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Constructivist Beliefs and Teaching Practices in Different School Environments

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Abstract: The goals of this paper are: a) to identify dominant teachers' practices (teaching and co-operation with colleagues) as well as constructivist beliefs and b) to analyze the differences in the school environment where different groups of teachers work (more precisely, the school climate and feedback teachers receive in school). The secondary analysis (cluster analysis and ANOVA) of TALIS 2013 data enabled attaining the research goals. Four groups of teachers were identified with varying patterns of scores on three variables – constructivist beliefs (about teaching and learning), co-operation with colleagues, and teaching practices – through cluster analysis: one group with all three highly positive scores, one with all three highly negative scores, and two groups of teachers with moderately developed teaching practices but with varying beliefs and co-operation practices. All groups differ significantly in the extent to which teachers find the feedback they receive in schools important. Also, the majority of the groups significantly differ in teachers' assessment of the school climate (that is based on respect and mutual trust). A trustful and supportive school climate and frequent feedback are the characteristics of the schools where the teachers work using structured, student-centered, and enhanced teaching practices and frequently cooperate with their colleagues. The results suggest that systematic practices of co-operation with other teachers and a system of receiving and giving feedback on various aspects of professional practices, in a supportive school climate, possibly strengthen effective teaching practices regardless of the teachers' beliefs about teaching and learning. From the policy perspective, strengthening the school climate that is based on mutual respect and support and developing a system of teacher feedback is considered as possible ways of teacher professional development for meaningful and effective teaching practices.

Keywords: teaching practices, constructivist beliefs, co-operation with colleagues, school climate, teacher feedback

Introduction

If an education system tends to improve the quality of the teaching, it is essential to understand what influences effective instruction or whether it can be improved through interventions at the policy and school level, which is a path towards increasing students' achievement (Creemers & Kyriakides, 2011; Fullan & Hargreavas, 1991; Rado, 2010; Scheerens, 2000; Teodorovic, 2009; Townsend, 2007). Education policies at the system level, school policies about teaching and learning environment at the school level, and teacher beliefs and practices at the classroom level have a strong effect on students' achievements, while the most significant impact comes from the classroom level (Creemers, 1994, Creemers & Kiriakides, 2010, 2011). In this context, examining, on the one hand, the relationship between different patterns of teachers' beliefs and practices and, on the other, school-level factors (such as climate and teacher feedback) are relevant for better understanding how to help the educational system to improve its policies in order to improve the students' learning and achievement.

The Teaching and Learning International Survey (TALIS) has become one of the most important resources for educational researchers. Teachers provide information on their pre-service and in-service training and education, the feedback they have received on their practices, classroom, and school climate, i.e., on different factors of effective teaching practices that can be utilized in order to support educational systems to improve polices and, hence, students' learning (OECD, 2014).

Teaching practices. Several components of instruction have been recognized as crucial for insightful learning processes (Baumert et al., 2010; Bro phy, 2000; Scheerens & Bosker, 1997; Seidel & Shavelson, 2007). Some of them are cognitively-challenging and well-structured learning opportunities, learning support through monitoring of the learning process, individual feedback, adaptive instruction, and effective classroom and time management (Joyce & Weil, 1988). These components of effective instruction can be prompted in several ways. For example, cognitively-activating tasks may be prompted by drawing on the students' prior knowledge or through class discussion – students are encouraged to evaluate the validity of their solutions or to test more than one solution path (Stigler & Hiebert, 2004). Another way is achieving a fit between the topics and materials chosen by the teacher and the curricular demands (Attewell & Domina, 2008). Successful teachers are very

sensitive to students' misconceptions (Baumert et al., 2010). Additionally, effective support provided by the teacher considers challenging tasks, support and scaffolding students learning activities, and monitoring of the difficulties and support that addresses these difficulties while respecting students' autonomy (Greeno, Collins, & Resnick, 1996; Pintrich, Marx, & Boyle, 1993; Puntambekar & Hubscher, 2005; Turner et al., 1998, in Baumert et al., 2010).

