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The Effect of Intellectual Development on Approaches to Learning: A Study of Perry's Model with Pre-service Teachers in Turkey*

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Abstract

The present research seeks to figure out the influence of intellectual development on learning approaches, after controlling for age. Data were gathered from 322 pre-service primary school teachers using the Turkish versions of the University Students' Intellectual Development Scale and The Revised Two-Factor Study Process Questionnaire. Quantitative data were analysed via statistical software using descriptive statistics and a one-way multivariate analysis of covariance. The results revealed that pre-service teachers' learning approaches significantly differ at their levels of intellectual development, after controlling for their age. Pairwise comparisons also revealed relativistic thinkers learned in more depth than the multiplistic ones, holding their age constant. Enabling teacher educators in Turkey to recognize the intellectual development levels of pre-service teachers, these results may also imply several suggestions for healthier communication with pre-service teachers. This study may also help teacher educators in expanding pre-service teachers' intellectual development levels in order to make them learn in more depth.

Keywords: *approaches to learning; intellectual development; pre-service teachers; Perry's Model; Turkey*

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Introduction

Cano (2005) stated that two paradigms, metacognitive and phenomenographic paradigms, have emerged out of the work of Perry (1970). Both paradigms identify how beliefs related to knowledge and learning and learning approaches alter as learners progress to an advanced level in their studies, respectively (Cano, 2005). The literature related to beliefs about knowledge and learning has revealed three most studied strands (Hofer & Pintrich, 1997) as a main focus of the metacognitive paradigm: (1) studies that try to gain insight into individuals' interpretations of their own educational experiences; (2) studies that analyse students' thought processes and reasoning; (3) studies that examine the possible relations between various aspects of learning and beliefs related to knowledge and learning. In fact, Zhu (2017) argued that Perry's work (1970) and its extensions (Baxter-Magolda, 1988; Belenky et al., 1986; King & Kitchener, 1994; Kuhn, 1991) have commonly showed similar trends in intellectual development over the past four decades. They have all proposed a transition from an objectivist stance of knowledge to a constructivist one (Zhu, 2017). This study will, therefore, focus mainly on the work of Perry (1970). As a pioneer research in the first strand mentioned above, it still arouses wonder of many because Perry (1970) conceptualized nine stages of intellectual development, in which university students moved from simple to complex ways of thinking about the world. Intellectual development was described as happening usually in a certain order of phases in which each phase provides a unique framework for perceived meaning of knowledge (Widick, 1977). Perry's nine stages of intellectual development are an expected output of higher education (Baxter-Magolda, 1988). The nine stages of intellectual development through which university students journey are as follows: "basic duality", "multiplicity pre-legitimate", "multiplicity subordinate", "multiplicity correlate", "relativism correlate, competing, or diffuse", "commitment foreseen", "initial commitment", "orientations in implications of commitment", and "developing commitment" (Perry, 1970).

The number of stages was later reduced to three (i.e. dualism, multiplism, relativism), and these stages were described in relation to perceptions of students about learning, teaching, knowledge, and assessment (Katung et al., 1999). Dualistic thinkers perceive students as passive receivers of knowledge, teachers as authorities giving facts, knowledge as something either black or white, and exams as a means of giving back the memorized facts. According to multiplistic thinkers, students have some degree of responsibility of learning, and teachers sometimes need guidance for decision-making although they are still authorities. They do not see knowledge as something absolute. Rather, knowledge is uncertain. They perceive exams as a means of demonstrating maximum knowledge. Relativistic thinkers view students as sources of knowledge, who discuss and make their own decisions; teachers as facilitators of learning; knowledge as something contextual to be explored; and exams

as a means of expressing ideas and views. Perry's intellectual development model has been criticized due to its consideration of mostly white, male, top-performing students at prestigious colleges (Belenky et al., 1986). Despite critiques, Perry's intellectual development model has been widely accepted (Mackenzie et al., 2003) because it is based on the data collected from university students through interviews on how they perceive learning, learning environment, nature of knowledge and roles of learners and teachers (Perry, 1970).

The literature revealed intellectual development of students is believed to be related to their approaches to learning (Gibbs, 1981, cited in Zhang & Watkins, 2001). Indeed, Zhang and Watkins (2001) found significant relationships between intellectual development levels and learning approaches of American and Chinese university students. Richardson (2005) mentioned learning approaches used in tertiary education as follows: surface approach, strategic approach and deep approach. In fact, learning approaches were first studied by Marton and Säljö (1976a, 1976b). They contrasted surface and deep levels with their emphasis on memorization and understanding, respectively (Burnett et al., 2003). Deep learners play an active part in learning and perceive it as something which they do on their own while surface learners are passive and perceive learning as something happening to them (Marton, 1976, cited in Richardson, 2005). Learning is also viewed from two major perspectives, namely quantitative and qualitative (Biggs, 1994). Quantitatively, learning is acquiring and accumulating knowledge. However, it is, qualitatively, meaning-making upon prior knowledge. Individuals at different levels of intellectual development perceive values and knowledge in a different manner and these differences are most likely visible in their learning approaches (Widick, 1977, pp.35-36). For example, low-level conceptions of learning and teaching, which are subject- and teaching-oriented/lecturer dependent respectively, are perceived as dualistic while the high-level ones, which are student- and learning-centred respectively, are seen as non-dualistic (Varnava-Marouchou, 2007).

International research on university students' intellectual development

The international literature revealed there are both descriptive and correlational studies, which mostly focus on intellectual development of university students from different departments. However, the intellectual development of university students studying education has rarely been studied.

Baxter-Magolda (1988) investigated whether first year students' epistemological development significantly differed in terms of gender and concluded that males showed more intellectual growth than females during the first year of study. Epistemological development of both genders did not significantly differ in their learning styles, though. Gender differences in epistemological development of university students were accounted for by the contextual factors rather than individual

ones. Relations between reasoning patterns of females and males and the learning context seemed to influence their intellectual growth. Female students' descriptions of the learning context included less active involvement than those of male students. Due to exposure to lectures, which are mostly limited to listening, note-taking, and memorizing, females relied more on authority and peers, while males were more actively involved in learning and relied more on themselves. Being influenced by the culture experienced in the described learning context, females, therefore, viewed self in relation to others more than males did. Sheppard and Gilbert (1991) found that epistemological development of students was affected by their learning approaches, perceptions about learning environment and teachers' instructional theories. In addition, conceptions of students about knowledge and their learning approaches were also affected by course structure. In particular, epistemological development of students was related to historical and philosophical studies and instructional methods. Wright (1992) concluded that students' intellectual development was positively correlated with the number of interdisciplinary general education courses, which foster active, integrative and lifelong learning. Wilson (1998) investigated possible relationships between freshmen's intellectual development and their dispositions toward critical thinking and found a significant correlation between intellectual development and maturity, which was one of the subdimensions of dispositions toward critical thinking. Barnard (2001) investigated the impact of participation in a learning community on cognitive development of first year university students and found out that their cognitive development did not significantly differ in participation in a learning community.

Katung et al. (1999) found that autonomous learning changed students' attitudes toward their role. Over 70 % of students became relativistic thinkers, or autonomous learners by the end of the year, and the majority did not perceive science as unambiguous and fact-based, nor did they perceive instructors as authorities who are experts in their particular fields anymore. Rather, they were at the helm of their own learning and became active learners, through individual study and working with others. Zhang (1999) examined the generalizability of Perry's intellectual development model (1970) in Chinese culture and concluded that it was not universal and that it varied according to diverse cultural and education systems because Chinese university students' patterns of cognitive development were reversed from the one that Perry proposed. In other words, unlike what Perry described, Chinese university students were found to exhibit decreasing levels of reasoning as they advanced in their studies. Zhang (1999) attributed these unexpected results from the Chinese sample to the following cultural aspects: unlike their American counterparts, Chinese university students are not given enough opportunities for decision-making. They must complete a predetermined list of overspecialized courses to attend a university. They do not enjoy any freedom to develop their own curricula. The instruction is mostly teacher-centred. Students are not provided with career guidance. University

graduates are assigned jobs. In addition, Chinese university students do not have any chance to meet new peers because they stay in the same class section and in a dorm room for seven students. But, interpersonal relationships, lack of choice, and contemporary life in China were stated as possible reasons why Chinese freshman students were more relativistic and committed than their counterparts in the United States (Zhang & Hood, 1998). Zhang and Watkins (2001) investigated relationships between intellectual development levels and learning approaches of American and Chinese university students and examined whether there were cultural differences in the patterns of intellectual development and in the relationships between intellectual development and achievement and demographic characteristics. The results showed dualistic thinking was positively associated with surface learning, but reversely with deep learning. On the contrary, relativistic thinking and commitment within it were positively associated with deep learning, but reversely with surface learning. In addition, Chinese university students' patterns of intellectual development were found different from those of American students. The intellectual development of Chinese university students, but not that of American ones, significantly differed according to their year of study in college. In other words, first-year Chinese students were the least dualistic and the most relativistic thinkers, while third year students were the most dualistic and the least relativistic ones. Besides, extracurricular activities, such as work, travel, and leadership, had positive impact on both American and Chinese students' intellectual development. The positive relation between cognitive development, especially commitment within relativistic thinking, and achievement, which was detected among American students, was statistically insignificant among the Chinese ones.

Clarkeburn (2000) evaluated the ethics curriculum implemented through structured discussions and problem-based learning to encourage moral development of biology and other students, for which cognitive development is necessary, but not sufficient. Results indicated that students' levels of moral sensitivity got significantly higher due to teaching of ethics and students used relatively low-level moral decision-making tools inconsistently. Hence, it was suggested teaching of ethics is needed to help students find sufficient moral decision-making tools to make moral decisions. Ingram and Nelson (2008) did not find any correlation between intellectual development and evolutionary content knowledge, or accepting evolution, and achievement in upper-level biology majors' course. Selepeng (2000) investigated intellectual development of undergraduate biology students and found that high school students felt more confident in the system, but they expected to be more independent than did university students. The staff also had higher expectations about the exam content than did students. In addition, there was also a mismatch between what was intended (i.e., independence, accountability) and what was practiced. For instance, traditional methods of assessment used did not help students develop intellectually. Also, second-year courses were not effective in promoting intellectual development of students.

Simmons (2008) found that counselling and social work students' experiences related to education and human services significantly predicted their cognitive complexity which significantly differed only in earned degrees. In other words, master's students attained higher levels of cognitive complexity than did bachelor's students. Carruth (2008) conducted a descriptive case study to gain insight into professional development of a counsellor at a large southeastern university and concluded that the counsellor moved from Perry's early to late stages of intellectual development during her internship.

El-Farargy (2010) studied epistemological beliefs of introductory chemical process engineering students and concluded students had developed views on their role in learning, but confusing views on the lecturer's role and on the nature of knowledge. With regard to assessment, chemical process engineering students seemed to have moved from a dualistic view to a single view, in which they enjoyed thinking critically and expressing creative ideas. Zhu and Cox (2015) described intellectual development levels of Chinese doctoral students in engineering at five Midwestern universities and whether they significantly differed in their academic progress and universities or not. It was concluded that about 80 % showed higher levels of thinking. In addition, their levels of intellectual development significantly differed in their academic progress (in favour of those who passed their qualifying examinations) and universities.

Murray (2013) examined epistemological beliefs of sophomore medical students undertaking the problem-based learning (PBL) program and whether their beliefs significantly differed in maturity, the learning process and academic achievement. The results showed prior learning experiences in high school and academic performance of students had significant impact on their epistemological beliefs, which were associated with their learning approaches. Second year students with the lowest academic rank demonstrated naïve beliefs, misunderstood the PBL program, and developed disabling approach to learning, while those with the highest academic rank developed sophisticated beliefs, comprehended the complexity of the PBL program, and adopted enabling approach to learning. The constructivist PBL program had significant impact on medical students' epistemological development.

