

Comparing 'Ex-Cathedra' and IT-Supported Teaching Methods and Techniques: Policy of Teaching Practice

Marina Dobrota and Slađana Benković
Faculty of Organizational Sciences, University of Belgrade

Abstract

Teaching at higher education institutions in Serbia still relies on traditional 'ex-cathedra' methods and is mostly based on acquiring factual knowledge, which discourages student participation in the learning process, as well as any initiative on their part. The aim of the paper is to point to the implementation of the traditional 'ex-cathedra' versus the use of IT-supported teaching methods and techniques. The underlying idea is that professors' abilities depend on their familiarity with different teaching methods and techniques, their knowledge of a foreign language, and the use of ICT. The data analysis has confirmed that teachers do differ from each other with respect to their academic titles: senior teachers (associate and full professors) use traditional methods more frequently than younger teachers do. In general, all teachers should incorporate modern trends into their teaching styles, since traditional teaching methods and techniques are used more often than IT-supported ones.

Key words: *IT-supported teaching; teaching methods; teaching techniques; traditional 'ex-cathedra' teaching; universities in Serbia.*

Introduction

Many studies report that students' academic success depends on their teachers (Lofstrom et al., 2010; Šašić & Sorić, 2010; Tot, 2010; Harris & Sass, 2011; Stronge, Ward, & Grant, 2011; Rockoff et al., 2011). However, it is not easy to point out the specific qualities that a teacher needs to possess in order for those to be reflected on students' results (Hanushek, 2011). It is relatively simple to define the knowledge that

a teacher should possess in a field or a subject, but his qualities depend on the teacher himself, i.e. his readiness to actively follow and participate in the learning and the implementation of modern educational methods and techniques (Avalos, Tellez, & Navarro, 2010; Puljić, 2010; Pantić & Wubbels, 2010; Maitles, 2010).

Tatto (2006) claims that the influence of educational reforms on teaching staff and their work is the result of global changes, cultural and social influence of the environment that teachers work in, as well as the higher education institutions where the teachers learn and work. Therefore, the introduction of standards into the learning process is especially important and represents an integral part of a quality education system. Apart from that, it provides a clear view on many advantages and positive aspects (Van Maele & Van Houtte, 2010), as well as shortcomings of education. The introduction of standards is therefore the subject of numerous studies (Cosser, 2011; White, Fox, & Isenberg, 2011; Cho, 2012).

Many technological developments have been adapted to education so far (Dogan, 2010). Serbia is working hard to adopt and implement the European Union (EU) educational standards, with the goal of joining the common European education area (Srđić & Cvjetičanin, 2012). Kogan (2011) points to the fact that Serbia is one of the last countries in Southeast Europe to go through the economic and social transformation. The discrepancy between Serbia and the EU countries is evident in that matter.

In Serbia, students' learning process still relies on the traditional '*ex-cathedra*' methods, which treat the teacher as someone who passes knowledge, with clearly defined ways of learning – testing – and student evaluation. The learning and teaching process in Serbia is still mostly based on acquiring factual knowledge, which discourages student participation in the learning process, as well as any initiative on their part (Klenha et al., 2010). It is very important to point out the necessity of implementation of information and communication technologies (ICT) in the teaching process (Tezci, 2011; Horvat et al., 2013b) and to investigate where Serbia stands in this matter (Benković & Dobrota, 2012; Kabok, 2013).

The aim of the paper is to point to the education methods and techniques used by university professors in Serbia, i.e. the presence of implementation of the traditional '*ex-cathedra*' teaching methods and techniques versus the use of information technologies supported (IT-supported) teaching methods and techniques at universities in Serbia.

The subsequent part of the paper is organized as follows. The next chapter gives a detailed overview of the problem and after that, the research sample and the research methodology are given. Results are presented in the chapter that follows, and finally, certain premises and suggestions are proposed.

Problem Definition

The research goal was to make an overall comparison of '*ex-cathedra*' and IT-supported methods and techniques, used at higher education institutions in Serbia. Our initial hypotheses were concerned with the '*ex-cathedra*' methods and techniques. We subsequently formed the hypotheses concerning IT-supported methods and

techniques, in order to verify whether there would be any statistical differences between the teachers who possessed the characteristics examined by the survey (see section *Sample Description and Research Methodology*), concerning 'ex-cathedra' and IT-supported methods and techniques. Finally, we directly compared the 'ex-cathedra' and IT-supported methods and techniques.

Hypothesis 1: *The difference between teachers with various academic titles, in the use of traditional teaching methods and techniques, is statistically significant.*

Hypothesis 2: *There is no statistically significant difference between teachers from various science fields in the use of traditional teaching methods and techniques.*

In the course of the research, we firstly noted that teachers with higher academic titles used traditional teaching methods more often than the teachers with lower academic titles. Teachers with higher academic titles still held on to traditional 'ex-cathedra' teaching methods. We formed the variable *Traditional methods and techniques*, based on the data collected in this research (see section *Sample Description and Research Methodology*). Secondly, it was noted that all fields of science used traditional teaching methods and techniques equally.

Hypothesis 3: *The difference among teachers from various universities in Serbia, in the use of IT-supported teaching methods and techniques, is statistically significant.*

Hypothesis 4: *The difference among teachers from various science fields, in the use of IT-supported teaching methods and techniques, is statistically significant.*

In order to test these hypotheses, we formed a scale *IT-supported methods and techniques* (see section *Sample Description and Research Methodology*). Differences were found in the use of IT-supported teaching methods and techniques between Serbian universities. We also noted that teachers from the field of technical sciences used IT-supported teaching methods and techniques more often than the teachers from the field of humanities.

Hypothesis 5: *The difference in the use of 'ex-cathedra' and IT-supported methods and techniques is statistically significant.* In other words, teachers generally still hold on to traditional 'ex-cathedra' teaching methods and techniques.

The contribution of the research is reflected in the possibility to view the current situation in Serbia in relation to the computer literacy of the teachers, as well as in the willingness of the academic staff employed at state universities in Serbia to implement modern teaching methods and techniques, i.e. to facilitate the improvement of students' learning process.

Sample Description and Research Methodology

Subjects and Sample Characteristics

The research within this paper involved the biggest state universities in Serbia, i.e. the University of Novi Sad, University of Belgrade, University of Kragujevac and University of Niš. The conducted survey was anonymous. Teachers from

higher education institutions in Serbia participated in the research. We sent out 200 questionnaires. The collected sample was 153, which represents a response rate of 76.5%. There were 55.56% subjects from the University of Belgrade, 19.61% from the University of Novi Sad, 14.38% from Kragujevac, while 10.45% of the subjects were from the University of Niš.

