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Investigating Potential Differences in the Approaches to Studying of Gifted and Normative Learners via PISA Math Tests Results

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Abstract

For the past few decades, the way students learn, that is, their "approaches to studying" have been characterized by the students' perception of their academic environment, conceptions about learning, and the perception of oneself as a learning agent. Equally, the differences between gifted and average learners in terms of their approaches to learning remain unclear. Hence, this research utilized the data from the American edition of the Program for International Student Assessment (PISA-2009) to assess the aforementioned potential differences in 15-year-old students. The research utilized structural equation modelling, wherein multigroup analysis was performed. Invariance was revealed between the two groups, and subsequent mean testing revealed all three approaches significantly differed between the groups. Gifted learners employed higher levels of control and monitoring strategies, while average students employed higher levels of memorization. Implications of this study for teaching practices are discussed in terms of adjusting the curriculum to allow gifted learners to be more a part of the classroom learning experience, through teachers' use of classroom differentiation techniques. Equally, non-gifted students should be supported in moving away from memorization techniques and employing more elaboration strategies.

Key words: *approaches to studying; gifted learners; learning strategies; metacognitive skills; PISA math tests.*

Introduction

It has been found that the way learners use their skills to develop certain approaches to studying is conditioned by students' perception of themselves as participants in the learning process, especially in connection to where, what and how they study (Richardson, 2011). When investigating approaches to studying, two separate research issues emerge. The first point is characterized by a classroom-based research approach that mainly employs interviews and questionnaires (Richardson, 2011), which aim to quantify non-observable constructs in students' behaviour and cognitive processes. The second approach is characterized by a more laboratory-based investigation of learning and pays attention to observable behaviour in students and cognitive processes inferred from their behaviour (Richardson, 2011). The current study is more aligned with the first approach as it employs self-reported behaviour when quantifying approaches to learning. Entwistle and Peterson (2004) investigated individual learning preferences, various perceptions of learning and pedagogical foundations of the learning process, and found that individual study behaviour is crucial. Moreover, there are several other important factors in one's approach to learning, such as the relationship between students and the employed teaching method, the teaching content and various other social experiences. These other factors reveal that the learning context is both institutional and socio-political.

While it remains unclear whether differences between gifted and average students are exclusively connected to their approaches to learning or learning styles, the purpose of the current study was to investigate which learning approaches are employed by gifted learners and whether they differ from the approaches employed by average learners. The data from the American edition of the Programme for International Student Assessment (PISA-2009) were used to investigate learning approaches. More specifically, potential differences between gifted and average students were examined with the use of approaches to studying scale.

However, prior to investigating the research subject, the existing learning approaches were examined. The literature review found that Marton et al. (1993) defined six approaches to learning. The first is knowledge-maturing learning which builds on the already acquired information in order to develop new ideas; learning is based on the pre-existing foundation. The second is learning based on memory, i.e. reproduction, such as studying for a test or exam in order to pass, which is often motivated by a desire to succeed instead of understanding the subject matter. Learning aimed at practical application of a task is the third approach, and it concentrates on acquiring practical information for specific activities, such as driving a car. The fourth approach is learning through abstraction, i.e. meaning, wherein one attempts to find meaning in the learning content, so the purpose of learning is not utilitarian but existential. The fifth is learning based on interpretation-comprehension, in which understanding reality is achieved by means of interpreting acquired information to the point of making sense of reality through acquisition of new data. The sixth approach is person-alteration

learning, which aims at personal development in a meaningful way, so significance is a mandatory feature of the learning process. The PISA Approaches to Studying Questionnaire can generally be seen as a combination of the above approaches; however, the intersections and emphasis of the individual concepts are different, but still mostly encompass the above notions.

Awareness of how learners employ different approaches to studying is crucial in fully understanding students' learning process irrespective of any political or economic factors. For instance, it can be argued that in capitalist economies, lack of attention to how gifted or average students choose to approach their studies may lead to educating a docile proletariat in a capitalist economy. Moreover, this lack of attention in emerging economies could lead to immense gaps in the achievements of both gifted and average students. This could be attributed to the former type of students receiving more attention than the latter.

Specifically, education of the gifted became the focus of government interest in South Africa in the 1960s. However, within the Apartheid context, this focus was characterized as white gifted children being provided with more attention in education. Fortunately, gifted black children began to receive focus due to a 1988 report highlighting the need for the establishment of schools for these learners (Oswald & de Villiers, 2013, p.2). After 1994, educational policies in post-Apartheid governments appeared to have changed on paper, but not in practice, due to the lack of educational opportunities offered to gifted learners (Welton, 2001). Equally, government initiatives did not result in any significant changes, both in terms of school policies and classroom practices for gifted learners (Bloch, 2009).

The current situation for South African gifted learners is full of challenges (van der Westhuizen & Maree, 2006, p.204). This is mainly due to societal and teacher perceptions of equity and the belief that gifted learners are already coming from a place of privilege (Taylor & Kokot, 2000). Norwich (1994) describes this as an ideological dilemma for teachers stemming from the tension "between the social value of promoting equal respect and value for all and the value which recognizes each person's individuality" (1994, p. 293), or stated otherwise, a confusion of equity with equality. Commonly, teachers view gifted students as already exceptional, and their time and focus should therefore be devoted to underachieving students. However, teachers who recognize individual differences also believe that a one-size-fits-all curriculum is insufficient to provide equal learning opportunities for all students. Kokot (2005) asserted that separate or exclusive education should no longer be considered for gifted learners, but rather an inclusive approach within normative schools among normative students.

The situation with gifted learners in South Africa is also relevant for the larger-scope discussion concerning gifted students worldwide. If differences are revealed between gifted and normative students, then this fact needs serious consideration in terms of its pedagogical and didactical implications. One direct implication would be the evaluation of classroom differentiation techniques to provide the best and appropriate

learning opportunities to all students. Hence, classroom differentiation can be a possible remedy in addressing gifted learners' needs, one that is easy to implement, alongside productive educational policy changes, in capitalists as well as emerging economies.

However, there is a crucial difference between capitalist and emerging economies when it comes to gifted learners: gifted learners generally leave emerging economies for capitalist economies, where they feel their potential can be used more effectively. Olszewski-Kubilius and Clarenbach (2012) asserted that this "leaving" phenomenon could be managed efficiently by removing barriers to excellence through the identification of best practices that especially emphasize the improvement of learning opportunities for low-income promising students. On the other hand, emerging economies could experience a loss of potential innovation in society if gifted learners are not given the opportunity to fully develop intellectually, academically and scientifically.

Therefore, the teaching practices founded in classroom differentiation have a dual benefit: firstly, they support both gifted and normative students due to them sharing the same inclusive classroom. Moreover, regardless of the reason for focusing on differentiation, the fact that teachers know about this teaching practice and apply it is bound to lead to more effective teaching for all students (Tomlinson, 1996; 1999; 2005). Secondly, these practices can be applied in any economy, capitalist or emerging, with minimal requirements, that is, augmentation and alteration of the employed teaching methodologies for gifted learners, as opposed to costly systemic changes in educational infrastructure, such as special schools for gifted learners.

Theoretical foundations of approaches to studying

Researchers developed their understanding of the study processes already in the 1970s, but the instruments for assessing students' learning process were designed in the 1980s (Jones, 2003). Biggs' (1985) study among 823 graduate and 150 postgraduate students based on theoretical literature about students' learning identified three approaches to studying (deep, surface and achieving), thus leading to the development of the Study Process Questionnaire (SPQ). This research partly used the mixed method, which utilized a quantitative questionnaire based on interviews and derived from theoretical perspectives on learning (Richardson, 2004). The initial version of the SPQ contained six subscales (42 items) intended to measure motives and strategies on three dimensions. Each item entailed a 5-point scale from 'this item is never or only rarely true for me' to 'this item is always or almost always true for me'. Dimension 1 is surface approach to learning, in which the study motivation is instrumental; it is highly reproductive, with an intended outcome limited to only essential aspects needed to pass. It is generally facilitated by mechanical reproduction through rote learning. Dimension 2 is deep approach to learning, which entails an intrinsic motive for learning as it aims to actualize interest and competence while focusing on particular subjects through a meaningful strategy. This dimension is anchored in wide-scope reading and connectivity with previous relevant students' knowledge. Dimension 3 is the achieving approach in which the study motive is ego-enhancing and rooted

in competitiveness, as one aims to obtain the highest grades, regardless of whether the material is interesting or not. The achieving strategy is organizational in terms of having a focus on following all suggested materials and carefully scheduling time, thus striving to become the 'exemplary learner'. With the help of two colleagues, Biggs (2001) created the Revised Two-Factor Study Process Questionnaire (R-SPQ-2F), which contains 20 items and measures two dimensions, surface and deep approach. The achieving approach was excluded in order to make the usage of the R-SPQ-2F more efficient for teachers as a learning assessment tool.

Entwistle and Ramsden (1981) used a phenomenographic approach and identified four approaches to learning: meaning (deep), reproducing (surface), strategic and non-academic. Entwistle and Ramsden employed qualitative methodology, i.e. 'rigorous qualitative analysis' (Jones, 2003), in order to develop the ASI by focusing on students' perceptions of their approaches to learning. Entwistle and Ramsden (1981) designed the Approaches to Study Inventory (ASI) comprising 16 sub-scales with 64 items in total. The items were grouped in four general themes. The first, Meaning Orientation, is based on the deep approach characterized by active questioning during the process of learning, interrelating ideas by seeking connections to other parts of the material, connecting proof to conclusions by active use of evidence, and learning for the sake of learning or, in other words, intrinsic motivation driven by interest. The second, Reproducing Orientation, employs the surface approach based on preoccupation with memorization, relying on teachers to define the learning tasks (i.e., syllabus-boundness), exhibiting fear of failure by harbouring pessimism and anxiety about academic outcomes, and focusing on a course for its qualifications. The third, Achieving Orientation, also has four features: the strategic approach characterized by the awareness of the demands set by the teaching staff, disorganized study methods reflected in the inability to work regularly or efficiently, negative attitudes to studying, such as lack of interest and effort, and achievement motivation manifested in active competition and overt confidence. The fourth theme is Styles and Pathologies, with the former including comprehensive learning or readiness to map out subject areas and divergent thinking, as well as operative learning or the emphasis on facts and logical analysis, following an essentially non-academic approach to learning. The latter includes globetrotting, over-readiness to jump to conclusions and improvidence, or over-cautiousness in relying on details. Working with a colleague, Entwistle (1994) drafted the Revised Approaches to Study Inventory (RASI), which contained only 38 items on 5 subscales.