The related literature also showed that the intellectual development of (especially female) pre-service teachers at the universities in the Middle East has mostly been investigated. For example, Al-Shibli (2003) did a study on Omani students' intellectual development to establish whether their intellectual growth significantly differed in the use of problem-based activities. The results showed that college students attained higher levels of intellectual development than secondary school students. But, intellectual development of final year college students tended to decline. In addition, students in Oman showed good change in the areas of the lecturer's and student's role, a fair change in the area of assessment, but a poor

shift in the area of nature of knowledge. The intellectual development of students in Oman was positively related to their achievement and differed significantly based on gender (females) and stream (science). The results also revealed that interactive materials designed and used for problem-based learning, that were stated to be favoured and used by most students, caused change in college students' perceptions about the lecturer's role, a considerable change in perceptions of the nature of knowledge, a slight change in perceptions of assessment, but no change in perceptions about the student's role. In other words, a problem-based curriculum might make students attain higher levels of intellectual development. Khine and Hayes (2010) investigated how female Emirati pre-service teachers knew and concluded they favoured connected ways of knowing and of learning. Aldegether (2017) also investigated the way in which female Saudi pre-service teachers had knowledge and found out that female pre-service teachers in Saudi Arabia, as had been culturally expected, mainly used connected ways of knowing.

National research on university students' intellectual development

In Turkey, studies have been carried out on epistemological beliefs of university students (Başbay, 2013; Erol & Ercan, 2015; Tümkaya, 2012), pre-service teachers (Ayaz, 2009; Bakır & Adak, 2014; Demir, 2012; Demirel & Çam, 2016; Erdamar & Alpan, 2015; Fırat-Durdukoca, 2013; İçen, İlğan, & Göker, 2013; Karabulut & Ulucan, 2012; Kazu & Erten, 2015; Özşaker et al., 2011; Pan & Yanpar-Yelken, 2016; Şahin-Taşkın, 2012; Uysal & Kösemen, 2013; Ünal-Çoban, Ateş, & Kaya-Şengören, 2011) and of both pre- and in-service teachers (Bangir-Alpan & Koç-Erdamar, 2014). The literature related to epistemological beliefs revealed national research has mostly been carried out on pre-service teachers.

Tümkaya (2012) investigated whether university students' epistemological beliefs significantly differed in terms of gender, areas of study, year of study, academic achievement, and learning styles. Results indicated epistemological beliefs of university students did not significantly differ in their gender and academic achievement, but they significantly differed in their areas of study (in favour of those studying in the departments of health, social sciences, and science and technology), year of study (in favour of freshmen and seniors), and learning styles (in favour of those who had divergent learning styles). Başbay (2013) found out that metacognitive awareness levels of university students partially mediated the relation between their epistemological beliefs and critical thinking dispositions. Erol and Ercan (2015) examined personal epistemologies and self-perceptions of international university students in Turkey and found out both personal epistemologies and self-perceptions of international university students significantly differed in their perceived adequacy of secondary education, adjustment to higher education, and academic performance. International university students' self-perceptions significantly differed in their years of study

(in favour of seniors) as well. In addition, personal epistemologies of international university students were positively correlated with their self-perceptions.

Ünal-Çoban et al. (2011) studied epistemological views of pre-service physics teachers. They found that their achievement was significantly correlated with their knowledge-oriented epistemological views, but not with their learning-oriented epistemological views. Their knowledge-oriented, but not learning-oriented epistemological views significantly differed in terms of their gender, in favour of females. Learning-oriented epistemological views were found developed in all years of study. Learning-oriented epistemological views significantly differed in year of study, in favour of those at lower years, while knowledge-oriented epistemological views significantly differed in year of study, in favour of those at higher years of study.

Özşaker et al. (2011) found out self-esteem levels of pre-service PE teachers were reversely associated with beliefs in effort-based learning and in ability-based learning. In addition, pre-service PE teachers' beliefs in effort-based learning and in ability-based learning significantly and negatively predicted their levels of self-esteem. Karabulut and Ulucan (2012) found that pre-service PE teachers' scientific epistemological beliefs did not significantly differ in their gender and universities they were attending. But, their scientific epistemological beliefs significantly differed in their year of study, in favour of seniors.

Demir (2012) studied pre-service primary school teachers' epistemological beliefs and concluded their beliefs were at a moderate level and did not significantly differ in their gender and types of instruction. Epistemological beliefs of those who took the "Research Methods" course were significantly more developed than those of pre-service primary school teachers who did not take it. Şahin-Taşkın (2012) concluded pre-service classroom teachers' beliefs about effort-based learning significantly predicted their deep approaches to learning, while their beliefs about one single truth significantly predicted their surface approaches to learning. Also, epistemological beliefs of pre-service classroom teachers significantly differed in terms of their gender, in favour of the females. Fırat-Durdukoca (2013) found out beliefs held by pre-service classroom teachers who were taught through systematic instruction in ability-based learning and in one single truth were less developed than those held by pre-service classroom teachers exposed to lectures, which is a key component of traditional method of teaching. Pre-service classroom teachers exposed to systematic instruction learned deeper than those who were exposed to lecturing.

İçen et al. (2013) studied pre-service social studies teachers' epistemological beliefs and concluded they believed more in ability-based learning, but less in effort-based learning and in one single truth. Ayaz (2009) found that pre-service science teachers' beliefs in effort-based learning were significantly predicted by deep learning approach, gender, strategic approach to learning, university attended, and monthly income, respectively. Their beliefs in ability-based learning were significantly predicted by surface learning approach, gender, deep learning approach, monthly income, high school which they graduated from, and the number of books at home, respectively.

Their beliefs in one single truth were significantly predicted by surface approach to learning, their mother's level education, and place of residence, respectively.

Bakır and Adak (2014) concluded epistemological beliefs pre-service science teachers held significantly differed only in their year of study, in favour of the freshmen. Kazu and Erten (2015) examined epistemological beliefs pre-service teachers held and whether they significantly differed according to their gender, departments and GPAs. Results indicated pre-service teachers believed mostly in effort-based learning. Their epistemological beliefs did not significantly differ in their gender and GPAs, but their beliefs in effort-based learning and in ability-based learning significantly differed according to their departments. Pre-service science teachers believed less in effort-based learning; pre-service classroom teachers believed less in ability-based learning, and pre-service early childhood teachers believed less in one single truth. Demirel and Çam (2016) concluded pre-service science teachers had more sophisticated fixed ability beliefs, but less sophisticated quick learning beliefs. Only their beliefs in simple knowledge significantly differed in terms of their gender (females) and GPAs (those who achieved at a moderate level). But, their epistemological beliefs did not differ in the year of study.

Erdamar and Alpan (2015) conducted a longitudinal study to determine changes in epistemological beliefs pre-service vocational teachers held and in their problem-solving skills throughout their studies, and concluded pre-service vocational teachers believed mostly in effort-based learning, but in one single truth at least. They perceived themselves as more competent in problem solving, thinking, planning, and they had more self-confidence when they were seniors. But, the hasty approach was the least developed one when they were both freshmen and seniors.

Pan and Yanpar-Yelken (2016) examined the effects of certain variables on epistemological beliefs pre-service English language teachers held and on their study processes, and found out they had sophisticated beliefs, and their epistemological beliefs (in favour of females) and study processes (in favour of males) significantly differed in their gender, but not in their year of study and grade point average.

Uysal and Kösemen (2013) concluded self-efficacy levels of pre-service teachers earning a certificate from pedagogical formation program in Turkey were reversely associated with their beliefs in effort-based learning. Pre-service teachers' beliefs in effort-based learning and their self-efficacy levels significantly differed, depending on the university attended (in favour of a university in Northwestern Turkey), but not on gender. However, their beliefs in ability-based learning and in one single truth significantly differed in gender (in favour of males), but not in university attended.

Bangir-Alpan and Koç-Erdamar (2014) compared epistemological beliefs pre- and in-service teachers held and found that pre-service teachers were more sophisticated at the outset of practice teaching, but their epistemological beliefs became more naive during the teaching practice. In addition, in-service teachers' epistemological beliefs did not significantly differ in their teaching experience and subjects they were teaching.

Correlational studies have been done to detect significant relations between epistemological beliefs of university students and their achievement, critical thinking dispositions, learning approaches, self-perceptions, self-efficacy, and self-esteem. There are also studies examining whether epistemological beliefs of university students are predicted by several variables (i.e. gender, high school which they graduated from, learning approaches, monthly income, mother's education level, number of books at home, place of residence, and university attended). Causal-comparative studies, comparing pre- and in-service teachers' epistemological beliefs, have been conducted as well. Quasi-experimental design has also been employed to ascertain whether prospective classroom teachers' epistemological beliefs significantly differ in methods of teaching. Furthermore, descriptive studies have been conducted to investigate whether university students' epistemological beliefs significantly differ in certain variables (i.e. achievement, adjustment to higher education, field of study, gender, year of study, learning style, perceived adequacy of secondary education, type of instruction, university attended, and whether "Research Methods" course has been taken or not). However, research on the effect of intellectual development of university students, especially of those studying teacher education in Turkey, on their learning approaches is still hard to find, although it has widely been known that intellectual development and learning approaches of American and of Chinese university students are associated with each other (Zhang & Watkins, 2001). Therefore, this replication research tries to find the answers to these questions:

(1) Which level(s) of intellectual development are pre-service teachers at?
(2) What are their learning approaches?
(3) What is the effect of intellectual development of pre-service teachers on their learning approaches, after controlling for their age?

To define operationally, intellectual development of pre-service teachers refers to one of the three levels measured by the Turkish version (Şenocak, 2006) of the University Students' Intellectual Development Scale (USIDS) (Katung et al., 1999): dualistic, multiplistic, and relativistic. Pre-service teachers' learning approaches correspond to the average scores of items that measure "surface learning" and "deep learning" in the Turkish version (Önder & Beşoluk, 2010) of the Revised Two-Factor Study Process Questionnaire (R-SPQ-2F) (Biggs et al., 2001).

Being anticipated to fill the research gap, this study is of great significance because its results may imply several suggestions for healthier communication with pre-service teachers by enabling teacher educators in Turkey to recognize their intellectual development levels. It may also help teacher educators in expanding pre-service teachers' intellectual development levels in order to make them learn deeper.

Method

The effect of intellectual development on approaches to learning, after controlling for age was studied on a sample of 322 pre-service classroom teachers who were

conveniently chosen from a public university in Turkey. Within this group, female pre-service classroom teachers made up the majority (78 %). Their age (M = 20.1, SD = 1.45) ranged from 17 to 25, across the whole sample. About 30 % of them were sophomores, approximately one-fourth (24.5 %) of them were freshmen, and a little more than 23 % of them were seniors, whereas about 22 % of them were juniors.

In the present survey research, data were gathered via the Turkish version (Şenocak, 2006) of the USIDS (Katung et al., 1999) and the Turkish version (Önder & Beşoluk, 2010) of the R-SPQ-2F (Biggs et al., 2001). The Turkish version of the USIDS consists of 12 items categorized under three factors based on Perry's Model: "dualism", "multiplism", and "relativism" (Şenocak, 2006). The 12 items of the USIDS are related to the following levels of intellectual development: dualistic (D), multiplistic (M), and relativistic (R) for learning; M, R, D for teaching; D, R, M for knowledge; D, R, M for assessment (Şenocak, 2006). As done by Katung et al. (1999), students were clustered into three categories, as shown in Table 1. For instance, a pre-service teacher was classified as thinking in a dualistic way if s/he selected four items of the USIDS in the following order: D, D, D, D; thinking in a multiplistic way if s/he selected four items of the USIDS in the following order: M, M, D, R; and as thinking in a relativistic way if s/he selected four items of the USIDS in the following order: R, R, M, M.

