knowledge-based position. In order to achieve competitive advantage acquired by students having completed their studies, which should be manifested and materialized in their employment process, not only business schools but also institutions educating

experts of other profiles must familiarize their students with collaboration using 2.0 technologies while they are still in classrooms, and "since the use of technology in the classroom is also known to improve the learning process, learning by doing could be an important outcome of teaching business with Web 2.0 tools, and students benefit twice" (Nica, 2008, p. 2).

The aim of this article is to define a possible model for implementing wikis in the university teaching process, on the example of a course in Innovation Management. This course was chosen because of its syllabus, which, among others, encompasses subjects related to methods of gathering, creating, storing and using knowledge for the purpose of innovation. During the collaborative wiki content creation, the students will participate in the process of innovation gathering and, at the same time, acquire important experience in the productive use of Web 2.0 technologies.

Not questioning the existence of theories advocating opposing opinions, this article started from the hypothesis that the current generations of students are members of what is referred to as the Net Generation. In order to build the implementation models on as real foundations as possible, the authors have studied reference literature dealing with the typical characteristics of the Net Generation, the future creators and users of a nascent wiki system, starting from the idea of shifting from traditional to new ways of teaching and learning. The subsequent step was to study the potentials of wikis in the sphere of education, modalities of their application and results of some available research into the positive and negative experience of introducing a wiki system into university-level instruction. A questionnaire based on the gathered theoretical materials was compiled and distributed among students (potential participants in the course where the wiki system would be built) with the aim of gaining insight into their attitudes and preferences and incorporating them into the implementation model. Finally, a Wiki implementation model was defined. The structure of the article follows the logic of the sequence of the above mentioned actions.

Theoretical Background

The Net Generation

The current generations of students are members of the Net Generation, denoted in literature with a multitude of synonyms, such as millennials, www generation, digital generation, N-generation, generation E, echo boomers, generation Y, cyber kids, Dot-com generation, Next generation, etc. (Rettie, 2002; Buckingham, 2006; Green & Hannon, 2007; Sandars & Morrison, 2007; Moore, 2008; Bullen, Morgan, & Qayyum, 2011), and the years of birth vary in range – between 1977 and 1994 (Broadbridge, Maxwell, & Ogden, 2007, p. 526), 1980 and 1994 (Hess & Jepsen, 2009, p. 265), 1977 and 1988 (Jorgensen, 2003, p. 43), 1980 and 1999 (Hubschmid, 2012, p. 12). It is interesting to point out the argument proposed by Hubschmid (2012), that the members of the Net generation in countries in transition were born after the changes that occurred in the 1990s.

The vigorous dissemination of digital technology made a determining impact on the Net Generation, who grew up surrounded by computers, video games, mobile phones, etc. Owing to constant exposure to digital and net-based technologies, they effortlessly and instinctively developed ICT skills at admirable levels through play. As argued by Frand (2000), Prensky (2001), Metros (2008) and Shelly, Gunter and Gunter (2012), multitasking, interactiveness, networking, group work and using collaborative environments are typical of this generation, who are, in addition to this, pronouncedly individual, narcissistic (Hubschmid, 2012) and demand to be entertained at all times (D'Netto, 2011, p. 2).

The sophisticated use of digital technology and fundamentally different attitude to information and media have also resulted in changes in the Net Generation's ways of learning and thinking patterns, generating different expectations from the education system (Jones, 2011). As early as 2001, Prensky pointed to the difference between the ways of learning used by the Net Generation students and those offered by the established educational system. He claimed that changes in the Net generation's learning paths were not only incremental by nature; what happened was genuine discontinuity in the information processing manner, and the thinking patterns of the new generations of students differ fundamentally from that of their predecessors. Prensky (2001) also refers to the members of the Net Generation as digital natives, and the professors, not born in the digital era, but fascinated by it and embracing many of its benefits at some points of their (formerly digital) lives, as digital immigrants, highlighting that the latter, speaking an outdated language learnt in the pre-digital era, are, in fact, "struggling to teach a population that speaks an entirely new language" (Prensky, 2001, pp. 1-2).

Based on the work of Bennett, Maton and Kervin (2008), Jones (2011) argues that the Net Generation "...is identified as a positive but threatening presence in relation to the existing academic order. The Net Generation and digital native discourse is one that provides a series of binary distinctions, new generation or old generations; technically capable and inclined or technically challenged; and finally between students and their teachers." (Jones, 2011, p. 32). The Net Generation is therefore, as Jones (2011) points out, the cause of what could be termed as the academic moral panic (p. 32).

As a solution to the increasingly manifested antagonism between the Net Generation and the digital immigrants, Tapscott and Williams (2010) propose radical changes in the structure and operating model of universities, which would be focussed on "(1) the value created for the main customers of the university (the students); and (2) the model of production for how that value is created. First we need to toss out the old industrial model of pedagogy (how learning is accomplished) and replace it with a new model called collaborative learning. Second we need an entirely new modus operandi for how the subject matter, course materials, texts, written and spoken word, and other media (the content of higher education) are created" (Tapscott & Williams, 2010). These opinions are also corroborated by Shelly, Gunter and Gunter's (2012) reflections on the new ways of teaching and learning, shown in Figure 1.

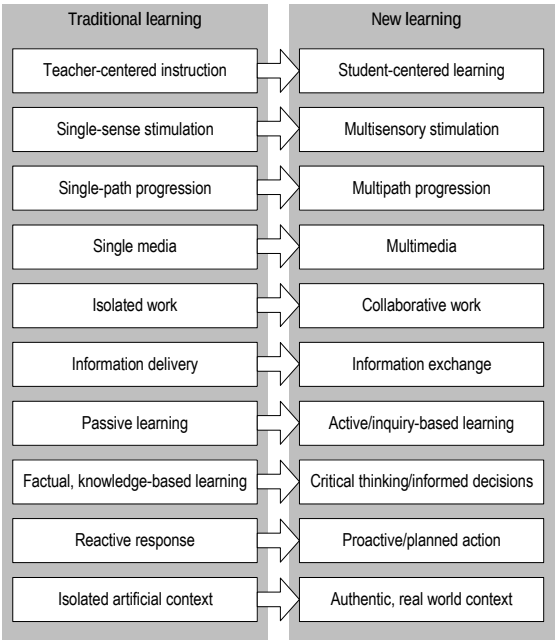

Figure 1. New ways of teaching and learning adapted from Shelly, Gunter and Gunter (2012, p. 2)

Wikis

Wikis rate among the most popular Web 2.0 applications/services. Wiki users can develop a site collaboratively, using wiki mechanisms such as posting content, editing, creating hyperlinks between contents, etc. Wikis can be said to be interactive editable web sites. One of the best known (public) wikis is definitely Wikipedia, a multilingual online collaborative encyclopaedia containing entries in 250 languages, which appeared in 2001, and 12 years later it contains about 4 million entries in English, with a submission rate of over 900 new entries daily (O'Bannon & Britt, 2012).

Studying their potential use in education, Eide and Eide (2005) emphasise that wikis promote analytic, creative and associative thinking patterns, and as such, feature as a powerful medium for accessing and sharing high-quality information. Most often wikis serve as an ever-growing knowledge repositories (Godwin-Jones, 2003, p. 15), while Kokkinaki (2009) especially highlights the potential of wikis reflecting in the fact that the students, as individuals, are offered the opportunity to add specific identity to their learning, while advancing their teamwork skills at the same time.

Karasavvidis (2010b) argues that wikis possess the highest potential of all e-learning 2.0 tools, inter alia, because of the following:

– their use does not require any special operative systems or applicative software; a customary web browser serves the purpose;
– the threshold of skills required for creating and manipulating wiki contents is comparatively low;

– wikis offer functions such as tracking changes, comparing different versions, rollback, page protection, use of multimedia, etc.
– wikis offer the possibility of collaborative creation of associative hyperlinks, giving the user great freedom in terms of links to select and follow due to lack of (strict) hierarchical structure;
– wikis enable individual work, collaboration, communication and evaluation;
– wikis support several types of educational activities, including collective learning, collective database formation, enhancing interaction among students, on-line teaching and assessment, collaborative writing, collaborative material generation, wikibook or wiki textbook creation, etc.

Wikis can also be used for brainstorming, group projects, meeting support, creating various directories (e.g. glossaries of terms), creating FAQ answers, creating repositories of relevant documents, creating link collections (social bookmarking), building group portfolios (University of Delaware, 2008), for posting homework/course material/study guides, peer review and feedback (Shelly, Gunter, & Gunter, 2012), etc. In this, wikis offer students temporally and spatially unconditioned abilities to access and contribute to wiki contents, allowing each student the most convenient work pace.

Experiences in Introducing Wikis into the University Teaching Process

Introducing wikis into the university teaching process is aimed at intensifying interaction between students (at the expense of classical lectures), P2P collaboration, placing greater emphasis on the study programme, whose focal point is shifted from the lecturer to the student, through generating knowledge where students participate personally by using available (in most cases free) digital sources (but not only those). Such a constellation also changes the primary objectives of learning: the skills of memorising and acquiring factual knowledge are replaced by critical reasoning, decision making, synthesising and integrating knowledge and skills (Lin, Sajjapanroj & Bonk, 2011, pp. 327-328). Although the adoption of wiki technologies was expected to generate positive qualitative changes in the university education, these expectations have so far not been fully met. This is confirmed by the results of selected research presented below in an aggregated form. The common denominator of the studies (Rick & Guzdial, 2006; Elgort, Smith & Toland, 2008; Ma & Yuen, 2008; Ravid, Yorad, & Sheizaf, 2008; Wheeler, Yeomans, & Wheeler, 2008; Cole, 2009; Wheeler & Wheeler, 2009; Karasavvidis, 2010a) is that compiling wikis requires significant efforts from both the students and the teachers. As positive effects of introducing wikis into university teaching, these studies highlight the following:
– students showed increased motivation to create higher-quality content, due to the awareness that their work would be exposed to the public (even if the term "the pubic" only referred to the group that created the wiki);
– the process of wiki creation made a stimulating impact on group work, collaboration and knowledge sharing;

– rewarding corrections of others' mistakes with points, i.e. activity credits encouraged students to read sections of the wiki that they would otherwise not have read;
– creating wikis resulted in better subject knowledge;
– the teachers achieved a closer cooperation with students as individuals, and the group as a whole;
– students became aware of the responsibility entailed by the decision what to include and what to omit from the wiki;
– students who participated in generating wiki contents achieved better exam scores.

