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Disciplinary Differences and University Teachers' Perspectives: Possibilities of Applying the Teaching Perspectives Inventory

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Based on the conceptual and empirical framework of five perspectives on teaching and earlier studies that have suggested a link between teaching perspectives and teachers' academic disciplines, this paper aimed to examine the differences in the university teachers' perspectives from various academic disciplines and faculties. This research also aimed to validate the Teaching Perspectives Inventory on a sample of 526 university teachers in Serbia. The results confirmed the differences in the university teachers' perspectives and led to the conclusion that hard sciences teachers were more teacher-centred, while soft sciences teachers were more student-centred. Additionally, exploratory factor analysis indicated that the slightly modified version of the TPI is applicable and reliable to use in other educational contexts. However, it can be concluded that research on teachers' perspectives is limited to specific cultural, educational, and research contexts.

Keywords: academic disciplines, hard/soft sciences, higher education, perspectives on teaching, university teachers

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Razlike med strokami in stališča visokošolskih učiteljev: možnosti uveljavitve inventarja perspektiv poučevanja

JOVANA MILUTINOVIĆ, BILJANA LUNGULOV IN ALEKSANDRA ANĐELKOVIĆ

~ Na osnovi pojmovnega in empiričnega okvira petih perspektiv poučevanja ter starejših študij, ki so nakazale na povezavo med perspektivo in akademsko disciplino, ki ji pripada učitelj, je prispevek skušal preiskati razlike med pogledi visokošolskih učiteljev različnih strok in fakultet. Raziskava si je obenem prizadevala validirati inventar perspektiv poučevanja na vzorcu 526 visokošolskih učiteljev v Srbiji. Rezultati potrjujejo, da razlike med pogledi visokošolskih učiteljev obstajajo, kar je pripeljalo do zaključka, da znotraj naravoslovnih znanosti prevladuje na učitelja osredinjen pristop, družboslovne vede pa zagovarjajo osredinjenost na študenta. Poleg tega je eksplorativna faktorska analiza pokazala, da je nekoliko spremenjena različica inventarja perspektiv poučevanja uporabna in zanesljiva tudi v drugih izobraževalnih kontekstih, lahko pa se sklene, da je preiskovanje učiteljskih pogledov omejeno s kulturnimi posebnostmi ter z izobraževalnimi in raziskovalnimi okoliščinami.

Ključne besede: akademske discipline, naravoslovne/družboslovne vede, visoko šolstvo, perspektive poučevanja, univerzitetni učitelji

Introduction

Current higher education policies at the international level are directed towards improving the quality of higher education, with a particular focus on the issue of raising the quality of university-level teaching and pedagogical training for university teachers (Aškerc Veniger, 2016; ENQA, 2015; High Level Group on the Modernisation of Higher Education, 2013). The increased need to ensure the quality of teaching placed new demands on university teachers; considering the development of adequate models and programmes through which it is possible to improve the quality of teaching became very important. Results of numerous studies (Gibbs & Coffey, 2004; Ho et al., 2001; Hubball et al., 2005; Postareff et al., 2007; Potter et al., 2015) showed that well-structured and long-term programmes of pedagogical training of university teachers have a significant influence on ways teachers conceptualise lectures, their approaches to teaching, and students' approaches to learning.

However, it is important to note that university teachers do not represent a homogenous group but rather have different socio-cultural, educational, and professional backgrounds. They project and bring different sets of cultural and professional experiences into the educational environment, as well as their personal values and beliefs. Those experiences, values, and beliefs influence and further shape the way university teachers perceive and understand teaching. In this context, it is presupposed that the conceptions of teaching are influenced, if not determined, by teachers' personal traits, professional development, specialisation, previous experience, and other socio-cultural variables (Chan, 1994). However, it has not yet been fully determined to what extent these variables can influence teachers' perspectives on teaching.

Earlier studies have suggested a possible link between teaching conceptions and university teachers' academic discipline. In several studies, it has been concluded that teaching conceptions of university teachers significantly vary in different disciplines; for example, among respondents from the soft sciences, the conceptual change/teaching approach focused on the student has predominated, while for the respondents from the hard sciences, the most predominant has been the transfer of information/teaching approach focused on the teacher (Kemp, 2013; Lindblom-Ylänne et al., 2006; Lueddeke, 2003; Päuler-Kuppinger & Jucks, 2017; Postareff et al., 2008; Stes & Van Petegem, 2014). The research results, therefore, point to the differences between teachers of hard and soft sciences and suggest they prefer two rather different and contrasting concepts of teaching: information transmission and conceptual change. This paper, based on a conceptual and empirical framework developed by Pratt (1998), provides

a certain level of validation of Pratt's construct (1992) of five perspectives on teaching and addresses differences in university teachers' perspectives on teaching, taking into consideration their academic discipline and their faculty affiliation.