Table 1

Pre-service classroom teachers' positions on the Perry model

	Dualistic (D)		Multiplistic (M)	Relativistic (R)	
Several combinations that form each group	DDDD DDDM DDDR	DDMR DDMM	MMDR	MMMM MMMR MMMD	RRDD RRMM RRDR	RRRR RRRD RRRM

Note. Adapted from Katung et al., 1999, p. 51.

The Turkish version of the R-SPQ-2F is bidimensional with 20 items clustered under surface learning and deep learning (Önder & Beşoluk, 2010). The alpha coefficient of the Turkish version of the USIDS is .94 (Şenocak, 2006), and the R-SPQ-2F produces Cronbach alpha reliability coefficients of .74 for surface learning and of .78 for deep learning (Önder & Beşoluk, 2010). For this study, the reliability coefficient values were found as .80 for deep learning and .76 for surface learning. Certain questions were also asked in order to obtain data about pre-service classroom teachers' demographic characteristics, such as gender, age, and year of study.

These scales were administered to 322 pre-service classroom teachers. They were provided information on nature and possible risks of the study. Their consent for participation was obtained. All of them were told that any data collected from them would stay confidential because codes were assigned to each pre-service classroom

teacher. For example, PST1 was assigned to the first pre-service classroom teacher, PST2 to the second one, etc.

The quantitative data were analysed via statistical software using descriptive statistics. Because learning approaches are significantly related to age (Gijbels et al., 2005; Zeegers, 2001), the effect of age is adjusted to investigate the effect of intellectual development on learning approaches. That is, pre-service classroom teachers' age is regarded as confounding covariate which is also continuous. Therefore, one-way multivariate covariance analysis (MANCOVA) was done to ascertain the influence of intellectual development of pre-service classroom teachers on their approaches to learning, after controlling for age. The significance level was established as .05.

Results

Pre-service classroom teachers' levels of intellectual development

Intellectual development levels of pre-service classroom teachers were explored through 12 items categorized under three factors based on Perry's Model, namely, dualism, multiplism, and relativism. As Table 2 displays, they were mostly relativistic thinkers (≈89 %). In addition, there were also multiplistic (≈8 %) and dualistic (≈3 %) thinkers. Pre-service classroom teachers seemed to display a strong orientation toward relativistic thinking.

Table 2

Pre-service classroom teachers' levels of intellectual development

		f	%
Intellectual development	Dualistic	9	2.8
	Multiplistic	25	7.8
	Relativistic	288	89.4
	Total	322	100

Pre-service classroom teachers' learning approaches

Pre-service classroom teachers' learning approaches were explored through 20 items classified into two headings, namely, surface learning and deep learning. Descriptive analysis of the data revealed pre-service classroom teachers seemed to adopt deep approach to learning ($M = 3.23, SD = 0.59$) more than surface approach to learning ($M = 2.71, SD = 0.65$), as shown in Table 3.

Table 3

Pre-service classroom teachers' learning approaches

		M	*SD*
Learning approaches	Surface	2.71	0.65
	Deep	3.23	0.59
	Total	2.97	0.35

The effect of intellectual development on approaches to learning, after controlling for age

To figure out the influence of intellectual development on learning approaches, after controlling for age, a one-way MANCOVA was performed. There was one independent variable, intellectual development, with three levels (i.e. dualism, multiplism, relativism) and one dependent variable, approaches to learning, with two levels (i.e. surface learning, deep learning). The effect of age, which is also continuous, was regarded as a covariate because learning approaches are significantly related to age (Gijbels et al., 2005; Zeegers, 2001). Table 4 displays descriptive statistics for each dependent variable level.

Table 4

Descriptive statistics for surface and deep learning approaches

		Deep learning		Surface learning	
		M	*SD*	*M*	*SD*
Intellectual development	Dualistic	2.80	0.62	3.08	0.48
	Multiplistic	2.88	0.56	3.11	0.55
	Relativistic	3.27	0.58	2.66	0.64
	Total	3.23	0.59	2.71	0.65

The descriptive analysis of the data revealed pre-service classroom teachers who were relativistic thinkers ($M = 3.27$, $SD = 0.58$) seemed to adopt deep learning approach more than those who were multiplistic ($M = 2.88$, $SD = 0.56$) and dualistic ($M = 2.80$, $SD = 0.62$) thinkers. In addition, pre-service classroom teachers who were multiplistic thinkers ($M = 3.11$, $SD = 0.55$) seemed to adopt surface learning approach more than those who were dualistic ($M = 3.08$, $SD = 0.48$) and relativistic ($M = 2.66$, $SD = 0.64$) thinkers.

To figure out the influence of intellectual development on learning approaches, after controlling for age, a one-way MANCOVA was used. Beforehand, the assumptions of a MANCOVA, encompassing all assumptions of multivariate analysis of variance, that is, independent observations, multivariate normality, homogeneity of population covariance for the dependent variables, linear relationships between the dependent variables and the covariate, absence of outliers on the dependent variables and the covariate, and homogeneity of regression coefficients were checked. The findings revealed that the covariance homogeneity assumption was met (Box's $M = 3.80$, $p > .05$). Therefore, Wilks' λ was selected for reporting. According to Levene's test, the assumption of homogeneity of variance for deep learning [$F(2, 317) = 0.28$, $p > .05$] and for surface learning [$F(2, 317) = 1.98$, $p > .05$] was not violated. Bonferroni adjustment was utilized to control for Type I error and to assess univariate F statistics and the assumed alpha level of .05 for deep learning and surface learning was divided by the number of dependent variables (i.e., two). Therefore, the obtained F statistics were assessed at the alpha level of .025. Table 5 shows the results of multivariate and univariate analyses of covariance.

Table 5

MANCOVA of intellectual development with age as covariate and univariate analyses of covariance

		ANCOVA	
	MANCOVA	Deep learning	Surface learning
	F(4, 630)	*F*(2, 319)	*F*(2, 319)
Age	1.73	3.37	0.13
Intellectual development	5.01*	6.83**	6.94**

**p<.05,* η^2 *= .03; **p<.025,* η^2 *= .04*

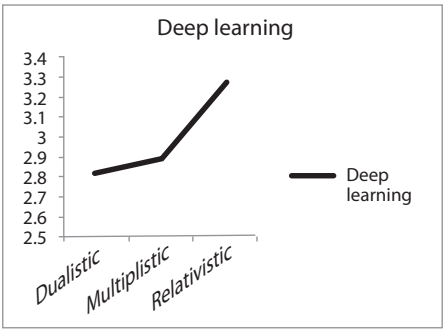
According to Table 5, results of a one-way MANCOVA revealed that pre-service teachers' approaches to learning significantly differed in their levels of intellectual development, after controlling for their age (Wilks' $\lambda = 0.94$, $F(4, 630) = 5.01$, $p < .05$, $\eta^2 = .03$). The multivariate η^2 value of .03 implied the size of the effect was small to medium, according to the criteria generally accepted (Cohen, 1988). The mean scores of deep learning and surface learning adjusted for initial differences were ordered across each level of intellectual development in Table 6.

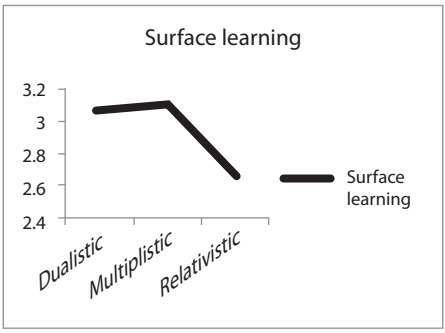
Table 6

Means and standard errors of surface and deep and learning before and after adjustment for age

	Deep learning				Surface learning			
	Before adjustment		After adjustment		Before adjustment		After adjustment	
	M	*SE*	*M*	*SE*	*M*	*SE*	*M*	*SE*
Dualistic	2.80	0.21	2.82	0.19	3.08	0.16	3.07	0.21
Multiplistic	2.88	0.11	2.90	0.12	3.11	0.11	3.10	0.13
Relativistic	3.27	0.03	3.27	0.03	2.66	0.04	2.67	0.04

Controlling for their age, pre-service classroom teachers' adoption of deep learning approach significantly differed in the levels of intellectual development, $F(2, 319) = 6.83$, $p < .025$, $\eta^2 = .04$. It can also be said 4 % of variance in deep learning was accounted for by intellectual development, holding age constant. Pairwise comparisons revealed that pre-service classroom teachers who were relativistic ($M = 3.27$) thinkers learned deeper than multiplistic ($M = 2.90$) ones, adjusting for their ages. In addition, adjusting for their ages, pre-service classroom teachers' adopting surface learning approach also significantly differed in the levels of intellectual development, $F(2, 319) = 6.94$, $p < .025$, $\eta^2 = .04$. It can also be said 4 % of variance in surface learning was also accounted for by intellectual development, holding age constant. Pairwise comparisons revealed that pre-service classroom teachers who were multiplistic ($M = 3.10$) thinkers adopted surface approaches to learning more than relativistic ($M = 2.67$) ones, when their ages were adjusted for (see Figures 1 and 2).





Figures 1 and 2. Group differences on approaches to learning, after adjustment for age

Discussion and Conclusions

Pre-service classroom teachers seemed to display a strong orientation toward relativistic thinking and adopt deep learning approach more than surface approach. A one-way MANCOVA was done to ascertain the influence of intellectual development of pre-service classroom teachers on learning approaches, after controlling for their age. Results of the MANCOVA revealed pre-service teachers' approaches to learning significantly differed in their levels of intellectual development, after controlling for their age. Pre-service classroom teachers who were relativistic thinkers were found to learn deeper than those who were multiplistic ones, when adjusting for their ages. In addition, pre-service classroom teachers who were multiplistic thinkers were found to adopt surface approach to learning more than relativistic ones when their ages were adjusted for. Why did pre-service classroom teachers display strong orientation toward relativistic thinking although the higher education system in Turkey might be accepted as traditional as it is in China (Zhang, 1999)?

Although expected to be affected by the traditional Confucian Chinese culture, pre-service teachers in Hong Kong, China did not tend to rely on the assumption that knowledge is certain and unambiguous (Chan & Elliott, 2004). Pre-service classroom teachers in this study were from Turkey, where East meets West. Like their Chinese counterparts from Hong Kong, pre-service teachers in this study might be influenced by both eastern and western cultures and be aware of the tentative and changing nature of knowledge (Chan & Elliott, 2004). In addition, compulsory education and expansion of universities (Chan & Elliott, 2004) might also enable them not to perceive teacher educators as authorities giving facts anymore. Hence, teacher educators in Turkey should provide them with alternatives to teach them to make their own decisions (Zhang & Watkins, 2001). Another possibility is that pre-service classroom teachers in this study might possess higher levels of self-confidence (Wood & Sleet, 1993, cited in Al-Shibli, 2003). That is, developing views on an issue through many sources of knowledge, relativistic thinkers rely on themselves and have high self-esteem. In addition, dualistic thinkers believe in the authority as the only knowledge source and

feel confident as well. But, multiplistic thinkers are doubtful, uncertain, and feel less confident. "Social desirability" would be the other possibility. Pre-service classroom teachers might be conducive to reflecting on their own thinking and learning. This possibility refers to a suggestion for further research. Pre-service classroom teachers should also be interviewed and observed in order to enable researchers understand their ways of thinking and learning deeper.