Still, the studied body of research (Rick & Guzdial, 2006; Elgort, Smith, & Toland, 2008; Ma & Yuen, 2008; Ravid, Yorad, & Sheizaf, 2008; Wheeler, Yeomans, & Wheeler, 2008; Cole, 2009; Wheeler & Wheeler, 2009; Karasavvidis, 2010a) unequivocally pointed to problems more than to positive experiences. Karasivvidis (2010a) takes an interesting approach, viewing wikis in the light of introducing innovation into an existing, routine system, and arguing that it naturally causes conflict situations, frictions, contradictions and inconsistencies. Wiki has, states Karasivvidis (2010a), disturbed the run-of-the-mill, traditional course of students' process and activities, thus creating tensions. In order to define a model for introducing wikis into university courses, the most notable problems detected in these studies were classified into the following groups:

P1 – Students' motivation and effort

P-1.1 The students preferred having a lower grade to the obligation to use a wiki system and participate in online collaboration.

P-1.2 Only a comparatively small number of students made significant contribution to wiki content generation, whereas the majority of students invested considerably less effort. After a while there were no more contributions to the wiki.

P-1.3 There were lively discussions in the classroom, but not online, on the wiki system.

P2 – Training for the use of wiki systems

P-2.1. There was frustration due to the lack of sufficient quality of skills required for using wiki systems.

P3 – Organisation

P-3.1 Activity coordination was often difficult.

P-3.2 The set deadlines were exceeded.

P4 – Students' confidence, insecurity and reluctance

P-4.1 The students were sceptical about their interpretation of individual concepts. Due to the habit of learning from "authoritative" sources recommended by their lecturers, students did not find materials compiled by creating wikis reference worthy.

P-4.2 The students were unwilling to use wikis as information sources for exam preparation.

P-4.3 The students were reluctant to make corrections or additions to the contents contributed by their peers.

P5 – Evaluation

P-5.1 The students were sceptical regarding the fairness of the evaluation of the effort invested in wiki creation.

P-5.2 The students were concerned that each error, vague wording or inconsistency in their contents may have a negative effect on their final grade.

P-5.3 The students found some topics easier, and others more difficult: the easier topics were those that had been taught during lectures, whereas more difficult topics were those that had not been explained in teaching, and required extensive research and content gathering.

P-5.4 The students wanted to protect (as intellectual property) their ideas (sections of wikis on which they worked), ignoring their peers' contributions at the same time.

P-5.5 The students deemed that they would have achieved a better final score if they had worked individually rather than in a team.

P-5.6 The students were willing to take responsibility for their share of the contribution, but not for others' contents, and therefore a significant number of students requested that the examination question be derived from the contents written by themselves, rather than those contributed by their peers.

P6 – Public accessibility of contents entered into wikis

P-6.1 Students expressed anxiety about public accessibility of the texts they had entered into wikis (at the same time, this was also recorded as a motivating factor).

P-6.2 Plagiarism: copy-paste has become the usual technique of "filling up" wikis. Superficially written contents were mostly the output of a copy-paste strategy, and these were considerably longer compared to contents delving into the issues more deeply and requiring more work.

Research

Based on the reviewed features of the Net Generation, educational potentials of wikis and studied positive and negative experiences in their application at university, a web questionnaire was compiled, structured in three sections. Among others, the first contained questions on grade point average (GPA), computer and internet use habits, and equipment they have and use for accessing contents on the Internet. Questions and replies in this section were worded so as to be comparable with the official data of the Statistical Office of the Republic of Serbia. In the second part of the survey, the respondents were required to express their opinion on Wikipedia, the best known example of wikis, as this will be used as a model for building the student-generated wikis (Lim, 2009; Deters, Cuthrell, & Stapleton, 2010; Head & Eisenberg, 2010). Finally, the third and the most important section of the questionnaire dealt with the students' opinion on individual questions related to building a student-generated wiki.

The questionnaire was sent to 216 students selected by random sample method. 162 students (75%), 90 of whom (55.56%) were males and 72 (44.44%) were females,

responded and participated in the survey. The structure of respondents by GPA is shown in Figure 2, clearly showing the normal distribution.

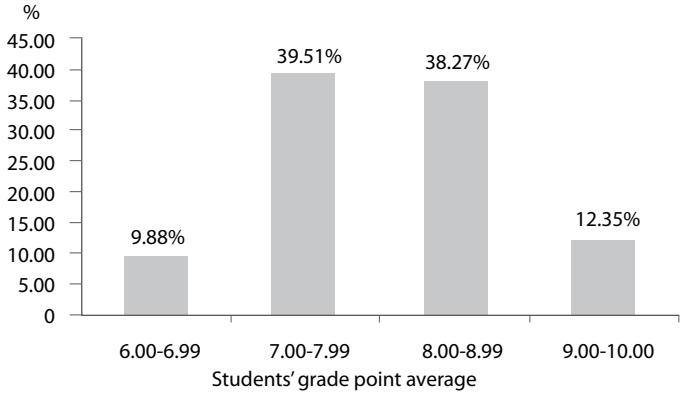

Figure 2. Respondent structure by GPA criterion

Results

R-1 Computers and the Internet are used by 100% surveyed students, daily or almost daily (lower usage frequency was not stated by any of the participants). These data were to be expected, taking into account that as many as 99.5% of the student population at the national level use computers, and the percentage of Internet users is the same (Statistical Office of the Republic of Serbia, 2011).

The percentages of individual types of equipment used by the surveyed students to access the Internet is shown in Figure 3. Based on the shown data, it can be concluded that a high percentage of the surveyed student population use several types of equipment for accessing the Internet: only 17.5% access the Internet only through PCs and laptops, whereas others do it using several devices. As many as 81.25% respondents access the Internet using, among others, smartphones, which confirms the assumption that the students have the opportunity to access student created wikis practically anywhere and anytime. 42.5% respondents have the opportunity to access the Internet with PCs, laptops and smartphones.

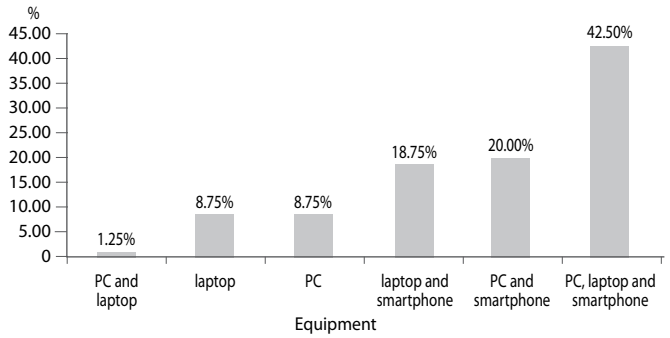

Figure 3. Equipment used by surveyed students for accessing the Internet

R-2 As expected, Wikipedia is used by 100% respondents. The majority (as many as 60.49%) do it daily or weekly (Figure 4). However, the percentage of active Wikipedia users is significantly lower: only 12.35% respondents have participated in creating or changing the content.

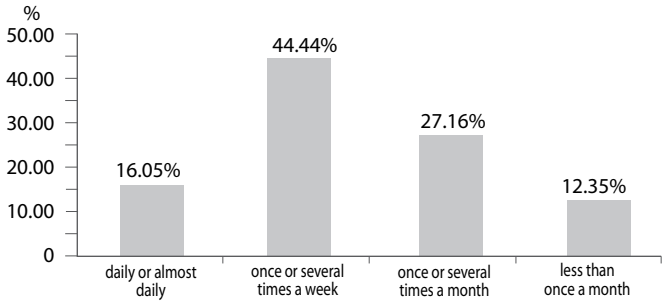

Figure 4. Frequency of using Wikipedia

Using a 1-5 scale (1 = the lowest, 5 = the highest), students gave Wikipedia's navigation system an average grade of 4.09, appearance 3.50, and usability 4.05. The respondents were also asked to express the degree of agreement with several statements about Wikipedia on a scale of 0%-100%. The results are shown in Table 1.

Table 1

Opinions of surveyed students about Wikipedia

Statement	Average degree of agreement with the statement
Browsing the Wikipedia is enjoyable	68.43%
I get new ideas using Wikipedia	54.81%
Wikipedia is fun	62.18%

Note: 0 = % completely disagree; 100% = completely agree

R-3 Despite the relatively frequent use of Wikipedia, as many as one-third of respondents do not use it for preparing examinations, and 12.35% did not provide information on using Wikipedia for preparing examinations (Figure 5).

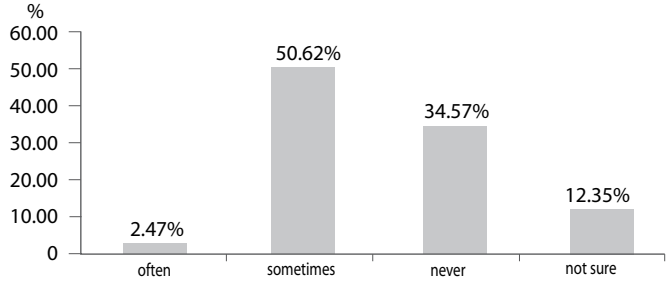

Figure 5. Frequency of using Wikipedia for preparing examinations

It can be said that the students who use Wikipedia for preparing examinations do not have a clearly formed opinion on its usefulness for this purpose: they expressed 49.05% agreement on the average with the statement that Wikipedia is useful for

preparing examinations and 50.95 disagreement (where 0% = completely disagree; 100% = completely agree).

R-4 Frequency of comparing data from Wikipedia with alternative information sources is illustrated in Figure 6, showing that fewer than 10% respondents do not verify information obtained from Wikipedia at all, somewhat more than 12% have no formed opinion or have not answered the question; as many as 62.96% respondents sometimes opt for verification of information from Wikipedia, whereas 14.81% of them do it frequently.

Students who verify information obtained from Wikipedia evaluated their accuracy, reliability, usefulness and up-to-dateness as shown in Table 2.

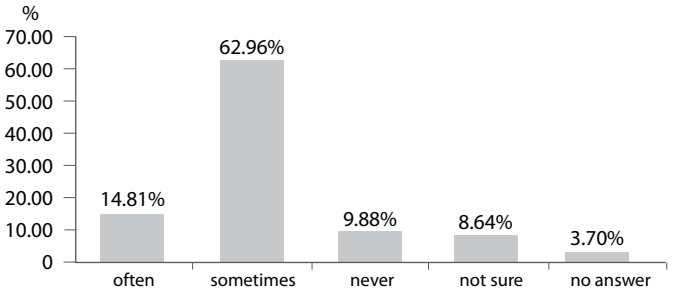

Figure 6. Frequency of comparing data from Wikipedia with other sources

Table 2

Evaluation of Wikipedia (1 = lowest; 5 = highest)

Criterion	Average grade
Accuracy and reliability of information	3.80
Usefulness of information	4.33
Up-to-dateness	4.02
Quality of texts	3.67

R-5 In the last, third section of the questionnaire, the students expressed their opinions on the idea of building a student generated wiki on a given topic modelled after Wikipedia, within the lectures and tutorials, in cooperation between professors, associates and students. The surveyed students most liked the idea itself of building a student created wiki within regular lectures and tutorials, and this idea received an average grade of 4.40 on a scale of 1 to 5 (1 = lowest; 5 = highest). Similar grades were given to the ideas that the contents of the student-created wiki should constitute a part of examination questions (average grade: 4.35), and that activities on creating the student wiki should receive additional credits when calculating the final grade (average grade: 4.16).