Conceptual Framework and Use of TPI in Previous Research

When researching the efficacy of teaching in higher education, many researchers were focused on the field of examining teachers' beliefs and sought to define and empirically confirm teaching conceptions (Chan, 1994; Dall'Alba, 1991; Feiman-Nemser, 1990; Samuelowicz & Bain, 1992; Trigwell et al., 1994). Their analysis resulted in a significant agreement on certain features; categories used independently by different researchers to describe conceptions about teaching have shown a high level of concordance. Drawing from previous research, Pratt (Pratt, 1992; Pratt, 1998; Pratt & Collins, 2000) developed a conceptual framework consisting of five perspectives on teaching. In the paper that led to the development of that framework, Pratt (1992, p. 203) defined conceptions about teaching as cognitive representations of the way teachers think and understand the concept of teaching. Those conceptions are rooted in cultural, societal, historical, and personal frameworks of meaning, and they represent a lens through which teachers observe teaching and learning. Pratt would later use the term 'teaching perspectives' (Pratt, 2002; Pratt & Associates, 1998), emphasising that perspectives represent an intertwined set of beliefs and intentions that guide and justify teachers' actions (the five perspectives are: *Transmission*, *Apprenticeship*, *Developmental*, *Nurturing*, and *Social Reform*). Based on these premises, the TPI instrument was developed (*Teaching Perspectives Inventory*).

The TPI instrument has found wide application in research in many countries on samples of respondents who belong to various cultural contexts and speak different languages (Collins & Pratt, 2011). For the subject of this research, the studies focusing on determining differences in the teaching perspectives of teachers from different faculties and academic disciplines are particularly relevant. Thus, the research conducted by Rotidi et al. (2017) on the subsamples of Greek university teachers and university teachers from other countries (the international sample was drawn from the TPI database) aimed to examine the differences in perspectives between teachers of different faculties as clustered in Biglan's typology (Biglan, 1973). It was determined that Greek teachers from soft disciplines scored higher on the Social Reform, Developmental, and Nurturing perspectives compared to the teachers from hard

disciplines. Nevertheless, this research concluded that although disciplinary differences are real, they are small compared to potential interpersonal differences or even international differences (Rotidi et al., 2017, p. 11).

In the study involving teachers from a research university in the southern United States (Deggs et al., 2008), it was determined that significant differences between teachers of different faculties were only present with respect to the apprenticeship perspective.

Another research study conducted at the *Autonomous University of Yucatan in Mexico* (Canto y Rodríguez & Burgos Fajardo, 2011) also showed that there are differences between teachers in regards to the representation of certain teaching perspectives; teachers from the Faculties of Social Science and Architecture, Art and Design scored higher on the Developmental perspective, while the Nurturing perspective was shown to be more dominant with respondents from the Faculty of Health Sciences and Architecture, as well as the Faculty of Art and Design.

A study conducted at Oklahoma State University (Matofari & Edwards, 2017) showed that there are certain differences in perspectives among teachers from different faculties; teachers from the College of Arts and Sciences had significantly higher scores on the Developmental perspective compared to the teachers from other faculties.

The Present Study and Research Aim

Large individual differences in the experience and competence in teaching exist among university teachers in Serbia, since a vast number of them did not acquire any education or training in pedagogy, didactics, or teaching methods throughout their careers. Consequently, a traditional approach to teaching and prioritising basic knowledge and the content rather than how that knowledge is passed on to others negatively affects the teaching work and its results.