Deep learning

According to Entwistle and Ramsden (1983), deep learning approach is based on the intention to understand the course material for oneself, and this approach employs critical interaction with the subject matter. Learners who employ this approach demonstrate a significant capacity to exercise cognitive effort actively in order to connect new ideas to their previous knowledge. Moreover, this approach aims at the integration of ideas through self-organizing principles. At the same time, students employing this

approach show the ability to relate evidence to conclusions and possess the ability to examine the logic of an argument pertaining to the content of their study (Entwistle & Ramsden, 1983). Marton and Säljö (1976b) indicated that the potential benefits of deep learning reside in the fact that it demonstrates not only attention to the content, but also an interest in 'what is signified'. Learners who employ this method are very likely to be actively preoccupated with the meaning of information as to focus on concepts and problems.

Surface learning

Surface learning approach is characterized by the learner's intention to reproduce parts of the study content by passively accepting ideas and information. This approach to learning can be characterized by a general focus on formal assessment requirements and demonstrate no reflection in terms of purpose or strategies when it comes to acquiring new information. Consequently, students who employ this approach make full use of memorization techniques and procedures and thus fail to distinguish principles or patterns within the content of their study materials.

Strategic learning

Strategic learning approach is associated with two themes: strategic learning and non-academic learning. While the former is built on the intention to out-guess the ultimate assessment by playing games, with the sole purpose of getting the best exam score, the latter is associated with self-assessment of academic progress by promoting an approach that is not reflexive nor deep. In order to obtain good exam results, students who employ strategic learning focus on what the teacher requires, while non-academic learning is anchored in a 'cook-book orientation', with a strong preference for certain, concrete, practical and often easily applicable knowledge. While strategic learners can also employ both surface and deep approach, non-academic learners tend to view learning as instrumental in achieving their personal goals.

Entwistle and Ramsden (1983) asserted that achieving learning strategies also have potential benefits, especially regarding the malleability of this approach to be combined with either deep or surface approach. For example, strategic learners can employ the surface approach when they accept that the assessment process could be fair and accurate, and if it reflects their knowledge. However, strategic learners can employ the deep approach, most likely in conjunction with the need to acquire deeper understanding of the material. Moreover, non-academic learners can be highly focused on knowledge with immediate practical applicability in certain jobs, and for its qualifications.

Approaches to studying and giftedness

According to Hielat and Al-Shabatat (2012) and Sternberg (1985), gifted learners generally excel in three domains: analysis, synthesis and practice. Analytic giftedness reveals an above-average ability to understand problems and to think about the

constitutive elements of problems in a logical way. Synthetic giftedness refers to people with highly creative abilities connected to discoveries and inventions. Practical giftedness is related to practitioners, namely people who focus on the application and implementation of various aspects within concrete environments. The above notion is very much in line with the ideas entailed in the No Child Left Behind Act (2001), which associates giftedness with high intellectual, creative/artistic and leadership achievements. Equally, there are elements of Renzulli's (2011) Three Cluster Model of giftedness, which couples giftedness with basic human traits manifested in above-average general abilities, high levels of task commitment and high levels of creativity. Besides these three clusters, Dunn and Milgram (1993) suggested that gifted learners make extensive use of sensory learning styles, learning through auditive, visual and kinesthetic methods. Additionally, Altun and Yazici (2010) asserted that gifted learners use visual and kinesthetic means to achieve their learning purposes to a higher degree than their normative peers.

Generally, in comparison to their average peers, gifted learners differ in the ways they learn. Pyryt (1998) reported that gifted learners are both more independent and more often seek to be a part of the learning experience than their normative counterparts. Wolfensberger (2012) asserted that gifted learners prefer interactive teaching and discussion-based learning with a focus on feedback and elaboration more than their normative peers. Chan (2001) indicated that gifted learners appear to be more inclined to independent learning connected to school environments that support debate-oriented teaching.

More specifically, Muir-Broaddus and Bjorklund (1990) asserted that gifted learners are less strategic than their normative peers due to gifted students' memorization skills relying on their higher intellect. Duan et al. (2010) elaborated on this notion and asserted that normative learners need to devise strategic ways for efficient memorization in comparison to gifted learners. Gifted learners can generally rely on their higher intelligence, which requires considerably lower levels of effort in memorizing the material.

Conversely, Gallagher et al. (1986) postulated that normative learners are surpassed by their gifted counterparts precisely due to the fact that average learners are generally better strategists in employing their memorization skills. Supporting this notion, Gaultney et al. (1996) asserted that non-gifted children use their memorization skills less rapidly and less efficiently. However, Zhang et al. (2017) demonstrated that normative children display the collaborative inhibition effect, i.e. better collective performance in the information retrieval stage, after data clustering. On the other hand, as shown by Weldon and Bellinger (1997), gifted children do not. This leads to the conclusion that memorization in gifted learners is more strategic and elaborate, while in average learners it appears to be less strategic and more mechanical.

Self-regulation is generally less present in normative learners (Clark, 1992). This indicates that normative learners are usually less autonomous when it comes to performing learning tasks (Heller, 1999). Moreover, average learners tend to use

affective learning styles, which are much more likely to result in renunciation or even repudiation of sustained learning when incentives for sustained learning effort are no longer present (Hooda & Devi, 2017).

Specifically, regarding the self-monitoring of the learning process, gifted learners are generally more inherently motivated to study (Beyaztaș & Metin, 2019), as well as more prone to use systematic approaches as they investigate and employ problem-solving steps, and thus achieve their goals (Porter 1999). Internally motivated to focus on learning (Olszewski-Kubilius et al., 1988), gifted learners generally seek better solutions in order to improve their study experience; in doing so, they employ self-regulation for monitoring their studies (Sternberg, 1997). At the same time, they invest considerable effort in making the learning process motivational (Kanevsky, 1992). Gifted learners tend to be highly curious and interested in their study tasks, which leads to monitoring their learning process through demonstrating complex individual initiative with respect to cognition, behaviour and motivation (Zimmerman, 1986). Nota et al. (2004) revealed that frequently employed monitoring techniques by gifted learners include personal self-evaluation, organization of the learning process, planning the study task, establishing goals while learning, taking notes for future use, searching for data, checking previously taken notes, and the analysis of complex information for personally drawn conclusions. Consequently, gifted learners are more aware of their metacognitive approaches to learning, and they know how to improve their learning experience by using various learning strategies (Alexander et al., 1995). It should be stressed here that, even if they are more cognizant of their metacognitive motivations for learning than average learners, gifted learners do not differ significantly from their non-gifted peers in regards to the way they are employed in monitoring the learning process (Zimmerman & Martinez-Ponz 1990).

However, since gifted learners are more aware of their metacognitive motivations for learning, they also seem to be more successful in learning, because their metacognitive approaches motivate them to use different self-regulating learning strategies as monitoring techniques (Azevedo et al., 2005). Although it is still unclear how gifted learners use their metacognitive skills in the learning process, it is evident that they not only possess higher metacognitive motivation but also employ it better than their normative peers, thus leading to more successful and effective learning (Greene et al., 2008).

Programme for International learner assessment (PISA)

PISA is the Program for International Learner Assessment devised by the Organization for Economic Co-operation and Development (OECD). In line with OECD's mission 'to build better policies for better lives' (Ross, 2020), the PISA aims to inspire 'national efforts to help learners to learn better, teachers to teach better, and school systems to become more effective' (OECD, 2010).

Study approaches in PISA

The PISA survey (2009) comprises 13 questions that investigate learners' approaches to studying. While slightly different in nomenclature, these three components strongly mirror the three concepts generally found in the academic literature: Elaboration (deep), Memorization (surface) and Control Strategies (achieving/strategic).

PISA Elaboration Strategies are in line with Biggs' SPQ (1985), which characterizes the deep approach as having a deep, i.e. intrinsic motive (the study is meant to actualize interest and competence, with a focus on particular subjects), and as meaningful (reading is wide in scope and content in order to connect it to previous relevant knowledge). PISA elaboration strategies also match Entwistle and Ramsden's (1981) ASI/RASI, which views the meaning orientation as characterized by the deep approach (active questioning in learning), interrelating ideas (connecting a text with other content), use of evidence (relating evidence to conclusions) and intrinsic motivation (interest in learning for the sake of learning). Q31h is an example of the PISA elaboration strategy: "*When I study, I figure out how the information might be useful outside school.*"

PISA memorization strategies concur with Biggs' SPQ (1985), according to which the surface approach is defined by an instrumental surface motive (focus on gaining a qualification with pass-only aspirations, usually out of fear of failure) and a reproductive surface strategy (limited to target-only essentials by reproducing information through mechanical or rote learning). Q31c is an example of the PISA memorization strategy: "*When I study, I try to memorize as many details as possible.*" PISA memorization strategies also overlap with Entwistle and Ramsden's Approaches to Study Inventory, in which the reproduction orientation includes the surface approach (characterized by preoccupation with memorization), syllabus-boundness (relying on staff to define learning tasks), fear of failure (produced by pessimism and anxiety about academic results) and extrinsic motivation (to gain certain qualifications by learning).