Following such evidence, TALIS 2013 identifies the structure, student orientation, and enhanced activities as the basic dimensions of teaching practices that may lead to providing a wide range of learning opportunities for the students (OECD, 2014). Teachers that score better on these dimensions are more likely to clarify the structure and goals of the lesson to the students, to adapt their instruction and support students' participation in the lesson, as well as to summarize practices that give students the chance to work independently over a longer period of time (Vieluf, Kaplan, Klieme, & Bayer, 2012). TALIS 2013 also investigates teacher co-operation and collaboration (OECD, 2014) that support teacher reflection, which is an essential aspect of a quality pedagogical and instructional practice (Vieluf et al., 2012). According to Vieluf et al. (2012), teachers that frequently apply these practices also agree more with constructivist beliefs about the nature of teaching and learning.

Teachers' beliefs. Considering the teachers who are more likely to provide effective and insightful instruction to all students, research suggests that those could be the ones who hold more constructivist beliefs about learning and instruction. So, teachers' beliefs are related to classroom practices and, therefore, to what students learn (e.g., Muijs & Reynolds, 2001; Schroeder et al., 2011; Staub & Stern, 2002; Woolfolk Hoy, Davis, & Pape, 2006). Teachers who endorse more constructivist views provide better learning support and select more demanding tasks, thus supporting students' higher-order thinking skills (Staub & Stern, 2002). This results in better student learning outcomes, meaning that they are more likely to provide cognitively-challenging, well-structured learning opportunities as well as learning support. In other words, they deliver instruction that is conducive of the students' learning (Dubberke et al., 2008, in Baumert et al., 2010; Staub & Stern, 2002). According to some authors, beliefs can act as personal pedagogies that influence teachers' practices such as defining teaching tasks and organizing relevant knowledge and information, while others suggest that beliefs can also be changed by reflecting upon practices (Mansour, 2009).

Therefore, the relationship between beliefs and practices can be described as "dialectical" (Poulson, Avramidis, Fox, Medwell, & Wary, 2001).

Co-operation with colleagues. Teachers' professional practices also consider different kinds of interactions among teachers. As early as the 1980s, scholars recognized the importance of supportive networks for teachers (Darling-Hammond, 1984), and, during the 1990s, "communities of practice" (Lave & Wenger, 1991) was the predominate concept in educational research. These practices include the interaction among teachers, co-operation and collaboration, exchange of instructional materials, developing curricula, meeting to discuss student progress, and collective learning activities. Some of these practices have shown to be related to effective students' learning (Hattie, 2003; Vescio, Ross, & Adams, 2008) and overcoming weaknesses of traditional professional development practices (Guskey, 1986, 2002; Little, 2002). TALIS 2013 recognizes the exchange and coordination for teaching, and professional collaboration, as professional practices related to teachers' self-efficacy, job satisfaction, student-teacher relationships, and, ultimately, to students' learning (Clement & Vandenberghe, 2000; OECD, 2014). Benefits of such practices for professional development lie in the stronger focus on the social aspect of knowledge formation, involving the staff in in-depth, systematic, and collaborative activities (OECD, 2014).

School climate and teacher feedback system. The school environment supports or constrains effective teaching practices. Indicators of the school environment that are recognized by TALIS are teacher appraisal and feedback systems and school climate (OECD, 2014). Because teacher appraisal and feedback can recognize, celebrate, and expand teachers' strengths while simultaneously challenging them to address the weaknesses in their pedagogical practices (Santiago & Benavides, 2009, in OECD, 2014), such practices can have an impact on the classroom instruction and student outcomes. School climate can be described as the overall culture of the school, which encompasses the quality of the relationships between the staff as well as between the staff and the students, and the levels of co-operation, respect, and sharing (OECD, 2014). As such, it is related to the academic outcomes and emotional and social well being of the students (e.g. Fraser & Walberg, 2005; Hoy, Tarter, & Bliss, 1990; MacNeil, Prater, & Busch, 2009; Van Petegem, 2008) as well as to collegial collaboration, teachers' level of job satisfaction, and their sense of self-efficacy (Fullan, 2001; OECD, 2014). Unfortunately, on average, across TALIS countries, nearly half of all teachers report that teacher appraisal and

feedback systems in their school are largely undertaken merely to fulfill administrative requirements (OECD, 2014).

