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The Importance of Higher Education Institutions in the Republic of Serbia for Improving Key Competencies in the 21st Century

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Abstract *In a turbulent and increasingly demanding labor market, the gap between the demand for skilled workers and the supply of qualified job seekers is evident. The authors aimed to identify crucial competencies for the 21st century that should be actively developed in higher education institutions. The research sample consisted of 137 participants from two private universities in the Republic of Serbia. The study found a strong correlation between certain competencies developed during studies and those developed independently of studies. Additionally, students with developed research skills exhibited greater information management skills. Factor analysis results supported the division of skills into two component groups. The first group, associated with static competencies, refers to an individual's innate cognitive ability to effectively manage and understand various behaviors. The second group, associated with dynamic competencies, depends on external influences to ensure their effective application.*

Keywords: *key competencies for life, higher education, private universities, labor market, factor analysis.*

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Introduction

Numerous authors highlight the importance of higher education institutions in developing key competencies needed for the 21st century. Key roles in this process are assigned to decision-makers, public policy makers, and members of the academic community. The dynamic, changing, and complex environment has led to the adoption of the UN 2030 Agenda, which aims to ensure inclusive and equitable education and promote lifelong learning through defined goals (UNESCO, 2016).

The European Commission emphasizes that everyone has the right to quality and inclusive education, training and lifelong learning that develops key competencies and basic skills, supporting academic staff in implementing competency-based approaches and learning. In this context, the recommendations of the EU Council on key competences for lifelong learning should be understood. These recommendations identify key competences as a combination of knowledge, skills and attitudes (European Commission, 2016; Official Gazette of the EU, 2018). Key competences include: digital competence, multilingual competence, literacy competence, mathematics and competence in science, technology and engineering, then civic, entrepreneurial and cultural awareness and competence of expression, personal and social competence, and the competence of learning to learn.

Emphasizing that knowledge is a fundamental factor in organizational innovation, many authors highlight the importance of a learning-oriented approach as a crucial organizational resource for achieving competitive advantage and ensuring a sustainable future for a knowledge-based society (González-Salamanca et al., 2020; Nikolić et al., 2022). They analyze this phenomenon from psychological, sociological, anthropological, political, economic, and business perspectives (Aleksić Mirić, 2017, p. 140). Mastering generic and digital competencies is essential for a smooth transition from higher education to the workforce, aiming to minimize the gap between the competencies acquired during studies and the demands of the labor market (Pažur Aničić et al., 2022). This implies that students should be equipped to act as responsible and active citizens and to thrive in a dynamic labor market (Birtwistle & Wagenaar, 2020).

By positively correlating the relevance of future competencies with the use of performance analytics, Kleimola and Leppisaari (2022) confirm the goal-oriented nature of learning analytics. Their findings support professionals in higher education institutions who are creating conditions for the development of future competencies and are investing efforts in the purposeful use of learning analytics through extensive utilization of digital tools and systems. This includes visualizing social interactions and forming learning groups and communities. In this context, Parameswaran (2020) identifies the extent to which companies provide strategic human resource development based on necessary competencies, empowering individual creativity, knowledge management, and career planning, with a focus on predictability and consistency. Chen et al. (2022) propose a project-based approach as an effective method for competence development that encourages creative thinking, particularly in terms of flexibility and accuracy. Their results indicate that this approach can significantly enhance students' creative thinking and teamwork skills.

Distance education in the Republic of Serbia, especially during the COVID-19 pandemic, pointed to weaknesses in the education system, such as limited access to the

Internet and the initially low digital competence of teachers and students. Ranđelović et al. (2021) suggest several steps for integrating distance learning into a hybrid model in schools. These include the provision of digital resources, the use of a unified school-wide learning platform and the systematic encouragement of teacher collaboration and horizontal learning.

Key competencies at higher education institutions

The aim of the paper was to establish how key competencies for the 21st century are targeted, planned and systematically incorporated into the education system, through the analysis and presentation of private universities in the Republic of Serbia. In this context, it was necessary to define which socio-emotional and key competencies are involved. It was decided to analyze the following key competencies: Creativity/innovation (C1), Critical thinking (C2), Ability to solve problems (C3), Ability to make decisions (C4), Flexibility and adaptability – the ability to adapt to a new situation (C5), Cooperation – the ability to work in a team (C6), Communicativeness (C7), Oral and written communication in a foreign language (C8), Basic computer skills (C9), Ability to manage information – gathering and analyzing information from various sources (C10), Research and inquiry – research skills (C11), Ethical commitment and orientation (C12), Ability to apply knowledge in practice (C13), Leadership ability – leadership and responsibility (C14), Appreciation of diversity and multiculturalism (C15), Initiative and self-management (C16), Ability to learn (C17), Ability to organize and plan (C18), Ability to criticize and self-criticize (C19), Self-motivation to work (C20).