Finally, PISA control strategies appear to be described exclusively in positive terms, which is unlike Biggs' SPQ (1985) and its slightly negative characterization of the achieving approach as 'ego-enhancing'. Biggs' remaining features are generally positive, with the achieving mode presented as competitive (to obtain the highest grades, irrespective of the perceived interest about the material) and the achieving strategy seen as organizational (to follow all suggested readings by scheduling time and adopting the 'model learner' behaviour). Q31b is an example of the PISA control strategy: "*When I study, I start by figuring out what exactly I need to learn.*" Similarly, Entwistle and Ramsden's ASI/RASI (1981) includes both positive and negative aspects in defining the achieving orientation, which includes not only the positive strategic approach (awareness of staff demands) and positive achievement motivation (competitive and confident) but also negative study methods (disorganized, without efficiency and regularity) and negative attitudes to learning (e.g., lack of interest and application).

PISA scores and identifying academically gifted learners

There is a substantial body of literature on investigating PISA scores and IQ. Building on this literature has led to the identification of gifted learners in these datasets (Godor & Szymanski, 2017; Lubinski & Humphreys, 1990; 2007; Roznowski et al., 2000; Weiss, 2009). In the current study, learners' math scores were used to identify academically gifted learners. This is due to the fact that all three facets of the PISA heavily focus on cognitive ability; therefore, there is no essential difference between solely using learners' math scores and the combined scores for all three facets of the PISA (Rindermann, 2007; Weiss, 2009). The definition of "gifted learners" remains contested in the academic literature. The choice of identification of academically gifted learners used in the current study is in line with the notion of academically gifted learners (see Geake & Gross, 2008; Lohman, 2005). Academically gifted learners are generally distinguished by high levels of current accomplishment (grades) within the curriculum. Normative learners can be characterized by achieving average levels of accomplishment (grades) within the current curriculum. On the one hand, employing both this distinction and method of identifying students can narrow the concept of "giftedness" to giftedness in academic performance only, without taking other forms of "giftedness" (musical, arts, and/or sports) into account. On the other hand, due to the fact that this paper investigates students' approaches to studying, this distinction is relevant, and it supports the research context, that is, students' learning behaviours.

Current research focus and hypotheses

In order to investigate potential differences in approaches to studying, the PISA USA (2009) dataset was employed to test the hypotheses based on the research question below:

Research Question: Do gifted learners employ different approaches to studying when compared to their average peers?

H-1: Gifted learners will employ lower levels of memorization strategies compared to their average peers.

H-2: Gifted learners will employ higher levels of elaboration strategies compared to their average peers.

H-3: Gifted learners will employ higher levels of control strategies compared to their average peers.

Method

Participants

The 2009 PISA dataset was obtained from the two-stage application of tests on a nationally representative sample of 15-year-old US students, including 4,929 learners in total. From the 4,103,738 15-year-olds actively enrolled in school in the US, 15,199 were excluded from the desired target population. This lead to an exclusion rate of 0.36 %. A variation of one month in terms of age was permitted for inclusion in the

sample. However, the sample did not include "testing of 15-year-olds schooled in the home, workplace or out of the country" (OECD, 2012, p. 4). No socio-economic data was available for the participants; therefore, the models will not show a possible link to the mentioned variable. The gender variable was taken into consideration, and the students were labelled gifted or average according to math scores, due to them being a strong proxy for general intelligence. The ranking process was executed according to gender and is in line with previous studies of mathematical giftedness (Lubinski & Humphreys, 1990; Roznowski et al., 2000). The current study included 2,420 female (49.1 %) and 2,509 male (50.9 %) 15-year-old students.

The identification of academically gifted learners is primarily rooted in the work of Rindermann (2007) and Weiss (2009), in which learner's math scores were demonstrated to be highly correlated with national IQ scores (see Rindermann, 2007). Rindermann (2007) reported that PISA math scores highly correlate to both national ability means (r = .60 – .98) and to intelligence tests (r = .85 – .86). Weiss (2009) investigated national IQ and PISA scores from more than 40 countries, whereby he strongly demonstrated that, over time, the relationship between PISA math scores and national IQ 'seems to be in relative equilibrium' (2009, p.75). Moreover, Rindermann (2007, p.667) found a 'homogeneity of results in PISA, TIMSS, PIRLS and IQ-tests across nations'. Moreover, Rindermann et al. (2017) have also used the technique of employing the PISA dataset to assess the sense of belonging in academically gifted learners across 26 EU countries.

As mentioned before, this study utilized the learners' math scores to identify the academically gifted, because all three facets of the PISA heavily focus on cognitive ability, and therefore there is no essential difference between solely using learners' math scores and combining scores for all three facets (Rindermann, 2007; Weiss, 2009). According to Weiss, 'essentially, all three scales of PISA measure general intelligence' (2009, p.75). The 2009 PISA US dataset contains five plausible math values for each learner. All five plausible values were ranked per learner within the whole dataset (n = 4929). This ranking process was executed per gender and is in line with previous studies of mathematical giftedness (Lubinski & Humphreys, 1990; Roznowski et al., 2000). The students ranked in the 95th percentile for all plausible math scores were labeled as gifted. This resulted in 247 students identified as gifted (female = 121, male = 126) and 4,682 as average (female = 2299, male 2383).

Instruments

In the PISA 2009, thirteen items were included to investigate learners' approaches to learning. The Approaches to Learning Scale consists of three subscales: memorization, elaboration and control strategies. These three constructs closely mirror the above-mentioned concepts generally used in previous approaches to investigating the learning processes: memorization (*When I study, I read the text so many times that I can recite it*); surface, elaboration (*When I study, I try to understand the material better by relating it to my own experiences*); deep and control strategies (*When I study, I check if I understand*

what I have read); strategic approach. The assessments were given on a four-point scale: "almost never," "sometimes," "often," to "almost always." These questionnaires were in English as they were executed in the United States.

Data analysis

In order to ascertain the presence of the aforementioned concepts in the data, a confirmatory factor analysis (CFA) using structural equation modelling was performed. Adequate model fit was achieved (CFI = .90, RMSEA .056, $x^2 = 8.75$). Due to the large sample size, the x^2 (cmin/df) was unacceptable. However, x^2 tests are generally deemed sensitive to large sample sizes. To test the mean differences between the two groups, multigroup invariance testing was performed. This confirmed invariance between the two groups at a configural, metric and scalar level (see Table 1). Since invariance was achieved, the model could now test the mean scores between the two groups of learners.

Table 1
Invariance testing

	CFI	Δ CFI	cmin/df	RMSEA
Configural Invariance	0,910		8.75	.056
Metric Invariance	0,908	< ,01	8.23	.054
Scalar Invariance	0,901	< ,01	8.14	,054

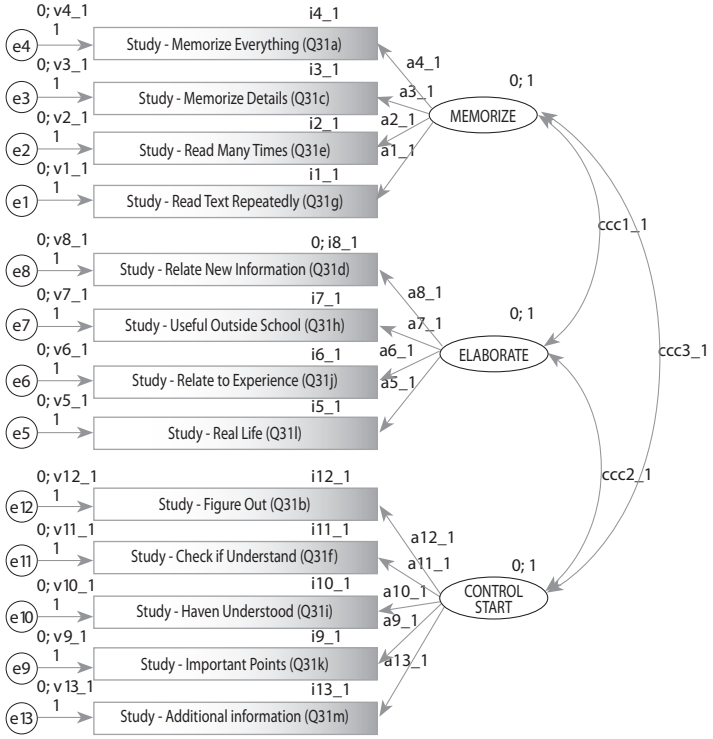

Figure 1. Description of Approaches to Study

Results

Table 2
Descriptive statistics

	Academically Gifted			Average		
Strategy	n	$\overline{x}$	sd	n	$\overline{x}$	sd
ELABORATION	247	2,36	0,77	4682	2,23	0,75
MEMORISATION	247	2,18	0,63	4682	2,45	0,71
CONTROL	247	3,11	0,63	4682	2,75	0,70

In the SEM, the latent constructs were constrained to zero for average learners and allowed free estimate for academically gifted learners. Any freely estimated critical ratios that are significantly different to zero indicate significant differences between the two groups. The results per hypothesis are given below:

H-1: *Gifted learners will employ lower levels of memorization strategies compared to their average peers.* Multigroup mean score comparison tests revealed significantly higher mean levels of academically gifted learners for Elaboration subscale (normative = CR = -.3.46, p = < .001).

H-2: *Gifted learners will employ higher levels of elaboration strategies compared to their average peers.* Multigroup mean score comparison tests revealed significantly higher mean levels of academically gifted learners for the Control Strategies subscale (normative = CR = -8.24, p = < .001).