Research context

About 12% of the variance of teachers' constructivist beliefs can be explained with the the differences in educational systems (OECD, 2014). In Serbia, constructivist teaching beliefs are good predictors of the teachers' use of active forms of teaching practices (OECD, 2014). In many post-socialist countries, including Serbia, curricula with compulsory subject content are mandated by the state and are still content-centered, which can partially limit positive effects of constructivist teaching on student outcomes (Silova & Bray, 2006). The secondary analysis of TALIS 2013 data in post-socialist countries has revealed a negative correlation between the teachers' constructivist beliefs and the students' achievements (Jovanović, Jokić, & Petrović, 2016). This could possibly open up questions about the reforms in those countries and the quality of the way the constructivist teaching is introduced and implemented. Also, in Serbia, a negative correlation was noted between math teachers' student-centered support and the PISA math scores (Jovanović & Jokić, 2017). On the other hand, the first monitoring of inclusive education in Serbia shows that students feel more accepted and satisfied (higher sense of well being) in schools where teachers are perceived to foster active and meaningful student involvement in the learning, encourage an active exchange among the students, as well as between the students and the teacher, and clearly articulate high expectations from all students with regards to their achievements (Jokić, Kovač Cerović, & Rajović, 2015). These findings raise the issue of whether these constructs are related in the same way across different working environments. On average, in Serbia, when teachers receive feedback in schools, it usually follows the observation of their teaching or analysis of their students' test scores (OECD, 2014). According to most teachers (70%), this feedback comes from the principals, while only 38% of teachers say they receive feedback from other teachers and more than 30% of principals say their teachers have never been formally appraised by other teachers (OECD, 2014). On the other hand, more than 60% of teachers report that they have perceived a moderate or large positive change in their teaching practices after they had received feedback on their work in school (OECD, 2014).

In such a context, cognitive activation prompted by effective teaching (achieving the fit between the topics, materials, and curricular demands, as

well as scaffolding the students' learning activities while respecting their autonomy, etc.) represents a rather substantial challenge. However, when achieved, it represents an outstanding success, which is worthy of more in-depth understanding. Taking this into consideration, investigating teachers' beliefs, their teaching practices, and co-operation practices within the schools in Serbia that vary in climate and teacher feedback is the focus of this research.

Research goals

Following the aforementioned, this research has two goals: a) to describe the subject teachers in Serbia in terms of their practices (teaching and co-operation with colleagues), as well as in terms of the constructivist beliefs by considering how teachers could be grouped based on these characteristics, and b) to analyze the differences in the school environment where different groups of teachers work (more precisely, the school climate and teacher feedback).

Method

Sample. The sample comprised 3,857 teachers from 191 schools in Serbia.
Variables and instruments:

- *Constructivist beliefs* in TALIS 2013 are represented in a four-item Likert scale that covers the beliefs about the teacher's role in facilitating their students' inquiry, students' learning, and the importance of the thinking and reasoning process and curriculum content. Cronbach's alpha (scale reliability) for Serbia is 0,69.
- *Teaching practices* (teachers' instructional practices) in TALIS 2013 are presented as a four-item Likert scale where teachers report about how often they present a summary of recently learned content, organize students' work in small groups, give different work to students with difficulties or those who advance fast, and refer to an everyday life or work problem.
- *Teacher co-operation* in TALIS is presented with eight items composed from two scales: exchange and coordination for teaching and professional collaboration. The items cover teachers' exchange of materials, engagement in joint activities (teaching, assessment, conferences etc.), observations of other teachers' lessons, collaborative

professional learning, etc. For Serbia, Cronbach's alpha (scale reliability) is 0.79.