The idea that each student should participate in the creation of the student wiki was not as well received as the previously mentioned idea, and received an average grade of 2.77. The same average grade was received by the idea that the student-generated wiki should be made available to the general public, and the idea that the contents of

the student-generated wiki should be available only on the student intranet by means of username and password was evaluated somewhat higher (3.79).

As for reviewing the content of the student-generated wiki, the surveyed students uniformly expressed the wish that the professor should be an active reviewer of the contents entered by students (average grade 4.37), and the idea that the professor should be assisted in reviewing by selected students was evaluated only slightly lower (average grade 4.03). The idea that students should be entrusted with reviewing exclusively, without the professor's participation was received unenthusiastically, with an average grade of 2.66. Defining and applying strict rules of stating sources of materials uploaded to student created wiki (i.e. referencing) received an average grade of 4.17. The average grades of the above stated ideas are given in Figure 7.

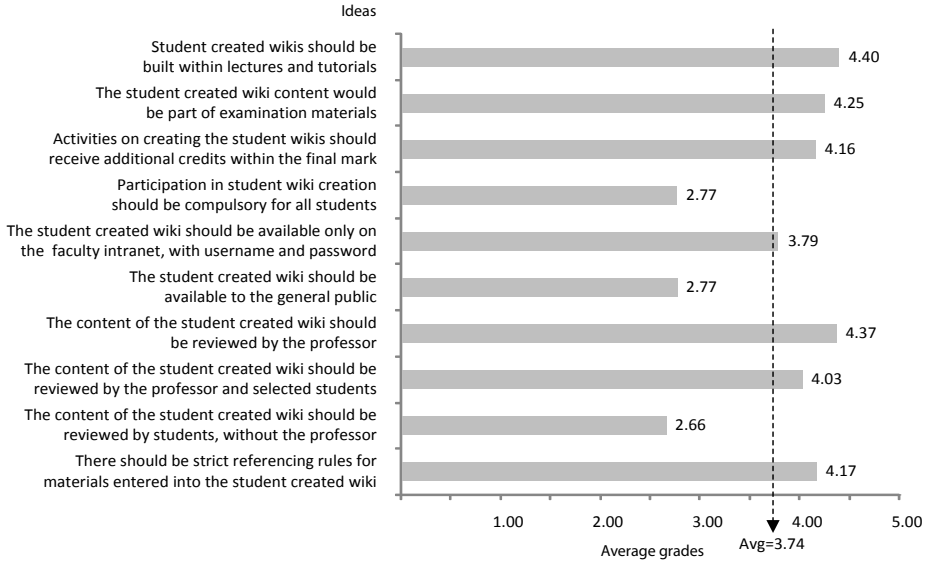

Figure 7. Average grades for individual ideas regarding developing a student wiki

R-6 Special attention was paid to the opinions of surveyed students related to evaluating activities on creating the student wiki. As Figure 8 shows, the idea that participation in building the wiki should be compulsory for all students was met with much less enthusiasm (average grade 2.77) than most other ideas. However, when the students were offered the choice between abstaining from the construction of the student wiki and getting a lower final grade on the one hand, and taking part in building the student wiki for a higher final grade on the other, the results unequivocally showed that most students preferred participating in student wiki creation. More specifically, only fewer than 5% of surveyed students were willing to accept a lower grade in exchange for abstaining from participation in the student wiki creation. Undecided students accounted for somewhat less than 15%, whereas almost 70% respondents expressed willingness to participate in building the student

wiki and thus achieve higher exam score. The "other" category, accounting for 11.11% responses, included answers such as "depending on other obligations", "depending on the topic covered by the wiki", "depending on the time available", "depending on the professors I would have to cooperate with", etc. (Figure 8).

R-7 When asked to express their opinion on group work and assessing students, the respondents provided answers shown in Figure 9. Almost half of them (46.91% of the surveyed students) would accept a grade given to their group; a little more than one-third of the respondents (35.80%) prefer individual work and want to earn the grade solely based on their own activities, whereas a little more than 12% students have no opinion on the issue. The option "Other" comprises opinions expressing willingness to accept a collective grade only if the group were composed of only 2 or 3 members, opinions on introducing the possibility of exclusion of group members who do not invest sufficient effort and contribution, etc.

R-8 As expected, students with lower GPAs preferred group work and a collective grade for all group members, whereas students with higher GPAs preferred grades based on individual work (Figure 10). More precisely, all surveyed students with GPAs under 7.00 (out of maximum possible 10.00) chose a collective grade, students with GPAs in the range between 7.00 and 7.99 preferred a collective grade in 62.5% cases, while the percentage of students who preferred a collective grade in the category with GPAs 8.00-8.99 and 9.00-10.00 is 45% and 20% respectively.

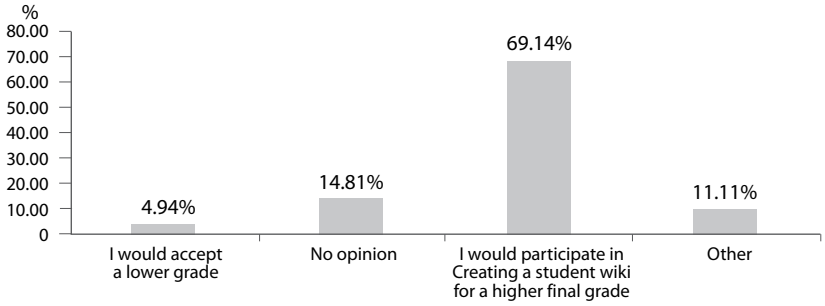

Figure 8. Students' willingness to participate in creating a student wiki for a higher grade

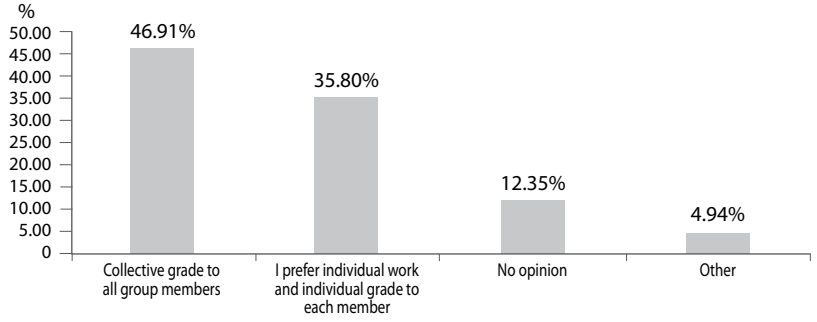

Figure 9. Opinions of surveyed students on group and individual work on wiki creation

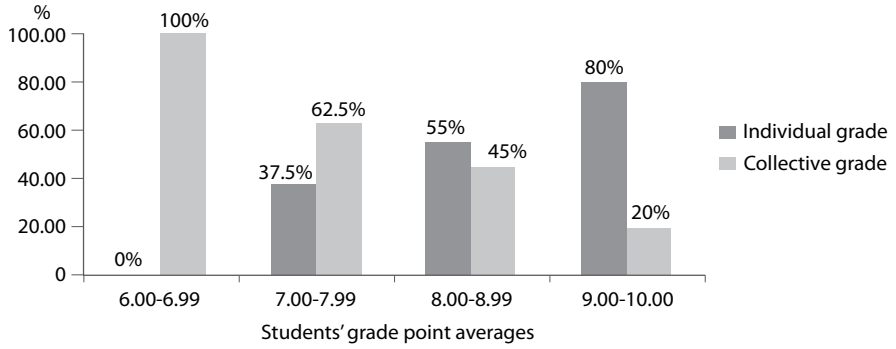

Figure 10. Students' preferences regarding collective or individual grading

R-9 A similar pattern was also found regarding preferences – as to whether the content "filling" the student wiki should be signed by contributing students' full names or nicknames (in which case the professor would know their identity). Viewing all the gathered answers, 16.05% respondents had no opinion on this issue, 38.27% of the surveyed students would prefer nicknames, and 45.68% would like their full names to be displayed. Pivoting the gathered data has shown that anonymity is greatly preferred by students with lower academic performance, whereas announcing full names is an option more often selected by higher GPAs (Figure 11), as expected.

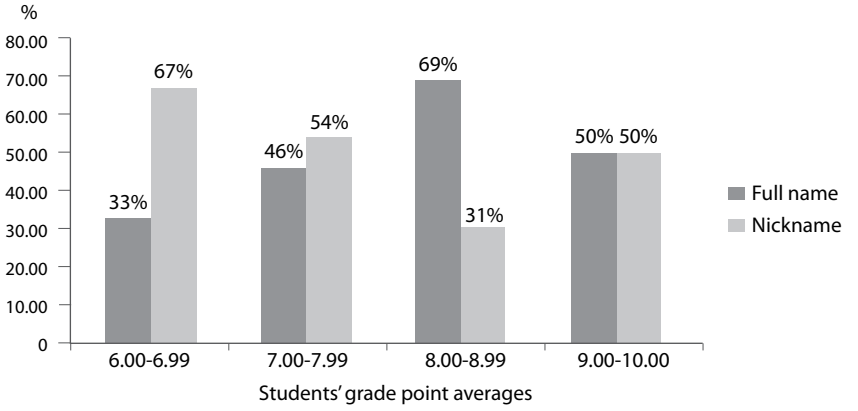

Figure 11. Students' preferences regarding anonymity, i.e. announcing full names

Wiki Implementation Model

The Innovation Management Course is taught to two groups of students, in two locations, in Subotica and Novi Sad. In the course of the semester, the students are supposed to write a seminar paper dealing with a specific topic. An assessment test based on texts published in a textbook is administered at the end of the semester.

Instead of writing their compulsory seminar paper, the selected group of students (the experimental group), will have to work on a wiki system; more precisely, the materials that would otherwise be handed in written form as a seminar paper will be

entered into a wiki system. The other group of students (the control group) will write classical seminar papers, like the previous generations of students. The performance of the experimental and the control group will be compared on the final test at the end of the semester. The wiki contents will therefore not be the research subject, in order to achieve comparability of the control and experimental group's performance on the final test.