The duration of the employment of the subjects at higher education institutions was between half a year to 40 years of service, $M=12.16$, $SD=9.51$. The structural makeup of the participating teachers according to their academic titles was the following: 52.94% of teaching assistants, 24.84% of assistant professors, 11.11% of associate professors and 11.11% of full professors. It can easily be noted that the assistants and assistant professors responded to the questionnaire in much greater numbers. Social sciences made up the majority of the sample (60.78%), while there were 15.69% of technical sciences, 17.65% of medical sciences and 5.88% of natural sciences.

Instruments

The questionnaire used in the research consisted of two parts. The first part addressed the demographic data and included data on university, faculty, department, research area, academic title, as well as the length of each participant's employment at the university. It also provided information on current scientific degree of the test subjects, as well as the number of subjects and the number of students they teach.

The second part of the questionnaire comprised questions about the frequency of use of some methods and techniques in teaching. The methods referred to lectures, seminar papers, workshops, case studies, field research, simulation, service learning, distance learning, team projects, group projects, research projects. The techniques referred to the use of PowerPoint presentations, overhead transparencies and overhead projector, markers and board, flip-chart. The subjects were also asked about the implementation of alternative methods and techniques used to stimulate students' interest in the subject matter, considering guest professors from other departments/faculties/universities, students' critical opinion, creation of portfolios, collaborative learning.

In order to test the initial assumptions, we created two variables (Dobrota, Jeremić, & Marković, 2012; Horvat et al., 2013a):

IT-supported teaching methods and techniques – includes simulation, distance learning, research project, and PowerPoint presentation. These methods and techniques are IT-supported and are a base for a computer literate teacher. Such a teacher is more capable of transferring knowledge to students, since it is easier for him to implement modern methods and techniques, which are present at the leading universities in the world. In addition, such a teacher constantly communicates with students, since his availability to the students is not limited by time or place.

Traditional teaching methods and techniques – includes lectures, seminar papers, workshops, case study, and board and markers. These 'ex-cathedra' methods and techniques are traditional and require the teacher to stand 'behind his desk' while teaching.

Both variables were formed using a five-point Likert scale. Cronbach's alpha coefficient that measures internal consistency of scale was 0.7 for both scales, which is acceptable (Cronbach, 1951; George & Mallery, 2003). We tested if the variables were normally distributed values. Table 1 presents test results, as well as descriptive characteristics of the given variables. Significance for both variables is greater than 0.05, which proves the null hypothesis that both variables are normally distributed values, i.e. that there are no significant deviations from the normal distribution.

Table 1.

Results of Kolmogorov-Smirnov test of normality

Variables	Mean	SD	Test Value	Significance
Traditional methods and techniques	17.202	2.987	1.022	0.248
IT-supported methods and techniques	10.947	3.021	1.317	0.062

Methods

Data analysis was performed using various statistical methods. In order to explain the research goals, we used the parametric ANOVA test (Lilliefors, 1967), to determine the difference between the groups. For locating the statistically significant differences, we used Bonferroni test. Kolmogorov-Smirnov test was used to establish if the variables were normally distributed, in order to confirm the assumption of the test. Supporting research included the use of Independent sample t-test and Paired sample t-test.

Results

Table 2 shows the results of hypotheses testing using the ANOVA method. Levene's Homogeneity of variance test confirmed that the assumption on homogeneity of group variances was not disturbed in any of the hypotheses.

Hypothesis 1: The second assumption was that a statistically significant difference among the teachers with various academic titles in the use of traditional teaching methods and techniques would be found. The teachers were divided into groups according to their academic titles: teaching assistant, assistant professor, associate professor and full professor. The value of F statistics was 4.245, $p=0.007$, which confirmed the second assumption at the significance level of 0.01. The influence of the difference measured with η^2 (eta-squared) indicator was 0.078, which, according to Cohen (1988), is the medium. Bonferroni test located the differences between the groups of teaching assistants ($M=16.617$, $SD=3.116$) and full professors ($M=18.941$, $SD=2.486$), which was the exact essence of our initial assumption. There was no statistically significant difference found between the groups of assistant professors ($M=17.105$, $SD=2.299$), or associate professors ($M=18.47$, $SD=3.337$) and other groups. A graphical representation of this difference is given in Figure 1 (a), which also clearly shows the increase in the use of traditional methods and techniques from assistant to full professor.

Table 2.

Results of the ANOVA test, Traditional and IT-supported teaching methods and techniques characteristics (Mean ± SD) of teachers belonging to different groups

Variable	Groups				Test	Bonferroni corrected
Traditional teaching methods and techniques	Teaching Assistant	Assistant Professor	Associate Professor	Full Professor	4.254**	Pairwise comparison
	16.62±3.116	17.11±2.299	18.47±3.337	18.94±2.486		Assistant < Full professor*
Traditional teaching methods and techniques	Humanities	Natural sciences	Medical sciences	Technical sciences	1.917	Pairwise comparison
	17.46±0.306	15±1.118	17.07±0.525	17.17±0.63		n/a
IT-supported teaching methods and techniques	Univ. Belgrade	Univ. Novi Sad	Univ. Kragujevac	Univ. Niš	7.242**	Pairwise comparison
	11.86±2.845	10.33±2.643	9.64±3.185	9.06±2.768		Univ. Belgrade > Univ. Kragujevac*
						Univ. Belgrade > Univ. Niš*
IT-supported teaching methods and techniques	Humanities	Natural sciences	Medical sciences	Technical sciences	7.577**	Pairwise comparison
	10.16±2.86	10.33±3.774	12.33±2.583	12.67±2.823		Humanities < Medical sciences*
						Humanities < Technical sciences*

*Significant at $p < 0.05$ level

** Significant at $p < 0.01$ level

Hypothesis 2: Our third assumption was that no statistically significant difference would be found among teachers from various science fields in the use of traditional teaching methods and techniques. The teachers came from the fields of natural sciences, medical sciences, technical sciences, and humanities. The results in this case showed that the F statistics was 1.917, $p=0.129$, thus confirming our initial assumption.