Although the TPI is a widely used instrument for examining teaching perspectives in many countries and in different populations, no study has been conducted in Serbia to validate this instrument on a sample of university teachers. The first goal of this research was to examine the factor structure of the TPI while assuming that the original five-factor structure of the questionnaire would be confirmed. The second goal was to determine the reliability of the Serbian version of the TPI, and it was assumed that high reliability would be confirmed as in previous studies (Chan, 1994; Collins & Pratt, 2011). The third research goal was to explore the differences in teaching perspectives among university teachers in relation to the academic discipline and their faculty

affiliation. Based on the results of previous studies (Canto y Rodríguez & Burgos Fajardo, 2011; Deggs et al., 2008; Matofari & Edwards, 2017; Rotidi et al., 2017), it was hypothesised that the academic discipline and faculty would have influenced the university teachers' perspectives on teaching.

Method

Participants

The research sample consisted of a total of 526 university teaching staff, specifically 65.8% (N = 346) teachers and 34.2% (N = 180) associates. The participants were teachers and associates from eleven faculties within two public universities in Serbia; 342 (65%) from the University of Novi Sad and 184 (35%) from the University of Niš, with 57.2% (N = 301) female and 42.8% (N = 225) male respondents. The sample was suitable and based on the socio-demographic characteristics of the participants, it was concluded that all representative groups of university teachers in Serbia were included; teachers of all academic titles, different ages and different lengths of work experience in teaching at the university level. According to the official data provided by the Statistical Office of the Republic of Serbia (Republički zavod za statistiku Republike Srbije, 2021), about 15% of the teaching staff employed at the University of Novi Sad and the University of Niš participated in this research.

When it comes to the classification of university teachers from different academic disciplines, the predominant model is Biglan's three-dimensional classification (Biglan, 1973), according to which the sciences are divided into Hard/Soft, depending on their methodological rigour and objectivity, Pure/Applied, according to their orientation towards application, and Life/non-Life, depending on whether the disciplines deal with the research of living or non-living subject matter. Regarding the classification of sciences into hard and soft, it is important to note that, based on the revised Biglan classification model (Stoecker, 1993), the teachers from the health sub-discipline are generally more similar to soft sciences than to hard sciences in terms of different pedagogical dimensions (Aškerc Veniger & Kočar, 2018). Furthermore, in the context of the division of sciences into Hard/Soft and Pure/Applied, some studies (Lindblom-Ylänne et al., 2006) show that university teachers from hard and soft sciences are particularly polarised. Using these results, as well as the classifications of disciplines in previous research dealing with teaching approaches (Lindblom-Ylänne et al., 2006; Mladenovici et al., 2022; Stes & Van Petegem, 2014; Trigwell & Prosser, 2020), the classification of teachers from different disciplines was done in the manner indicated by Biglan's classification (Becher & Trowler, 2001;

Biglan, 1973). The structure of the sample with regard to faculties and hard/soft sciences is shown in Table 1.

Table 1

Structure of the Sample with Regard to Faculties and Hard/Soft Sciences

Hard/Soft sciences and faculties	N	%
	526	100
Hard sciences	368	70
Technical Sciences	110	20.9
Mechanical Engineering	17	3.2
Medicine	134	25.5
Agriculture	39	7.4
Sciences	57	10.8
Technology	11	2.1
Soft sciences	158	30
Sport and Physical Education	30	5.7
Economics	18	3.4
Philosophy	77	14.6
Education	25	4.7
Law	8	1.5

Instrument

The instrument used in the research was the TPI (*Teaching Perspectives Inventory*) by Pratt (Collins & Pratt, 2011; Pratt, 1998) with previously obtained permission and consent of the author. The original instrument was translated into Serbian by experts in the field of educational sciences and university teaching using the back-translation method, which is most often recommended for the validation of instruments in cross-cultural research (Cha et al., 2007). The instrument consisted of 45 items that examined five perspectives on teaching, which were assessed on a five-point Likert scale (1=never, 5=always; 1=strongly disagree, 5=strongly agree). Additionally, the instrument was structured through three subscales; each one contained 15 items that examined the Beliefs, Intentions, and Actions of teachers. The data of the original study conducted by the authors of the instrument Collins and Pratt (2011) indicated satisfactory psychometric properties, and the values of the Cronbach's alpha for each of the subscales were: Transmission (.72), Apprenticeship (.73), Developmental (.70), Nurturing (.82), and Social Reform (.83), with an average value of .76. Additionally, in the original study (Collins & Pratt, 2011, p. 366), psychometric

characteristics of the instrument were also checked using factor analysis, which confirmed the five-factor solution that explained the 39.7% of the variance.