Methodology and stylized facts

In order to assess the views and opinions of final year students on the development of key competencies for the 21st century during their studies, as well as independently of their studies, a primary survey was created. The following research questions were asked:

Q_1. How and to what extent do students think they acquired 21st century competencies during their studies?

Q_2. How and to what extent does the development of 21st century competencies depend on the gender of the respondents?

Q_3. How and to what extent are 21st century competencies, which the respondents developed during their studies and independently of their studies, related?

The data were collected by the direct survey method. The research sample was selected using purposive sampling among students in their final years at two private universities in the Republic of Serbia. The pilot survey included 25 students each, while the final number of respondents was 137 (n=137). The period of data collection was from May 2023 to November 2023.

The questionnaire consisted of two parts. The first part comprises questions of a general type, e.g. about gender, size of place of residence, average grade during studies, parents' level of education. In the second part, on a scale from 1 to 7, 1 being an insufficiently

developed competency and 7 being an excellently developed competency, students evaluated the 21st century competencies that they acquired at a higher education institution and those that they acquired independently of their studies. In order to obtain answers to the research questions, descriptive measures, dispersion measures, symmetry measures and correlation analysis were calculated. Nonparametric techniques were used for hypothesis testing. The reliability of the competence scale/items was assessed using Cronbach's Alpha coefficients. Principal components analysis (PCA) was used to extract the factors followed by oblique rotation of factors using Oblimin rotation. The number of factors to be retained was guided by three decision rules: Kaiser's criterion (eigenvalues above 1), inspection of the scree plot, and Horn's parallel analysis. Parallel analysis was conducted using software developed by Watkins.

Empirical results and discussion

The research results are based on the "Labor market of the 21st century and key competencies of human resources of the Republic of Serbia" surveys (Ivanović & Penjišević, 2023). One hundred and thirty-seven final year student respondents participated in the research, of whom 77 (56.2%) were Male and 60 (43.8%) were Female. It can be seen that the greatest percentage of respondents (56.9%) live in a large city, and that the most common level of education for both father and mother is secondary school (3 or 4 years), i.e., 40.1% and 36.0% respectively (for more details, see Table 1). Looking at the average grade (current) during their studies, the largest number of respondents have an average grade of Above Average 39.8%, followed by Average 30.6%, Excellent 19.4%, and Below Average 10.2%. The chi-square test of independence did not show a significant relationship between the average grade during studies and the gender of the respondents, $\chi^2(3, n=98)=3.3699$, $p=0.296$, but a slightly higher percentage of Female respondents (69.2%) have an average grade of Above Average or Excellent compared to 52.6% of Male respondents.

Table 1
Summary of the demographics

		Frequency	Percent
Gender	Male	77	52,2
	Female	60	43,8
	Total	137	100,0
Your place of residence (the place where you live permanently or temporarily)	Village (up to 5,000 inhabitants)	9	6,6
	Town (up to 10,000 inhabitants)	9	6,6
	Smaller city (up to 50,000 inhabitants)	18	13,1
	City (up to 100,000 inhabitants)	23	16,8
	Large city (more than 100,000 inhabitants)	78	56,9
	Total	137	100,0

Average grade during your university studies	Excellent			19	19,4
	Above average			39	39,8
	Average			30	30,6
	Below average			10	10,2
	Total			98	100,0
Parents' education level	Education of parents	Father	%	Mother	%
	No education (did not finish school)	/	/	/	/
	Primary school	8	5,8	4	2,9
	Secondary school (3 or 4 years)	55	40,1	49	36,0
	College (3 years of study)	16	11,7	12	8,8
	Faculty (4 years of study)	32	23,4	44	32,4
	Magister or Master (5 years of study) – Mr/ Msr	21	15,3	23	16,9
	Doctor of Science – Ph.D.	5	3,6	4	2,9
	Total	137	100,0	136	100.0

Source: Authors (2023), results of primary research

Respondents estimate that the three best developed competencies, during their studies, were Basic computer skills (Average 5.59, Median 6, Mode 7), Ability to solve problems (Average 5.46, Median 6, Mode 6, interval 1.5IQR: 4 to 7) and Ability to apply knowledge in practice (Average 5.46, Median 6, Mode 6), while according to the respondents' assessment, the three most poorly developed competencies, during their studies, were Ethical commitment and orientation (Average 4.82, Median 5, Mode 5), Leadership ability – leadership and responsibility (Average 4.84, Median 5, Mode 6) and Creativity/ innovation (Average 4.94, Median 5, Mode 6).