- *Teacher feedback* is presented with 11 items that examine in more detail how important teachers find different topics that call for feedback (e.g., students' performance, knowledge of the subject, pedagogical practices, assessment practices, individualized teaching, collaboration with colleagues, etc.). The results of the factor analysis show that all items load the first principal component. Therefore, we calculated the score for Teacher feedback as a mean of individual items. For Serbia, Cronbach's alpha for this scale (scale reliability) is 0.79.
- *School climate – mutual respect* in TALIS 2013 is presented as a four-item Likert scale where teachers are asked how frequently their school openly discusses difficulties and problems, whether teachers have mutual respect for each other, whether they share their success, and whether they have a good relationship with the students. For Serbia, Cronbach's alpha for this scale (scale reliability) is 0.80.

Analysis. Secondary analysis of the TALIS 2013 database enabled achieving the research goals. Two main analyses were conducted. Firstly, we carried out a hierarchical cluster analysis, whereby we included the variables (z scores) related to teachers' beliefs and teaching and the practices of co-operation in order to see whether there are different types of teachers who share different patterns of relationship between the beliefs, practices, and co-operation in school. The second analysis was ANOVA. It was used to determine the differences in the school environment between the clusters of teachers – more precisely, the differences in the teacher feedback system and school climate, separately in two analysis. ANOVA was conducted in order to see how the school-level variables, important for policy implementations, are connected with the different patterns of teachers' beliefs and practices.

Results

Cluster analysis. A solution with four clusters shows the greatest differences between the groups of teachers in all three variables ($F=1041{,}08$, $p<.001$, Wilks' Lambda=.166). Figure 1 shows the means of all variables included in the analysis for each cluster.

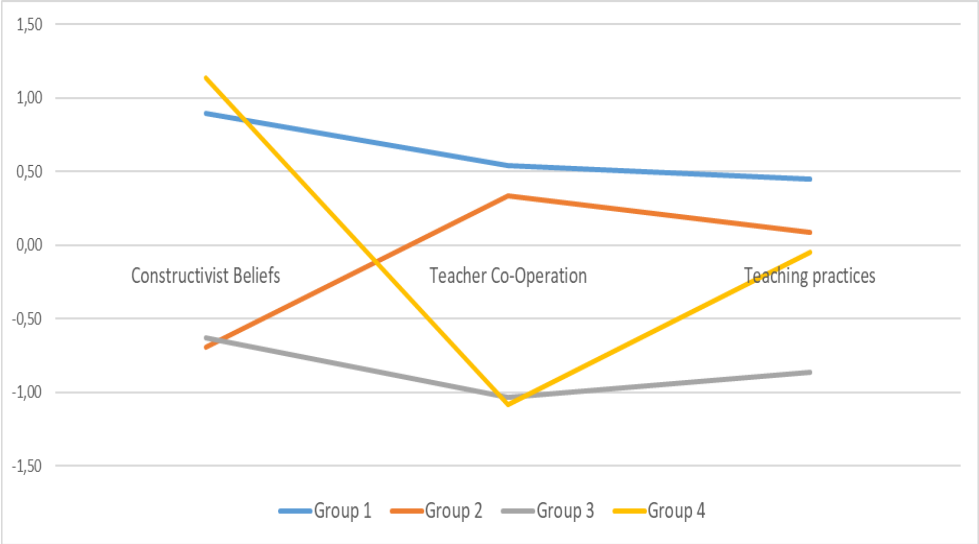

Figure 1. Means of the three variables included in the cluster analysis (constructivist beliefs, teacher co-operation, teaching practices) for the four groups

Group 1. Teachers grouped under this cluster score high in all three variables. These teachers have strong constructivist beliefs and report a frequent co-operation with other teachers and implementation of student-oriented, structured, enhanced activities in their teaching (they present a summary of the recently learned content, their students work in small groups, they give different tasks to students with difficulties or those who advance fast, and they refer to a problem from the everyday life or work). Out of the 3,857 teachers who participated in the survey, 32.1% of the teachers belong to this cluster.