Hypothesis 3: Our next assumption implied that the difference between teachers from various Universities in Serbia, in the use of IT-supported teaching methods and techniques, would be statistically significant. It was found that the value of F statistics was 7.242, $p<0.001$, which proved our assumption with a 0.01 level of significance. The influence of the difference expressed by η^2 (eta-squared) indicator was 0.127, thus confirming that the influence was great (Cohen, 1988). Using Bonferroni test, we found that the group University of Belgrade ($M=11.858$, $SD=2.845$) was significantly different from the group University of Kragujevac ($M=9.636$, $SD=3.185$) and the group University of Niš ($M=9.062$, $SD=2.768$). There was no statistically significant difference found between the group University of Novi Sad ($M=10.333$, $SD=2.643$) and other groups. Graphical representation of this difference is given in Figure 1 (b).

Hypothesis 4: The next assumption implied that there would be a statistically significant difference found between teachers from various science fields in the use of IT-supported teaching methods and techniques. ANOVA results showed that $F=7.577$, $p<0.001$, which proved our assumption at the significance level of 0.01. According to

Cohen (1988), $\eta^2=0.132$, so the influence of the difference is large. Later comparison of the groups using Bonferroni test showed a statistically significant difference between humanities ($M=10.161$, $SD=2.86$) and medical sciences ($M=12.333$, $SD=2.587$), as well as humanities and technical sciences ($M=12.666$, $SD=2.823$). The group of natural sciences ($M=10.333$, $SD=3.774$) was not significantly different from other groups. Graphical representation of this difference is shown in Figure 1 (c) with humanities on the left and technical sciences on the right side of the graph.

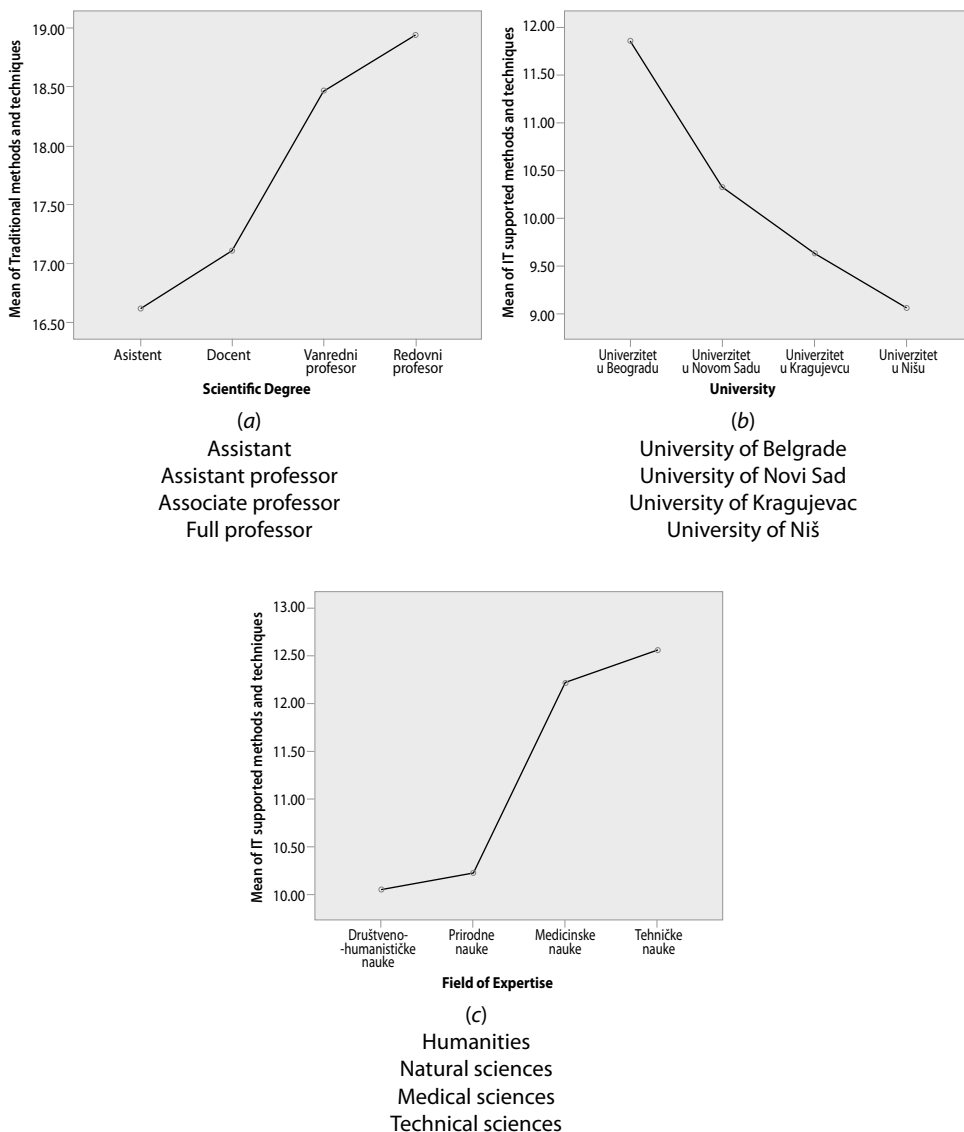


Figure 1. Mean difference between (a) Scientific Degree at Traditional methods and techniques, and (b) University and (c) Field of Expertise at IT-supported methods and techniques

Hypothesis 5: Our final assumption was that the difference in the use of 'ex-cathedra' and IT-supported methods and techniques would be statistically significant and that teachers would still hold on to traditional 'ex-cathedra' teaching methods and techniques. The results of this assumption are presented in Table 3, clearly showing that *Traditional teaching methods and techniques* (M=17.203, SD=3.777) are used more than *IT-supported teaching methods and techniques* (M=13.685, SD=2.988). The value of the t-test is 9.374, $p > 0.001$, which confirms that this difference is significant.

Table 3.
Results of the t-test in Hypothesis 5

Variable	Mean	SD	Test Value
IT-supported teaching methods and techniques	13.685	2.988	9.374**
Traditional teaching methods and techniques	17.203	3.777	

*Significant at $p < 0.05$ level

**Significant at $p < 0.01$ level

Conclusion

This paper concentrated on the comparison of 'ex-cathedra' and IT-supported methods and techniques, used at higher education institutions in Serbia. Our primary assumption is that teachers in Serbia still use traditional teaching methods and techniques, and that they have not yet opened up towards IT-supported ones. The underlying idea is that professors' abilities depend on their familiarity with different teaching methods and techniques. Knowledge of a foreign language and use of ICT is often an obstacle for teachers to continuously follow modern trends in the transfer of knowledge at the university.