This study, which was conducted regarding implications of Demir and Akınoğlu (2010) for further research, may assist teacher educators in expanding pre-service teachers' intellectual development levels in order to make them learn deeper. How? Approaches to learning depend partly on individual (i.e. motivation, study skills, and personality) and partly on contextual (i.e. forms of assessment, learning task, and attitudes and enthusiasm of teachers) factors (Beattie et al., 1997). Therefore, the preference of a learning approach does differ in the aforementioned factors (Richardson, 2005). As stated by Elton and Laurillard (1979), changing the assessment practice will cause the fastest change in the way that students learn. No educational change will change students' learning approaches unless students also alter their own perceptions of assessment (Richardson, 2005) that refer to attitudes toward, preferences for, and views on assessment (Birenbaum & Rosenau, 2006), because perceptions of students about assessment significantly affect their learning approaches, and vice versa (Struyven et al., 2005; Thomson & Falchikov, 1998). The ways teachers assess students have a strong influence on their learning approaches (Zhang & Watkins, 2001). Deep learners tend to prefer challenging lessons and assessment tools that permit expression of ideas while surface learners do not favour courses that focus on understanding and assessment that is not fact-based (Entwistle & Tait, 1990). Kasapoglu (2013) found that pre-service classroom teachers who are deep and strategic learners tend to prefer alternative assessment more than those who adopt surface approach to learning. Thus, teacher educators might use assessment methods, preferably alternative ones, which tend to facilitate deeper learning approaches (Zhang & Watkins, 2001).

Enabling teacher educators in Turkey to recognize the intellectual development levels of pre-service teachers, these results may imply several suggestions for healthier communication with pre-service teachers as well. If teacher educators understand the differences among pre-service teachers, they will be more able to meet their diverse needs of learning and design instruction that is beneficial to all pre-service teachers, who will in turn be more likely to learn effectively throughout the process of professionalization (Felder & Brent, 2005). Otherwise, pre-service teachers, especially those who are dualist thinkers, for example, might be perplexed if told that numerous responses to an assignment, or a question on a test might be appropriate and correct (Battaglini & Schenkat, 1987). However, Perry (1970) postulated that development of cognition is a consequence of facing and resolving cognition-based dissonance. Teacher educators who teach pre-service teachers who are multiplistic thinkers

should also present relativistic views so that they face reasoning at a higher level of intellectual development. This dissonance will even develop new sets of beliefs and be adopted and used as a guide for their further teaching (Eisenhardt et al., 2012). Pre-service teachers might also be provided with opportunities which cause conflicts in their minds. Out-of-class experiences of students are found positively correlated with their cognitive development (Zhang & Watkins, 2001). For example, in work, travel and leadership experiences, they might deal with different people, problems, and views (Zhang & Watkins, 2001).

Explicit communication of expectations, variety in learning tasks, student-centred instruction (i.e. guided inquiry, cooperative and active learning, problem/project-based learning, etc.), work and constructive feedback in higher-level tasks, and modelling and valuing students at different developmental stages also facilitate intellectual development (Felder & Brent, 2005). The integration of ill-structured problems, which are contextual and have more than one right answer, into the curriculum was also implied by Wilson (1998). Savin-Baden (1996) considered problem-based learning as a catalyst for meaning-making upon prior knowledge and experience. Alcock (2001) also concluded problem-solving approach developed logical and formal understanding better than did lectures because students are willing to formulate their own arguments and are given regular feedback. According to Ingram and Nelson (2008), ill-structured problems might be used in structured activities to challenge intellectual development of students. Al-Shibli (2003) also implied intellectual development of students might be fostered through the implementation of problem-based activities. In addition, pre-service teachers should also engage in analytical and reflective thinking and constructive learning, which are emphasized in western cultures, such as North America (Chan & Elliott, 2004). Hallam (1995) found out analytic/holistic, or versatile learners were more likely to attain the highest intellectual development level and suggested students should be encouraged to adopt analytic/holistic, or versatile learning styles through discussions (Hallam, 1995). In addition, to help students become versatile learners, it might be beneficial to use student-led tutorial groups, support students, and help them develop effective reading and study strategies (Entwistle, 1977).

Last but not least, as the data were gathered from 322 pre-service teachers, this study might be replicated considering also private universities with a larger sample size to yield more generalizable results.

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Utjecaj intelektualnoga razvoja na pristupe učenju: istraživanje Perryjeva modela na studentima nastavničkih smjerova u Turskoj*

Sažetak

Ovim se istraživanjem pokušava saznati kakav je utjecaj intelektualnoga razvoja na pristupe učenju, nakon kontrole varijable dobi. Podatci su prikupljeni na uzorku od 322 studenta razredne nastave, pomoću turskih verzija Skale intelektualnoga razvoja studenata i Revidiranoga dvofaktorskog upitnika o procesu učenja. Kvantitativni podatci analizirani su pomoću statističkoga programa koji koristi deskriptivnu statistiku i jednosmjerne multivarijatne analize kovarijance. Rezultati su pokazali da se pristupi učenju studenata nastavničkih smjerova značajno razlikuju s obzirom na njihovu razinu intelektualnoga razvoja, nakon što je provedena kontrola varijable dobi. Usporedbe u parovima također su pokazale da studenti koji razmišljaju na relativistički način uče gradivo puno dublje nego studenti koji razmišljaju na multiplistički način, a iste su životne dobi. Ovi bi rezultati, osim što mogu pomoći nastavnicima koji poučavaju buduće nastavnike u Turskoj prepoznati njihovu razinu intelektualnoga razvoja, mogli također i dati određene prijedloge za bolju komunikaciju sa studentima nastavničkih smjerova. Ovo istraživanje može također pomoći nastavnicima koji obrazuju buduće nastavnike unaprijediti njihovu razinu intelektualnoga razvoja i pomoći im da uče dublje.

Ključne riječi: *intelektualni razvoj; Perryjev model; pristupi učenju; studenti nastavničkih smjerova; Turska*

Uvod

Cano (2005) je smatrao da su se dvije paradigme, metakognitivna i fenomenografska, razvile iz Perryjeva rada (1970). Obje paradigme prepoznaju kako se uvjerenja o znanju i učenju i pristupi učenju mijenjaju kako učenici prelaze na naprednije razine u obrazovanju (Cano, 2005). Dostupna literatura o uvjerenjima

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o znanju i učenju otkrila je tri struje koje su se najviše proučavale (Hofer i Pintrich, 1997) i koje su u fokusu metakognitivne paradigme: (1) istraživanja koja pokušavaju steći uvid u način na koji pojedinci interpretiraju vlastita obrazovna iskustva, (2) istraživanja koja analiziraju misaone procese i razmišljanje kod učenika/studenata, (3) istraživanja koja ispituju moguće veze između različitih aspekata učenja i uvjerenja o znanju i učenju. U stvari, Zhu (2017) tvrdi da su i Perryjev rad (1970) i njegove dodatne razrade (Baxter-Magolda, 1988; Belenky, Clinchy, Goldberger i Tarule, 1986; King i Kitchener, 1994; Kuhn, 1991) pokazivale slične trendove u intelektualnom razvoju tijekom protekla četiri desetljeća. Svi su predložili prijelaz s objektivističkoga stajališta o znanju na konstruktivističko stajalište (Zhu, 2017). Stoga će se ovo istraživanje uglavnom fokusirati na Perryjev rad (1970). Kao početno istraživanje u prvoj struji koja je gore opisana, ono još uvijek izaziva čuđenje mnogih jer je Perry (1970) konceptualizirao devet faza intelektualnoga razvoja, u kojima se studenti kreću od jednostavnih do kompleksnih načina razmišljanja o svijetu. Smatralo se da se intelektualni razvoj obično odvija u određenom slijedu faza, u kojem svaka faza pruža jedinstveni okvir za percipirano značenje znanja (Widick, 1977). Perryjevih devet faza očekivani su proizvod visokoga obrazovanja (Baxter-Magolda, 1988). Tih devet faza intelektualnoga razvoja kroz koje prolaze studenti tijekom svojega obrazovanja su: „osnovni dualitet", „predlegitimni multiplicitet", „podređeni multiplicitet", „korelativni multiplicitet", „korelacijski, natjecateljski ili difuzni relativizam", „predviđena obveza", „inicijalna obveza", „orijentacije u implikacijama obveze" te „obveza u razvoju" (Perry, 1970).

Broj faza kasnije je reduciran na tri (tj. dualizam, multiplizam i relativizam), a te su faze opisane u odnosu na percepcije studenata o učenju, poučavanju, znanju i ocjenjivanju (Katung, Johnstone i Downie, 1999). Oni koji razmišljaju na dualistički način percipiraju studente kao pasivne primatelje znanja, nastavnike kao autoritete koji prikazuju činjenice, znanje kao nešto što je ili bijelo ili crno, a ispite kao načine vraćanja memoriranih činjenica. Sa stajališta onih koji razmišljaju na multiplistički način, studenti imaju određenu dozu odgovornosti za učenje, a nastavnici ponekad trebaju pomoć pri donošenju odluka, iako su još uvijek autoriteti. Ne smatraju da je znanje apsolutno, nego da je neizvjesno. Smatraju da su ispiti način pokazivanja maksimalnoga znanja. Relativistički mislioci smatraju da su studenti izvori znanja koji raspravljaju o i donose vlastite odluke, nastavnici su pomoćnici u procesu učenja, znanje je kontekstualno i treba ga istražiti, a ispiti su način izražavanja ideja i stavova. Perryjev model intelektualnoga razvoja naišao je na kritike zbog toga što je u obzir uzeo uglavnom studente koji su muškoga spola, bijelci, imaju dobre ocjene te studiraju na prestižnim obrazovnim ustanovama (Belenky i sur., 1986). Usprkos kritikama, Perryjev model intelektualnoga razvoja jako je dobro prihvaćen (Mackenzie, Johnstone i Brown, 2003) jer se temelji na podatcima prikupljenima na uzorku studentske populacije putem intervjua o tome kako oni percipiraju učenje, okruženje za učenje, prirodu znanja i uloge učenika i nastavnika (Perry, 1970).

Literatura je pokazala da se smatra da je intelektualni razvoj studenata povezan s njihovim pristupom učenju (Gibbs, 1981, citirano u Zhang i Watkins, 2001). Doista, Zhang i Watkins (2001) uočili su značajne veze između razina intelektualnoga razvoja i pristupa učenju kod američkih i kineskih studenata. Richardson (2005) je spomenuo sljedeće pristupe učenju koji se koriste u tercijarnoj razini obrazovanja: površinski pristup, strateški pristup i dubinski pristup. U stvari, pristupe učenju prvo su ispitivali Marton i Säljö (1976a, 1976b). Oni su usporedili površinsku razinu i dubinsku razinu te su kod jedne naglasak stavili na pamćenje, a kod druge na razumijevanje (Burnett, Pillay i Dart, 2003). Studenti koji primjenjuju dubinski pristup imaju aktivnu ulogu u učenju i smatraju da se samostalno moraju upustiti u učenje, dok su studenti koji primjenjuju površinski pristup pasivni i smatraju da je učenje nešto što im se događa (Marton, 1976, citirano u Richardson, 2005). Učenje se također promatra s dvije glavne perspektive – kvantitativne i kvalitativne (Biggs, 1994). Kvantitativno gledajući, učenje je usvajanje i akumuliranje znanja. Međutim, ono je, kvalitativno, stvaranje značenja temeljeno na postojećem znanju. Pojedinci na različitim razinama intelektualnoga razvoja percipiraju vrijednosti i znanje na različit način, a te razlike najizraženije su u njihovim pristupima učenju (Widick, 1977, str. 35-36). Na primjer, predodžbe nižega reda o učenju i poučavanju, koje su, svaka za sebe, orijentirane na predmet i nastavu te ovisne o predavaču, percipiraju se kao dualističke, dok se one višega reda, koje su orijentirane na studenta i na učenje, ne percipiraju kao dualističke (Varnava-Marouchou, 2007).