Research Design

Data collection was conducted online during November and December 2019, and participants could anonymously complete the questionnaire when it suited them best within three weeks. Participation in the research was voluntary. Before completing the questionnaire, participants were informed about the goals, needs, and importance of the research. Data were analysed using the SPSS software package version 25.

Results

All subscales determined in our study had a normal distribution (Skewness and Kurtosis <1), except for the Apprenticeship subscale (Skewness = -1.24 and Kurtosis = 2.43); the mean values ranged from 3.57 to 4.52 (Table 2).

Table 2

Descriptive Statistics of the TPI on the Sample Consisting of University Teachers in Serbia

Perspective	N	Minimum	Maximum	M	SD	Skewness	Kurtosis	Cronbach's α
Transmission	526	3.14	5.00	4.45	0.43	-.64	-.27	.71
Apprenticeship	526	1.83	5.00	4.52	0.45	-1.24	2.43	.75
Modelling	526	1.25	5.00	4.26	0.63	-.76	.32	.70
Nurturing	526	1.22	5.00	3.67	0.77	-.47	-.15	.86
Social Reform	526	1	5.00	3.57	0.87	-.63	.01	.87

Factor Structure of the TPI

In order to validate the TPI, exploratory factor analysis was applied using the principal components method and given Promax factor rotation. Bartlett's test of sphericity ($\chi^2 = 9889.63$; $p < .01$) was statistically significant, which indicated the justification of the data compression procedure. The Kaiser-Mayer-Olkin (KMO) indicator of representativeness was .924, suggesting that sampling was adequate and that the representativeness of the questionnaire was high. Horn's parallel analysis was used as a criterion for extracting the numbers of factors, and it was determined that five factors have a characteristic root value higher than that which would be obtained on the basis of random values obtained on analogue data. A five-factor solution that explained the

questionnaire variance of 45.93% was adopted. Results of the Exploratory Factor Analysis (EFA) indicated that some items should be omitted from further analyses and the scale was reduced accordingly (Table 3).

Table 3

Factor Matrix with Factor Loadings on Five Factors of the TPI

Items	Transmission	Apprenticeship	Modelling	Nurturing	Social Reform
T6 I want students to achieve good results on the test as a result of my teaching	.762				
T4 My job is to present the content and prepare the students for the exams	.703				
T1 I cover planned content very precisely and at a pre-determined time	.583				
T5 I expect students to possess good knowledge of information related to the subject	.580				
T3 I make it clear to my students what knowledge they need to possess	.491				
T2 I carefully follow the course content and objectives	.464				
T7 Learning can be improved if the goals are determined in advance	.312				
A1 I put my course in the practical or applied context		.771			
A5 I expect students to know how to apply the content from my subject in a real situation		.637			
D4 My intent is to help students develop more complex ways of thinking		.636			
A4 My intent is to demonstrate how to behave or what to do in realistic scenarios		.628			
D6 I want students to see how complex and intertwined things are		.429			
A2 I apply the skills and methods of an efficient lecturer		.357			
A7 To be an effective teacher, one must be an effective practitioner			.776		
A8 The best way to learn it is through work with good practitioners			.756		
A9 Knowledge and its application cannot be separated			.593		
T9 For a teacher to be efficient, they first must be an expert in the area they teach			.431		
N2 I encourage the expression of feelings and emotions during lectures				.897	

Items	Transmission	Apprenticeship	Modelling	Nurturing	Social Reform
N3 I share my feelings and expect my students to do the same				.830	
N7 It is important to me to acknowledge my students' emotional reactions				.714	
S2 During lectures, I put more focus on values rather than knowledge				.707	
N6 When teaching, I try to establish a balance between caring and setting challenges				.638	
A3 I organise classes so beginners can learn from the more experienced students were				.503	
N8 When teaching, my priority is building students' self-confidence				.434	
N5 I expect students to improve their self-esteem through my lectures				.351	
S5 I expect students to be dedicated to changing our society					.836
S8 Individual learning is not enough without a social change					.815
S3 I help students notice the need for change in the society					.773
S7 My teaching is focused on social changes rather than an individual student					.753
S6 I want my students to become aware of things they take for granted in our society					.736
D8 Teaching should be focused on the development of qualitative changes in thinking					.519

Regarding the reliability of the Serbian version of the instrument, the values of Cronbach's alpha showed that all five subscales had satisfactory or good reliability, with the Social Reform subscale having the highest reliability (.87) and the Modelling subscale the lowest (.70), while the reliability of the scale as a whole was .91 (Table 2). Additionally, good reliability was found for all three subscales related to Beliefs (.79), Intentions (.78), and Actions (.77). Based on Pearson's correlation coefficient, it was concluded that there was a positive correlation between all latent factors ranging from low (.15) to moderate (.55) and no correlations above .85 were registered.