Introducing a wiki in the teaching process has a material and technical basis, as shown by research results (R-1, R-3), according to which 100% of the respondents use computers and the Internet, 100% of the respondents use Wikipedia, and the idea itself to introduce a wiki system into the teaching process received a high grade of 4.40 out of a maximum of 5.00 (R-5).

Building a wiki within the Innovation Management course has the following objectives:

- to enable the students to acquire (or improve) skills in using Web 2.0 technologies, i.e. the skill of creating information infrastructure by means of a wiki system, providing them with a competitive employment advantage, and preparing them for lifelong learning activities;
- to use the wiki system to stop students from being restricted to the role of knowledge recipients, but rather, to make them partners in creating, editing, and sharing the learning contents. This will also foster the participation and sharing culture in the learning community, and make students the leading participants in their own learning, responsible for locating the content required;
- to supplement the existing traditional ways of learning to the greatest possible extent (Figure 1) with new teaching and learning approaches and practices, and thus make the teaching process as close to the Net Generation's expectations as possible;
- to achieve a better understanding of the taught contents by means of practical work on wikis;
- to gain insight into the impact of building a wiki system on better understanding of the content, based on the control and experimental group's performance on the final test at the end of the semester.

Starting from the problems pointed to by the results of earlier research, and considering the opinions and general feeling of students shown by the author's research, wiki building will be conducted as follows:

- Participation in wiki creation at the chosen teaching location will be compulsory for all students (P-1.1, P-1.2). The authors' research has shown that, although the idea to make participation in wiki creation compulsory for each student received a comparatively low grade (2.77 out of 5.00), over 80% of the surveyed students would still agree to participate in wiki creation (about 11% of whom conditionally) for a better final grade (R-5, R-6).

– At the beginning of the semester, the students will be informed in detail on wiki system usage techniques, through serious training for all wiki activities: writing, editing and content revision. Through prepared examples, students will get detailed instructions about the wiki system, spelling, grammar and formatting rules, the recommended and unacceptable writing style and netiquette (P-2.1). These activities are also necessary due to the fact established in the author's research (R-2): only 12.35% have participated in creating or changing Wikipedia contents.
– The structure of wiki contents will be determined in advance, through a list of section/chapter headings, and topics will be allocated to students, to achieve equal complexity (P-5.3). The topics will be the extension of the already existing textbook contents. Each student will get a separate topic. Although the average students' opinion shows that there is a willingness for group work and the acceptance of a collective grade (R-7, R-8), pivoting the gathered data has shown a significant correlation between the degree of acceptance of the idea of group work, i.e. collective grade on the one hand, and the grade point average of surveyed students. In addition, the authors bore in mind Hubschmid's (2012) claim about the Net Generation's distinct individualism and narcissism, stated in the introduction. Group work and collaboration will nevertheless not be neglected, as check point and brainstorming meetings will be organised, where students will be enabled (and encouraged) to express objections to the work of their peers and the entire group.
– Aware that copy-pasting is unavoidable, the wiki contents will be verified by means of a Web-based plagiarism detection tool. Special attention will be devoted to referencing the used sources (P-6.2) and constant reviews by the professor. The author's research results (R-5) show a very high grade for the ideas that strict referencing rules should be applied (4.17 out of 5.00) and the professor should take a dominant role in reviewing the contents entered into the wiki by the students (4.37 out of 5.00).
– The wiki will be a closed one (Figure 12), thus mitigating the students' anxiety because of public availability of their texts (although this was also mentioned as a positive, motivating factor). The conducted survey (R-5) identified that the idea of making the wiki available to the general public was not greeted with a high degree of the students' approval – graded 2.77 out of the possible 5.00. The idea that the wiki should be available only to the registered users on the Faculty's intranet was received better (3.79 out of 5.00).
– The students will contribute to the wiki under their full names rather than nicknames. Each student will be evaluated for their work on the wiki (R-7, R-8), in the same way as they are evaluated when they write seminar papers. This is in compliance with the opinions of the surveyed students. As stated earlier, 38.27% of the surveyed students would prefer nicknames, and 45.68% would like their full

names to be clearly stated. Furthermore, anonymity is more preferred by students with lower academic performance, and stating full names is favoured by students with higher GPAs.

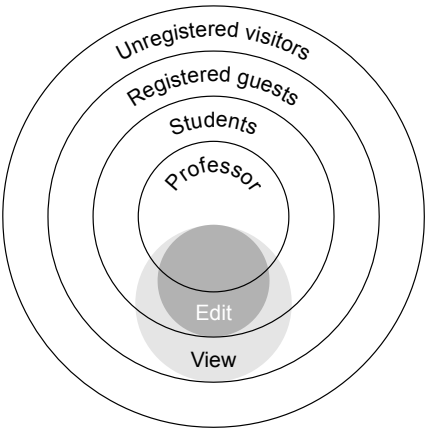

Figure 12. The target audience and the permission sets Source: University of Delaware, 2008, p. 15

– The wiki contents will not be tested on the final examination, only the knowledge of the texts from the textbook will be checked in the test (P-4.1, P-4.2, P-5.5, P-5.6). The work on the wiki will be assessed and evaluated as a seminar paper. Although the idea that the contents should be part of the materials examined on the final test was graded high (4.25 out of 5.00) (R-5) by the surveyed students, when the model was defined, it was nevertheless concluded that this would require experience and analysis of the quality of texts contributed by the first generation of students.
– Equal emphases will be placed on the wiki building process and the content, i.e. participation and presentation. Brainstorming/checkpoint meetings will be organised to this end, in order to discuss the progress of wiki system building and the problems which arise at different stages of the process. In these meetings, students will be encouraged to express their comments, objections and suggestions regarding their peers' work, with the aim of placing the control in the learner's hands (P-1.3, P-3.1, P-3.2, P-4.3). As 77.77% of the respondents tend to subject the information obtained through Wikipedia to some kind of verification (R-4), they could also use the acquired habits and skills for controlling the content contributed by their peers.
– The final grade for wiki activities will be announced in the last brainstorming/checkpoint meeting, when each of the students will be able to express their opinions as well (P-5.1, P-5.2).
– A glossary of terms will be formed, and the index of used sources classified by types: web pages, books, articles, video and audio recordings, etc., where the individual contribution of each student will be separately evaluated (P-5.1).

– The developed wiki will be available to the next generation of students, and the best texts from the student-generated wiki will be uploaded to Wikipedia (P-6.1).

Wiki implementation will include nine activities, whose timeline, leaders and executors are shown in Figure 13.

Activity code	Title
A1	Introducing students with the aim and tasks of wiki creation.
A2	Detailed introduction to the wiki system and practicing techniques / wiki activities (writing, editing, revising) through collective case study (example prepared earlier) *Note: Required resources must be provided before the beginning of the semester. Contents elaborated in the textbook will be entered.*
A3	Instructions about the wiki system, spelling, grammar and formatting rules, recommended and unacceptable writing style and netiquette.
A4	Assigning individual tasks to students and defining dates and times of checkpoint/ brainstorming meetings. *Note: Wiki structure is preset; students receive topics, materials and an initial list of additional sources.*
A5	The first checkpoint/brainstorming meeting: clarifying possible unclear issues.
A6	Verifying the contents entered into the wiki system in an anti-plagiarism service. Reviewing the entered contents.
A7	Check point/brainstorming meetings. *Note: Professor/Assistant Lecturer informs the students about the current situation on the wiki, point to good and bad examples, and gives instructions for correction.*
A8	Final meeting – Assessment and grading. *Note: Submitting reports on each student's work, announcing and explaining decisions about grades for each students; discussion, comments, objections, responses.*
A9	The test will be based on the contents of the textbook, but will mostly comprise questions answered by way of logical inferences rather than reproduction of facts. Performance of the experimental and control group will be compared.

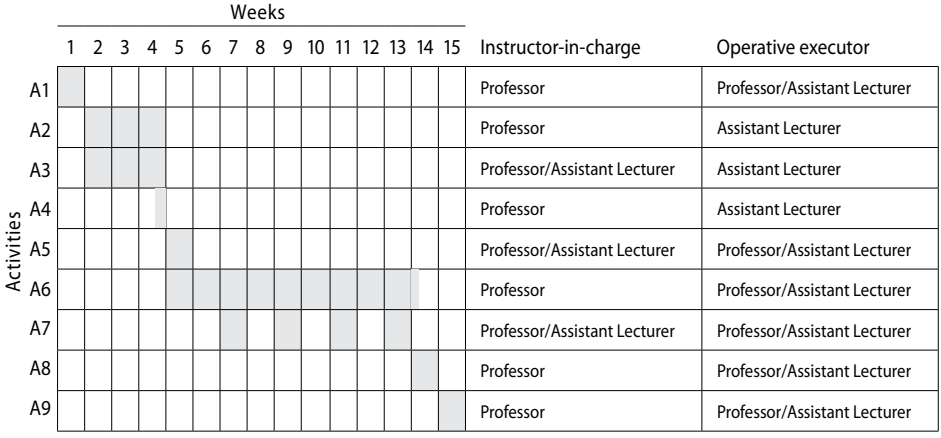

Figure 13. Activities, timeline, instructors-in-charge and operative executors of wiki implementation

Conclusion

Universities should invest significant effort to bring their ways of learning closer to the Net Generation, consisting of current students as well, who come to universities with naturally and instinctively developed skills in multitasking, interactiveness, networking, group work and use of collaborative environments.

Introducing wikis into the teaching process could be a marked breakthrough in the application of the new ways of learning at universities that would use these positive characteristics of the Net Generation. The currently existing experiences related to its introduction warn that it is by no means simple, and gives rise to numerous problems. These problems are systematised and grouped in this article, and, as such, used as a basis for compiling a web-based survey conducted among the potential attendants of the Innovation Management course at the Faculty of Economics Subotica of the University of Novi Sad. Besides the respondents' opinions on introducing Wikipedia into university teaching process, the survey provided insights into some of their habits related to using computers, the Internet and Wikipedia. A model for implementing a wiki within the teaching process was defined based on the detected problems and the surveyed students' opinions.

The experiences to be gained through the implementation of the defined model, and the results to be achieved by comparing the performance of the control and the experimental groups should be used for conceiving the limitations and further improvements of the proposed model. This primarily refers to collaboration in wiki content creation, which has been reduced to discussions during checkpoint/brainstorming meetings rather than receiving adequate amount of attention, all due to the lack of hands-on experience.