The data analysis has confirmed the assumption that teachers do not differ from each other, with regard to the university or the science field, in use of traditional teaching methods and techniques. However, as we presumed, they do differ from each other regarding their academic titles: senior teachers (associate and full professors) use traditional methods more frequently than younger teachers do. That is most often due to the lack of teachers' effort and interest in new methods and techniques which can improve and make students' learning process more active.

Secondly, as we presumed turning to the IT-supported teaching methods and techniques, the difference among teachers from various universities in Serbia in the use of IT-supported teaching methods and techniques, is statistically significant. They are more commonly used at the Universities of Belgrade and Novi Sad. With this in mind, we can draw the conclusion that since the University of Belgrade is the biggest university in Serbia and since it is located in the capital of Serbia, it has the privilege to be the most financially supported university by the Ministry of Science and

Education due to its 100-year-long tradition and reputation in Southeastern Europe. That would be a direct explanation of the fact that IT-supported teaching methods and techniques are mostly applied at the University of Belgrade ($M=11.858$, $SD=2.845$). Similarly, the differences were found within the field of expertise, since technical and medical sciences use IT-supported teaching methods and techniques more common than humanities do. The reason could be that they have invested significant funds from their own sources to train their employees and purchase technical infrastructure.

Finally, even though we suspected that younger teachers would use IT-supported teaching methods and techniques more frequently, this was not the case. This means that all teachers should incorporate modern teaching methods and techniques into their everyday teaching styles. This is also obvious from the finding that *Traditional teaching methods and techniques* ($M=17.203$, $SD=3.777$) are more commonly used than *IT-supported teaching methods and techniques* ($M=13.685$, $SD=2.988$).

In conclusion, we will firstly point out that this issue is important to investigate since it is not enough to create ICT infrastructure for the teaching process to achieve IT-supported teaching. Teachers' willingness and motivation to incorporate ICT into the teaching process are also required. Only competent and educated teachers are an intellectual asset of a university. For such a teacher the notion of 'mobility' is not unfamiliar. This statement is extremely important for students as well since only universities which are recognized in the world can provide Serbian students with worldwide recognized diplomas.

The current study raises some interesting questions for further investigations. There certainly is the need for additional investments into IT infrastructure, as well as the need for additional incentives for teachers to incorporate modern teaching methods and techniques into their everyday teaching styles. In the course of future research, we will define some other methods and techniques that are also not incorporated into the system of higher education in Serbia, or are partially, yet insufficiently, included.

References

- Avalos, B., Tellez, F., & Navarro, S. (2010). Learning about the effectiveness of teacher education: A Chilean study. *Perspectives in Education*, 28(4), 11-21.
- Benković, S., & Dobrota, M. (2012). Application of teaching methods and techniques in Serbian Universities: progress over time. *Management*, 16(63), 35-43. doi:10.7595/management.fon.2012.0007
- Cho, M.H. (2012). Online student orientation in higher education: a developmental study. *Educational Technology Research and Development*, 60(6), 1051-1069. doi:10.1007/s11423-012-9271-4
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences (2nd ed.)*. Hillsdale, NJ: Lawrence Earlbaum Associates.
- Cosser, M. (2011). Pathways through the education and training system: Do we need a new model? *Perspectives in Education*, 29(2), 70-79.

- Cronbach, L.J. (1951). Coefficient alpha and the internal structure of the tests. *Psychometrics*, 16, 297-334.
- Dobrota, M., Jeremić, V., & Marković, A. (2012). A new perspective on the ICT Development Index. *Information Development*, 28(4), 271-280. doi:10.1177/0266666912446497
- Dogan, S. (2010). Perceptions of Teachers about the Use of Educational Technologies in the Process of Instruction. *Odgojne znanosti*, 12(2), 297-309.
- George, D., & Mallery, P. (2003). *SPSS for Windows step by step: A simple guide and reference. 11.0 update (4th ed.)*. Boston, USA: Allyn & Bacon.
- Harris, D.N., & Sass, T.R. (2011). Teacher training, teacher quality and student achievement. *Journal of Public Economics*, 95(7-8), 798-812. doi:10.1016/j.jpubecon.2010.11.009
- Hanushek, E.A. (2011). The economic value of higher teacher quality. *Economics of Education Review*, 30, 466-479. doi:10.1016/j.econedurev.2010.12.006
- Horvat, A., Dobrota, M., Krsmanović, M., & Čudanov, M. (2013a). Student Perception of Moodle LMS: A Satisfaction and Significance Analysis. *Interactive Learning Environments*, (Epub. ahead-of-print), 1-13. DOI:10.1080/10494820.2013.788033
- Horvat, A., Krsmanović, M., Dobrota, M., & Čudanov, M. (2013b). Students' Trust in Distance Learning: Changes in Satisfaction and Significance, *Management*, 16(69), 47-54. doi: 10.7595/management.fon.2013.0026
- Kabok, J. (2013). Analysis of Higher Education Efficiency in Serbia. *Management*, 16(67), 47-54. doi:10.7595/management.fon.2013.0008
- Klenha, V., Nielsen, S., Petkova, E., & Erkan, S.A. (2010). Country Review of Human Resource Development in Serbia. *European Association for the Education of Adults /online/*. Retrieved on 14th July 2011 from <http://www.eaea.org/doc/pub/Serbia-Country-review-of-human-resource-development.pdf> Accessed September 25, 2011.
- Kogan, I. (2011). When formal is normal. . . On the role of credentials and contacts for the job entry in Serbia. *Research in Social Satisfaction and Mobility*, 29(4), 445-458. doi:10.1016/j.rssm.2011.03.001
- Lilliefors, H. (1967). On the Kolmogorov-Smirnov test for normality with mean and variance unknown. *Journal of the American Statistical Association*, 62, 399-402.
- Lofstrom, E., Poom-Valickis, K., Hannula, M.S., & Mathews, S.R. (2010). Supporting emerging teacher identities: can we identify teacher potential among students? *European Journal of Teacher Education*, 33(2), 167-184. doi:10.1080/02619761003631831
- Maitles, H. (2010). Citizenship initiatives and pupil values: a case studies on one Scottish school's experience. *Educational Review*, 62(4), 391-406.
- Pantić, N., & Wubbels, T. (2010). Teacher competencies as a basis for teacher education – Views of Serbian teachers and teacher educators. *Teaching and Teacher Education*, 26(3), 694-703. doi:10.1016/j.tate.2009.10.005
- Puljić, B.K. (2010). Teacher Education and Reflective Thinking between Knowledge and Action. *Odgojne Znanosti-Educational Sciences*, 12(1), 119-129.
- Rockoff, J.E., Jacob, B.A., Kane, T.J., & Stalger, D.O. (2011). Can You Recognize an Effective Teacher When You Recruit One? *Education Finance and Policy*, 6(1), 43-74. doi:10.1162/EDFP_a_00022