Teaching Perspectives regarding the Disciplinary Differences

In order to determine the differences in the perspectives on the teaching of teachers from different academic disciplines, the MANOVA procedure

was conducted (Table 4). Respondents were assigned to a group of hard or soft sciences based on the faculty at which they were employed. The model as a whole was statistically significant ($F(5,520) = 6.798, p = .000$), and statistically significant differences were registered in the perspectives of Social Reform and Nurturing. The soft sciences teachers had higher scores on these perspectives compared to the hard sciences teachers.

Table 4

Differences in the Perspectives on Teaching Depending on the Hard/Soft Sciences

Perspective	Sciences	M	SD	F	df	df _{error}	p
Transmission	Hard	4.47	0.42	3.30	1	524	.070
	Soft	4.39	0.44				
Apprenticeship	Hard	4.52	0.46	0.18	1	524	.673
	Soft	4.53	0.40				
Modelling	Hard	4.29	0.62	3.10	1	524	.079
	Soft	4.19	0.66				
Nurturing	Hard	3.62	0.79	5.39	1	524	.021
	Soft	3.78	0.68				
Social Reform	Hard	3.45	0.89	22.70	1	524	.000
	Soft	3.83	0.72				

The impact of academic disciplines on teaching perspectives was additionally examined regarding the faculties where the teachers worked. MANOVA was applied, and the model as a whole was statistically significant ($F(60,2387) = 2.151, p = .000$). Statistically significant differences were registered in all five teaching perspectives. In order to determine the differences in each perspective among teachers from various faculties, the Scheffe post hoc test was applied. The results are presented only for those faculties where statistically significant differences were found (Table 5).

Table 5*Differences in Perspective on Teaching Based on Faculties*

Perspective	Faculty of	M	SD	F	df	df _{error}	p
Transmission	Sport and Physical Education	4.52	0.45	3.74	10	510	.000
	Philosophy	4.32	0.46				
	Technical Sciences	4.31	0.43				
	Medicine	4.59	0.37				
	Economics	4.33	0.34				
	Sciences	4.40	0.44				
	Agriculture	4.59	0.35				
Apprenticeship	Philosophy	4.48	0.39	2.77	10	510	.002
	Technical Sciences	4.41	0.54				
	Medicine	4.66	0.38				
	Sciences	4.39	0.41				
Modelling	Philosophy	4.05	0.72	2.88	10	510	.001
	Technical Sciences	4.13	0.67				
	Medicine	4.45	0.52				
	Economics	4.11	0.41				
	Sciences	4.24	0.65				
	Agriculture	4.34	0.63				
	Education	4.48	0.60				
Nurturing	Sport and Physical Education	3.95	0.71	2.87	10	510	.001
	Philosophy	3.68	0.70				
	Technical Sciences	3.46	0.82				
	Medicine	3.83	0.73				
	Education	3.98	0.52				
	Sciences	3.40	0.73				
	Agriculture	3.72	0.73				
Social Reform	Sport and Physical Education	3.76	0.83	3.28	10	510	.000
	Philosophy	3.89	0.67				
	Technical Sciences	3.40	0.91				
	Medicine	3.53	0.94				
	Education	3.74	0.60				
	Sciences	3.20	0.80				
	Agriculture	3.62	0.73				
	Law	4.02	0.91				

Discussion

Numerous studies indicated the importance and role of teachers' beliefs and perspectives on teaching (Dall'Alba, 1991; Collins & Pratt, 2011; Feiman-Nemser, 1990; Kemp, 2013), and the results confirmed that there is a correlation between these beliefs and teachers' actions in the direct teaching practice (Kember & Kwan, 2000; Trigwell & Prosser, 1996; Samuelowicz & Bain, 2001). However, in the educational context of Serbia, there is an obvious lack of standardised instruments for examining the perspectives on teaching and teacher beliefs, especially in the context of higher education. Having this in mind, our first goal of this research was to validate the TPI as a widely used instrument in international studies and to examine the possibility of its application in the educational context in Serbia.