H-3: *Gifted learners will employ higher levels of control strategies compared to their average peers.* Multigroup mean score comparison tests revealed significantly lower mean levels of academically gifted learners for Memorization subscale (normative = CR = 6.08, p = < .001).

Discussion

How students study or "approach their studies" can be characterized by the students' perception of academic environment, their conception about learning and perspective of themselves as learning agents (Richardson, 2011). In this study, a classroom-based research perspective was applied in order to investigate student approaches to studying via questionnaires focusing on non-observable constructs, such as students' nonverbal behaviour and cognitive processes inferred from self-reports (Richardson, 2011).

The three concepts that are the foundation of learning approaches were tested in SEM to determine their statistically significant presence and stability in these two groups of students. In the current study, invariance testing in the SEM revealed that the three concepts are present in both groups, as well as conceptually similar, and that the current instrument tests the same construct between these groups. This is an important finding and contribution to the academic discussion on both the notion of giftedness as well as the potential differences in how gifted learners view and approach their studies in comparison to their average counterparts. In other words, as three unique concepts, the notions of approaches to studying are similar in the two

researched groups in terms of elaboration, memorizing and control strategies. The conclusion arises that the building blocks for studying are conceptual and statistically the same in both groups.

However, the levels that are employed during studying by the two researched groups of students are significantly different. Gifted learners employ significantly higher levels of elaboration and control strategies, and significantly lower levels of memorization during their studying, when compared to their average peers. These differences in approaches to studying may lead to the conclusion that gifted students should be separated from normative children during the learning process. They may not be a problem in themselves when explaining gifted students' experience in the classroom, but may be more rooted in the lack of differentiated teaching methods, which could prove to be inadequate for addressing the needs of gifted and normative learners simultaneously.

Entwistle and Ramsden (1981) used a phenomenographic research method which has led to the identification of four approaches to learning: meaning (deep), reproducing (surface), strategic, and non-academic (achieving). According to Entwistle and Ramsden (1983), the deep learning approach is based on the intention to independently understand the learning content and provides a critical interaction with the subject. The surface learning approach is characterized by the learner's intention to reproduce parts of the study's content by accepting ideas and information passively. Strategic learning focuses on what the teacher wants for better results, while non-academic learning is anchored in a 'cook-book orientation', with a strong preference for certain, concrete and practical, often easily applicable knowledge. The PISA 2009 Questionnaire contains three subscales for exploring approaches to learning: Memorizing, Elaboration and Control Strategies. They generally encompass the notions of approaches to studying and are useful in identifying gifted learners among their normative peers.

H-1: Gifted learners will employ lower levels of memorization strategies compared to their average peers.

With regard to memorization, it could be the case that gifted learners' ability to memorize content is better than in their non-gifted counterparts, who, as such, would report lower levels. Muir-Broaddus and Bjorklund (1990) proposed that gifted learners' memorization is superior due to their higher intelligence. Equally, Gaultne et al. (1996) asserted that normative students' use of memorization skills is not as fast or efficient as among their gifted peers. However, approaches to studying can be characterized by the learner's perception of the academic environment and, therefore, they can partly be built on individual student's needs and desires. As stated above, gifted learners desire to be engaged in their learning process and report higher levels of elaboration. Statements such as Q31C, "*When I study, I try to memorize as many details as possible,*" and "*When I study, I read the text over and over again*" seem to contradict those assertions. Moreover, normative learners are usually less autonomous when it

comes to performing the learning tasks (Heller, 1999). Therefore, an average student focuses more on the content or text as not to deviate from the teacher's assignment. On the other hand, gifted learners strive to understand the content, not merely reproduce it - Q31F, "*When I study, I check if I understand what I have read,*" and they apply new information to their lives - Q31J, "*When I study, I try to understand the material better by relating it to my own experiences.*"

H-2: Gifted learners will employ higher levels of elaboration strategies compared to their average peers

The fact that gifted learners employ higher levels of elaboration can be linked to Hielat and Al-Shabatat's (2012) and Sternberg's (1985) notion that gifted learners excel in analysis and practice. These skills of analysis complement gifted learners' desire for discussion-based learning, with a focus on feedback (Wolfensberger, 2012), and their desire to be a part of the classroom learning experience (Pyryt, 1998). In other words, elaboration can be defined as the aspiration for deep meaning built upon engagement: active questioning in learning - Q31H, "*When I study, I try to understand the material better by relating it to my own experiences;*" interrelating ideas, i.e. connecting a text with other content - Q31D, "*When I study, I try to relate new information to prior knowledge acquired in other subjects;*" use of evidence, i.e. relating evidence to conclusions, and intrinsic motivation, that is, interest in learning for the sake of learning (Entwistle & Ramsden, 1981). Therefore, elaboration forms the foundation of gifted learners' approaches to studying.

H-3: Gifted learners will employ higher levels of control strategies compared to their average peers

Specifically focusing on control strategies, gifted learners seem to employ a more metacognitive approach to their studies. This concept is characterized and akin to the positive strategic approach (awareness of teachers' demands) and positive achievement motivation (competitive and confident) (Entwistle & Ramsden, 1981). For example, being aware of the teacher's demands is represented in the Q31B, "*When I study, I start by figuring out what exactly I need to learn.*" Additionally, this concept encompasses the elements of Biggs' SPQ (1985) achieving approach in terms of checking for understanding and looking for main points, as well as the notion of monitoring one's studying (Entwistle & Ramsden, 1981). For example, Q31F is an example of self-monitoring, "*When I study, I check if I understand what I have read.*" The notion that gifted learners employ higher levels of control strategies can also be linked to Renzulli's notion of task commitment, not in terms of completing a task, but more with regard to a focused effort on understanding and actively seeking gaps in one's knowledge about the subject at hand. This is exemplified in Q31K, "*When I study, I make sure that I remember the most important points in the text*" and Q31M, "*When I study and I don't understand something, I look for additional information to clarify it.*"

Ontology of difference

Since all children (gifted and average) differ in terms of development and cognitive ability (Bruna, 2009), it could be argued that general differences should be in focus, and not specific differences between gifted and average children. This may be a sound alternative to pursuing educational policies and practices helping not only gifted students, but all students in general. Thus, Roth (2008) argued in favour of 'ontology of difference' as a guiding factor in educating gifted and average students in the same classroom. Since students jointly participate in classroom activities (Howell, 2007), not as much attention should be paid to actual content being taught as to the reality of each learner, be they gifted or average (Tomlinson, 2004). The fact that gifted learners adopt different learning strategies and approaches to studying in comparison to average children could be less important than the necessity for teachers to be aware of this difference and consequently support both student types by employing teaching techniques supportive of the learning of gifted and average children alike (Oswald & de Villiers, 2013:6).

The knowledge about different the learning styles of gifted and average children forms the basis of providing adequate educational opportunities for all types of learners. The provision of appropriate educational opportunities for all types of learners should be striven for, regardless of the problems encountered by teachers in finding the proper way to bridge the gap between government policies, teacher beliefs, local school initiatives and classroom reality (Engelbrecht, 2006, p. 254).

Implications for practice and conclusion

The implications of the current study mainly pertain to the notion of classroom differentiation. Since gifted students strive for elaboration in their studies, room should be created in the curriculum for this possibility. In addition, if the curriculum aims at learners employing deep strategies during their studies, additional attention should be granted to non-gifted students in terms of supporting their learning and assuring they possess the necessary skills for applying this approach to studying. For example, average learners might benefit from assessment modelling in terms of understanding and analysis (deep approaches), in order to raise awareness about assessment beyond simple reproduction. Additionally, studying techniques such as mind-mapping or intensive note taking may support non-gifted learners, who may lack these skills and thus struggle with performing on a deeper level. As for memorization, supporting non-gifted learners in their transition towards a deeper approach should be identified. Additionally, taking into account gifted learners' less frequent use of memorization strategies, the characteristics of educational activities offered to gifted learners should avoid strong emphasis on memorization. Like elaboration, average learners generally employ lower levels of control strategies and, as such, they should be supported in the process of gaining these skills.

Classroom experience shows that gifted students perform better than their average peers in using metacognitive skills to develop efficient learning strategies and variegated approaches to study. However, contradictorily, the gifted learners require more teacher attention, help and support if they are included in a regular class. Even coupled with educational and professional assistance in the context of classroom practice, government support is not sufficient. In line with this notion, Oswald and de Villiers (2013) indicated that, in addition to government educational policies, parents and local community members should be actively involved in providing constant support to intellectually gifted children if they are to demonstrate efficient academic performances in an inclusive classroom system. However, before the implementation of inclusive classroom practices such as classroom differentiation, accurate identification of intellectually gifted children in classroom environments remains essential (Sattler, 2002). However, in striving to identify gifted students, teachers need to be aware of the fact that children's capacity for learning stems from unequal academic and psychological potential (Jewell, 2005). Nevertheless, in an inclusive educational system, classroom differentiation should aim at challenging all students equally (Winstanley, 2006) while cultivating professional awareness about their employment of different learning strategies and approaches to studying.

Research limitations

The main limitation of this study is that it utilized self-reported data. Therefore, objective conclusions on the actual competence of students cannot be made. In addition, the research data were obtained from one country, whereas research among students in an international sample might yield different results.