- Šašić, S.S., & Sorić, I. (2010). Do Personal Characteristics of Teachers Contribute to the Type of Interaction They Have with Their Students? *Društvena Istraživanja*, 19(6), 973-994.
- Srdić, V., & Cvjetičanin, S. (2012). The Educational Integration Process of the Roma in Serbia. *Društvena Istraživanja*, 21(2), 569-587, doi:10.5559/di.21.2.14
- Stronge, J.H., Ward, T.J., & Grant, L.W. (2011). What Makes Good Teachers Good? A Cross-Case Analysis of the Connection between Teacher Effectiveness and Student Achievement, *Journal of Teacher Education*, 62(4), 339-355. doi:10.1177/0022487111404241
- Tatto, M.T. (2006). Education reform and the global regulation of teacher's education, development and work: A cross-cultural analysis. *International Journal of Educational Research*, 45, 231-241. doi:10.1016/j.ijer.2007.02.003
- Tezci, E. (2011). Factors that influence pre-service teachers' ICT usage in education. *European Journal of Teacher Education*, 34(4), 483-499. doi:10.1080/02619768.2011.587116.
- Tot, D. (2010). Students' Competences and Modern Teaching Practice. *Odgojne znanosti*, 12(1), 65-78.
- Van Maele, D., & Van Houtte, M. (2010). The Quality of School Life: Teacher-Student Trust Relationship and the Organizational School Context. *Social Indicators Research*, 100, 85-100. doi:10.1007/s11205-010-9605-8
- White, C.S., Fox, R.K., & Isenberg, J.P. (2011). Investigating teachers' professional learning in an advanced Master's degree programme. *European Journal of Teacher Education*, 34(4), 387-405. doi:10.1080/02619768.2011.587115

Marina Dobrota

Faculty of Organizational Sciences, University of Belgrade
Jove Ilića 154, 11 000 Belgrade, Serbia
dobrota.marina@fon.bg.ac.rs

Sladana Benković

Faculty of Organizational Sciences, University of Belgrade
Jove Ilića 154, 11 000 Belgrade, Serbia
benkovic.sladjana@fon.bg.ac.rs

Usporedba metode ex cathedra i računalno potpomognutih metoda i tehnika poučavanja: politika nastavne prakse

Sažetak

Na visokoškolskim institucijama u Srbiji poučavanje se još uvijek oslanja na tradicionalne ex cathedra metode, većinom se temelji na usvajanju činjeničnoga znanja, čime se studenti obeshrabruju od sudjelovanja u procesu učenja i poduzimanja inicijative. Cilj ovoga rada jest uputiti na upotrebu tradicionalnog ex cathedra poučavanja u usporedbi s računalno potpomognutim metodama i tehnikama poučavanja. Smatra se da sposobnosti nastavnika ovise o njihovu poznavanju različitih metoda i tehnika poučavanja, znanja stranoga jezika i upotrebe informacijsko-komunikacijskih tehnologija. Analiza rezultata potvrdila je da se nastavnici međusobno razlikuju s obzirom na akademska zvanja: iskusniji nastavnici (izvanredni i redoviti profesori) češće se koriste tradicionalnim metodama od njihovih mlađih kolega. Općenito, svi bi nastavnici trebali uključiti moderne trendove u svoje stilove poučavanja, s obzirom na to da se tradicionalne metode i tehnike koriste češće od onih računalno potpomognutih.

Ključne riječi: metode poučavanja; računalno potpomognuto poučavanje; sveučilišta u Srbiji; tehnike poučavanja; tradicionalno ex cathedra metoda poučavanja.

Uvod

Mnoga istraživanja pokazuju da akademski uspjeh studenata ovisi o njihovim nastavnicima (Lofstrom i dr., 2010; Šašić i Sorić, 2010; Tot, 2010; Harris i Sass, 2011; Stronge, Ward i Grant, 2011; Rockoff i dr., 2011). Međutim, nije lako istaknuti posebne kvalitete koje nastavnik treba posjedovati kako bi se one odrazile na akademske rezultate studenata (Hanushek, 2011). Prilično je jednostavno definirati predmetno znanje koje nastavnik treba posjedovati, no njegove kvalitete ovise o samom nastavniku, odnosno njegovoj spremnosti na aktivno praćenje i sudjelovanje u učenju i implementaciji modernih edukacijskih metoda i tehnika (Avalos, Tellez i Navarro, 2010; Puljić, 2010; Pantić i Wubbels, 2010; Maitles, 2010).

Tatto (2006) tvrdi da je utjecaj obrazovnih reformi na nastavno osoblje i njihov rad rezultat globalnih promjena, kulturoloških i društvenih utjecaja okoline u kojoj nastavnici rade, kao i visokoškolskih institucija na kojima nastavnici uče i rade. Stoga je uvođenje standarda u proces učenja osobito važno te predstavlja sastavni dio kvalitetnoga obrazovnoga sustava. Osim toga, standardi pružaju jasan pogled na mnoge prednosti i pozitivne aspekte (Van Maele & Van Houtte, 2010), kao i nedostatke obrazovanja. Iz navedenih je razloga uvod standarda tema brojnih istraživanja (Cossier, 2011; White, Fox i Isenberg, 2011; Cho, 2012).

Stečevine tehnološkoga razvoja primijenjene su na obrazovanje (Dogana, 2010). Srbija intenzivno radi na prilagođavanju i implementaciji obrazovnih standarda Europske unije (EU), s ciljem pristupanja europskom obrazovnom području (Srđić i Cvjetićanin, 2012). Kogan (2011) ističe činjenicu da je Srbija jedna od posljednjih zemalja jugoistočne Europe koja prolazi ekonomsku i društvenu transformaciju. Razlike između Srbije i zemalja Europske unije u vezi s tim su očite.