Međunarodna istraživanja o intelektualnom razvoju studenata

Međunarodna literatura pokazala je da postoje i deskriptivna i korelacijska istraživanja, koja se uglavnom fokusiraju na intelektualni razvoj studenata iz različitih odsjeka. Međutim, intelektualni razvoj studenata na nastavničkim smjerovima rijetko je bio predmetom istraživanja.

Baxter-Magolda (1988) ispitivala je razlikuje li se značajno epistemološki razvoj studenata prve godine s obzirom na spol. Zaključila je da su studenti pokazali veći intelektualni rast nego studentice, i to tijekom prve godine studija. Međutim, epistemološki razvoj obaju spolova nije se značajno razlikovao u stilovima učenja. Razlike među studentima u epistemološkom razvoju s obzirom na spol objašnjene su kontekstualnim faktorima, a ne individualnim. Veze između obrazaca razmišljanja kod studentica i kod studenata i konteksta učenja utjecale su na njihov intelektualni razvoj. Opis konteksta učenja koji su dale studentice pokazao je nižu razinu aktivne uključenosti nego kod studenata. Zbog izloženosti predavanjima, koja su uglavnom ograničena na slušanje, vođenje bilješki i memoriranje, studentice su se više oslanjale na autoritet i vršnjake, dok su studenti bili aktivnije uključeni u učenje i više su se oslanjali sami na sebe. S obzirom na to da je na njih utjecala kultura koju su iskusile u opisanom kontekstu učenja, studentice su, dakle, stvarale slike o sebi u odnosu

na druge, i to u većoj mjeri nego studenti. Sheppard i Gilbert (1991) uočili su da na epistemološki razvoj studenata utječu njihovi pristupi učenju, percepcije o okruženju za učenje te nastavne metode profesora. Osim toga, na predodžbe studenata o znanju i njihove pristupe učenju također je utjecala struktura kolegija. Točnije, epistemološki razvoj studenata bio je povezan s povijesnim i filozofijskim studijima i nastavnim metodama. Wright (1992) je došao do zaključka da je intelektualni razvoj studenata u pozitivnoj vezi s brojem interdisciplinarnih, općeobrazovnih kolegija, koji stvaraju aktivno, integrirano i cjeloživotno učenje. Wilson (1998) je istraživao moguće veze između intelektualnoga razvoja studenata prve godine i njihovu sklonost kritičkom mišljenju. Uočio je značajnu korelaciju između intelektualnoga razvoja i zrelosti, što je jedna od poddimenzija sklonosti kritičkom mišljenju. Barnard (2001) je istraživao utjecaj sudjelovanja u zajednici učenja na kognitivni razvoj studenata prve godine i došao do saznanja da se njihov kognitivni razvoj nije značajno razlikovao zbog sudjelovanja u zajednici učenja.

Katung i suradnici (1999) utvrdili su da autonomno učenje mijenja stav studenata prema vlastitoj ulozi. Do kraja godine, više od 70 % studenata usvojilo je relativistički način razmišljanja ili su stekli autonomiju u procesu učenja, a većini se znanost više nije činila nejasnom i punom činjenica. Nastavnike više nisu smatrali autoritetima koji su eksperti u svojim područjima. Umjesto toga, sami su se našli u središtu vlastitoga procesa učenja i postali su aktivnim sudionicima u njemu, kroz individualni trud i suradnju s drugima. Zhang (1999) je ispitivao koliko se Perryjev model intelektualnoga razvoja (1970) može generalizirati u kineskoj kulturi te je zaključio da on nije univerzalan i da varira ovisno o različitim kulturološkim i obrazovnim sustavima jer su obrasci kognitivnoga razvoja kineskih studenata upravo suprotni onima koje je Perry opisao. Drugim riječima, za razliku od onoga što je Perry opisao, kinseki su studenti pokazali da im razina logičkoga razmišljanja opada kako napreduju u studiranju. Zhang (1999) je ovakve neočekivane rezultate dobivene na uzorku kineskih studenata pripisao sljedećim kulturološkim aspektima: za razliku od američkih vršnjaka, kineski studenti nemaju dovoljno prilika za donošenje odluka. Moraju odslušati unaprijed određene, usko specijalizirane tečajeve kako bi se mogli upisati na fakultet. Nemaju slobodu za razvoj vlastitih kurikula. Nastava je uglavnom usmjerena na nastavnika. Studenti nemaju pomoć za profesionalnu orijentaciju. Studenti dodiplomskih studija počinju i raditi. Osim toga, studenti u Kini nemaju priliku upoznati se s novim kolegama jer ostaju u istoj obrazovnoj skupini i sobi u studentskom domu sa sedam studenata. No, međuljudski odnosi, nedostatak izbora te suvremeni život u Kini smatraju se mogućim razlozima zašto su studenti prve godine u Kini više relativistički mislioci i zašto su predaniji radu nego vršnjaci u Americi (Zhang i Hood, 1998). Zhang i Watkins (2001) ispitivali su veze između razina intelektualnoga razvoja i pristupa učenju kod američkih i kineskih studenata i pokušali utvrditi postoje li kulturološke razlike u obrascima intelektualnoga razvoja i u vezi između intelektualnoga razvoja

i postignuća i demografskih karakteristika. Rezultati su pokazali da je dualistički način razmišljanja u pozitivnoj vezi s površinskim učenjem, ali ne i s dubinskim učenjem. Upravo suprotno, relativističko razmišljanje i predanost radu koja dolazi uz njega u pozitivnoj su vezi s dubinskim učenjem, no u suprotnoj vezi s površinskim učenjem. Obrasci intelektualnoga razvoja kod kineskih studenata različiti su od takvih obrazaca kod američkih studenata. Intelektualni razvoj kineskih, ali ne i američkih studenata značajno se razlikovao s obzirom na njihovu godinu studija. Drugim riječima, studenti prve godine u Kini bili su manje dualistički, a najviše relativistički mislioci, dok su studenti na trećoj godini uglavnom bili dualistički, a manje relativistički mislioci. Osim toga, slobodne aktivnosti, koje uključuju posao, putovanje te rukovođenje, imali su pozitivan utjecaj na intelektualni razvoj i američkih i kineskih studenata. Pozitivna veza između kognitivnoga razvoja, posebno predanosti radu u sklopu relativističkoga načina razmišljanja, i postignuća, uočena kod američkih studenata, nije bila statistički značajna kod kineskih studenata.

Clarkeburn (2000) je procjenjivao kurikul etike koji se provodio kroz strukturirane rasprave i problemsko učenje kako bi se poticao moralni razvoj studenata biologije i ostalih studenata, kod kojih je kognitivni razvoj neophodan, ali nije dovoljan. Rezultati upućuju na to da su njihove razine moralne osjetljivosti značajno porasle zbog pohađanja nastave etike, dok su studenti nedosljedno koristili prilično jednostavne alate za donošenje moralnih odluka. Stoga je predloženo da se pomoću nastave etike studentima pomogne pronaći odgovarajuće alate za donošenje moralnih odluka. Ingram i Nelson (2008) nisu uočili nikakvu korelaciju između intelektualnoga razvoja i znanja o evoluciji ili prihvaćanja evolucije i postignuća u naprednim kolegijima koje su studenti biologije odabrali. Selepeng (2000) je istraživao intelektualni razvoj studenata biologije na dodiplomskom studiju i uočio da srednjoškolci imaju najviše samopouzdanja u cijelom sustavu, no da se od njih očekuje da budu puno samostalniji nego studenti. Osoblje također ima visoka očekivanja kada se radi o sadržaju ispita nego što ih imaju studenti. Osim toga, postoji nesklad između onoga što se namjerava ostvariti (npr. samostalnost, odgovornost) i onoga što se provodi. Na primjer, tradicionalne metode ocjenjivanja ne pomažu intelektualnom razvoju studenata. Kolegiji koje studenti na drugoj godini slušaju nemaju uspjeha u poticanju intelektualnoga razvoja studenata.

Simmons (2008) je uočio da studenti obrazovnih i društvenih studija imaju puno savjetovanja koja se mogu značajno predvidjeti, dok diplomirani studenti socijalnoga rada dosežu kognitivnu kompleksnost koja se razlikuje samo po završenom stupnju obrazovanja. Drugim riječima, studenti magistarskih studija dosežu višu razinu kognitivne kompleksnosti nego studenti dodiplomskih studija. Carruth (2008) je provela deskriptivnu studiju slučaja kako bi stekla detaljniji uvid u profesionalni razvoj savjetnika na velikom sveučilištu na jugoistoku države i došla do zaključka da se savjetnik tijekom stažiranja kreće od Perryjevih ranih do kasnih faza intelektualnoga razvoja.

El-Farargy (2010) je proučavala epistemološka uvjerenja studenata kemijskoga inženjerstva i zaključila da studenti imaju predodžbu o svojoj ulozi u učenju, no da im nije jasna uloga predavača i priroda znanja. Što se tiče ocjenjivanja, ti su studenti prešli s dualističkoga na jednostavno stajalište, gdje su uživali u kritičkom razmišljanju i izražavanju kreativnih ideja. Zhu i Cox (2015) opisali su razine intelektualnoga razvoja kineskih studenata na doktorskim studijima inženjerstva na pet sveučilišta na srednjem zapadu te su opisali postoje li značajne razlike u njihovom akademskom napretku i sveučilištu koje pohađaju ili te razlike ne postoje. Zaključak je bio da je oko 80 % studenata pokazalo više razine razmišljanja. K tomu, njihove razine intelektualnoga razvoja značajno su se razlikovale u akademskom napretku (u korist onih koji su položili stručne ispite) i sveučilištu koji su pohađali.

Murray (2013) je ispitivala epistemološka uvjerenja studenata druge godine medicine koji su pohađali program problemskoga učenja (PBL) te jesu li se njihova uvjerenja značajno razlikovala u zrelosti, procesu učenja i akademskim postignućima. Rezultati su pokazali da ranija iskustva učenja stečena u srednjoj školi i akademski uspjeh studenata imaju značajan utjecaj na njihova epistemološka uvjerenja koja su bila povezana s njihovim pristupima učenju. Studenti na drugoj godini koji su imali najnižu razinu akademskih postignuća pokazali su naivna uvjerenja, krivo su shvatili program problemskoga učenja te su razvili pogrešan pristup učenju, dok su oni s najvišom razinom akademskih postignuća razvili sofisticirana uvjerenja, shvatili su kompleksnost programa problemskoga učenja te su usvojili uspješan pristup učenju. Konstruktivistički program problemskoga učenja imao je značajan utjecaj na epistemološki razvoj studenata medicine.