Based on the respondents' assessment, if we look at the development of competences independently of studies, the three best developed competences were: Basic computer skills (Average 5.92, Median 6, Mode 7), Appreciation of diversity and multiculturalism (Average 5.86, Median 6.5, Mode 7), and Oral and written communication in a foreign language (Average 5.73, Median 6, Mode 7), and the three weakest distributed competencies independent of studies were: Leadership ability – leadership and responsibility (Average 4.99, Median 5, Mode 5).

Significant linear correlations ($0.5 < |r| < 0.7$) between competencies developed during studies and those developed independently of studies exist for competencies (items): Communicativeness (r=0.611), Leadership ability – leadership and responsibility (r=0.603), Appreciation of diversity and multiculturalism (r=0.527), Ability to criticize and self-criticize (r=0.522), Ability to organize and plan (r=0.540) and Ability to criticize and self-criticize (r=0.635), while for all other items the linear relationships are weak.

Table 2
Correlations

	Correlation
	0.226
Critical thinking	0.310
Ability to solve problems	0.257
Ability to make decisions	0.357
Flexibility and adaptability – the ability to adapt to a new situation	0.386
Cooperation – the ability to work in a team	0.479
Communicativeness	0.611
Oral and written communication in a foreign language	0.303
Basic computer skills	0.232
Ability to manage information – gathering and analyzing information from various sources	0.439
Research and inquiry – research skills	0.425
Ethical commitment and orientation	0.494
Ability to apply knowledge in practice	0.353
Leadership ability – leadership and responsibility	0.603
Appreciation of diversity and multiculturalism	0.527
Initiative and self-management	0.466
Ability to learn	0.470
Ability to organize and plan	0.540
Ability to criticize and self-criticize	0.635
Self-motivation to work	0.400

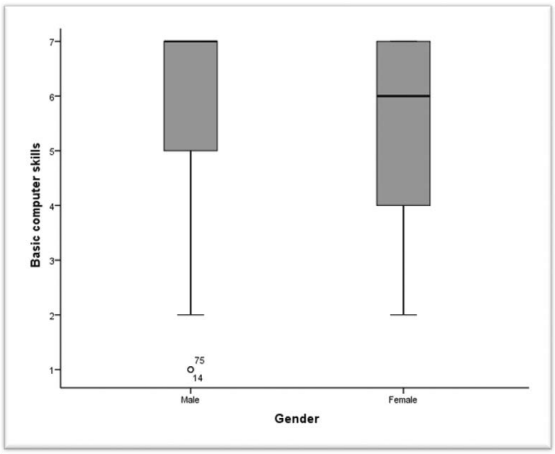
Source: Authors (2023), results of primary research

The Mann-Whitney U test revealed a statistically significant difference in the evaluation of the development of the Basic computer skills item during the study for Male (*Me*=7.0, *n*=77) and Female (*Me*=6.0, *n*=63), *U*=1694.00, *z*= -2.372 , *p*=0.018, impact size, i.e., it can be said that the impact is small to medium (Cohen, 1988). The variable has a higher Mean Rank for respondents of the Male gender.

The Mann-Whitney U test did not reveal a statistically significant difference in relation to Gender for the other two items that, according to the respondents, they developed the most during their studies (Ability to solve problems and Ability to apply knowledge in practice).