The EFA results indicated that after reducing the scale, the five-factor structure of the instrument was obtained as originally assumed, but it differed from the original factor structure (Collins & Pratt, 2011) and was more similar to scale validations in other studies (Chan, 1994; Lake & Matters, 2009; Misieng, 2013). In our study, it was found that the four extracted factors, as well as most of the items that these factors gathered, corresponded to the original structure of the scale. However, the factor related to the Developmental perspective was not extracted separately, as six items from this subscale were omitted due to low loadings and high cross-saturation, and the remaining three items belonged to the other subscales (Apprenticeship and Social Reform). Such results were obtained during the adaptation of the TPI in the Portuguese population as well, where four factors were also extracted, and the items related to the Developmental subscale were distributed to other factors (Rebelo et al., 2007, as cited in De Lima et al., 2014, p. 219). Additionally, a four-factor scale structure was determined in a study in New Zealand, with the Developmental subscale being reduced the most and attached to the Apprenticeship subscale (Brown et al., 2009).

The modified scale contained 31 items that were distributed into five factors: Transmission, Apprenticeship, Modelling, Nurturing, and Social Reform. These factors accurately represent the whole scale of teaching perspectives, as they include four factors from the original scale (Collins & Pratt, 2011) and a fifth factor that has been extracted and described in another study (Chan, 1994). The Apprenticeship perspective factor was divided into two factors, both of which relate to practice but have been found to measure two different constructs: Apprenticeship-Practice and Apprenticeship-Modelling (Chan, 1994).

The first factor identified in our study included six items from the original scale and was related to the Transmission perspective, which was based on the

belief that certain knowledge and teaching content should be effectively and accurately transmitted to students (Pratt, 1998). The second factor was related to the Apprenticeship perspective, and it included four items from the original scale as well as two additional items. These items indicated that learning is best realised through practical application and that knowledge and practice are inseparable concepts (Chan, 1994). The third factor gathered three items from the original Apprenticeship subscale and one more item, which all indicated that 'the role of the teacher was to function as a role model, to demonstrate desirable ways and values of working' (Chan, 1994, p. 145). Accordingly, the third factor is called Modelling. The fourth factor contained six items from the original subscale corresponding to the Nurturing perspective and two additional items. All items indicated that teachers are committed to creating an environment that provides support to all students but also a challenge in terms of progress and learning (Pratt & Collins, 2000). The fifth factor referred to the Social Reform perspective and contained five items from the original subscale, which all implied the focus of teaching on influencing changes in society (Pratt & Collins, 2000).

The differences found in our research regarding the factor structure of the TPI in relation to the original structure can be explained by the fact that individual items are interpreted differently by different respondents. An example of this is the item *Good teaching of the content is like performing a theatrical play*, which could be misinterpreted or even negatively interpreted in the educational context in Serbia. Also, items that had high cross-saturation, when translated into Serbian, could content-wise refer to several perspectives on teaching. Such findings may indicate that certain items have different meanings for respondents in Serbia compared to respondents in English-speaking countries, which is the most common challenge when translating and adapting instruments in a cross-cultural context (Cha et al., 2007; Sousa & Rojjanasrirat, 2011).

The second goal of the research was to examine the reliability of the Serbian version of the TPI, and it was determined that the modified scale satisfied other psychometric criteria. The reliability of the whole scale was very high (.91), with good reliability of all three subscales related to Beliefs, Intentions and Actions (above .70), as well as good reliability of all five subscales related to teaching perspectives (above .70). Such data were also obtained during scale validation in other populations (Chan, 1994; Misieng, 2013) and indicated that the degree of similarity of all retained items in the revised questionnaire was high and had the same unique subject of measurement. It was also found that all selected factors positively correlated with each other in the range from low ($r = .15$) achieved by the factors Transmission and Social Reform to moderate correlations ($r = .55$) between the factors Nurturing and Social Reform, which

is in line with data by the authors of the scale (Collins & Pratt, 2011). Moderate and low correlations are indicators that the extracted factors in the modified version of the scale present different constructs, with each one of them measuring a different perspective on teaching.