Postojeća literatura o toj temi također pokazuje da se na sveučilištima na Bliskom istoku uglavnom istraživao intelektualni razvoj studenata nastavničkih smjerova (pogotovo ženskoga spola). Na primjer, Al-Shibli (2003) je proveo istraživanje o intelektualnom razvoju na uzorku studenata u Omanu kako bi utvrdio razlikuje li se značajno njihov intelektualni rast primjenom problemskih zadataka. Rezultati su pokazali da su studenti dosegli više razine intelektualnoga razvoja nego srednjoškolci. No, intelektualni razvoj studenata na završnoj godini studija imao je tendenciju opadanja. Uz to, studenti u Omanu pokazali su pozitivnu promjenu u područjima percipiranja uloge predavača i uloge studenta, znatnu promjenu u području ocjenjivanja, no slabu promjenu u području prirode znanja. Intelektualni razvoj studenata u Omanu u pozitivnoj je vezi s njihovim postignućima te se značajno razlikuje s obzirom na spol (ženski) i područje (znanost). Rezultati su također pokazali da su interaktivni materijali izrađeni i korišteni u problemskom učenju, za koje je rečeno da ih većina studenata voli, izazvali promjenu u načinu na koji studenti percipiraju ulogu predavača, znatnu promjenu u percipiranju prirode znanja, malu promjenu u percipiranju ocjenjivanja, no nikakvu promjenu u percipiranju uloge studenta. Drugim riječima, kurikul problemskoga učenja mogao bi studentima pomoći dostići više razine intelektualnoga razvoja. Khine i Hayes

(2010) su istraživali kako studentice nastavničkih studija u Emiratima usvajaju znanje i zaključili su da one spajaju načine znanja i učenja. Aldegether (2017) je također istraživao način na koji studentice nastavničkih smjerova u Saudijskoj Arabiji posjeduju znanje i došao je do saznanja da su, kako je i bilo očekivano s obzirom na kulturološke aspekte, uglavnom koristile razne načine povezivanja znanja.

Nacionalno istraživanje o intelektualnom razvoju studenata

U Turskoj su provedena istraživanja o epistemološkim uvjerenjima studenata (Başbay, 2013; Erol i Ercan, 2015; Tümkaya, 2012), studenata nastavničkih smjerova (Ayaz, 2009; Bakır i Adak, 2014; Demir, 2012; Demirel i Çam, 2016; Erdamar i Alpan, 2015; Fırat-Durdukoca, 2013; İçen, İlğan i Göker, 2013; Karabulut i Ulucan, 2012; Kazu i Erten, 2015; Özşaker, Canpolat, i Yıldız, 2011; Pan i Yanpar-Yelken, 2016; Şahin-Taşkın, 2012; Uysal i Kösemen, 2013; Ünal-Çoban, Ateş i Kaya-Şengören, 2011) te studenta nastavničkih smjerova i nastavnika koji već rade u školama (Bangir-Alpan i Koç-Erdamar, 2014). Literatura o epistemološkim uvjerenjima pokazala je da su se nacionalna istraživanja uglavnom provodila na studentima nastavničkih smjerova.

Tümkaya (2012) je istraživao razlikuju li se epistemološka uvjerenja studenata značajno s obzirom na spol, područje studiranja, godinu studija, akademska postignuća te stilove učenja. Rezultati su pokazali da se epistemološka uvjerenja studenata nisu značajno razlikovala s obzirom na njihov spol i akademska postignuća, ali da su se značajno razlikovala s obzirom na područje studiranja (u korist onih koji su studirali na odsjecima za zdravstvo, društvene znanosti, znanost i tehnologiju), godinu studija (u korist studenata prve i zadnje godine studija) te stilove učenja (u korist onih koji su imali divergentan stil učenja). Başbay (2013) je došao do saznanja da razina metakognitivne svijesti studenata djelomično posreduje u vezi između njihovih epistemoloških uvjerenja i sklonosti prema kritičkom mišljenju. Erol i Ercan (2051) istraživali su osobnu epistemologiju i samopercepcije međunarodnih studenata u Turskoj i uočili da se i njihove osobne epistemologije i samopercepcije značajno razlikuju u percipiranoj prikladnosti završenoga srednjoškolskoga obrazovanja, prilagodbi visokom obrazovanju te akademskom uspjehu. Samopercepcije međunarodnih studenata značajno su se razlikovale i s obzirom na godinu studija (u korist studenata zadnje godine studija). K tomu, osobna epistemologija međunarodnih studenata bila je u pozitivnoj korelaciji s njihovom samopercepcijom.

Ünal-Çoban i suradnici (2011) proučavali su epistemološka stajališta budućih nastavnika fizike. Utvrdili su da su njihova postignuća bila u značajnoj korelaciji s njihovim epistemološkim stavovima prema znanju, ali ne i s njihovim epistemološkim stajalištima prema učenju. Takva epistemološka stajališta značajno su se razlikovala

s obzirom na spol, i to u korist ženskoga spola. Epistemološka stajališta o učenju bila su razvijena u svim godinama studija, no značajno su se razlikovala s obzirom na godinu studija, u korist onih na nižim godinama studija. Epistemološka stajališta o znanju značajno su se razlikovala s obzirom na godinu studija, u korist onih na višim godinama studija.

Özşaker i suradnici (2011) došli su do saznanja da je razina samopoštovanja budućih nastavnika tjelesne i zdravstvene kulture u inverznoj vezi s uvjerenjima o učenju koje zahtijeva ulaganje truda i određene sposobnosti. K tomu, uvjerenja studenata tjelesne i zdravstvene kulture o učenju koje zahtijeva ulaganje truda i određene sposobnosti značajno su i negativno predvidjela njihove razine samopoštovanja. Karabulut i Ulucan (2012) došli su do saznanja da se znanstvena epistemološka uvjerenja budućih nastavnika tjelesne i zdravstvene kulture ne razlikuju značajno s obzirom na njihov spol i sveučilište na kojem studiraju. No, njihova znanstvena epistemološka uvjerenja značajno su se razlikovala s obzirom na godinu studija, i to u korist studenata na zadnjoj godini studija.

Demir (2012) je proučavao epistemološka uvjerenja studenata razredne nastave i zaključio da su ona na umjerenom stupnju te da se ne razlikuju značajno s obzirom na spol i tipove nastave. Epistemološka uvjerenja onih koji su odabrali kolegij Metode istraživanja bila su znatno naprednija nego kod onih studenata razredne nastave koji nisu odabrali taj kolegij. Şahin-Taşkın (2012) došao je do zaključka da su uvjerenja studenata razredne nastave o učenju koje zahtijeva ulaganje truda značajno predvidjela njihov dubinski pristup učenju, dok su njihova uvjerenja o jednoj jedinoj istini značajno predvidjela njihov površinski pristup učenju. Također, epistemološka uvjerenja studenata razredne nastave značajno su se razlikovala s obzirom na njihov spol, a išla su u prilog studenticama. Fırat-Durdukoca (2013) utvrdila je da su uvjerenja studenata razredne nastave koji su učili kroz sustavnu nastavu temeljenu na sposobnostima te koji su imali uvjerenje o jednoj jedinoj istini bila nerazvijenija od uvjerenja studenata razredne nastave koji su učili kroz predavanja, koja se smatraju temeljnom komponentom tradicionalne nastave. Studenti razredne nastave izloženi sustavnoj nastavi učili su dublje od onih koji su bili izloženi predavanjima.

İçen i suradnici (2013) proučavali su epistemološka uvjerenja budućih nastavnika društvenih znanosti i došli do zaključka da su oni više vjerovali u učenje na temelju sposobnosti nego u učenje uz ulaganje truda i u jednu jedinu istinu. Ayaz (2009) je došao do zaključka da se uvjerenja budućih nastavnika prirodnih znanosti o učenju uz ulaganje truda mogu značajno predvidjeti pomoću dubinskoga pristupa učenju, spola, strateških pristupa učenju, sveučilišta koji su pohađali te mjesečnih prihoda. Njihova uvjerenja o učenju temeljenom na sposobnostima značajno su se mogla predvidjeti pomoću površinskoga pristupa učenju, spola, dubinskoga pristupa učenju, mjesečnih prihoda, srednje škole koju su završili te broja knjiga koje su kod kuće imali. Njihovo vjerovanje u jednu jedinu istinu moglo se značajno

predvidjeti pomoću dubinskoga pristupa učenju, stupnja obrazovanja majke te mjesta stanovanja.

Bakır i Adak (2014) došli su do zaključka da su se epistemološka uvjerenja budućih nastavnika prirodnih znanosti značajno razlikovala samo s obzirom na godinu studija, i to u korist studenata prve godine. Kazu i Erten (2015) ispitivali su epistemološka uvjerenja studenata nastavničkih smjerova te jesu li se ona značajno razlikovala s obzirom na spol, odsjek i prosječnu ocjenu. Rezultati su pokazali da su studenti najviše vjerovali u učenje uz ulaganje truda. Njihova epistemološka uvjerenja nisu se značajno razlikovala s obzirom na spol i prosječnu ocjenu, no njihova uvjerenja o učenju uz ulaganje truda i učenju temeljenom na sposobnostima značajno su se razlikovala s obzirom na odsjek.

Budući nastavnici prirodoslovnih predmeta manje su vjerovali u učenje uz ulaganje truda, studenti razredne nastave manje su vjerovali u učenje na temelju sposobnosti, dok su studenti predškolske nastave manje vjerovali u jednu jedinu istinu. Demirel i Çam (2016) došli su do zaključka da budući nastavnici prirodoslovnih predmeta imaju sofisticiranije stavove o nepromjenjivim sposobnostima, no manje sofisticirane stavove o brzom učenju. Značajno su se razlikovala samo njihova uvjerenja o jednostavnom znanju, s obzirom na spol (ženski) i prosječnu ocjenu (oni koji su imali srednju prosječnu ocjenu). No, njihova epistemološka uvjerenja nisu se razlikovala s obzirom na godinu studija.

Erdamar i Alpan (2015) proveli su longitudinalno istraživanje kako bi utvrdili promjene u epistemološkim uvjerenjima budućih nastavnika strukovnih predmeta i u njihovim vještinama rješavanja problema tijekom studija. Zaključili su da su budući nastavnici strukovnih predmeta uglavnom vjerovali u učenje uz ulaganje truda, ali su najmanje bili uvjereni da postoji jedna jedina istina. Sami su sebe smatrali kompetentnima za rješavanje problema, razmišljanje i planiranje te su imali više samopouzdanja kada su bili na zadnjoj godini studija. No, nepromišljeni pristup imali su najrjeđe kada su bili studenti na prvoj i drugoj godini.

Pan i Yanpar-Yelken (2016) ispitivali su utjecaj određenih varijabli na epistemološka uvjerenja budućih nastavnika engleskoga jezika i na njihov proces studiranja te su došli do saznanja da imaju sofisticirana uvjerenja. Njihova epistemološka uvjerenja (u korist ženskoga spola) i proces studiranja (u korist muškoga spola) značajno su se razlikovala s obzirom na spol, ali ne i s obzirom na godinu studiranja i prosječnu ocjenu.

Uysal i Kösemen (2013) zaključili su da su razine samoučinkovitosti studenata nastavničkih smjerova koji će u Turskoj dobiti diplomu o pedagoškoj naobrazbi u obrnutoj vezi s njihovim uvjerenjima o učenju uz ulaganje truda. Njihova uvjerenja o učenju uz ulaganje truda i njihove razine samoučinkovitosti značajno su se razlikovale, ovisno o sveučilištu koje su pohađali (u korist sveučilišta u sjeverozapadnom dijelu Turske), ali nisu ovisile o spolu. Međutim, njihova uvjerenja o učenju temeljenom na sposobnostima i uvjerenja da postoji jedna jedina istina

značajno su se razlikovala s obzirom na spol (u korist muškoga spola), ali ne i s obzirom na sveučilište koje su pohađali.

Bangir-Alpan i Koç-Erdamar (2014) uspoređivali su epistemološka uvjerenja budućih nastavnika i nastavnika koji već rade u struci te su došli do saznanja da su budući nastavnici sofisticiraniji na početku nastavničke karijere, no njihova epistemološka uvjerenja postaju naivnija tijekom rada u nastavi. Osim toga, epistemološka uvjerenja nastavnika koji rade u školama nisu se značajno razlikovala s obzirom na radno iskustvo i predmete koje su predavali.