Poučavanje srpskih studenata još se uvijek odvija na tradicionalne *ex catedra* načine, koje nastavnika tretiraju kao osobu koja prenosi znanje i upotrebljava jasno definirane načine učenja – testiranja – i vrednovanja studenata. Proces učenja i poučavanja u Srbiji se još uglavnom temelji na stjecanju činjeničnoga znanja, čime se studenti obeshrabruju da sudjeluju u procesu učenja i poduzimaju bilo kakvu inicijativu (Klenha i dr., 2010). Vrlo je važno istaknuti potrebu za implementacijom informacijsko-komunikacijskih tehnologija (ICT) u proces učenja (Tezci, 2011; Horvat et al., 2013b) te istražiti gdje Srbija u tome stoji (Benković i Dobrota, 2012; Kabok, 2013).

Cilj je ovoga rada uputiti na obrazovne metode i tehnike kojima se koriste sveučilišni nastavnici u Srbiji, odnosno prisutnost tradicionalnih *ex catedra* nastavnih metoda i tehnika u odnosu na uporabu računalno potpomognutih metoda i tehnika poučavanja na sveučilištima u Srbiji.

Daljnji tekst rada organiziran je na sljedeći način: sljedeće poglavlje daje detaljan pregled problema nakon čega se izlažu uzorak i metodologija istraživanja. Rezultati su prezentirani u poglavlju koje slijedi, a na kraju se iznose određene teze i prijedlozi.

Istraživački problem

Cilj istraživanja bio je izraditi opću usporedbu metode *ex catedra* i računalno potpomognutih metoda i tehnika koje se koriste na visokoškolskim institucijama u Srbiji. Naše početne hipoteze odnosile su se na *ex catedra* metode i tehnike. Naknadno smo izradili hipoteze koje se tiču računalno potpomognutih metoda i tehnika, kako bismo utvrdili postoje li razlike među nastavnicima koji posjeduju karakteristike obuhvaćene istraživanjem (v. poglavlje *Opis uzorka i metodologija istraživanja*) između metode *ex catedra* i računalno potpomognutih metoda i tehnika.

Hipoteza 1: *Razlika među nastavnicima različitih akademskih zvanja u upotrebi tradicionalnih metoda i tehnika poučavanja statistički je značajna.*

Hipoteza 2: *Ne postoji statistički značajna razlika među nastavnicima iz različitih znanstvenih polja u upotrebi tradicionalnih metoda i tehnika poučavanja.*

Tijekom istraživanja najprije smo primijetili da su nastavnici u višim znanstveno-nastavnim zanimanjima upotrebljavali tradicionalne metode poučavanja češće nego nastavnici u nižim znanstveno-nastavnim zanimanjima. Nastavnici u višim znanstveno-nastavnim zanimanjima još su se uvijek držali tradicionalnih ex cathedra metoda poučavanja. Na temelju podataka koje smo prikupili u ovome istraživanju izradili smo varijablu *Tradicionalne metode i tehnike* (v. poglavlje *Opis uzorka i metodologija istraživanja*). Također smo primijetili da sva područja znanosti jednako intenzivno upotrebljavaju tradicionalne metode i tehnike poučavanja.

Hipoteza 3: *Razlika među nastavnicima iz različitih sveučilišta u Srbiji u njihovoj upotrebi računalno potpomognutih metoda i tehnika poučavanja statistički je značajna.*

Hipoteza 4: *Razlika među nastavnicima iz različitih područja znanosti u njihovoj upotrebi računalno potpomognutih metoda i tehnika poučavanja statistički je značajna.*

Kako bismo testirali navedene hipoteze izradili smo skalu *Računalno potpomognute metode i tehnike* (v. poglavlje *Opis uzorka i metodologija istraživanja*). Utvrđene su razlike u upotrebi računalno potpomognutih metoda i tehnika poučavanja među srpskim sveučilištima. Također smo utvrdili da su nastavnici iz različitih polja tehničkih znanosti upotrebljavali računalno potpomognute metode i tehnike poučavanja češće nego nastavnici iz područja humanističkih znanosti.

Hipoteza 5: *Razlika u upotrebi metode ex cathedra i računalno potpomognutih metoda i tehnika statistički je značajna.* Drugim riječima, nastavnici se općenito još uvijek drže tradicionalnih ex cathedra metoda i tehnika.

Doprinos ovoga istraživanja jest u sagledavanju trenutne situacije u Srbiji s obzirom na računalnu pismenost nastavnika, kao i volju nastavnoga osoblja zaposlenoga na državnim sveučilištima u Srbiji da implementiraju moderne metode i tehnike poučavanja, odnosno da potpomognu poboljšanje studentskog učenja.

Opis uzorka i metodologija istraživanja

Ispitanici i karakteristike uzorka

Istraživanje na temelju kojega je nastao ovaj rad obuhvatilo je najveća državna sveučilišta u Srbiji: Sveučilište u Novom Sadu, Sveučilište u Beogradu, Sveučilište u Kragujevcu i Sveučilište u Nišu. Istraživanje je bilo anonimno i u njemu su sudjelovali nastavnici zaposleni na visokoškolskim institucijama u Srbiji. Poslali smo 200 upitnika, od kojih su ispunjena 153, što predstavlja stopu odaziva od 76,5%. Od ukupnoga broja ispitanika njih 55,56% bilo je sa Sveučilišta u Beogradu, 19,61% sa Sveučilišta u Novom Sadu, 14,38% sa Sveučilišta u Kragujevcu, a 10,45% sa Sveučilišta u Nišu.

Ispitanici su na visokoškolskim institucijama radili u trajanju od šest mjeseci do 40 godina, $M=12,16$, $SD=9,51$. Raspodjela ispitanika prema znanstveno-nastavnim zvanjima bila je sljedeća: 52,94% asistenata, 24,84% docenata, 11,11% izvanrednih profesora i 11,11% redovnih profesora. Iz tih je podataka vidljivo da su asistenti i docenti pristupili ispunjavanju upitnika u puno većem broju od izvanrednih i redovnih profesora. Većina uzorka sastojala se od nastavnika iz područja društvenih znanosti (60,78%), a 15,69% bilo ih je iz tehničkih znanosti, 17,65% iz medicine i 5,88% iz prirodnih znanosti.

Instrumenti

Upitnik koji su ispitanici ispunili sastojao se od dva dijela. Prvi se dio odnosio na demografske podatke i sadržavao pitanja o sveučilištu, fakultetu, odsjeku, istraživačkom području, zvanju i razdoblju zaposlenja na visokoškolskoj instituciji. Ispitanici su se trebali izjasniti i o svom akademskom zvanju, kao i broju kolegija i studenata koje poučavaju.