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Inovacijske mogućnosti koje nudi upotreba wikija u izvođenju visokoškolskih kolegija: implementacijsko modeliranje

Sažetak

Rezultati istraživanja otkrivaju značajne inovacijske potencijale upotrebe wikija u sveučilišnoj nastavi, ali i probleme koji nastaju tijekom njihove implementacije. U ovome se članku predlaže model za implementaciju wiki sustava u okviru kolegija Inovacijski menadžment. Model je utemeljen na iskustvima nekih prije implementiranih sveučilišnih wiki sustava i rezultatima istraživanja provedenoga sa studentima Ekonomskoga fakulteta u Subotici.

Ključne riječi: *inovacijski menadžment; net generacija; suradničko učenje; Web 2.0.*

Uvod

Jedan od najvažnijih preduvjeta za dugoročno natjecateljsko preživljavanje koji globalizacijska ekonomija utemeljena na znanju stavlja pred postojeće tvrtke odnosi se na suradnju u pronalaženju postojećih znanja, kreiranju novih znanja, stjecanju novih znanja, spremanju i pronalaženju novih znanja, primjenjivanju i ponovnom korištenju znanja (sa svrhom stjecanja utjecaja) (Pervaiz i Shepherd, 2010, str. 512-514). Znanje je postalo najvažniji, ako ne i jedini, čimbenik u proizvodnji. Natjecateljska prednost u poduzetništvu utemeljena je na sposobnosti pronalaženja, upotrebe i omogućavanja cjeloživotnog individualnog i organizacijskog učenja za radnike. S obzirom na stečene tehnološke razine danas je praktički nemoguće učinkovito postići taj imperativ bez mogućnosti produktivne upotrebe Web 2.0 tehnologija. Tako je Web 2.0 pismenost postala ključan pojam u životopisu bilo kojeg kandidata za radno mjesto posla utemeljena na znanju. Kako bi studenti pri završetku svojih studija postigli natjecateljsku prednost na tržištu rada koja bi se trebala manifestirati i materijalizirati u njihovu procesu zapošljavanja, poslovne škole i institucije koje obrazuju stručnjake raznih profila moraju još tijekom studija upoznati svoje studente s mogućnostima suradnje s pomoću 2.0 tehnologija. Ovo je važno i „zbog toga što je poznato da upotreba tehnologije u razredu pospješuje proces učenja te da učenje

kroz rad može postati važan rezultat poučavanja ekonomije s pomoću Web 2.0 alata pa studenti tako imaju dvostruku korist od ove vrste poučavanja" (Nica, 2008, str. 2).

Cilj ovoga članka jest definirati jedan mogući model implementacije wikija u procesu sveučilišne nastave i to na primjeru kolegija iz Inovacijskoga menadžmenta. Taj kolegij izabran je zbog njegova silaba koji, između ostaloga, obuhvaća teme koje se odnose na metode skupljanja, stvaranja, kreiranja, spremanja i korištenja znanja u inovacijske svrhe.

Tijekom suradničkog kreiranja sadržaja wikija studenti će sudjelovati u procesu prikupljanja inovacija te će u isto vrijeme steći važno iskustvo u produktivnoj upotrebi Web 2.0 tehnologija.

Bez propitkivanja postojanja teorija koje zastupaju oprečne stavove ovaj članak počiva na hipotezi prema kojoj su trenutne generacije studenata članovi takozvane net generacije. S ciljem izgradnje implementacijskih modela na što realnijim temeljima autori ovoga članka proučili su referentnu literaturu usredotočenu na tipične karakteristike tih mladih koji se smatraju budućim stvarateljima i korisnicima wiki sustava u nastajanju. Temeljna zamisao na kojoj počiva izrada spomenutoga modela jest pomak od tradicionalnih prema novim načinima poučavanja i učenja. Sljedeći je korak bio proučavanje potencijala wikija u sferi obrazovanja, modalnostima njihovih primjena i rezultata dostupnih istraživanja o pozitivnim i negativnim iskustvima uvođenja wiki sustava u sveučilišnu nastavu. Na temelju prikupljenih teorijskih materijala izrađen je upitnik koji je distribuiran među studentima (potencijalnim sudionicima na kolegiju na kojem bi se izgradio wiki sustav) kako bi se stekao uvid u njihove stavove i preferencije i kako bi ih se uključilo u implementacijski model. Naposljetku je definiran wiki implementacijski model. Struktura članka u skladu je sa slijedom prethodno navedenih aktivnosti.

Teorijska pozadina

Net generacija

Trenutne generacije studenata pripadaju net generaciji koju u literaturi nalazimo pod raznim nazivima: milenijali (engl. *millennials*), www generacija (engl. *www generation*), digitalna generacija (engl. *digital generation*), N-generacija (engl. *N-generation*), generacija E (engl. *generation E*), kćeri i sinovi baby boom generacije (engl. *echo boomers*), generacija Y (engl. generation Y), djeca kibernetike (engl. *cyber kids*), točka-com generacija (engl. *Dot-com generation*), sljedeća generacija (engl. *Next generation*) itd. (Rettie, 2002; Buckingham, 2006; Green i Hannon, 2007; Sandars i Morrison, 2007; Moore, 2008; Bullen, Morgan, i Qayyum, 2011), a njihove godine rođenja variraju između 1977. i 1994. (Broadbridge, Maxwell, i Ogden, 2007, str. 526), 1980. i 1994. (Hess i Jepsen, 2009, str. 265), 1977. i 1988. (Jorgensen, 2003, str. 43), i 1980. i 1999. (Hubschmid, 2012, str. 12). Zanimljivo je istaknuti argument koji navodi Hubschmid (2012) prema kojemu su članovi net generacije u tranzicijskim zemljama rođeni nakon promjena koje su se dogodile 90-ih godina prošloga stoljeća.

Intenzivna diseminacija digitalne tehnologije imala je odlučujući učinak na članove net generacije tako što im je pomogla da razviju vještine u korištenju informacijsko-komunikacijske tehnologije. Članovi net generacije odrasli su okruženi računalima, video igrama, mobilnim telefonima itd., podložni su stalnoj i sveprisutnoj izloženosti digitalnim i mrežnim tehnologijama i u stanju su igrati se njima bez velikih napora. Autori Frand (2000), Prensky (2001), Metros (2008) i Shelly, Gunter i Gunter (2012) tvrde da su višezadaćnost (engl. *multitasking*), interaktivnost, mrežno povezivanje, rad u skupini, kao i korištenje suradničkih okolina tipični za tu generaciju koja je također iznimno individualna, narcisoidna (Hubschmid, 2012) i zahtijeva da je se sve vrijeme zabavlja (D'Netto, 2011, str. 2).

Sofisticirana upotreba digitalne tehnologije i izrazito različit stav prema informacijama i medijima također su rezultirali promjenama u načinima učenja i uzorcima razmišljanja u net generaciji zbog čega su među njezinim članovima nastala različita očekivanja od obrazovnoga sustava (Jones, 2011). Prensky je već 2001. istaknuo razliku između načina učenja kojima su se koristili studenti net generacije i onih koje je nudio ustaljeni obrazovni sustav. Tvrdio je da promjene u načinima učenja kojima se koristi net generacija nisu samo po prirodi u porastu već da je došlo do nepatvorena prekida u načinu procesiranja informacija pa da se obrasci razmišljanja novih generacija studenata u svojoj srži razlikuju od onih njihovih prethodnika. Prensky (2001) članove net generacije također naziva digitalnim domorodcima (engl. *digital natives*), a profesore koji nisu rođeni u digitalno doba, ali su njime fascinirani te prigrljuju mnoge njegove dobre strane u nekom trenutku svojih (prethodno digitalnih) života, naziva digitalnim imigrantima te naglašava da se ti potonji, koji govore zaostali jezik naučen u preddigitalno doba, zapravo „muče u poučavanju populacije koja govori potpuno novi jezik" (Prensky, 2001, str. 1-2).

Na temelju zamisli Bennetta, Matona i Kervina (2008), Jones (2011) tvrdi da se net generacija „...identificira kao pozitivna, no prijeteća prisutnost u odnosu na postojeći akademski poredak. Net generacija i diskurs digitalnih domorodaca čini niz binarnih razlika: nova generacija nasuprot starim generacijama, generacija s tehničkim sposobnostima i sklonostima nasuprot onih kojima tehnologija predstavlja teško premostiv izazov i, na kraju, studenti nasuprot svojim profesorima." (Jones, 2011, str. 32). Net generacija je, dakle, uzrok onome što možemo nazvati akademskom moralnom panikom (str. 32).

Kao rješenje sve izraženijem antagonizmu između net generacije i digitalnih imigranata Tapscott i Williams (2010) predlažu radikalne promjene u strukturi i operativnim modelima sveučilišta koje će biti usredotočene na „(1) vrijednost stvorenu za glavne klijente sveučilišta (studente) i (2) model proizvodnje kojime će se opisati način na koji se ta vrijednost stvara. Najprije trebamo izbaciti stari industrijski model pedagogije (kako se postiže učenje) i zamijeniti ga novim modelom nazvanim suradničko učenje. Potom trebamo potpuno nov način rada za kreiranje novoga kolegija, nastavnih materijala, tekstova, pisane i govorene riječi, kao i ostalih

medija (sadržaj visokoškolskoga obrazovanja)" (Tapscott i Williams, 2010). Te stavove potvrđuju pogledi Shelly, Gunter, i Gunter (2012) na nove načine poučavanja i učenja, kako je prikazano na slici 1.

Slika 1.

Wikiji

Wikiji se nalaze među najpopularnijim Web 2.0 aplikacijama/uslugama. Korisnici wikija mogu u suradnji razviti internetsku stranicu, koristiti se wiki mehanizmima kao što su objavljivanje i uređivanje sadržaja, kreiranje poveznica (engl. *hyperlink*) između različitih sadržaja itd. Možemo reći da su wikiji interaktivne internetske stranice koje se može uređivati. Jedan od najpoznatijih (javnih) wikija je svakako Wikipedija, višejezična internetska suradnička enciklopedija koja sadrži unose na 250 jezika. Wikipedija je stvorena 2001. godine, a 12 godina poslije sadrži oko 4 milijuna unosa na engleskome jeziku, s dnevnom stopom od oko 900 novih unosa (O'Bannon i Britt, 2012).

Eide i Eide (2005) proučavaju moguću upotrebu wikija u obrazovanju te naglašavaju da oni jačaju analitičko, kreativno i asocijativno razmišljanje i na taj način predstavljaju moćan medij za pristupanje i dijeljenje kvalitetnih informacija. Wikiji najčešće služe kao stalno rastuće riznice znanja (Godwin-Jones, 2003, str. 15). Kokkinaki (2009) osobito naglašava potencijal wikija koji se odražava u činjenici da je studentima kao pojedincima ponuđena mogućnost da dodaju osobit identitet svojem učenju, dok u isto vrijeme unaprjeđuju svoje suradničke vještine.