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Istraživanje potencijalnih razlika u pristupima učenju nadarenih i prosječnih učenika putem rezultata PISA testova iz matematike

Sažetak

Posljednjih nekoliko desetljeća način na koji učenici uče, tj. njihovi „pristupi učenju" karakterizirani su učeničkom percepcijom vlastite obrazovne okoline, njihovim koncepcijama o učenju i percepcijom sebe kao aktivnih sudionika u procesu učenja. Jednako tako, razlike između pristupa učenju darovitih i prosječnih učenika ostaju nejasne. Stoga su u ovom istraživanju korišteni podatci američkoga Međunarodnoga programa za ispitivanje znanja i vještina učenika (PISA-2009) kako bi ispitalo prije spomenute razlike na uzorku petnaestogodišnjih učenika. U ovom istraživanju upotrijebljeno je strukturirano modeliranje, unutar kojega je provedena analiza višestrukih skupina. Ustanovljena je invarijanta između dvije skupine, a posljedično testiranje aritmetičkih sredina pokazalo je da se primjena tri istraživana pristupa učenju znatno razlikuje između skupina. Daroviti učenici koristili su više razine strategija kontrole i nadgledanja, dok su prosječni učenici koristili više razine zapamćivanja. Implikacije ovoga istraživanja za praksu poučavanja odnose se na prilagođavanje kurikula s ciljem pružanja više prilika darovitim učenicima za sudjelovanje kroz diferencijaciju nastave. Slično tome, prosječne učenike treba podupirati u njihovu odmicanju od tehnika zapamćivanja i u korištenju strategija elaboracije.

Ključne riječi: *daroviti učenici; metakognitivne vještine; PISA testovi iz matematike; pristupi učenju; PISA testovi iz matematike; strategije učenja.*

Uvod

Ustanovljeno je da su načini na koji učenici koriste svoje vještine razvijanja određenih pristupa učenju uvjetovani učeničkom percepcijom sebe kao sudionika u procesu učenja, posebno s obzirom na to gdje, što i na koji način uče (Richardson, 2011). U istraživanju pristupa učenju pojavljuju se dvije odvojene istraživačke teme. Prva se može

okarakterizirati kao istraživački pristup zasnovan uglavnom na upotrebi intervjua i anketa (Richardson, 2011), s ciljem kvantificiranja nevidljivih konstrukata ponašanja i kognitivnih procesa učenika. Drugi pristup predstavlja više znanstvenu istragu učenja s fokusom na vidljivim ponašanjima učenika i kognitivnim procesima koji proističu iz ponašanja (Richardson, 2011). Ovo istraživanje više se oslanja na prvi pristup jer prilikom kvantificiranja pristupa učenju koristi samoizvještaje učenika o ponašanju. Entwistle i Peterson (2004) istraživali su individualne procese učenja, razne preferencije u procesu učenja i pedagoške osnove procesa učenja, na osnovi toga su tvrdili da je individualno učenje krucijalno. Štoviše, još je nekoliko važnih čimbenika u pristupu učenju pojedinca, poput odnosa između učenika i primijenjene metode poučavanja, sadržaja poučavanja i raznih drugih socijalnih iskustava. Ti faktori pokazuju da je kontekst učenja institucionalan i sociopolitički.

Dok ostaje nejasno jesu li razlike između darovitih i prosječnih učenika rezultat isključivo njihovih pristupa učenju ili stilova učenja, svrha ove studije bila je istražiti koje pristupe učenju koriste daroviti učenici i razlikuju li se oni od pristupa koje primjenjuju prosječni učenici. Korišteni su podatci američkoga izdanja Međunarodnoga programa za procjenu znanja i vještina učenika (PISA-2009) kako bi se istražili pristupi učenju. Konkretnije, istraživale su se potencijalne razlike između darovitih i prosječnih učenika, upotrebom skale pristupa učenju kao mjernoga instrumenta.

Prije samoga istraživanja potencijalnih razlika, ispitani su postojeći pristupi učenju. Na primjer, Marton i suradnici (1993) definirali su šest pristupa učenju. Prvi pristup je učenje zasnovano na znanju koje sazrijeva, u kojemu se nadograđuju već usvojene informacije s ciljem razvoja novih ideja, tj. učenje se zasniva na postojećem predznanju. Drugi pristup je učenje zasnovano na zapamćivanju, tj. reprodukciji, poput učenja za test ili ispit s ciljem dobivanja prolazne ocjene, a koji je često motiviran željom za uspjehom, umjesto razumijevanjem predmetnoga sadržaja. Praktično učenje je treći pristup, zasnovano na stjecanju praktičnih informacija za obavljanje specifičnih aktivnosti poput vožnje automobila. Četvrti pristup je učenje putem apstrakcije-razumijevanja u kojemu se pokušava formirati gledište prema kojemu učenje vodi smislu, pa je tako svrha učenja egzistencijalna, a ne utilitarna. Peti pristup je učenje putem tumačenja-razumijevanja u kojemu se stvarnost razumijeva putem stjecanja novih informacija i njihovoga tumačenja. Šesti pristup je učenje putem osobne promjene koje za cilj ima osobni razvoj na smislen način, pa je tako značenje obvezna odrednica procesa učenja. PISA upitnik pristupa učenju može se općenito promatrati kao kombinacija navedenih pristupa; ipak, preklapanja i naglasak na individualnim konceptima su različiti, ali još uvijek većinom obuhvaćaju prethodno navedene pojmove.

Svijest o tome kako učenici koriste različite pristupe učenju je važna za potpuno razumijevanje procesa učenja učenika neovisno o političkim i ekonomskim faktorima. Na primjer, može se tvrditi da u kapitalističkim ekonomijama nedostatak pažnje za način na koji nadareni i prosječni učenici odabiru pristup učenju može voditi obrazovanju poslušnoga proletarijata u kapitalističkoj ekonomiji. Štoviše, ovaj nedostatak u zemljama

u razvoju mogao bi rezultirati velikim prazninama u postignuću kako darovitih tako i prosječnih učenika, a što se može pripisati većoj pažnji koju dobivaju daroviti učenici.

Obrazovanje darovitih učenika ušlo je u fokus vlade Južne Afrike tijekom 60-ih godina prošloga stoljeća. Unutar konteksta Aparthejda ovaj je fokus ipak bio obilježen većom akademskom pažnjom za bijelu darovitu djecu. Na sreću, daroviti učenici crne rase počeli su dobivati više pažnje zbog izvještaja iz 1988. godine, u kojemu se naglašava potreba za osnivanjem škola za sve učenike (Oswald i de Villiers, 2013, str.2). Poslije 1994. godine obrazovna politika u vladama nakon Aparthejda naizgled se promijenila, ali samo na papiru, ne i u praksi, kako to pokazuje manjak obrazovnih prilika za nadarene učenike (Welton, 2001). Osim toga, vladine inicijative nisu rezultirale značajnim promjenama, kako u smislu obrazovnih politika tako i nastavne prakse za darovite učenike (Bloch, 2009).

Trenutačna situacija u kojoj se nalaze daroviti učenici u Južnoj Africi puna je izazova (van der Westhuizen i Maree, 2006, str. 204) većinom zbog društvenih i nastavničkih percepcija pravednosti i vjerovanja da su daroviti učenici već privilegirani (Taylor i Kokot, 2000). Norwich (1994) opisuje ovu činjenicu kao ideološku dilemu nastavnika koja potječe iz napetosti „između društvene vrijednosti promocije jednakog poštovanja i vrijednosti svih i vrijednosti koja prepoznaje individualnost svake osobe" (1994, str. 293) ili drugačije rečeno, napetosti između pravednosti i jednakosti. Obično učitelji već percipiraju darovite učenike kao izuzetne, pa bi stoga njihovo vrijeme i fokus trebali biti posvećeni slabijim učenicima. Ipak, učitelji koji prepoznaju individualne razlike također vjeruju da je kurikul jednak za sve učenike nedovoljan za pružanje pravednih prilika za učenje svih učenika. Kokot (2005) navodi da se više ne treba razmatrati odvojeno, tj. ekskluzivno obrazovanje nadarenih, već prije inkluzivni pristup obrazovanju nadarenih u redovnim školama, zajedno s prosječnim učenicima.

Situacija s darovitim učenicima u Južnoj Africi također je važna za širu raspravu o darovitim učenicima širom svijeta. Ako se otkriju razlike između darovitih i prosječnih učenika, tu činjenicu treba ozbiljno razmotriti u smislu njezinih pedagoških i didaktičkih posljedica. Jedna od direktnih posljedica je evaluacija tehnika za diferencijaciju nastave s ciljem pružanja najboljih i primjerenih prilika za učenje svih učenika. Stoga diferencijacija u nastavi postaje lako primjenjivo i moguće rješenje, uz produktivne promjene obrazovne politike, kako u kapitalističkim tako i u zemljama u razvoju.

Ipak, postoji važna razlika između kapitalističkih ekonomija i zemalja u razvoju kada govorimo o darovitim učenicima: općenito, daroviti učenici napuštaju zemlje u razvoju i odlaze u kapitalističke zemlje jer smatraju da im pružaju mogućnosti učinkovitijega ostvarenja vlastitih potencijala. *Olszewski-Kubilius i Clarenbach (2012) navode da se ova pojava „odlaženja" može uspješno zaustaviti uklanjanjem prepreka napredovanju, kroz identifikaciju najboljih praksi koje posebno naglašavaju poboljšanje prilika za učenje darovitih učenika iz siromašnih obitelji. S druge strane, ekonomije u razvoju mogu doživjeti gubitak potencijalnih inovacija u društvu ako se darovitim učenicima ne pruži prilika za potpuni intelektualni, akademski i znanstveni razvoj.*

Stoga, nastavne prakse zasnovane na diferencijaciji imaju dvostruku korist: podržavaju darovite i prosječne učenike zbog toga što su uključeni u isto inkluzivno obrazovanje. Štoviše, bez obzira na razlog zbog kojeg diferencijacija dolazi u fokus, činjenica da učitelji znaju za ovu praksu poučavanja i primjenjuju je, mora voditi učinkovitijoj nastavi za sve učenike (Tomlinson, 1996; 1999; 2005). Osim toga, navedene prakse mogu se primijeniti u bilo kojem društvu, kapitalističkom ili u razvoju, s minimalnim zahtjevima, tj. povećanjem i promjenom postojećih metodologija poučavanja, umjesto skupim sustavnim promjenama obrazovne infrastrukture, poput specijalnih škola za darovite učenike.