Drugi je dio upitnika sadržavao pitanja o čestotnosti upotrebe nekih metoda i tehnika u poučavanju. Metode su se odnosile na predavanja, seminarske radove, radionice, studije slučaja, terenski rad, simulaciju, praksu, učenje na daljinu, timske projekte, skupne projekte, istraživačke projekte. Tehnike su se odnosile na uporabu PowerPoint prezentacija, grafoskopa i prozirnica, flomastera i ploče, flipchart blokova/ploča. Ispitanike se također pitalo o tome kako implementiraju alternativne metode i tehnike poučavanja u svoju nastavu sa svrhom poticanja studentskog interesa za predmetnu materiju, dovode li gostujuće profesore s drugih odsjeka/fakulteta/sveučilišta, inzistiraju li na kritičkom mišljenju studenata, izradi portfolija, surađivačkome učenju.

Da bismo testirali početne pretpostavke, izradili smo dvije varijable (Dobrota, Jeremić i Marković, 2012; Horvat i dr., 2013a):

Računalno potpomognute metode i tehnike poučavanja – varijabla obuhvaća simulaciju, učenje na daljinu, istraživački projekt i PowerPoint prezentaciju. Te metode i tehnike računalno su potpomognute pa su temelj računalno pismenoga nastavnika. Takav je nastavnik sposobniji u prenošenju znanja svojim studentima, s obzirom na to da mu je lakše implementirati moderne metode i tehnike koje se koriste na vodećim svjetskim sveučilištima. Osim toga, takav nastavnik stalno komunicira sa studentima, s obzirom na to da im može biti na raspolaganju bez vremenskog i prostornoga ograničenja.

Tradicionalne metode i tehnike poučavanja – varijabla obuhvaća predavanja, seminarske radove, radionice, studiju slučaja i ploču i flomastere. To su tradicionalne ex cathedra metode. Koristeći se njima, nastavnik stoji „iza svog stola“ dok poučava studente.

Objekti su varijable kreirane s pomoću petostupanjske Likertove skale. Cronbach alpha koeficijent kojim se mjeri unutarnja konzistentnost skale bio je 0,7 za obje

skale, što se smatra prihvatljivim (Cronbach, 1951; George i Mallery, 2003). Testirali smo normalnost distribucije varijabli. Rezultati testiranja i deskriptivne karakteristike danih varijabli prikazani su u Tablici 1. Za obje je varijable značajnost bila veća od 0,05, čime je potvrđena prva hipoteza prema kojoj je predviđeno da će varijable biti normalno distribuirane vrijednosti, odnosno da nema većih odstupanja od normalne distribucije.

Tablica 1.

Metode

U analizi su korištene različite statističke metode. Za interpretaciju ciljeva istraživanja i utvrđivanje razlike između skupina upotrijebili smo ANOVA test (Lilliefors, 1967). Za pronalaženje statistički značajnih razlika upotrijebili smo Bonferroni test. Kolmogorov-Smirnovljevi test upotrijebljen je za utvrđivanje normalnosti distribucije varijabli, a sa svrhom potvrđivanja pretpostavke testiranja parametara. Za pozadinska istraživanja upotrijebljeni su t-test za nezavisne uzorke i t-test za zavisne uzorke.

Rezultati

U Tablici 2 prikazani su rezultati testiranja hipoteza uz pomoć ANOVA metode. Levenovim testom homogenosti varijance u svim je hipotezama potvrđena pretpostavka o homogenosti varijanci skupina.

Hipoteza 1: U drugoj smo pretpostavci predvidjeli da neće biti statistički značajne razlike među nastavnicima različitih akademskih zvanja u upotrebi tradicionalnih metoda i tehnika poučavanja. Nastavnici su bili podijeljeni u skupine prema akademskim zvanjima: asistent, docent, izvanredni profesor i redoviti profesor. F vrijednost bila je 4.245, $p=0,007$ pa je druga hipoteza potvrđena na razini značajnosti 0,01. Utjecaj razlike izmjerene s pomoću η^2 (eta na kvadrat) indikatora bio je 0,078, što je srednja vrijednost prema Cohenu (1988). Bonferroni test upotrijebljen je za lociranje razlika između skupine asistenata ($M=16,617$, $SD=3,116$) i redovitih profesora ($M=18,941$, $SD=2,486$), što i jest bila upravo suština naše početne pretpostavke. Nije pronađena statistički značajna razlika između skupine docenata ($M=17,105$, $SD=2,299$) ili izvanrednih profesora ($M=18,47$, $SD=3,337$) i ostalih skupina. Slika 1 (a) daje grafički prikaz te razlike iz kojega se također jasno vidi porast upotrebe tradicionalnih metoda i tehnika počevši od docenta do redovnog profesora.

Tablica 2.

Hipoteza 2: Naša je treća pretpostavka bila da neće biti statistički značajne razlike među nastavnicima iz različitih područja znanosti u upotrebi tradicionalnih metoda i tehnika poučavanja. Ispitanici su se bavili područjima prirodnih znanosti, medicine, tehničkih i humanističkih znanosti. Rezultati su pokazali da je F bio 1,917, $p=0,129$ pa je tako naša početna pretpostavka potvrđena.

Hipoteza 3: U sljedećoj smo pretpostavci predvidjeli da će postojati statistički značajna razlika u upotrebi računalno potpomognutih metoda i tehnika poučavanja među nastavnicima različitih sveučilišta u Srbiji. Dobivena je F vrijednost od 7,242, $p < 0,001$, čime je naša pretpostavka potvrđena sa stupnjem značajnosti od 0,01. Utjecaj razlike iskazane η^2 (eta na kvadrat) indikatorom bio je 0,127, čime je potvrđeno da je navedeni utjecaj bio velik (Cohen, 1988). Upotrijebivši Bonferroni test, otkrili smo statistički značajnu razliku među skupinama Sveučilište u Beogradu ($M=11,858$, $SD=2,845$), Sveučilište u Kragujevcu ($M=9,636$, $SD=3,185$) i Sveučilište u Nišu ($M=9,062$, $SD=2,768$). Pronađena je statistički značajna razlika između skupine Sveučilište u Novom Sadu ($M=10,333$, $SD=2,643$) i ostalih skupina. Slika 1 (b) daje grafički prikaz te razlike.