Karasavvidis (2010b) tvrdi da wikiji posjeduju najviši potencijal u odnosu na sve 2.0 alate za e-učenje, između ostalog, zbog njihovih sljedećih karakteristika:

– za njihovu upotrebu nisu potrebni nikakvi posebni operativni sustavi ni softver; dovoljan je uobičajeni internetski preglednik,
– potrebna je razmjerno niska razina vještina za kreiranje wiki sadržaja te njihovo manipuliranje,
– wikiji obuhvaćaju funkcije poput praćenja promjena (engl. track changes), usporedbe različitih inačica, povratka baze podataka na prethodno stanje (engl. rollback), zaštite stranice, upotrebe multimedije itd.,
– wikiji nude mogućnost suradničke izrade poveznica, pri čemu korisnik, zbog nedostatka (stroge) hijerarhijske strukture, ima veliku slobodu s obzirom na poveznice koje može odabrati i pratiti,
– wikiji omogućuju individualan rad, suradnju, komunikaciju i vrednovanje,
– wikiji potiču nekoliko vrsta obrazovnih aktivnosti, uključujući zajedničko učenje, zajedničku izradu baza podataka, unaprjeđenje interakcije među studentima, internetsko poučavanje i evaluaciju, suradničko pisanje i izradu materijala, izradu wiki knjige ili wiki priručnika itd.

Wikiji se također mogu koristiti za oluju ideja (engl. *brainstorming*), skupne projekte, sastanke za pružanje podrške, izradu različitih popisa (npr. glosara ili popisa

pojmova), pripremu odgovora na najčešće postavljana pitanja, izradu mjesta za pohranu važnih dokumenata, izradu zbirki poveznica (društveno označavanje), izradu skupnih portfolija (Sveučilište u Delawareu, 2008), za objavljivanje vodiča za pripremu domaćih uradaka/nastavnih materijala, vršnjačkoga recenziranja i davanja povratnih informacija (Shelly, Gunter, i Gunter, 2012) itd. U svemu tome wikiji studentima nude prostorno i vremenski bezuvjetne sposobnosti pristupa i doprinosa sadržajima wikija, omogućujući svakome studentu rad tempom koji mu najbolje odgovara.

Iskustva s uvođenjem wikija u sveučilišni proces poučavanja

Cilj uvođenja wikija u sveučilišni proces poučavanja jest postizanje intenzivnije interakcije među studentima (u odnosu na klasična predavanja), vršnjačke (P2P) suradnje, naglašavanje studijskoga programa čije se žarište pomiče s predavača na studenta i to generiranjem znanja u čemu studenti osobno sudjeluju s pomoću raspoloživih (većinom besplatnih) digitalnih izvora (no ne samo njih). Takav poredak također mijenja primarne ciljeve učenja: vještine memoriranja i stjecanja činjeničnoga znanja zamijenjene su kritičkim promišljanjem, donošenjem odluka, sintezom i integracijom znanja i vještina (Lin, Sajjapanroj, i Bonk, 2011, str. 327-328). Iako se očekivalo da će prihvaćanje wiki tehnologija donijeti pozitivne kvalitativne promjene u sveučilišno obrazovanje, ta očekivanja dosad nisu u potpunosti ispunjena. To su potvrdili rezultati odabranih istraživanja koje sažeto predstavljamo u daljnjem tekstu. Sva istraživanja (Rick i Guzdial, 2006; Elgort, Smith, i Toland, 2008; Ma i Yuen, 2008; Ravid, Yorad, i Sheizaf, 2008; Wheeler, Yeomans, i Wheeler, 2008; Cole, 2009; Wheeler i Wheeler, 2009; Karasavvidis, 2010a) potvrdila su da izrada wikija zahtijeva značajne napore studenata i profesora. Kao pozitivne učinke uvođenja wikija u sveučilišnu nastavu navedene studije ističu sljedeće:

- studenti su pokazali povećanu motivaciju za izradom visokokvalitetnog sadržaja jer su bili svjesni da će njihov rad biti izložen u javnosti (makar se termin „javnost" odnosio samo na skupinu studenata koja je načinila wiki),
- proces izrade wikija imao je stimulirajući učinak na skupni rad, suradnju i razmjenu znanja;
- nagrađivanje ispravljanja grešaka drugih studenata bodovima, tj. bodovima za aktivnost potaknulo je studente na čitanje dijelova wikija koje inače ne bi čitali,
- posljedica izrade wikija bilo je bolje predmetno znanje,
- profesori su postigli bliskiju suradnju s pojedinačnim studentima i grupom u cjelini,
- studenti su postali svjesni odgovornosti koju je nosila odluka o tome što uključiti u wiki, a što ne,
- studenti koji su sudjelovali u izradi wiki sadržaja postigli su bolje rezultate na ispitu.

No istraživanja (Rick i Guzdial, 2006; Elgort, Smith, i Toland, 2008; Ma i Yuen, 2008; Ravid, Yorad, i Sheizaf, 2008; Wheeler, Yeomans, i Wheeler, 2008; Cole, 2009; Wheeler

i Wheeler, 2009; Karasavvidis, 2010a) također nedvojbeno ističu veći broj problema nego pozitivnih iskustava s upotrebom wikija u nastavi. Karasivvidis (2010a) zauzima zanimljiv stav te promatra wikije u svjetlu uvođenja inovacija u postojeći rutinski sustav i tvrdi da on uzrokuje konfliktne situacije, trzavice, nesuglasice i nedosljednosti. Karasivvidis (2010a) tvrdi da je wiki uznemirio uobičajen, tradicionalan tijek studentskih procesa i aktivnosti i tako stvorio napetost. Kako bi se definirali modeli za uvođenje wikija u sveučilišne kolegije, na sljedeći su način grupirani najistaknutiji problemi vezani uz taj postupak:

P1 – motivacija i trud studenata

P-1.1 Studenti su radije prihvatili nižu ocjenu nego se koristili wiki sustavom i surađivali putem interneta.

P-1.2 Samo je razmjerno malen broj studenata dao značajan doprinos izradi wiki sadržaja, a većina je studenata uložila znatno manje truda. Nakon nekog vremena više nije bilo novih priloga na wikiju.

P-1.3 O wiki sustavu razvile su se živahne rasprave u razredu, ali ne i na mreži.

P2 – Obuka u korištenju wiki sustavima

P-2.1 Primijećena je frustracija studenata uzrokovana nedostatkom dovoljne razine vještina potrebnih za korištenje wiki sustavima.

P3 – Organizacija

P-3.1 Često je bilo teško koordinirati različite aktivnosti.

P-3.2 Rokovi nisu poštivani.

P4 – Samopouzdanje studenata, nesigurnost i oklijevanje

P-4.1 Studenti su bili skeptični u vezi s interpretacijom pojedinih koncepata. Studenti su navikli učiti iz „autoritativnih" izvora koje im preporučuju njihovi profesori pa materijale prikupljene izradom wiki izvora nisu smatrali vrijednima.

P-4.2 Studenti nisu bili voljni koristiti se wikijima kao izvorima informacija za pripremu ispita.

P-4.3 Studenti su nevoljko ispravljali i nadograđivali sadržaje koje su pripremili njihovi vršnjaci.

P5 – Vrednovanje

P-5.1 Studenti su bili skeptični s obzirom na pravednost vrednovanja truda uloženoga u izradu wikija.

P-5.2 Studenti su se brinuli za to da bi svaka greška, nejasna rečenica ili nedosljednost u njihovim sadržajima mogla imati negativan učinak na njihovu završnu ocjenu.

P-5.3 Studenti su neke teme smatrali lakšima, a neke težima. Lakše teme bile su one koje su poučavane tijekom predavanja, a teže one koje nisu razjašnjene na predavanjima pa je njihova obrada zahtijevala opširno istraživanje i prikupljanje sadržaja.

P-5.4 Studenti su željeli zaštititi svoje zamisli (dijelove wikija na kojima su radili) kao svoje intelektualno vlasništvo, a u isto su vrijeme zanemarivali doprinos svojih kolega.

P-5.5 Studenti su smatrali da bi postigli bolje završne rezultate da su radili samostalno, odnosno da nisu radili u timu.

P-5.6 Studenti su bili spremni preuzeti odgovornost za svoj dio priloga, ali ne i za priloge svojih kolega te je tako znatan broj studenata zatražio da ispitno pitanje bude utemeljeno na sadržajima koje su baš oni sastavili, a ne na sadržajima njihovih vršnjaka.

P6 – Javna dostupnost sadržaja wikija

P-6.1 Studenti su osjećali nelagodu zbog toga što su njihovi tekstovi bili javno dostupni na wikijima (javna dostupnost sadržaja također je bila motivirajući čimbenik).

P-6.2 Plagijat: kopiranje i lijepljenje sadržaja (engl. *copy-paste*) korišteno je kao uobičajena tehnika „popunjavanja" wikija. Površno napisani sadržaji pretežno su bili rezultat strategije kopiranja i lijepljenja te su tako nastali tekstovi bili znatno duži u odnosu na sadržaje koji su dublje zadirali u zadanu problematiku i zahtijevali su više rada.

Istraživanje

Na temelju prikazanih karakteristika net generacije, obrazovnih potencijala wikija i proučenih pozitivnih i negativnih iskustava u njihovoj primjeni na sveučilištu, izrađen je internetski upitnik koji se sastojao od tri dijela. Prvi je dio, između ostalog, sadržavao pitanja o prosjeku ocjena studenata, njihovim navikama u korištenju računalom i internetom, kao i opremom koju imaju i kojom se koriste za pristup sadržajima na internetu. Pitanja i odgovori u ovome dijelu bili su sazdani tako da ih se može usporediti s podatcima Ureda za statistiku Republike Srbije. U drugome dijelu istraživanja ispitanici su trebali izraziti svoj stav o Wikipediji, kao najboljem primjeru wikija, jer će im ona poslužiti kao model za izradu studentskih wikija (Lim, 2009; Deters, Cuthrell, i Stapleton, 2010; Head i Eisenberg, 2010). Treći i najvažniji dio upitnika bio je usmjeren na mišljenja studenata o izradi studentskih wikija.

Upitnik je poslan na adrese 216 studenata koji su odabrani metodom slučajnog uzorkovanja. Odazvala su se 162 studenta (75%); 90 (55,56%) muškaraca i 72 (44,44%) žene. Struktura ispitanika prema njihovim prosječnim ocjenama prikazana je na Slici 2. Jasno se vidi da je distribucija podataka normalna.