Teorijske osnove pristupa učenju

Istraživači su počeli proučavati procese učenja još u 70-im godinama dvadesetoga stoljeća, ali prvi instrumenti za procjenu procesa učenja razvijeni su u 80-im godinama (Jones, 2003). Biggsova (1985) studija s 823 sveučilišna studenta i 150 studenata poslijediplomskoga obrazovanja, zasnovana na teorijskoj literaturi o učenju, dovela je do identificiranja tri pristupa učenju (dubinski, površinski i strateški) i razvoja Upitnika o procesu učenja (SPQ). Taj proces bio je djelomično zasnovan na miješanoj metodi unutar koje se primijenio kvalitativni upitnik proizašao iz teorijskih perspektiva o učenju (Richardson, 2004). Prva verzija SPQ-a obuhvaća šest podskala (42 čestice) namijenjenih mjerenju motiva i strategija u tri dimenzije. Svaka čestica obuhvaća petostupanjsku skalu, od „nikada ili ponekad" do „uvijek ili gotovo uvijek". Prva dimenzija je površinski pristup učenju u kojemu je motivacija za učenje instrumentalna; on je vrlo reproduktivan, s planiranim ishodom ograničenim na osnovne aspekte potrebne za prolaz. Općenito je omogućen mehaničkom reprodukcijom kroz učenje napamet. Druga dimenzija je dubinski pristup učenju, koji obuhvaća unutrašnji motiv za učenje, s ciljem ostvarivanja interesa i kompetencije fokusiranjem na određenu predmetnu građu, tj. primjenom smislene strategije. Ova dimenzija ukorijenjena je u opsežnom čitanju i povezanosti s relevantnim predznanjem učenika. Treća dimenzija je strateški pristup u kojemu je motiv za učenje rast ega ukorijenjen u kompetitivnosti, jer pojedinac nastoji postići najviše ocjene bez obzira na zanimljivost materijala koji uči. Strateški pristup je organizacijski u smislu fokusa na točno slijeđenje predloženih materijala i pažljivu izradu vremenskoga rasporeda, tj. težnje da se bude „uzoran učenik". Uz pomoć dvojice kolega, Biggs (2001) je osmislio Revidirani dvofaktorski upitnik o procesu učenja (R-SPQ-2F), koji obuhvaća 20 čestica i mjeri dvije dimenzije, površinski i dubinski pristup. Strateški pristup je isključen kako bi se učiteljska upotreba R-SPQ-2F, kao instrumenta za procjenu učenja, učinila što efikasnijom.

Entwistle i Ramsden (1981) koristili su fenomenološki pristup koji je vodio identifikaciji sljedećih pristupa učenju: smisleni (dubinski), reproduktivni (površinski), strateški i neakademski. Entwistle i Ramsden koristili su kvalitativnu metodologiju, tj. „rigoroznu kvalitativnu analizu" (Jones, 2003) kako bi razvili ASI, fokusirajući se na učeničke percepcije vlastitih pristupa učenju. Entwistle i Ramsden (1981) dizajnirali su Inventar

pristupa učenju (ASI) koji je obuhvatio 64 čestice grupirane u 4 opće teme. Prva tema, Značenjska orijentacija, zasnovana je na dubinskom pristupu karakteriziranom aktivnim propitivanjem tijekom procesa učenja, međusobnim povezivanjem ideja i drugih dijelova sadržaja, povezivanjem dokaza sa zaključcima aktivnom upotrebom naučenoga i učenje zbog učenja, drugim riječima, intrinzičnom motivacijom koja se zasniva na interesu. Druga tema, tj. Usmjerenost reprodukciji, koristi površinski pristup zasnovan na zapamćivanju, oslanjanju na nastavnike prilikom definiranja zadataka učenja (tj. ograničenosti programom), strahu od neuspjeha manifestiranom u pesimizmu i tjeskobi zbog akademskih rezultata i fokusiranju na kolegije zbog kvalifikacija. Treća tema, tj. Strateški pristup, također ima četiri obilježja: svijest o zahtjevima koje postavljaju nastavnici, neorganiziranost metoda učenja manifestiranu u nesposobnosti kontinuiranoga i učinkovitoga rada, negativne stavove prema učenju, poput nedostatka interesa te stratešku motivaciju manifestiranu u aktivnom suparništvu i pretjeranom samopouzdanju. Četvrta tema su Stilovi i patologije, unutar koje prvospomenuto uključuje sveobuhvatno učenje, mapiranje predmetnih područja te divergentno mišljenje, kao i operativno učenje ili naglasak na činjenicama i logičkoj analizi, što zapravo predstavlja neakademski pristup učenju. Potonje obuhvaća naglost u donošenju zaključaka, nesmotrenost i pretjeranu opreznost u oslanjanju na detalje. U suradnji s kolegom, Entwistle (1994) je dizajnirao Revidirani upitnik o pristupima učenju (RASI) s 38 čestica i 5 podskala.

Dubinsko učenje

Prema Entwistleu i Ramsdenu (1983), dubinski pristup učenju zasnovan je na namjeri samostalnoga razumijevanja predmetnoga sadržaja i kritičkoj interakciji sa sadržajem. Učenik koji koristi ovaj pristup pokazuje značajnu sposobnost aktivne primjene spoznajnih procesa u povezivanju novih zamisli s prijašnjim znanjem. Osim toga, ovaj pristup ima za cilj integraciju ideja kroz principe samoorganizacije. U isto vrijeme, učenici koji upotrebljavaju ovaj pristup pokazuju sposobnost povezivanja dokaza sa zaključcima i propitivanja logike i argumenata koji se odnose na sadržaj koji uče (Entwistle i Ramsden, 1983). Marton i Säljö (1976b) pokazali su potencijalne koristi dubinskoga učenja, tj. fokusa na smisao sadržaja. Učenici koji upotrebljavaju ovu metodu vrlo će vjerojatno biti aktivno zaokupljeni značenjem informacija, tj. tumačenjem dubinskoga značenja pojmova i problema.

Površinsko učenje

Površinski pristup učenju podrazumijeva učenika koji reproducira dijelove sadržaja i uči pasivno prihvaćajući ideje i informacije. Ovaj pristup učenju karakteriziran je općim fokusom na formalnu procjenu znanja, a ne razmišljanjem o svrsi ili strategijama prilikom usvajanja novih informacija. S obzirom na to, učenici koji koriste ovaj pristup učenju u potpunosti će iskoristiti tehnike zapamćivanja, pri tome ne razlikujući principe i uzorke unutar sadržaja učenja.

Strateško učenje

Strateški pristup učenju povezan je s dvije teme: strateško učenje i neakademsko učenje. Dok je prvospomenuto zasnovano na namjeri predviđanja završne procjene znanja i vještina putem poigravanja strategijama u svrhu dobivanja najboljega ispitnog rezultata, potonje je povezano sa samoprocjenom akademskoga napretka putem promocije pristupa koji nije refleksivan ni dubinski. S ciljem postizanja najboljih ispitnih rezultata, strateško učenje fokusirano je na zahtjeve nastavnika, dok je neakademsko učenje stabilizirano u orijentaciji unaprijed definiranim strategijama s izraženom naklonosti k određenom, konkretnom, praktičnom i često lako primjenjivom znanju. Dok učenici koji primjenjuju strateški pristup mogu koristiti dubinski i površinski pristup učenju, učenici koji primjenjuju neakademski pristup skloni su promatrati učenje kao sredstvo u postizanju osobnih ciljeva.

Entwistle i Ramsden (1983) navode da strateški pristup učenju također ima potencijalne koristi, posebno s obzirom na sposobnost kombiniranja s dubinskim ili površinskim pristupom. Na primjer, učenici koje karakterizira strateški pristup učenju mogu koristiti površinski pristup prilikom prihvaćanja procesa ocjenjivanja kao poštenoga i točnoga, te ako odražava njihovo znanje. S druge strane, ti učenici mogu primijeniti i dubinski pristup razumijevanju predmetne građe. Štoviše, učenici koji primjenjuju neakademski pristup mogu se odlikovati jakim fokusom na znanje, s neposrednom praktičnom primjenjivosti u određenim poslovima.

Pristupi učenju i darovitost

Prema Hielatu i Al-Shabatatu (2012) i Sternbergu (1985), darovitost učenika općenito se iskazuje u tri područja: analizi, sintezi i praksi. Analitička nadarenost podrazumijeva iznadprosječnu sposobnost razumijevanja problema i razmišljanja o konstitutivnim elementima problema na logičan način. Nadarenost za sintezu odnosi se na ljude s visoko razvijenim kreativnim sposobnostima povezanim s otkrićem i izumima. Praktična nadarenost povezana je s praktičarima, tj. ljudima koji se fokusiraju na primjenu raznih aspekata unutar konkretnih okolina. Spomenuti koncept sukladan je zamislima obuhvaćenim zakonom *Nijedno se dijete ne ostavlja* (NCLB-No Child Left Behind) (2001) koji povezuje darovitost s visokim intelektualnim, kreativnim/umjetničkim sposobnostima i sposobnostima vođenja. Jednako tako, postoje elementi Renzullijeva (2011) „troslojnoga modela" nadarenosti koji uparuje nadarenost s osnovnim ljudskim osobinama koje se manifestiraju u iznadprosječnim općim sposobnostima, visokim razinama posvećenosti zadatku i visokim razinama kreativnosti. Osim te tri skupine, Dunn i Milgram (1993) otkrili su da daroviti učenici intenzivno koriste osjetilne stilove učenja, tj. učenje vizualnom, auditivnom i kinestetičkom metodom. Osim toga, Altun i Yazici (2010) ustanovili su da, u usporedbi s prosječnim vršnjacima, daroviti učenici više koriste vizualna i kinestetička sredstva kako bi ostvarili svrhu učenja.