Provedena su i korelacijska istraživanja kako bi se uočile značajne veze između epistemoloških uvjerenja studenata i njihovih postignuća, sklonosti prema kritičkom mišljenju, pristupa učenju, samopercepcije, samoučinkovitosti i samopoštovanja. Postoje i studije koje su ispitivale mogu li se epistemološka uvjerenja studenata predvidjeti pomoću nekoliko varijabli (tj. spola, srednje škole koju su završili, mjesta stanovanja te sveučilišta koje su pohađali). Provedene su i kauzalno-komparativne studije u kojima se uspoređuju epistemološka uvjerenja budućih nastavnika i onih koji već rade u nastavi. Kvazieksperimentalni dizajn istraživanja također je korišten kako bi se utvrdilo razlikuju li se značajno epistemološka uvjerenja budućih učitelja u nastavnim metodama. Nadalje, provedena su i deskriptivna istraživanja kako bi se utvrdilo razlikuju li se značajno epistemološka uvjerenja studenata u određenim varijablama (tj. postignućima, prilagodbi visokom obrazovanju, području studiranja, spolu, godini studija, stilu učenja, percipiranoj adekvatnosti srednjoškolskoga obrazovanja, vrsti nastave, sveučilištu koje pohađaju te jesu li odabrali kolegij Metode istraživanja ili ne). Međutim, još je teško pronaći istraživanja o utjecaju intelektualnoga razvoja studenata, posebno onih na nastavničkim studijima u Turskoj, na njihov pristup učenju, iako je poznato da su intelektualni razvoj i pristupi učenju međusobno povezani, kao što se pokazalo na primjerima američkih i kineskih studenata (Zhang i Watkins, 2001). Stoga ovo replicirano istraživanje pokušava naći odgovore na sljedeća pitanja:

(1) Na kojoj su razini intelektualnoga razvoja budući nastavnici?
(2) Koje pristupe učenju koriste?
(3) Kakav je utjecaj intelektualnoga razvoja budućih nastavnika na njihove pristupe učenju, nakon provedene kontrole varijable dobi?

Da pobliže odredimo, intelektualni razvoj budućih nastavnika odnosi se na jednu od tri razine mjerene turskom verzijom (Şenocak, 2006) Skale intelektualnoga razvoja studenata (Katung i sur., 1999): dualističku, multiplističku i relativističku. Pristupi učenju budućih nastavnika odgovaraju prosjeku rezultata na tvrdnjama kojima se mjeri „površinsko učenje" i „dubinsko učenje" u turskoj verziji (Önder i Beşoluk, 2010) Revidiranoga dvofaktorskoga upitnika o procesu učenja (R-SPQ-2F) (Biggs, Kember i Leung, 2001).

Kako se od ovoga istraživanja očekuje da ispuni prazninu u dosadašnjim istraživanjima, ono ima veliku važnost jer rezultati mogu dati nekoliko preporuka za

bolju komunikaciju s budućim nastavnicima tako što će nastavnicima koji obrazuju buduće nastavnike u Turskoj pomoći da prepoznaju svoje razine intelektualnoga razvoja. Također im mogu pomoći da kod budućih nastavnika unaprijede razine intelektualnoga razvoja kako bi im omogućili dubinsko učenje.

Metoda

Utjecaj intelektualnoga razvoja na pristupe učenju, nakon kontrole varijable dobi, proučavan je na uzorku od 322 studenta razredne nastave koji su prigodno odabrani na državnom sveučilištu u Turskoj. U toj su skupini studentice činile većinu (78 %). Njihova dob (M = 20,1, SD = 1,45) varirala je između 17 i 25 godina, u cijelom uzorku. Oko 30 % ih je bilo na prvoj godini, oko jedne četvrtine (24,5 %) na drugoj godini te nešto više od 23 % na zadnjoj godini studija, dok ih je oko 22 % bilo na trećoj godini studija.

U ovom istraživanju podatci su prikupljeni pomoću turske verzije (Şenocak, 2006) Skale intelektualnoga razvoja studenata (Katung i sur., 1999) i turske verzije (Önder i Beşoluk, 2010) Revidiranoga dvofaktorskoga upitnika o procesu učenja (R-SPQ-2F) (Biggs, Kember i Leung, 2001). Turska verzija Skale intelektualnoga razvoja studenata sastoji se od 12 tvrdnji kategoriziranih pod tri faktora temeljena na Perryjevom modelu: „dualizmu", „multiplicizmu" i „relativizmu" (Şenocak, 2006). 12 tvrdnji Skale intelektualnoga razvoja studenata povezano je sa sljedećim razinama intelektualnoga razvoja: dualističkom (D), multiplističkom (M) i relativističkom (R) kada se radi o učenju; M, R, D kada se radi o poučavanju; D, R, M kada se radi o znanju; D, R, M kada se radi o ocjenjivanju (Şenocak, 2006). Kako su učinili i Katung i suradnici (1999), studenti su grupirani u tri kategorije, što je prikazano u tablici 1. Na primjer, budući nastavnik stavljen je u kategoriju dualističkoga mislioca ako je odabrao četiri tvrdnje na Skali intelektualnoga razvoja studenata sljedećim redoslijedom: D, D, D, D; u kategoriju multiplističkoga mislioca ako je odabrao četiri tvrdnje na Skali intelektualnoga razvoja studenata sljedećim redoslijedom: M, M, D, R te u kategoriju relativističkoga mislioca ako je odabrao četiri tvrdnje na Skali intelektualnoga razvoja studenata sljedećim redoslijedom: R, R, M, M.

Tablica 1

Turska verzija Revidiranoga dvofaktorskoga upitnika o procesu učenja (R-SPQ-2F) je dvodimenzionalna i sadrži 20 tvrdnji grupiranih u dvije kategorije – površinsko učenje i dubinsko učenje (Önder i Beşoluk, 2010). Alfa-koeficijent turske verzije Revidiranoga dvofaktorskoga upitnika o procesu učenja je 0,94 (Şenocak, 2006), a taj upitnik rezultirao je Cronbachovim alfa-koeficijentima od 0,74 za površinsko učenje i 0,78 za dubinsko učenje (Önder i Beşoluk, 2010). U ovom su istraživanju koeficijenti pouzdanosti bili 0,80 za dubinsko učenje i 0,76 za površinsko učenje. Također su postavljena i određena pitanja kako bi se dobili podatci o demografskim karakteristikama budućih nastavnika – njihovom spolu, dobi te godini studija.

Ove skale podijeljene su uzorku koji se sastojao od 322 studenta nastavničkih smjerova. Prezentirane su im informacije o vrsti istraživanja i mogućim rizicima. Studenti su dali svoj pristanak za sudjelovanje u istraživanju. Svi su informirani da će njihovi podatci ostati povjerljivi jer će svaki student razredne nastave u istraživanju sudjelovati pod kodom. Na primjer, PST1 bio je prvi student razredne nastave, PST2 drugi, itd.

Kvantitativni podatci analizirani su pomoću statističkoga računalnoga programa koji koristi deskriptivnu statistiku. Budući da su pristupi učenju u značajnoj vezi s dobi (Gijbels, Van de Watering, Dochy i Van den Bossche, 2005; Zeegers, 2001), utjecaj dobi prilagođen je kako bi se ispitao utjecaj intelektualnoga razvoja na pristupe učenju. To jest, dob studenata razredne nastave smatra se zbunjujućom kovarijancom, koja je također i kontinuirana. Stoga je provedena i jednosmjerna multivarijatna analiza kovarijance (MANCOVA) kako bi su utvrdio utjecaj intelektualnoga razvoja studenata razredne nastave na njihove pristupe učenju, nakon što je provedena kontrola varijable dobi. Razina značajnosti bila je 0,05.

Rezultati

Razine intelektualnoga razvoja studenata razredne nastave

Razine intelektualnoga razvoja studenata razredne nastave ispitane su kroz 12 tvrdnji kategoriziranih pod tri faktora, po uzoru na Perryjev model. To su: dualizam, multiplizam i relativizam. Kako se može vidjeti u tablici 2, oni su uglavnom bili relativistički mislioci (≈89 %). Osim toga, bilo je nekoliko multiplističkih (≈8 %) i dualističkih mislioca (≈3 %). Čini se da su studenti razredne nastave skloni relativističkom razmišljanju.

Tablica 2

Pristupi učenju studenata razredne nastave

Pristupi učenju studenata razredne nastave ispitani su kroz 20 tvrdnji podijeljenih u dvije skupine – površinsko učenje i dubinsko učenje. Deskriptivna analiza podataka pokazala je da su studenti razredne nastave uglavnom primjenjivali dubinski pristup učenju (M = 3,23, SD = 0,59), a ne površinski pristup učenju (M = 2,71, SD = 0,65), kako se može vidjeti u tablici 3.

Tablica 3

Utjecaj intelektualnoga razvoja na pristupe učenju, nakon kontrole varijable dobi

Kako bi se utvrdio utjecaj intelektualnoga razvoja na pristupe učenju, nakon kontrole varijable dobi provedena je jednosmjerna MANCOVA. Postojala je jedna nezavisna varijabla, intelektualni razvoj, s tri razine (tj. dualizmom, multiplizmom i relativizmom) te jedna zavisna varijabla, pristupi učenju, s dvije razine (tj.

površinskim učenjem i dubinskim učenjem). Utjecaj dobi, koji je kontinuiran, smatran je kovarijancom jer su pristupi učenju značajno povezani s dobi (Gijbels i sur., 2005; Zeegers, 2001). Tablica 4 pokazuje deskriptivnu statistiku za svaku razinu zavisne varijable.

Tablica 4

Deskriptivna analiza podataka pokazala je da su studenti razredne nastave koji su relativistički mislioci (M = 3,27, SD = 0,58) skloniji dubinskom pristupu učenju nego oni studenti koji su multiplistički (M = 2,88, SD = 0,56) i dualistički (M = 2,80, SD = 0,62) mislioci. Osim toga, studenti razredne nastave koji su multiplistički mislioci (M = 3,11, SD = 0,55) uglavnom imaju površinski pristup učenju, za razliku od dualističkih (M = 3,08, SD = 0,48) i relativističkih (M = 3,08, SD = 0,48) mislioca.

Kako bi se ispitao utjecaj intelektualnoga razvoja na pristupe učenju, nakon kontrole varijable dobi provedena je jednosmjerna MANCOVA. Prije same njezine provedbe, provjerene su sve pretpostavke MANCOVA analize, uključujući sve pretpostavke multivarijatne analize varijance, tj., nezavisna opažanja, multivarijatnu normalnost, homogenost populacijske kovarijance za zavisne varijable, linearne veze između zavisnih varijabli i kovarijata te homogenost regresijskih koeficijenata. Rezultati su pokazali da je pretpostavka kovarijacijske homogenosti zadovoljena (Box's M = 3,80, p > 0,05). Stoga je za izvještaj odabrana Wilksova lambda. Prema Levenovom testu, pretpostavka homogenosti varijance za dubinsko učenje [F(2,317) = 0.28, p > .05] i za površinsko učenje [F(2,317) = 1.98, p > .05] je zadovoljena. Bonferronijeva prilagodba primijenjena je da bi se kontrolirala pogreška Tipa 1 i da bi se procijenila univarijatna F statistika. Procijenjena alfa-razina od 0,05 za dubinsko učenje i za površinsko učenje podijeljena je s brojem zavisnih varijabli (tj. s dva). Stoga je procijenjeno da je dobivena F statistika na alfa-razini od 0,025. Tablica 5 pokazuje rezultate multivarijatne i univarijatne analize kovarijance.