Graph 1

Assessment of the development of the Basic computer skills item during studies in relation to Gender

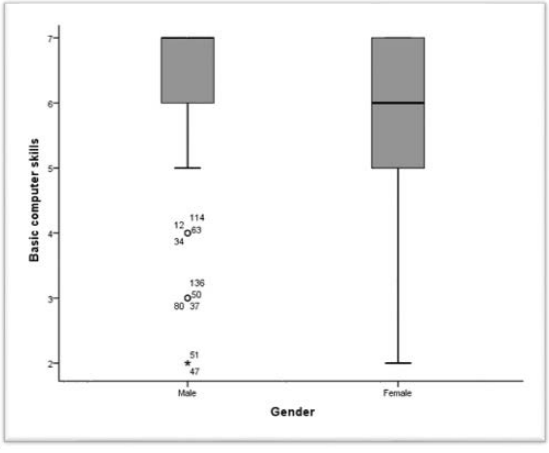


Source: Authors (2023), results of primary research

The Mann-Whitney U test revealed a statistically significant difference in the assessment of the development of the Basic computer skills item, independently of the study, for Male (*Me*=7.0, *n*=71) and Female (*Me*=6.0, *n*=58), *U*=1623.00, z=-2.204, *p*=0.028, impact size $r = \frac{z}{\sqrt{N}} = \frac{2.204}{\sqrt{129}} = 0.19$; the impact can be said to be small (Cohen, 1988). The variable has a higher Mean Rank for respondents of the Male gender. In Graph 2, we can see that for the assessment of the development of the Basic computer skills item, independently of studies, for the Male pol interval 1.5IQR: 5 to 7.

Graph 2

Assessment of the development of the Basic computer skills item, independently of studies, in relation to Gender



Source: Authors (2023), results of primary research

Table 3
Correlation

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
C1	-																			
C2	0.497**	-																		
C3	0.470**	0.441**	-																	
C4	0.395**	0.412**	**0.639****	-																
C5	0.397**	0.352**	**0.578****	0.497**	-															
C6	0.316**	0.388**	0.382**	0.453**	0.278**	-														
C7	0.366**	0.329**	0.379**	0.274**	0.235**	**0.620****	-													
C8	0.415**	0.380**	0.354**	0.354**	0.311**	0.405**	0.345**	-												
C9	0.479**	0.388**	0.468**	0.398**	0.351**	0.511**	0.449**	**0.529****	-											
C10	0.393**	0.437**	0.451**	0.435**	0.426**	0.440**	0.353**	0.500**	**0.665****	-										
C11	0.454**	0.467**	0.482**	0.453**	0.455**	0.476**	0.476**	0.387**	**0.593****	**0.712****	-									
C12	0.384**	0.519**	0.403**	0.430**	0.225**	0.553**	0.467**	0.572**	0.491**	0.531**	0.524**	-								
C13	0.519**	0.485**	**0.571****	0.452**	0.425**	**0.503****	0.369**	0.358**	**0.509****	**0.523****	**0.553****	0.464**	-							
C14	0.313**	0.304**	0.361**	0.444**	0.249**	**0.503****	**0.541****	0.345**	0.474**	0.422**	**0.511****	0.478**	**0.510****	-						
C16	0.377**	**0.510****	0.392**	0.431**	0.238**	**0.553****	0.394**	**0.555****	**0.525****	0.458**	0.475**	**0.649****	0.468**	0.449**	-					
C16	0.312**	0.313**	0.379**	0.427**	0.228**	0.381**	0.364**	0.379**	0.420**	0.412**	0.414**	0.394**	0.556**	0.624**	0.488**	-				
C17	0.376**	0.326**	0.509**	0.354**	0.309**	0.519**	0.432**	0.414**	0.415**	0.338**	0.400**	0.491**	**0.623****	0.448**	0.469**	0.467**	-			
C18	0.285**	0.448**	0.430**	0.474**	0.341**	0.456**	0.402**	0.302**	0.312**	0.359**	0.419**	0.464**	0.443**	**0.505****	0.363**	0.391**	**0.574****	-		
C9	0.274**	0.433**	0.307**	0.324**	0.278**	0.451**	0.388**	0.290**	0.393**	0.437**	0.339**	**0.536****	0.458**	0.451**	0.443**	0.431**	0.442**	0.362**	-	
C20	0.421**	0.429**	0.437**	0.410**	0.308**	**0.546****	0.393**	0.379**	0.368**	0.302**	0.324**	**0.516****	0.462**	**0.531****	**0.538****	0.443**	**0.626****	0.483**	**0.539****	-

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

The Mann-Whitney U test did not reveal a statistically significant difference in relation to Gender for the other two items that, according to the respondents, were developed independently of their studies (Oral and written communication in a foreign language and Appreciation of diversity and multiculturalism).