Općenito gledano, daroviti se učenici izdvajaju od prosječnih učenika zbog načina na koje uče. Pyryt (1998) je naveo da su nadareni učenici nezavisniji i češće nastoje

biti dio iskustva učenja od svojih prosječnih vršnjaka. Wolfensberger (2012) je tvrdio da, u usporedbi s prosječnim vršnjacima, nadareni učenici više preferiraju interaktivno poučavanja i učenje zasnovano na raspravi, s fokusom na povratnu informaciju i elaboraciju. Chan (2001) je pokazao da daroviti učenici imaju veću sklonost samostalnom učenju povezanom sa školskom okolinom koja podržava nastavu zasnovanu na raspravi.

Unutar više specifičnoga konteksta, Muir-Broaddus i Bjorklund (1990) tvrdili su da su daroviti učenici manje strateški orijentirani od svojih prosječnih vršnjaka zbog toga što se njihove vještine zapamćivanja zasnivanju na razvijenijoj inteligenciji. Duan i suradnici (2010) razradili su ovu zamisao i tvrdili da prosječni učenici trebaju osmisliti strateške načine za učinkovito zapamćivanje. Nadareni učenici općenito se mogu pouzdati u svoju višu inteligenciju, što zahtijeva znatno manji trud prilikom zapamćivanja sadržaja.

Suprotno tome, Gallagher i suradnici (1986) otkrili su da prosječni učenici zaostaju za svojim darovitim vršnjacima upravo zbog toga što su općenito lošiji stratezi u korištenju vještina zapamćivanja. U skladu s ovom zamisli, Gaultney i suradnici (1996) tvrdili su da prosječna djeca koriste vještine zapamćivanja sporije i manje učinkovito. Ipak Zhang i suradnici (2017) otkrili su da prosječna djeca pokazuju učinak suradničke inhibicije, tj. bolju kolektivnu izvedu u stadiju dohvaćanja informacija, nakon njihova grupiranja. S druge strane, kako su pokazali Weldon i Bellinger (1997), to nije slučaj s darovitom djecom. Spomenuto vodi zaključku da je zapamćivanje kod darovite djece više strateško i elaborirano, dok je kod prosječne djece manje strateško i više mehaničko.

Samoregulacija je općenito manje prisutna među prosječnim učenicima (Clark, 1992), što govori u prilog tome da su prosječni učenici općenito manje samostalni u učenju (Heller, 1999). Štoviše, prosječni učenici skloni su upotrebi afektivnih stilova učenja, za koje se smatra da će puno vjerojatnije rezultirati nesposobnošću za ili čak odbacivanjem kontinuiranoga učenja kada za njega više nisu prisutni poticaji (Hooda i Devi, 2017).

S obzirom na specifičnost samopraćenja procesa učenja, nadareni učenici općenito su motiviraniji za učenje (Beyaztaş i Metin, 2019), skloniji upotrebi sustavnih pristupa prilikom istraživanja i korištenju koraka u rješavanju problema, pa stoga postižu vlastite ciljeve (Porter 1999). Intrinzično motivirani za učenje (Olszewski-Kubilius i sur., 1988), daroviti učenici općenito traže bolja rješenja kako bi poboljšali svoje iskustvo učenja, pa tako upotrebljavaju samoregulaciju za nadzor vlastita učenja (Sternberg, 1997), dok u isto vrijeme ulažu značajna nastojanja kako bi učinili proces učenja motivirajućim (Kanevsky, 1992). Daroviti su učenici znatiželjniji i zainteresiraniji za zadatke učenja, što vodi procesu nadgledanja vlastita učenja putem složene individualne inicijative s obzirom na spoznajne procese, ponašanje i motivaciju (Zimmerman, 1986). Nota i suradnici (2004) otkrili su da česta upotreba tehnika praćenja darovitih učenika uključuje samoevaluaciju, organizaciju procesa učenja, planiranje zadataka učenja, određivanje ciljeva prilikom učenja, vođenje zabilješki za buduću upotrebu, pretraživanje podataka, provjeravanje prijašnjih zabilješki i analizu složenih informacija za samostalno donesene

zaključke. Iz navedenoga slijedi da su daroviti učenici svjesniji vlastitih metakognitivnih pristupa učenju i da unaprjeđuju vlastita iskustava učenja kroz upotrebu raznolikih strategija (Alexander i sur., 1995). Ovdje je potrebno naglasiti da se, čak ako su svjesniji vlastite metakognitivne motivacije za učenje od prosječnih vršnjaka, daroviti učenici ne razlikuju znatno od prosječnih vršnjaka s obzirom na način na koji su uključeni u nadgledanje procesa učenja (Zimmerman i Martinez-Ponz 1990).

Daroviti su učenici svjesniji vlastite metakognitivne motivacije za učenje, tj. uspješniji u učenju jer ih metakognitivni pristup učenju motivira na upotrebu različitih strategija samoupravljanja, tj. tehnika nadzora (Azevedo i sur., 2005). Iako još uvijek nije jasno kako daroviti učenici koriste svoje metakognitivne vještine u procesu učenja, evidentno je da oni ne samo da imaju višu metakognitivnu motivaciju, već ju i bolje primjenjuju od svojih prosječnih vršnjaka, što posljedično vodi uspješnijem i učinkovitijem učenju (Greene i sur., 2008).

Međunarodni program za procjenu znanja i vještina učenika (PISA)

PISA je međunarodni program za procjenu znanja i vještina učenika koji je osmislila Organizacija za ekonomsku suradnju i razvoj (OECD). U skladu s OECD-ovom misijom „razvoja boljih politika za bolje živote" (Ross, 2020), PISA nastoji potaknuti „nacionalna nastojanja za pomoć učenicima da bolje uče, učiteljima da bolje podučavaju i školskim sustavima da postanu učinkovitiji" (OECD, 2010).

PISA pristupi učenju

PISA upitnik (2009) sastojao se od 13 pitanja o učeničkim pristupima učenju. Iako ponešto različite u nomenklaturi, tri uključene sastavnice u velikoj mjeri odražavaju tri koncepta koja se općenito mogu pronaći u relevantnoj akademskoj literaturi: elaboracija (dubinski pristup), zapamćivanje (površinski pristup) i strategije kontrole (strateški pristup).

PISA strategije elaboracije sukladne su Biggsovu SPQ-u (1985) koji definira dubinski pristup kao zasnovan na intrinzičnom, tj. dubinskom motivu (učenjem se aktualizira interes i kompetencija, s fokusom na posebne predmete) i smislenosti (čitanje je opsežno i sadržajno, s ciljem povezivanja s relevantnim prethodnim znanjem). PISA strategije elaboracije također su u skladu s Entwistleovim i Ramsdenovim ASI/RASI-jem (1981), u kojemu je orijentacija na smisao definirana kao dubinski pristup (aktivno propitivanje tijekom učenja) karakteriziran međusobnim povezivanjem zamisli (povezivanje teksta s drugim kontekstima), upotrebom dokaza (povezivanje dokaza i zaključaka) i intrinzičnom motivacijom (interes za učenje zbog samoga učenja). Q31h je primjer pitanja PISA strategija elaboracije: „*Dok učim, razmišljam o tome kako nove informacije koristiti izvan škole.*"

PISA strategije elaboracije u skladu su s Biggsovim SPQ-om (1985) prema kojemu je površinski pristup definiran površinskim motivom (fokus na stjecanje kvalifikacije

s težnjom prolaza, obično zbog straha od neuspjeha) i reproduktivnom površinskom strategijom (ograničenost na nužne ciljeve reproduciranjem informacija kroz mehaničko učenje ili učenje napamet). Q31c je primjer pitanja PISA strategije zapamćivanja: „*Dok učim, pokušavam zapamtiti što više detalja.*" PISA strategija elaboracije također je u skladu s Entwistleovim i Ramsdenovim Inventarom pristupa učenju, koji je zasnovan na reprodukciji i uključuje površinski pristup (karakteriziran zapamćivanjem), ograničenost programom (zbog pesimizma ili tjeskobe uzrokovanih akademskim rezultatima) i ekstrinzičnom motivacijom (stjecanje određene kvalifikacije).

Zaključno, PISA strategije kontrole opisane su isključivo pozitivnim pojmovima, što se razlikuje od Biggsova SPQ-a (1985) i njegove blago negativne karakterizacije strateškoga pristupa kao pojačivača ega. Ostale karakteristike koje opisuje Biggs općenito su pozitivne, a strateški pristup opisan je kao natjecateljski (postići najviše ocjene neovisno o interesu za sadržaj koji se uči) i organizacijski (učenje svih zadanih materijala izradom vremenskoga rasporeda i težnjom za postizanjem statusa uzornoga učenika). Q31b je primjer pitanja PISA strategija kontrole: „*Učenje započinjem tako da shvatim što točno trebam naučiti.*" Slično tome, Entwistle i Ramsdenov ASI/RASI (1981) uključuje pozitivne i negative aspekte prilikom definiranja strateške orijentacije, koja obuhvaća ne samo pozitivni strateški pristup (svijest o zadanom), već i negativne metode učenja (neorganiziranost, neučinkovitost i neredovitost) i negativne stavove prema učenju (poput manjka interesa i lijenosti).