Slika 2.

Rezultati

R-1 Računalom i internetom svakodnevno ili gotovo svakodnevno koristi se 100% ispitanika (nijedan ispitanik nije rekao da se rjeđe koristi računalom). Navedeni su podatci očekivani s obzirom na to da se 99,5% studentske populacije na nacionalnoj

razini koristi računalima te da se isti postotak studenata koristi internetom (Zavod za statistiku Republike Srbije, 2011).

Postotak pojedinačnih tipova uređaja kojima se ispitanici koriste kako bi pristupili internetu prikazan je na Slici 3. Na temelju prikazanih podataka možemo zaključiti da visok postotak ispitivane studentske populacije koristi nekoliko tipova uređaja za pristup internetu: samo 17,5% ispitanika koristi se osobnim računalom ili laptopom, a ostali se koriste drugim uređajima. Čak 81,25% ispitanika se za pristup internetu služi, između ostalog, pametnim mobitelima. Tako je potvrđena pretpostavka o tome da studenti imaju mogućnost internetskog pristupa s pomoću osobnih računala, laptopa i pametnih mobitela.

Slika 3.

R-2 Kako smo i očekivali 100% ispitanika se koristi Wikipedijom. Većina njih (čak 60,49%) njome se koristi svakodnevno ili tjedno (Slika 4). Međutim, postotak aktivnih korisnika Wikipedije znatno je manji: samo je 12,35% ispitanika sudjelovalo u izradi ili izmjeni njezinih sadržaja.

Slika 4.

Studenti su karakteristike Wikipedije ocijenili ocjenama na skali od 1 do 5 (1 = najmanja ocjena; 5 = najviša ocjena). Wikipedijin navigacijski sustav ocijenili su ocjenom 4,09, njezin izgled ocjenom 3,50, a upotrebljivost ocjenom 4,05. Ispitanici su trebali izraziti svoje slaganje s nekoliko izjava o Wikipediji na skali od 0% do 100%. Rezultati su prikazani u Tablici 1.

Tablica 1.

R-3 Usprkos dosta čestoj upotrebi Wikipedije, čak jedna trećina ispitanika ne koristi se Wikipedijinim sadržajima za pripremu ispita, a 12,35% ispitanika nije se izjasnilo o tome koriste li se Wikipedijom za pripremu ispita (Slika 5).

Slika 5.

Može se reći da ispitanici koji se koriste Wikipedijom za pripremu ispita nemaju jasan stav o njezinoj korisnosti u navedene svrhe: izrazili su 49,05% slaganja i 50,95% neslaganja s izjavom da je Wikipedija korisna za pripremu ispita (gdje 0% označava potpuno neslaganje, a 100% potpuno slaganje).

R-4 Čestotnost uspoređivanja podataka iz Wikipedije s alternativnim izvorima informacija prikazana je na slici 6, gdje se vidi da manje od 10% ispitanika ne provjerava informacije koje nalazi na Wikipediji, nešto manje od 12% nema o tome mišljenje ili nije odgovorilo na pitanje, a da čak 62,96% ispitanika ponekad provjerava informacije koje pronađe na Wikipediji; 14,18% ispitanika to čini često.

Studenti koji provjeravaju informacije koje nalaze na Wikipediji ocijenili su njihovu točnost, korisnost i recentnost. Ti su podatci prikazani u Tablici 2.

Slika 6.

Tablica 2.

R-5 U posljednjem dijelu upitnika studenti su izrazili svoje stavove o zamisli da po uzoru na Wikipediju sa svojim kolegama izrade wiki na određenu temu i to u okviru predavanja i seminara, a u suradnji s profesorima, suradnicima i studentima. Studentima se najviše svidjela zamisao o izradi wikija u okviru redovitih predavanja i seminara pa je ta zamisao ocijenjena prosječnom ocjenom 4,40 na skali od 1 do 5 (1 = najniža ocjena; 5 = najviša ocjena). Sličnim su ocjenama ocijenjene i zamisli da sadržaji wikija koji su izradili studenti trebaju biti dijelom ispitnih pitanja (prosječna ocjena 4,35) i da aktivnosti vezane uz izradu studentskog wikija trebaju dobiti dodatne bodove pri izračunavanju konačne ocjene (prosječna ocjena 4,16).

Zamisao da bi svaki student trebao sudjelovati u izradi studentskog wikija nije bila tako dobro prihvaćena te je dobila ocjenu 2,77. Ista je prosječna ocjena dodijeljena zamisli da bi wiki koji izrade studenti trebao biti dostupan široj publici te je zamisao da bi sadržaji studentskog wikija trebali biti dostupni samo na studentskoj zatvorenoj mreži kojoj bi se pristupalo s pomoću korisničkog imena i zaporke ocijenjena nešto višom ocjenom (3,79).

U odgovoru na pitanje koje se tiče recenziranja (pregledavanja) sadržaja studentskoga wikija svi su studenti izrazili želju da profesor bude taj koji će pregledavati sadržaje koje su pripremili studenti (prosječna ocjena 4,37), a zamisao da bi profesoru pri pregledavanju sadržaja trebali pomoći odabrani studenti ocijenjena je samo malo nižom ocjenom (prosječna ocjena 4,03). Zamisao da bi sadržaje trebali pregledavati sami studenti, bez pomoći profesora, dočekana je bez entuzijazma, s prosječnom ocjenom 2,66. Definiranje i primjena strogih pravila navođenja izvora materijala koje studenti objavljuju na svojem wikiju (tj. referiranje na izvore) ocijenjena je prosječnom ocjenom 4,17. Prosječne ocjene navedenih zamisli prikazane su na Slici 7.

Slika 7.

R-6 Posebna je pažnja posvećena mišljenjima ispitanika o ocjenjivanju aktivnosti izrade studentskoga wikija. Kao što je prikazano na Slici 8, zamisao da bi sudjelovanje u izradi wikija trebalo biti obvezno za sve studente, dočekana je s puno manje entuzijazma (prosječna ocjena 2,77) od većine drugih zamisli. No kad je studentima ponuđeno da odaberu žele li ne sudjelovati u izradi wikija te dobiti nižu konačnu ocjenu ili žele sudjelovati u izradi wikija za višu završnu ocjenu, većina ih se odlučila sudjelovati u izradi wikija. Točnije, tek nešto manje od 5% ispitanika bilo je spremno prihvatiti nižu ocjenu i ne sudjelovati u izradi studentskoga wikija. Neodlučnih studenata bilo je nešto manje od 15%, a čak je 70% ispitanika izrazilo spremnost na sudjelovanje u izradi studentskog wikija kako bi zaradili višu ocjenu na ispitu. U kategoriju „ostalo" (11,11% odgovora) uvršteni su odgovori poput „ovisi o ostalim obvezama", „ovisi o temi izrade wikija", „ovisi o vremenu koje bih imao/imala na raspolaganju", „ovisi o tome s kojim bih profesorima trebao/trebala surađivati" itd. (Slika 8).

R-7 Kad su zamoljeni da izraze svoje mišljenje o radu u skupini i ocjenjivanju rada studenata, ispitanici su dali odgovore prikazane na Slici 9. Gotovo polovina ispitanika (46,91%) prihvatila bi ocjenu dodijeljenu njihovoj skupini. Nešto više od trećine ispitanika (35,80%) preferira individualni rad pa svoju ocjenu žele zaraditi isključivo na temelju samo svojih aktivnosti, a nešto više od 12% studenata nema mišljenje o tom pitanju. Opcija „ostalo" uključuje mišljenja kojima se izražava spremnost na prihvaćanje zajedničke ocjene samo ako bi se radna skupina sastojala od 2 ili 3 člana, zamisli o uvođenju mogućnosti eliminacije za članove skupine koji ne ulažu dovoljno truda i ne doprinose dovoljno itd.

R-8 U skladu s očekivanjima studenti s nižim prosjekom ocjena radije su birali rad u skupini i prihvaćanje zajedničke ocjene za sve članove skupine, a studenti s višim prosjekom ocjena preferirali su ocjenjivanje utemeljeno na individualnom radu (Slika 10). Točnije, svi ispitanici s prosjekom ocjena nižim od 7,00 (10,00 je najviši mogući prosjek) izabrali su zajedničku ocjenu, studenti s prosjekom ocjena od 7,00 do 7,99 preferirali su kolektivnu ocjenu u 62,5% slučajeva, 45% studenata s prosjekom od 8,00 do 8,99 i 20% studenata s prosjekom 9,00 do 10,00 odabralo kolektivnu ocjenu.

Slika 8., 9. i 10.

R-9 Sličan uzorak rezultata pronađen je i u mišljenjima ispitanika o tome bi li uz sadržaje kojima se „pune" studentski wikiji trebala stajati puna imena studenata ili njihovi nadimci (u tom bi slučaju profesor znao njihove identitete). 16,05% ispitanika nije imalo mišljenje o navedenome pitanju, 32,28% ispitanika odabralo bi nadimke, a 45,68% bi željelo da se prikažu njihova puna imena. Očekivano, anonimnost su odabrali studenti slabijeg akademskog uspjeha, a bolji su studenti češće birali objavu punih imena (Slika 11).

Slika 11.

Wiki implementacijski model

Kolegij iz Inovacijskog menadžmenta slušaju dvije skupine studenata na dvije lokacije, u Subotici i u Novom Sadu. Tijekom semestra studenti trebaju napisati seminarski rad na zadanu temu. Na kraju semestra studenti polažu ispit koji je utemeljen na gradivu sadržanom u priručniku.

Umjesto da piše spomenuti obvezni seminarski rad, odabrana skupina studenata (testna skupina) radit će na wiki sustavu; točnije, materijali koje bi studenti inače predali u pisanom obliku, kao seminarske radove, bit će uneseni u wiki sustav. Druga skupina studenata (kontrolna skupina) pisat će klasične seminarske radove, kao što su to radile prethodne generacije studenata. Rad testne i kontrolne skupine usporedit će se na završnom ispitu na kraju semestra. Sadržaji wikija neće biti predmetom istraživanja, već će se gledati rezultati kontrolne i testne skupine na završnom ispitu.

Uvođenje wikija u proces poučavanja počiva na materijalnim i tehničkim temeljima, kao što pokazuju rezultati ovoga istraživanja (R-1, R-3); 100% ispitanika koristi se

računalom i internetom, 100% ih se koristi Wikipedijom, a sama zamisao da se u proces poučavanja uvede wiki sustav ocijenjena je visokom ocjenom 4,40 od moguće ocjene 5,00 (R-5).