In Table 3, we can see that among a large number of items there are significant linear associations ($0.5<r<0.7$), and between the Ability to manage information – gathering and analyzing information from various sources and Research and inquiry – research skills items there is a strong linear association ($0.7<r<0.9$). All this practically means that students who have more developed research skills also have greater abilities in information management.

Principal Components Analysis (PCA)

Factor analysis (PCA) will explain the common variance of a set of competencies, i.e., the variability within groups of competencies. After the analysis of the matrix of correlations among the items (in order to assess the appropriateness of the data for the analysis), 16 competencies of positive and negative opinions of students were taken into account.

The value of the Kaiser-Meyer-Olkin Measure of Sampling Adequacy=0.762 and Bartlett's specificity test reached statistical significance ($Sig<0.001$), which indicates the factorability of the correlation matrix, i.e., factor analysis is justified.

According to Kaiser's criterion, we observe only components whose characteristic value is 1 or more. The analysis of the main components revealed the presence of five components with characteristic values greater than 1, namely 4.544, 1.836, 1.435, 1.114 and 1.039, which explain 28.40%, 11.47%, 8.97%, 6.96% and 6.49% of the variance, i.e., they explain a total of 62.29% of the variance. In the curve diagram, the existence of the first breaking point between the second and third components can be observed. In order to establish the number of factors that should be retained, a parallel analysis was performed.

Table 4

Comparison of characteristic values obtained from Principal Components Analysis (PCA) and threshold values obtained by parallel analysis

Number of the component	Generated characteristic value from PCA	Value obtained by parallel analysis	Decision
1	4.544	1.6423	accept
2	1.836	1.4986	accept
3	1.435	1.3889	accept
4	1.114	1.2948	reject
5	1.039	1.2109	reject

The results of the parallel analysis support the conclusion made on the basis of the curve diagram, that three factors whose characteristic value exceeds the corresponding threshold value obtained by means of an equally large matrix of random numbers (16 variables × 137 respondents), should be retained for further research.

However, in the SPSS report in the Table Component Matrix, it was observed that most items have fairly large factor weights (above 0.45) for two components, while very few items have factor weights for the other three components, indicating that a two-factor solution would be more appropriate.

After Oblimin rotation, the components showed a moderate intercorrelation (r=0.509). Analysis of the structure matrix indicated good discrimination between the factors. For Component 1 (Managerial skills), the lowest loading factor is 0.480 for the Appreciation of diversity and multiculturalism item, but it is still higher than the highest loading of the Flexibility and adaptability item – the ability to adapt to a new situation (0.407) of Component 2 (Core skills) to Component 1 (Managerial Skills). The Component 2 (Core skills) also showed good discrimination: the lowest loading factor (0.491) for the Oral and written communication in a foreign language item is still higher than the highest loading (0.417) for the Ability to apply knowledge in practice item, Component 2 (Core skills) on Component 1 (Managerial skills).

Table 5

Pattern and structure matrix for PCA with oblimin rotation of two factor solution

Competence	Pattern		Structure		Communalities
	Component 1	Component 2	Component 1	Component 2	
Communicativeness	**0.743**	-0.209	**0.673**	0.037	0.492
Leadership ability - leadership and responsibility	**0.714**	0.099	**0.747**	0.335	0.567
Cooperation - the ability to work in a team	**0.702**	-0.115	**0.663**	0.117	0.452
Ability to learn	**0.671**	-0.036	**0.660**	0.186	0.436
Initiative and self-management	**0.622**	0.132	**0.666**	0.338	0.459
Ability to apply knowledge in practice	**0.571**	0.328	**0.680**	0.417	0.557
Ability to organize and plan	**0.517**	-0.004	**0.516**	0.167	0.466
Appreciation of diversity and multiculturalism	**0.433**	0.142	**0.480**	0.285	0.248
Ability to solve problems	-0.115	**0.733**	0.233	**0.730**	0.533
Basic computer skills	-0.029	**0.694**	0.201	**0.685**	0.470
Ability to manage information - gathering and analyzing information from various sources	-0.074	**0.677**	0.150	0.653	0.431
Critical thinking	-0.089	**0.591**	0.106	**0.561**	0.322
Ability to make decisions	0.216	**0.485**	0.376	**0.556**	0.355
Creativity/innovation	0.117	**0.450**	0.266	**0.489**	0.351
Oral and written communication in a foreign language	0.004	**0.430**	0.146	**0.431**	0.359
Flexibility and adaptability - the ability to adapt to a new situation	0.365	**0.370**	0.407	**0.491**	0.186