Tablica 5

Prema tablici 5, rezultati jednosmjerne MANCOVA analize pokazali su da su se pristupi učenju studenata nastavničkih smjerova značajno razlikovali s obzirom na njihove razine intelektualnoga razvoja, nakon provedene kontrole varijable njihove dobi (Wilksova λ = 0,94, F(4, 630) = 5,01, p <0,05, η^2 = 0,03). Multivarijatna vrijednost η^2od 0,03 upućuje na to da je veličina učinka bila mala do umjerena, prema općeprihvaćenim kriterijima (Cohen, 1988). Srednji rezultati za dubinsko učenje i površinsko učenje prilagođeni u početnim razlikama bili su raspodijeljeni kroz svaku razinu intelektualnoga razvoja, kako se može vidjeti u tablici 6.

Tablica 6

Nakon kontrole varijable dobi, prihvaćanje dubinskoga pristupa učenju kod studenata razredne nastave značajno se razlikovalo u razinama intelektualnoga razvoja F(2, 319) = 6,83, p < 0,025, η^2 = 0,04. Može se također reći i da se 4 %

varijance u dubinskom učenju može pripisati intelektualnom razvoju, pod uvjetom da je varijabla dobi konstantna. Usporedbe u parovima pokazale su da studenti razredne nastave koji razmišljaju na relativistički način (*M = 3,27*) uče dublje od onih koji razmišljaju na multiplistički način (*M = 2,90*), kada se prilagodi varijabla dobi. Osim toga, prilagodbom varijable dobi pokazalo se da se prihvaćanje površinskoga pristupa učenju od strane studenata razredne nastave značajno razlikovalo s obzirom na razine intelektualnoga razvoja, $F(2,319) = 6,94$, $p < 0,025$, $\eta^2 = 0,04$. Također se može reći da se 4 % varijance u površinskom učenju može pripisati intelektualnom razvoju, pod uvjetom da je varijabla dobi stalna. Usporedbe u parovima pokazale su da studenti razredne nastave koji razmišljaju na multiplistički način (*M = 3,10*) prihvaćaju površinski pristup učenju više nego oni koji razmišljaju na relativistički način (*M = 2,67*), kada se prilagodi varijabla dobi (vidi slike 1 i 2).

Slike 1 i 2

Rasprava i zaključci

Čini se da studenti razredne nastave imaju veliku sklonost prema relativističkom načinu razmišljanja i da lakše prihvaćaju dubinski pristup učenju nego površinski. Provedena je jednosmjerna MANCOVA kako bi se utvrdio utjecaj intelektualnoga razvoja studenata razredne nastave na pristupe učenju, nakon kontrole varijable njihove dobi. Rezultati MANCOVA analize pokazali su da se pristupi učenju studenata razredne nastave značajno razlikuju u njihovim razinama intelektualnoga razvoja, nakon provedene kontrole varijable dobi. Pokazalo se da studenti razredne nastave koji su relativistički mislioci teže uče primjenom dubinskoga pristupa učenju od onih koji su multiplistički mislioci, nakon provedene kontrole varijable dobi. K tomu, studenti razredne nastave koji su multiplistički mislioci lakše prihvaćaju površinski pristup učenju od onih koji razmišljaju na relativistički način, nakon prilagodbe varijable dobi. Zašto su studenti razredne nastave pokazali veću sklonost relativističkom razmišljanju, iako je sustav visokoga obrazovanja u Turskoj jednako tradicionalan kao i onaj u Kini (Zhang, 1999)?

Iako se očekivalo da će biti pod utjecajem tradicionalne, Konfucijeve kineske kulture, studenti nastavničkih smjerova u Hong Kongu u Kini nisu se oslanjali na pretpostavku da je znanje sigurno i jednoznačno (Chan i Elliott, 2004). Studenti razredne nastave u ovom istraživanju žive u Turskoj, gdje se susreću istok i zapad. Kao i njihovi kolege u Hong Kongu, studenti nastavničkih smjerova koji su sudjelovali u ovom istraživanju također su mogli biti pod utjecajem istočnjačkih i zapadnjačkih kultura te svjesni nestalne i promjenjive prirode znanja (Chan i Elliott, 2004). Osim toga, obvezno obrazovanje i širenje sveučilišta (Chan i Elliott, 2004) možda su također pridonijeli tome što više ne percipiraju svoje profesore kao autoritete koji im predstavljaju činjenice. Stoga bi profesori koji poučavaju buduće nastavnike u Turskoj trebali tim studentima pružati alternative kako bi ih poučili da sami donose svoje odluke (Zhang i Watkins, 2001). Druga je mogućnost

da studenti razredne nastave koji su sudjelovali u ovom istraživanju možda imaju više razine samopouzdanja (Wood i Sleet, 1993, citirano u Al-Shibli, 2003). To jest, kada izgrađuju svoja stajališta o nekom problemu koristeći višestruke izvore znanja, relativistički mislioci oslanjaju se sami na sebe i imaju visoku razinu samopoštovanja. Dualistički mislioci smatraju da je autoritet jedini izvor znanja, no također osjećaju samopouzdanje. No, multiplistički mislioci su sumnjičavi, nesigurni i osjećaju manje samopouzdanja. „Društvena poželjnost" bila bi druga mogućnost. Studenti razredne nastave mogli bi biti pogodni za refleksiju o vlastitom procesu razmišljanja i učenja. Ova mogućnost mogla bi biti tema nekog budućega istraživanja. Studente razredne nastave trebalo bi intervjuirati i promatrati kako bi se istraživačima omogućilo da bolje razumiju njihov način razmišljanja i učenja.

Ovo istraživanje, provedeno uzimajući u obzir preporuke Demira i Akınoğlua (2010) za daljnja istraživanja, moglo bi pomoći profesorima na nastavničkim studijima u unaprjeđenju intelektualnoga razvoja budućih nastavnika kako bi im pomogli da uče dubinski. Kako? Pristupi učenju djelomično ovise o pojedincu (tj. njegovoj motivaciji, vještinama učenja i osobnosti), a djelomično o kontekstu (tj. oblicima ocjenjivanja, zadatku te stavovima i entuzijazmu nastavnika) (Beattie, Collins i McInnes, 1997). Stoga preferirani pristup učenju ovisi o ranije spomenutim faktorima (Richardson, 2005). Kako su naveli Elton i Laurillard (1979), promjena načina ocjenjivanja uzrokovat će najbrže promjene u načinu na koji studenti uče. Nijedna promjena u obrazovanju neće promijeniti pristupe studenata učenju, osim ako sami studenti ne promijene i svoje poimanje ocjenjivanja (Richardson, 2005), koje uključuje stavove o i poglede na ocjenjivanje (Birenbaum i Rosenau, 2006) jer način na koji studenti shvaćaju ocjenjivanje, značajno utječe na njihov pristup učenju, i obrnuto (Struyven, Dochy i Janssens, 2005; Thomson i Falchikov, 1998). Način na koji profesori ocjenjuju studente jako utječe na njihov pristup učenju (Zhang i Watkins, 2001). Studenti koji primjenjuju dubinski pristup učenju preferiraju nastavu punu izazova i alate za ocjenjivanje koji omogućavaju izražavanje ideja, dok studenti s površinskim pristupom učenju ne preferiraju kolegije koji se fokusiraju na razumijevanje i ocjenjivanje koje se ne temelji na činjenicama (Entwistle i Tait, 1990). Kasapoglu (2013) je došao do saznanja da studenti razredne nastave koji uče dubinski i strateški preferiraju alternativne načine ocjenjivanja više nego studenti koji imaju površinski pristup učenju. Stoga bi profesori koji poučavaju buduće studente mogli koristiti metode ocjenjivanja, pogotovo one alternativne, koji omogućavaju dubinski pristup učenju (Zhang i Watkins, 2001).

Kako ovi rezultati pomažu i profesorima koji poučavaju buduće nastavnike u Turskoj prepoznati njihove razine intelektualnoga razvoja, ujedno mogu poslužiti i kao preporuke za uspješniju komunikaciju s njima. Ako profesori koji poučavaju buduće nastavnike razumiju razlike među budućim nastavnicima, moći će bolje odgovoriti na njihove raznolike potrebe u učenju te svoju nastavu kreirati na način od kojega budući nastavnici imaju najviše koristi, a oni će moći uspješno učiti

tijekom cijeloga procesa profesionalne izobrazbe (Felder i Brent, 2005). U suprotnom bi slučaju budući nastavnici, pogotovo oni koji razmišljaju dualistički, na primjer, mogli biti zbunjeni ako im se kaže da različiti odgovori na pitanja ili rješenja zadataka na testu mogu biti prihvatljivi i točni (Battaglini i Schenkat, 1987). Međutim, Perry (1970) je pretpostavio da je razvoj kognicije posljedica suočavanja s kognitivnim neskladom i njegovim rješavanjem. Profesori koji poučavaju buduće nastavnike koji su multiplistički mislioci također bi trebali davati primjere relativističkih stajališta tako da ih izlože razmišljanju na višoj razini intelektualnoga razvoja. Ovaj će nesklad pomoći razviti nova uvjerenja koja će se prihvatiti i koristiti kao smjernica u njihovom daljnjem obrazovnom radu (Eisenhardt, Besnoy i Steele, 2012). Budući bi nastavnici također mogli imati priliku suočiti se s konfliktnim mišljenjima. Iskustva koja studenti stječu izvan nastave u pozitivnoj su korelaciji s njihovim kognitivnim razvojem (Zhang i Watkins, 2001). Na primjer, kroz poslovna iskustva, kao i ona s putovanja i iskustva stečena u rukovodstvu, budući se nastavnici nalaze u interakciji s različitim ljudima, problemima i stajalištima (Zhang i Watkins, 2001).

Izravna komunikacija o očekivanjima, raznolikost zadataka, nastava usmjerena na studenta (npr. vođeno istraživanje, kooperativno i aktivno učenje, problemsko i projektno učenje itd.), rad i konstruktivna povratna informacija u zadatcima više razine, kao i ocjenjivanje studenata u različitim razvojnim fazama također pomažu intelektualnom razvoju (Felder i Brent, 2005). Wilson (1998) je također spomenuo i potrebu integracije problemskih zadataka, koji su kontekstualni i imaju više od jednog točnog odgovora, u kurikul. Savin-Baden (1996) je razmatrao problemsko učenje kao katalizator stvaranja značenja na temelju postojećega znanja i iskustava. Alcock (2001) je isto zaključio da problemski pristup razvija logičko i formalno razumijevanje bolje od predavanja jer su studenti voljni formulirati vlastite argumente i redovito dobivaju povratne informacije. Prema Ingramu i Nelsonu (2008), problemski zadatci mogli bi se koristiti u strukturiranim aktivnostima kako bi se promicao intelektualni razvoj studenata. Al-Shibli (2003) također je istaknuo da bi se intelektualni razvoj studenata mogao poticati primjenom problemskih zadataka. Osim toga, budući nastavnici također bi trebali razvijati i refleksivno razmišljanje i konstruktivno učenje, što se naglašava u zapadnjačkim kulturama, poput Sjeverne Amerike (Chan i Elliott, 2004). Hallam (1995) je došao do saznanja da analitički/holistički, ili studenti koji uče na više načina, imaju više mogućnosti dostići najvišu razinu intelektualnoga razvoja i predložio je da bi ih se trebalo poticati da usvoje analitički/holistički ili raznolik stil učenja kroz rasprave (Hallam, 1995). K tomu, kako bi se pomoglo studentima da primjenjuju raznovrsne pristupe učenju, bilo bi dobro organizirati manje skupine studenata u kojima oni imaju glavnu riječ, davati im podršku i pomagati da razviju učinkovite strategije čitanja i učenja (Entwistle, 1977).

Na kraju, kako su podatci prikupljeni na uzorku od 322 buduća nastavnika, ovo istraživanje moglo bi se replicirati tako da se proširi i na privatna sveučilišta i na veći uzorak, kako bi se dobili rezultati koji se mogu bolje generalizirati.