Group 2. Teachers in this group (38.5%) express constructivist beliefs to a low extent; however, co-operation with other teachers and student-oriented, structured, and enhanced teaching practices are moderate.

Group 3. This group of teachers (19.9%) could be described as being opposite to the first group – low constructivist beliefs, rare co-operation with other teachers, and few teaching practices that offer well-structured learning opportunities for the students.

Group 4. Teachers belonging to this group (9.5%) hold very strong constructivist beliefs (higher than teachers in cluster 1), and, from time to

time, they implement cognitively-challenging teaching practices. On the other hand, co-operation with other teachers is moderate to low.

ANOVA. Results show significant differences between groups of teachers in school climate (F=67.41, df=3, p<.001). However, teachers in groups 3 and 4 do not differ in the degree to which the staff has open discussions about difficulties, the extent to which there is mutual respect for colleagues' ideas, and whether there is a culture of sharing success. The most significant difference in the school climate is noted between groups 1 and 3 (d=0.67), then between groups 2 and 4 (d=0.39), clusters 1 and 2 (d=0.16), and the smallest difference is between groups 3 and 4 (d=0.11).

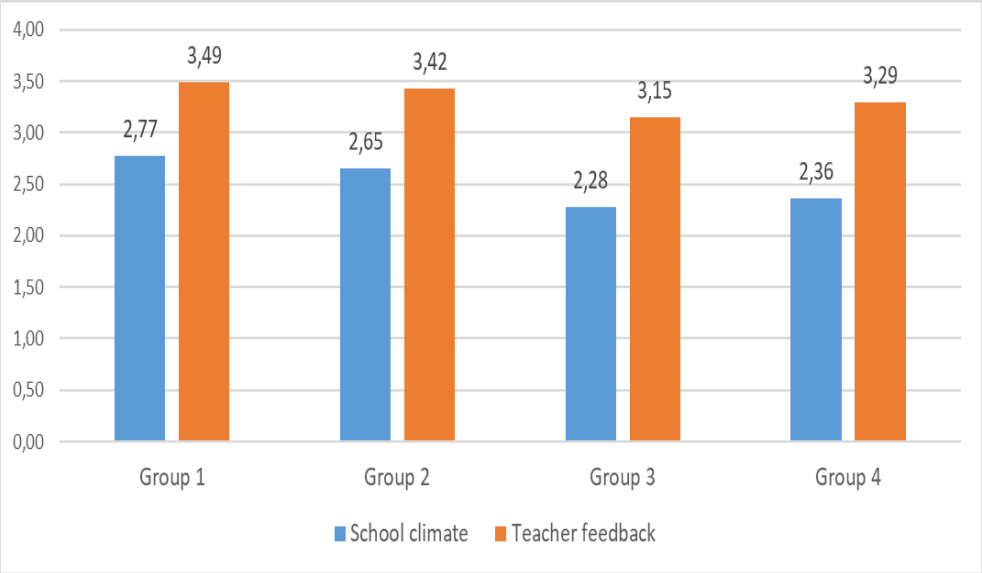

Figure 2. Means of school climate and teacher feedback for the four groups of teachers

Statistically significant differences across all clusters are also noted for feedback that teachers receive in school (F=68.62, df=3, p<.001). The biggest difference in school climate is noted between groups 1 and 3 (d=0,69), then between groups 2 and 4 (d=0,27) and groups 3 and 4 (d=0,26), while the smallest difference is between groups 1 and 2 (d=0,14).

Discussion and conclusions

This research investigated the variations in working environments (school climate and teacher feedback) across groups of teachers that differ in the patterns of teachers' beliefs, the perceived frequency of teaching practices, and co-operation practices. Cluster analysis yielded the solution with four

groups of teachers with the most different patterns of mean scores in three variables – constructivist beliefs, teaching practices, and co-operation practices – which vary significantly in their evaluation of the school environment in which they work.