In Table 4, for the two-factor solution for the competency items, we can see that each item has only one component with a large factor weight, while each component has been given large factor weight according to numerous variables. The main items for Component 1 (Managerial Skills), whose factor weights are greater than 0.65, are: Communicativeness, Leadership ability – leadership and responsibility, Cooperation – the ability to work in a team, and Ability to learn. For Component 2 (Core skills), the main items are: Ability to solve problems, Basic computer skills, and Ability to manage information – gathering and analyzing information from various sources. What can also be seen from Table 4 from the Communalities column (part of the variance explained by common factors for each variable) is that the Flexibility and adaptability – the ability to adapt to a new situation item has the smallest Communalities 0.186, but also the smallest factor weight (0.370) for Component 2, and the Appreciation of diversity and multiculturalism item has Communalities 0.248 and the lowest factor weight (0.433) for Component 1, which indicates that these items may not fit well in this component with other items.

The results of this analysis support the division of skills into two groups of components. The first group of components is nominally related to static competencies and can be defined as the innate cognitive capacity of an individual to effectively manage and understand different forms of behavior. The second group of components is recognized as the equivalent of dynamic competencies, whose capacity depends on the influence of external forces, to ensure a high level of their applicability by the individual.

Conclusion

The current educational needs of each student are aimed at meeting different educational goals. Depending on their interests, it is important to categorize competencies in order to prioritize them in the educational context. In this study, the authors tried to comply with the framework of the Ministry of Education of the Republic of Serbia, which foresees dominant competencies for the future. While higher education institutions are theoretically committed to effectively improving student knowledge for practical application after graduation, this research highlights variation in the effectiveness of competency-based education across variables.

What is most visible in this research is that the level of success in instilling competencies in students cannot be considered a very successful process. The obtained results indicate that there is a significant space available in the transformation of educational programs, in order to achieve a high level of success in this process. This is especially evident in the segments that contain analytics, critical thinking, multifunctionality and multiculturalism. Although the obtained results do not indicate a negative tendency on these issues, there is a certain kind of ambivalence, which indicates that the respondents believe that there is a need for additional knowledge about these elements. Such attitudes open up space for Faculties to turn more to aspects that combine different types of students' cognitive abilities and to establish an education system that will increase their knowledge in these segments. Although there is no solid evidence that private faculties in Serbia do not contribute effectively enough to the growth of student competencies, it is clear that

there is not enough alignment between student expectations, faculty curricula, and market expectations. Strengthening the program contents in the direction of increasing the competencies during the studies, must be imperative for higher education institutions.

This paper aims to highlight the success of equipping students with competencies and to motivate all stakeholders to become more actively involved in developing competency-based education. The success of this approach can impact not only the reputation and sustainability of private education but also the overall economic and market growth of the Republic of Serbia.

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Značaj visokoškolskih ustanova za unapređenje ključnih kompetencija u 21. veku u Republici Srbiji

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Apstrakt *Na dinamičnom i promenljivom tržištu rada sve više se primećuje nesklad između potražnje i nedovoljne ponude kvalifikovanih kandidata. Autori su postavili zadatak da identifikuju skup kompetencija koje se smatraju ključnim u 21. veku i koje treba aktivno razvijati u visokoškolskim ustanovama. U tom kontekstu formulisan je cilj rada: identifikacija ključnih kompetencija koje su ciljano, planski i sistematski implementirane u obrazovni sistem. Istraživanje je sprovedeno na uzorku od 137 studenata na dva privatna univerziteta u Republici Srbiji. Utvrđeno je da postoje jake korelacione veze između određenih kompetencija razvijenih tokom studija i nezavisno od studija. Studenti sa bolje razvijenim istraživačkim veštinama takođe imaju i veće sposobnosti u upravljanju informacijama. Rezultati faktorske analize podržavaju podelu veština na dve grupe komponenata. Prva grupa komponenata je nominalno povezana sa statičkim kompetencijama i može se definisati kao urođeni kognitivni kapacitet pojedinca za efikasno upravljanje i razumevanje različitih oblika ponašanja. Druga grupa komponenata prepoznata je kao ekvivalent dinamičkih kompetencija čiji kapacitet zavisi od uticaja spoljnih faktora.*

Ključne reči: *ključne kompetencije, visoko obrazovanje, privatni univerziteti, tržište rada, faktorska analiza.*