Hipoteza 4: Sljedećom se pretpostavkom sugeriralo da će se pronaći statistički značajna razlika među nastavnicima iz različitih znanstvenih polja s obzirom na njihovu upotrebu računalno potpomognutih metoda i tehnika poučavanja. Prema rezultatima ANOVE $F=7,577$, $p < 0,001$ dokazana je naša pretpostavka na razini značajnosti 0,01. Prema Cohenu (1988), $\eta^2=0.132$ pa je utjecaj razlike velik. Daljnja usporedba skupina s pomoću Bonferroni testa dala je statistički značajnu razliku između humanističkih znanosti ($M=10,161$, $SD=2,86$) i medicine ($M=12,333$, $SD=2,587$), zatim humanističkih i tehničkih znanosti ($M=12,666$, $SD=2,823$). Skupina prirodnih znanosti ($M=10.333$, $SD=3.774$) nije se značajno razlikovala od ostalih skupina. Ta je razlika grafički prikazana na Slici 1 (c); humanističke su znanosti s lijeve, a tehničke znanosti s desne strane prikaza.

Slika 1.

Hipoteza 5: Naša posljednja pretpostavka bila je da će razlika u upotrebi metode *ex catedra* i računalno potpomognutih metoda i tehnika biti statistički značajna, pa da će se pokazati da se nastavnici još uvijek drže tradicionalnih *ex catedra* metoda i tehnika poučavanja. Rezultati te pretpostavke predstavljeni su u Tablici 3 i jasno pokazuju da se *Tradicionalne metode i tehnike poučavanja* ($M=17,203$, $SD=3,777$) upotrebljavaju više nego *Računalno potpomognute metode i tehnike poučavanja* ($M=13,685$, $SD=2,988$). Vrijednost t-testa bila je 9,374, $p > 0,001$, što potvrđuje značajnost razlike.

Tablica 3.

Zaključak

U ovome smo se radu usredotočili na usporedbu metode *ex catedra* i računalno potpomognutih metoda i tehnika poučavanja koje se koriste na visokoškolskim institucijama u Srbiji. Osnovna je naša pretpostavka bila da se nastavnici u Srbiji još uvijek koriste tradicionalnim metodama i tehnikama poučavanja i da se još nisu otvorili prema računalno potpomognutim metodama. Temeljna je zamisao da sposobnosti nastavnika ovisi o njihovoj upoznatosti s različitim metodama i tehnikama poučavanja. Znanje stranoga jezika i upotreba informacijsko-komunikacijskih tehnologija nastavnicima često predstavlja prepreku u sustavnom praćenju modernih trendova u prijenosu znanja na sveučilištu.

Analizom rezultata potvrđena je naša pretpostavka o tome da se nastavnici ne razlikuju jedni od drugih u upotrebi tradicionalnih metoda i tehnika poučavanja s obzirom na sveučilište na kojemu rade i na njihovo područje znanosti. Međutim, kao što smo pretpostavili, razlikuju se s obzirom na svoje akademsko zvanje: iskusniji nastavnici (izvanredni i redoviti profesori) češće upotrebljavaju tradicionalne metode od svojih mlađih kolega. Razlog za to je najčešće nedostatak truda i zanimanja nastavnika za nove metode i tehnike kojima se proces učenja studenata može poboljšati i učiniti aktivnijim.

Što se tiče računalno potpomognutih metoda i tehnika, u skladu s našom pretpostavkom, primjetna je statistički značajna razlika u upotrebi računalno potpomognutih metoda i tehnika poučavanja među nastavnicima različitih sveučilišta u Srbiji. Računalno potpomognute metode češće se koriste na sveučilištima u Beogradu i Novom Sadu. Imajući to na umu, možemo zaključiti da Sveučilište u Beogradu, kao najveće srpsko sveučilište i jedino sveučilište smješteno u glavnom gradu Srbije, ima privilegiju da bude najbolje finansijski podržano od Ministarstva znanosti i obrazovanja, zahvaljujući svojoj stoljetnoj tradiciji i reputaciji u jugoistočnoj Europi. To bi bilo izravno obrazloženje činjenice da se računalno potpomognute metode i tehnike poučavanja uglavnom primjenjuju na Sveučilištu u Beogradu ($M=11.858$, $SD=2.845$). Slično je i s područjem stručnosti, s obzirom na to da tehničke znanosti i medicina upotrebljavaju računalne metode puno više od humanističkih znanosti. Razlog možda leži u ulaganju znatnih vlastitih sredstava sastavnica u obuku zaposlenika i nabavu tehničke infrastrukture.

Na kraju, iako smo sumnjali da će se mlađi nastavnici češće koristiti računalno potpomognutim metodama poučavanja od njihovih starijih kolega, to nije bio slučaj. To znači da bi svi nastavnici trebali uključiti moderne metode i tehnike poučavanja u svoje svakodnevne stilove poučavanja. To se jasno vidi i u tome što je ustanovljeno da se *Tradicionalne metode i tehnike poučavanja* ($M=17.203$, $SD=3.777$) koriste češće nego *Računalno potpomognute metode i tehnike poučavanja* ($M=13.685$, $SD=2.988$).

U zaključku najprije ističemo važnost ovoga problema s obzirom na to da nije dovoljno stvoriti informacijsko-komunikacijsku infrastrukturu za proces poučavanja da bi se postiglo računalno potpomognuto poučavanje. Potrebne su također volja i motivacija nastavnika da uključe informacijsko-komunikacijske tehnologije u proces poučavanja. Samo sposobni i obrazovani nastavnici predstavljaju intelektualnu vrijednost sveučilišta. Za takvoga nastavnika pojam mobilnosti nije nepoznanica. Ta je izjava također vrlo važna za studente jer samo svjetski prepoznata sveučilišta mogu srpskim studentima pružiti svjetski priznate diplome.

Ovaj rad postavlja neka zanimljiva pitanja koja bi bilo dobro obraditi u daljnjim istraživanjima. Očito je da postoji potreba za dodatnim ulaganjima u računalnu infrastrukturu, kao i potreba za dodatnim poticajima za nastavnike sa svrhom uključivanja modernih metoda i tehnika poučavanja u njihove svakodnevne stilove poučavanja. U našim ćemo daljnjim istraživanjima definirati neke druge metode i tehnike koje nedostaju ili su nedovoljno uključene u sustav visokoškolskoga obrazovanja u Srbiji.