Two clusters – 1 and 3 – have similar patterns of mean scores in all three variables. Those are teachers who hold beliefs that match the perceived frequency of teaching and co-operation practices. Group 1 is on the positive side of the overall mean scores and cluster 3 on the negative side. Groups 2 and 4 similarly perceive teaching practices (moderate), but they have opposite beliefs about learning and teaching as well as opposite co-operation practices. When looking closely at the differences in the working environments, the analysis of variance showed expected results for groups 1 and 3. Significant differences in the school climate (mutual respect) (d=0,67) and teacher feedback (d=0,68) show that teachers from group 1 work in a very supportive environment where the feedback system is highly valued, unlike group 3. Keeping in mind that teachers actively create the school climate (besides other employees and the students), these differences are not surprising.

On the other hand, differences between groups 2 and 4 reveal that teachers in group 2 work in a better environment in terms of the school climate and feedback system. Teachers that implement effective instruction moderately (group 2) assess the school climate and value feedback they receive in school significantly better than teachers from group 4, despite their "unconstructivist" beliefs. The power of feedback could be understood in the sense that teachers with more transmissive and less constructivist beliefs but with quite structured, student-centered, and enhanced teaching practices (group 2) receive more feedback on various aspects of teacher work than teachers who have developed constructivist beliefs but lack implementation in practice (group 4) (Cohen's d=0.27). This could point to the importance of developing policies at the school or national level that are strategically focused on establishing school systems of teacher feedback which could direct the teaching practice regardless of teachers' beliefs about teaching and learning. Teachers from group 2 come from schools with far more developed school climate (d= 0,27). This could be interpreted that schools that have strong social norms directed towards the improvement and well being of the students, including the constructivist approach, could have a greater impact on teaching practices of those teachers who do not share the same beliefs, especially through co-operation and collaboration, exchange of instructional

materials, developing curricula, meeting to discuss student progress, and collective learning activities (which, in turn, contributes to a supportive school climate).

Taking these findings into consideration, one might presume that systematic practices of co-operation with other teachers and a system of receiving and giving feedback on various aspects of professional practices prevent teaching practices from becoming unconducive of students' learning. This is especially important in a context where TALIS and PISA results show a negative correlation between teachers' constructivist beliefs and students' achievements (Jovanović, Jokić, & Petrović, 2016), student-centered support, and students' PISA math scores (Jovanović & Jokić, 2017), such as Serbia, but where constructivist beliefs are a good predictor of using active forms of teaching practices (OECD, 2014). A working environment that is based on mutual respect and support, where teachers openly discuss difficulties and problems, share their success, have good relations with the students, and where high value is put on receiving and giving feedback might be of crucial importance for moderating relationships between beliefs, teaching practices, and students' achievements. Teacher appraisal and feedback coupled with exchange and coordination for teaching and professional collaboration may expand teachers' strengths and, at the same time, facilitate addressing their weaknesses through involving the staff in in-depth, systematic, and collaborative activities (OECD, 2014) that enable beliefs and practices to influence each other interchangeably.

A more differentiated view of teachers' patterns of their beliefs, practices, and co-operation has enabled us insight into the complex relationships between these concepts and has also opened up questions about possible influences of the school climate and teacher feedback on teacher learning. School practices of giving and receiving feedback on teaching, by enabling reflection on teaching practices, can lead to changing not only those practices but also the beliefs about them. This shows the importance of feedback and school climate on nurturing effective teaching practices regardless of teachers' beliefs and, therefore, the importance of education policies that develop the teacher feedback system and school climate. Various authors have demonstrated the effectiveness of collaborative teacher professional development for such purposes. The key reasons for the effectiveness of such approaches to professional development are the involvement of teachers as both learners and teachers, professional development activities that take place during the

school day, that are in line with school and national policies, promote transformative practice, and are integrated in practice (Gore, Lloyd, Smith, Bowe, Ellis, & Lubans, 2017). Given this, the results of this research point to strengthening the school climate (that is based on mutual respect and support) and the teacher feedback system as possible ways of improving teacher professional development for meaningful and effective teaching practices.

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