Examining the latent structure of the TPI, it can be concluded that university teachers in Serbia very clearly recognise and define their role as a teacher who transmits teaching content, cares for students, pays attention to social values, and connects university teaching with practice and work in a real-life context. However, an additional isolated factor related to the perspective of the teacher as an expert who guides students and models their learning processes indicates that in the educational context in Serbia the role of teachers and their importance in higher education has been more emphasised, which was found in research in another educational context (Canto y Rodríguez & Burgos Fajardo, 2011). In this sense, this research represents a contribution to the validation of the TPI in other social and cultural circumstances since, in addition to similarities with the original study, it also indicates certain specifics that occur in different educational contexts and cultural traditions.

Academic Disciplines and Teaching Perspectives

Studies and research indicate the existence of different epistemic cultures in the production of knowledge of researchers and scientists belonging to different academic disciplines (Knorr Cetina, 1999), the connection between culture and knowledge of a particular academic discipline and academic tribes and territories (Becher & Trowler, 2001), and even the differences among scientists belonging to the same academic discipline (Horowitz et al., 2019). In addition to research and scientific approaches, such differences are reflected in the teaching process, since university teachers use those teaching methods that reflect the epistemological assumptions of their academic discipline (Neumann et al., 2002) and with which they identify the most (Neumann, 2001). Differences depending on academic discipline have also been identified when it comes to perspectives on teaching (Deggs et al., 2008; Rotidi et al., 2017), as well as teaching approaches that are teacher-centred or student-centred (Kemp, 2013; Lueddeke, 2003; Pähler-Kuppinger & Jucks, 2017).

Accordingly, the third goal of this research was to examine the differences in teaching perspectives among teachers of different academic disciplines and different faculties. Statistically significant differences were identified between teachers from hard and soft sciences regarding the Nurturing and Social Reform perspectives, with teachers of soft sciences scoring higher on these perspectives. These results indicated that teachers in Serbia who belong to the

social sciences and humanities are more focused on referring to the importance of social change, as well as on caring for students compared to teachers of natural, technical, and technological sciences. Very similar results were obtained in a study conducted on a population of Greek teachers, for which it was found that teachers of soft sciences had higher results in the Nurturing, Social Reform, and Developmental perspectives (Rotidi et al., 2017). In contrast, in the same research, hard sciences teachers from the international sample/TPI database had higher scores on these perspectives than teachers of soft sciences, which was contrary to previous and expected findings.

Some authors have pointed out that there are correlations between the perspectives of Transmission and Apprenticeship and that these two concepts are related and teacher-centred, while the perspectives of Nurturing, Social Reform, and Developmental are interrelated and student-centred (Chan, 1994, p. 100). Our findings are consistent with the findings of other studies (Kemp, 2013; Lindblom-Ylänne et al., 2006; Lueddeke, 2003), which confirmed that the teachers of soft sciences have a more student-centred perspective than teachers of hard sciences. The identified differences could be explained by the fact that teachers in different disciplines had gone through different processes of socialisation and education and accordingly adopted different concepts of teaching (Samuelowicz & Bain, 2001), as well as that students (un)willingly accept the norms of teaching and learning that exist in certain disciplines (Jarvis-Selinger et al., 2007).

The differences between academic disciplines are even more observable when comparing teachers from different faculties. In this case, statistically significant differences are recognised in all five perspectives on teaching, which further confirms the findings that there are differences between academic disciplines regarding the teaching perspectives (Deggs et al., 2008). The results again point to the conclusion that there are differences between teachers of soft and hard sciences, which is the most common variable in research on differences between disciplines (Kember & Leung, 2011), although exceptions have been observed in some perspectives. These differences may be the result of soft science teachers being more focused on teaching and learning, while hard science teachers could be more research-oriented (Neumann, 2001).

The perspective of Transmission and the approach to teaching as knowledge transmission were the least present among teachers from the Faculty of Technical Sciences and the Faculty of Philosophy and the most among teachers from the Faculty of Medicine. These results were not surprising given that 'health disciplines require students to acquire a body of basic knowledge which is reasonably well established' (Kember & Leung, 2011, p. 294). The Apprenticeship