Izrada wikija u okviru kolegija Inovacijskoga menadžmenta ime sljedeće ciljeve:

- studentima omogućiti stjecanje (ili unapređivanje) vještina u korištenju Web 2.0 tehnologija, tj. vještina izrade informacijske infrastrukture s pomoću wiki sustava, čime će steći natjecateljsku prednost pri zapošljavanju i pripremit će se za obavljanje aktivnosti cjeloživotnoga obrazovanja,
- upotrijebiti wiki sustav kako studenti ne bi bili ograničeni na ulogu primatelja znanja, već kako bi postali partneri u stvaranju, uređivanju i dijeljenju sadržaja svoga obrazovanja. Time će se potaknuti kultura sudjelovanja i dijeljenja u zajednici koja uči te će studenti imati vodeću ulogu u svojem učenju tako što će biti odgovorni za pronalaženje potrebnoga sadržaja,
- što je više moguće dopuniti postojeće tradicionalne načine učenja (Slika 1) novim pristupima poučavanju i učenju pa na taj način što je više moguće približiti proces poučavanja očekivanjima net generacije,
- praktičnim radom na wikijima steći bolje razumijevanje poučavanih kolegija,
- na temelju završnih ispitnih rezultata testne i kontrolne skupine steći uvid u utjecaj izrade wiki sustava na bolje razumijevanje sadržaja.

Imajući u vidu probleme na koje su uputili rezultati prethodnih istraživanja te uzimajući u obzir mišljenja i stavove studenata koje su prikupili autori ovoga rada, izradi wikija pristupit će se na sljedeći način:

- Sudjelovanje u izradi wikija na odabranoj lokaciji bit će obvezno za sve studente (P-1.1, P-1.2). Rezultati ovdje prikazanog istraživanja pokazali su da, usprkos tome što je zamisao da sudjelovanje u izradi wikija bude obvezno za svakog studenta ocijenjena relativno niskom ocjenom (2,77 od mogućih 5,00), više od 80% ispitanih studenata ipak bi pristalo sudjelovati u izradi wikija (oko 11% njih uvjetno) za višu završnu ocjenu (R-5, R-6).
- Na početku semestra studente će se detaljno informirati o tehnikama upotrebe wiki sustava putem ozbiljne obuke u obavljanju svih wiki aktivnosti: pisanja, uređivanja i recenzije sadržaja. Putem unaprijed pripremljenih primjera studenti će dobiti detaljne upute o wiki sustavu, pravilima pravopisa, gramatike i formatiranja, preporučenim i neprihvatljivim stilovima pisanja i pravilima poželjnoga ponašanja u internetskoj zajednici (engl. netiquette) (P-2.1).
- Navedene su aktivnosti potrebne i zbog toga što se pokazalo da je samo 12,35% studenata koji su sudjelovali u ovome istraživanju prethodno sudjelovalo u izradi ili mijenjanju sadržaja Wikipedije (R-2).
- Unaprijed će se izraditi popis naslova poglavlja i tako utvrditi struktura wiki sadržaja te će studentima biti dodijeljene njihove teme sa svrhom postizanja ujednačene kompleksnosti zadanih sadržaja (P-5.3). Zadane teme predstavljat će ekstenzije već postojećih sadržaja koji se nalaze u priručniku koji studentima služi

za kolegij. Svaki će student dobiti zasebnu temu. Iako prosječan stav studenata pokazuje volju za radom u skupini i prihvaćanje zajedničke ocjene (R-7, R-8), detaljnim pregledom podataka pokazalo se da postoji značajna korelacija između stupnja prihvaćanja rada u skupini, tj. prihvaćanja kolektivne ocjene i prosjeka ocjena studenata koji su sudjelovali u istraživanju. Osim toga, autori ovoga rada imali su na umu u uvodu spomenut opis net generacije koji donosi Hubschmid (2012), a prema kojemu je to generacija koja se ističe svojim individualizmom i narcisoidnošću. Ipak, rad u skupini i suradnja neće biti zanemarene jer će se organizirati sastanci provjere stadija rada na kojima će se također provoditi oluje ideja i studentima će biti omogućeno da izraze svoje primjedbe na rad vršnjaka i cijele skupine, na što će ih se sustavno poticati.

– Svjesni smo toga da je kopiranje i lijepljenje sadržaja neizbježno pa će se wiki sadržaje provjeravati s pomoću internetskog alata za pronalaženje plagijata. Osobita pozornost posvetit će se načinu navođenja korištenih izvora (P-6.2) i stalnim provjerama koje će obavljati profesor na kolegiju. Rezultati ovoga istraživanja (R-5) pokazuju da su zamisli prema kojima treba primjenjivati stroga pravila navođenja izvora ocijenjene najvišim ocjenama (4,17 od najviše moguće ocjene 5,00) i da profesor treba imati dominantnu ulogu u pregledavanju i procjeni sadržaja koje studenti unose u wikije (ocijenjeno ocjenom 4,73 od najviše moguće ocjene 5,00).
– Studentski će wiki biti zatvorenoga tipa (Slika 12) kako bi se ublažila nelagoda koju studenti osjećaju zbog javne dostupnosti njihovih tekstova (iako je ovo već spomenuto kao pozitivan, motivirajući čimbenik). Provedeno je istraživanje (R-5) pokazalo da zamisao o tome da se wiki učini dostupnim široj javnosti nije naišla na visoku razinu studentskog odobravanja te je ocijenjena ocjenom 2,77 od mogućih 5,00. Bolje je prihvaćena zamisao da wiki treba biti dostupan samo registriranim korisnicima na fakultetskoj zatvorenoj unutarnjoj mreži (engl. intranet). Ta je zamisao ocijenjena ocjenom 3,79 od moguće ocjene 5,00.
– Studenti će aktivnosti na wikiju obavljati pod svojim punim imenom radije nego pod nadimkom. Rad svakog studenta vrednovat će se na wikiju (R-7, R-8) na isti način na koji se studentski rad vrednuje kad pišu seminarske radove. To je u skladu sa stavovima ispitanih studenata od kojih se 38,27% radije koristi nadimcima, a 45,68% ih želi da im se imena jasno navedu. Anonimnost preferiraju studenti sa slabijim akademskim uspjehom, a bolji studenti žele da se navede njihovo puno ime.

Slika 12.

– Na završnom ispitu neće se testirati Wiki sadržaji, već samo znanje tekstova iz priručnika kojima se studenti koriste u kolegiju Inovacijski menadžment (P-4.1, P-4.2, P-5.5, P-5.6). Rad na wikiju vrednovat će se i ocijeniti na način na koji bi se ocijenio seminarski rad. Iako su ispitanici visoko ocijenili zamisao o tome da bi sadržaji studentskoga wikija također trebali imati svoje mjesto u ispitnim pitanjima (4.25 od mogućih 5.00) (R-5), pri definiciji modela zaključeno je da bi to

zahtijevalo iskustvo i analizu kvalitete tekstova koje bi pripremila prva generacija studenata.
– Naglasak će također biti na procesu izrade wikija i sadržaju, tj. na sudjelovanju u radu i prezentaciji toga rada. S tim ciljem organizirat će se sastanci provjere stadija rada na kojima će se također provoditi oluje ideja, a sa svrhom rasprave o izradi wiki sustava i o problemima koji nastaju u različitim fazama toga procesa. Na tim će se sastancima studenti poticati na iznošenje komentara, prigovora i prijedloga u vezi s radom njihovih vršnjaka, a s ciljem stavljanja kontrole u ruke studenta (P-1.3, P-3.1, P-3.2, P-4.3). S obzirom na to da 77,77% ispitanika na neki način provjerava informacije koje pronađu na Wikipediji (R-4), studenti se stečenim navikama i vještinama u vezi s kontrolom sadržaja Wikipedije mogu koristiti i za provjeru sadržaja koje objavljuju njihovi vršnjaci.
– Završne ocjene dodijeljene za wiki aktivnosti bit će iznesene na posljednjem sastanku provjere stadija rada i provođenja oluje ideja na kojemu će svaki student moći izraziti svoje mišljenje o radu na wiki sustavu (P-5.1, P-5.2).
– Izradit će se glosar pojmova, a indeks korištenih izvora klasificirat će se prema tipu kojemu pripadaju: internetske stranice, knjige, članci, video i audio snimke itd. te će individualni doprinos svakoga studenta biti ocijenjen posebno (P-5.1).
– Tako razvijen wiki bit će dostupan sljedećoj generaciji studenata, a najbolji tekstovi studentskoga wikija bit će stavljeni na Wikipediju (P-6.1).

Implementacija wikija obuhvaćat će devet aktivnosti. Hodogram, voditelji i izvođači navedenih aktivnosti prikazani su na Slici 13.

Slika 13.

Zaključak

Sveučilišta bi trebala uložiti značajan napor kako bi obrazovanje približila net generaciji, kojoj pripadaju i trenutni studenti, a koji na fakultet dolaze s prirodno i instinktivno razvijenim vještinama višezadaćnosti, interaktivnosti, umrežavanja, skupnoga rada i upotrebe suradničkih okolina.

Uvođenje wikija u nastavni proces moglo bi predstavljati prijelomni trenutak u primjeni novih načina učenja u višem obrazovanju koji bi se koristili pozitivnim karakteristikama net generacije. Trenutna iskustva vezana uz uvođenje wikija u nastavni proces upozoravaju nas da je to težak korak koji otvara vrata mnogim problemima. U ovome su članku ti problemi ususstavljeni i svrstani u pripadajuće skupine i taj je popis upotrijebljen kao temelj za provođenje upitnika putem interneta koji je poslan potencijalnim polaznicima kolegija Inovacijski menadžment na Ekonomskom fakultetu iz Subotice, Sveučilišta u Novom Sadu. Osim mišljenja ispitanika o uvođenju Wikipedije u proces sveučilišne nastave ovo je istraživanje pružilo uvid u neke njihove navike vezane uz upotrebu računala, interneta i Wikipedije. Na temelju zamijećenih problema i prikupljenih mišljenja ispitanika definiran je model za implementaciju wikija u okviru procesa poučavanja.

Iskustva koja ćemo steći implementacijom definiranoga modela i rezultate koje ćemo postići usporedbom rezultata kontrolne i testne skupine trebalo bi upotrijebiti s namjerom postavljanja granica i daljnjih unaprjeđenja predloženoga modela. To se prije svega odnosi na suradnju u izradi wiki sadržaja koja je trenutno svedena na rasprave tijekom sastanaka provjere stadija rada i provođenja oluje ideja umjesto da joj je posvećena primjerena pažnja. Razlog je tomu nedostatak potrebnoga praktičnog iskustva.