perspective, which implies that learning is best realised through practical application, was the least present among teachers from the Faculty of Sciences and the most among the teachers from the Faculty of Medicine. The reason for such differences can be found in the structure of study programmes, since practical skills are developed in medical students through clinical and professional practice, which is not the case in natural science study programmes (Kember & Leung, 2011). The teacher as a significant factor in modelling the learning process is a perspective that was the least present at the Faculty of Philosophy but surprisingly the most at the Faculty of Education, although both faculties belong to the soft sciences and study-related fields. Teachers from the Faculty of Education, in our research, had very strong Nurturing, Modelling, and Social Reform perspectives, which confirmed the results that 'teachers who had pedagogical experience, knew their job expectations and had a nurturing personality perceived themselves as role models' (Chan, 1994, p. 170). The Nurturing perspective was most prevalent among teachers from the Faculty of Education, as it was in previous research (Matofari & Edwards, 2017), followed by the Faculty of Sport, which was confirmed by pre-service teachers of physical education (Hyndman, 2014) and the least among teachers from the Faculty of Sciences. These results further confirmed the findings that student-centeredness is more present in soft science and medicine teachers than in hard science teachers (Kember & Leung, 2011; Kemp, 2013; Neumann, 2001). Regarding the perspective of Social Reform, expectations were confirmed, and the approach to teaching focused on social change was most present among the teachers from faculties belonging to soft sciences (Law, Philosophy, Education, Sport). Such results have been confirmed in other studies (Rotidi et al., 2017), since teaching at these faculties implies a high level of discussion, the exchange of opinions, and the development of critical thinking (Kember & Leung, 2011).

It is important to point out that teachers from the Faculty of Medicine had higher scores in almost all dimensions compared to other teachers (except for the Social Reform dimension). Such results can be justified by the fact that medical science teachers associate teaching more with practice, perceiving themselves as role models given that they are experts in practice, that due to the nature (and the epistemic culture) of the discipline a significant amount of information is transmitted during teaching but also that it is also a nurturing profession, which affects the attitude towards students (Kember & Leung, 2011). In contrast, it is interesting that teachers from the Faculty of Sciences had statistically significantly lower scores on all perspectives compared to other teachers, especially on the perspectives of Nurturing and Social Reform, which was confirmed by the results regarding pre-service teachers (Jarvis-Selinger et al., 2007). The explanation can

be found in the fact that science teachers concentrate more on conveying already grounded theories through a method of teaching that is predominantly focused on giving lectures, which reduces the nurturing approach and provides limited opportunities for students to discuss and develop practical skills (Kember & Leung, 2011). The results of our research indicate that a thorough understanding of key concepts of teaching and learning unequivocally depends on the characteristics of different domains of knowledge, academic disciplines and social milieu and that ignoring these differences leads to weakening related university practices and policies (Neumann et al., 2002).

Conclusions

As in all studies of this type, certain limitations should be mentioned. In this research, university teachers completed a questionnaire on a voluntary basis, which may mean that answers were collected from teachers who are certainly very interested and motivated to teach. Additionally, a significantly smaller number of respondents from some faculties participated in the research, which led to having a less representative sample and a lower representation of some faculties. However, it is important to emphasise that in addition to the identified differences between teachers of different academic disciplines, this research also has an additional value because it represents an analysis of perspectives on teaching in different educational and social contexts and thus contributes to previous studies and validation and application of the TPI in other countries.

Although the research is limited to specific cultural, educational, and research contexts, the significance of this study is reflected, in addition to its scientific contribution, in the practical implications of the research findings. First, the inclusion of five perspectives on teaching and the TPI scale in university teacher education programmes could provide additional support to teachers in initiating a process of reflection on their teaching beliefs that guide and justify their work. This could further contribute to changing the initial beliefs of university teachers and making adequate changes to the teaching objectives in order to improve teaching practice (Chan, 1994). Taking into account the conceptual framework of five perspectives on teaching (Pratt, 1992), which speaks in favour of the justification of a pluralistic approach to teaching, meaning the view that there is no universal answer to the question of what 'good teaching' is, the results of this research can serve as guidelines for creating and modifying programmes for acquiring the teaching competencies of university teachers. Since the results of this research clarify the differences in perspectives on

teaching, this paper emphasises the need to consider different social, cultural, and epistemic contexts of higher education and their close connection with scientific research when designing activities related to the professional development of university teachers.

Future research that would address university teachers' beliefs, intentions, and actions should further gather data on teachers' daily practice using observational and interview techniques, including assessments by other teachers and students. Since this research examined the differences between assumptions and beliefs about the teaching of university teachers from different academic disciplines, future research should investigate the relationships between perspectives on teaching university teachers and other personal and socio-cultural variables.

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