Rezultati PISA-e i identifikacija akademski nadarenih učenika

Literatura o istraživanju PISA rezultata i kvocijenta inteligencije je opsežna. Analiza te literature vodila je identifikaciji darovitih učenika u tim skupinama podataka (Godor i Szymanski, 2017; Lubinski i Humphreys, 1990; 2007; Roznowski i sur., 2000; Weiss, 2009). U ovom istraživanju korišteni su rezultati iz matematike za identifikaciju akademski nadarenih učenika, zbog činjenice da su sva tri aspekta PISA-e fokusirana na kognitivne sposobnosti, pa tako nema bitne razlike između korištenja samo rezultata iz matematike i kombiniranih PISA rezultata za sva tri aspekta (Rindermann, 2007; Weiss, 2009). U akademskoj literaturi i dalje vlada prijepor oko definicije „darovitih učenika". Odabir načina identifikacije akademski nadarenih učenika u ovom istraživanju u skladu je s definicijom akademski nadarenih učenika (vidi Geake i Gross, 2008; Lohman, 2005). Akademski nadareni učenici općenito se ističu visokom razinom trenutačnoga postignuća (ocjene) u sklopu nastavnoga programa, dok prosječni učenici imaju prosječna postignuća. S jedne strane, korištenje ove distinkcije i navedene metode identificiranja nadarenih učenika može suziti koncept „darovitosti" samo na akademsku nadarenost, bez razmatranja ostalih oblika nadarenosti (glazbene, umjetničke i/ili sportske). S druge strane, zbog činjenice da ovaj rad istražuje učeničke pristupe učenju, ova je razlika važna i u skladu s kontekstom istraživanja, tj. učeničkim ponašanjem prilikom učenja.

Fokus i hipoteze istraživanja

U ovom istraživanju korišteni su PISA podatci dobiveni u Americi (2009) kako bi se testirale tri hipoteze zasnovane na istraživačkom pitanju u nastavku:

Istraživačko pitanje: Koriste li nadareni učenici različite pristupe učenju od svojih prosječnih vršnjaka?

H-1: Nadareni učenici koristit će niže razine strategija zapamćivanja od svojih prosječnih vršnjaka.

H-2: Nadareni učenici koristit će više razine strategija elaboracije od svojih prosječnih vršnjaka.

H-3: Nadareni učenici koristit će više razine strategija kontrole od svojih prosječnih vršnjaka.

Metoda

Sudionici

Podatci PISA testiranja dobiveni su primjenom testova u dva stadija, na nacionalno reprezentativnom uzorku petnaestogodišnjih američkih učenika, uključujući ukupno 4 929 učenika. Od 4 103 738 aktivnih polaznika škole u SAD-u, 15 199 je isključeno iz ciljane populacije, što je vodilo stopi isključivanja od 0,36 %. Dobno odstupanje od jednog mjeseca bilo je dozvoljeno za uključivanje učenika u uzorak. Ipak, uzorak nije uključivao „testiranje petnaestogodišnjaka koji su školovani kod kuće, na radnom mjestu ili izvan zemlje" (OECD, 2012, str. 4). Socioekonomski podatci o sudionicima nisu bili dostupni, stoga ni jedan model neće govoriti o eventualnoj povezanosti s navedenom varijablom. U istraživanju je razmatrana varijabla spola, a učenici su identificirani kao nadareni ili prosječni prema rezultatima iz matematike kao snažnim pokazateljima opće inteligencije. Proces rangiranja izvršen je prema spolu, u skladu s prijašnjim studijama matematičke nadarenosti (Lubinski i Humphreys, 1990; Roznowski i sur., 2000). Uzorak ovoga istraživanja obuhvatio je 2 420 petnaestogodišnjih učenika (49,1 %) i 2 509 (50,9 %) petnaestogodišnjih učenica.

Identifikacija akademski nadarenih učenika primarno se oslanja na istraživanje Rindermanna (2007) i Weissa (2009) u kojemu je ustanovljena visoka korelacija između rezultata učenika iz matematike i nacionalnih rezultata s obzirom na kvocijent inteligencije (vidi Rindermann, 2007). Rindermann (2007) izvješćuje da su PISA rezultati iz matematike u visokoj korelaciji s nacionalnim rezultatima aritmetičkih sredina matematičkih sposobnosti (r = ,60 – ,98) i s testovima inteligencije (r = ,85 – .86). Weiss (2009) je istraživao nacionalne rezultate na testovima inteligencije i PISA rezultate iz preko 40 zemalja i s visokom preciznošću dokazao da, tijekom vremena, „odnos između PISA rezultata iz matematike i kvocijenta inteligencije na nacionalnoj razini ostaje u relativnoj ravnoteži" (2009, str.75). Osim toga, Rindermann (2007, str. 667) je ustanovio „homogenost rezultata PISA, TIMSS, PIRLS i IQ testova u mnogim zemljama".

Štoviše, Rinderman i suradnici (2017) također su koristili ovu tehniku upotrebe PISA podataka prilikom istraživanja osjećaja pripadnosti akademski nadarenih učenika iz 26 europskih zemalja.

Kao što je već spomenuto, prilikom identifikacije akademski nadarenih učenika, u ovoj studiji korišteni su rezultati iz matematike zbog toga što se sva tri aspekta PISA-e uvelike fokusiraju na kognitivne sposobnosti, stoga nema bitne razlike između korištenja isključivo rezultata iz matematike i kombiniranja rezultata iz sva tri područja (Rindermann, 2007; Weiss, 2009). Prema Weissu, „sve tri PISA skale mjere opću inteligenciju" (2009, str.75). Podatci dobiveni PISA testiranjem u SAD-u 2009. godine sadrže pet vjerodostojnih rezultata iz matematike za svakog učenika. Unutar cijele skupine podataka izvršeno je rangiranje po učeniku (n = 4929). Ovaj postupak rangiranja izveden je po spolu i u skladu je s prijašnjim studijama matematičke nadarenosti (Lubinski i Humphreys, 1990; Roznowski i sur., 2000). Učenici koji su se našli u 95. rangu za sve matematičke rezultate identificirani su kao nadareni, što je rezultiralo raspodjelom od 247 darovitih učenika (djevojčice = 121, dječaci = 126) i 4 682 prosječnih učenika (djevojčice = 2 299, dječaci = 2 383).

Instrumenti

PISA testiranje iz 2009. godine obuhvatilo je trinaest čestica za istraživanje pristupa učenju. Ti pristupi sastoje se od tri podskale: strategije zapamćivanja, elaboracije i kontrole. Ova tri konstrukta odražavaju prije spomenute koncepte koji se općenito upotrebljavaju u pristupima istraživanju procesa učenja: zapamćivanje (*Dok učim, čitam tekst toliko puta da ga mogu izrecitirati);* površinski, elaboracijski pristup (*Kada učim, pokušavam bolje razumjeti sadržaj tako da ga povežem s vlastitim iskustvima);* dubinske strategije i strategije kontrole *(Kada učim, provjeravam razumijevanje pročitanoga);* strateški pristup. Učenici su odgovarali koristeći skalu od četiri stupnja: „gotovo nikada", „ponekad", „često" i „gotovo uvijek". Upitnici su sastavljeni na engleskom jeziku zbog primjene u SAD-u.

Analiza podataka

Kako bi se ustanovila prisutnost prije spomenutih koncepata u podatcima, provedena je konfirmativna faktorska analiza (CFA) uz upotrebu strukturnoga modeliranja, kojim je ustanovljeno dobro pristajanje modela (CFI = ,90, RMSEA .056, $x^2 = 8{,}75$). Zbog velikoga uzorka, vrijednost x^2 (cmin/df) smatra se neprihvatljivom. Ipak, x^2 testovi općenito se smatraju osjetljivim u velikim uzorcima. Kako bi se ispitale razlike između srednjih vrijednosti dvije grupe ispitanika, provedeno je testiranje između dvije skupine u istraživanju kojim je ustanovljena invarijanta na konfiguracijskom, metričkom i skalarnom nivou (vidi Tablicu 1). Nakon toga je provedeno testiranje srednjih vrijednosti za dvije grupe učenika.

Tablica 1
Slika 1.

Rezultati

Tablica 2

Latentni konstrukti u SEM-u za prosječne učenike bili su ograničeni na nulu kako bi se omogućila slobodna procjena za akademski nadarene učenike. Svi slobodno procijenjeni kritični omjeri koji su se sa statističkom značajnosti razlikovali od nule bili su indikacija značajne razlike između dvije skupine. U nastavku su predstavljeni rezultati po hipotezama:

H-1: *Nadareni učenici koristit će niže razine strategija zapamćivanja od svojih prosječnih vršnjaka.*

Testovi usporedbe srednjih vrijednosti skupina otkrili su značajno višu srednju vrijednost za akademski nadarene učenike na podskali elaboracije (prosječni učenici: CR = -3,46, p = < ,001).

H-2: *Nadareni učenici koristit će više razine strategija elaboracije od svojih prosječnih vršnjaka.*

Primjenom testova usporedbe srednjih vrijednosti grupa ustanovljena je statistički značajno viša razina primjene strategija kontrole akademski nadarenih učenika (prosječni učenici = CR = -8,24, p = < ,001).

H-3: *Nadareni učenici koristit će više razine strategija kontrole od svojih prosječnih vršnjaka.*

Primjenom testova usporedbe srednjih vrijednosti grupa ustanovljena je statistički značajno niža razina primjene strategija zapamćivanja akademski nadarenih učenika (prosječni učenici = CR = 6,08, p = < ,001).

Rasprava

Pristupi učenju, tj. načini na koji učenici uče definirani su učeničkom percepcijom akademske okoline, njihovim zamislima o učenju i viđenju sebe kao aktivnih sudionika u procesu učenja (Richardson, 2011). U ovom istraživanju primijenjena je perspektiva o učenju u razrednoj okolini s ciljem ispitivanja učeničkih pristupa učenju. U tu svrhu korišten je upitnik kojim su se, na osnovi učeničkih samoizvješća, ispitivali nevidljivi konstrukti poput ponašanja učenika i njihovih kognitivnih procesa (Richardson, 2011).

Primjenom SEM-a testirane su tri sastavnice koje se nalaze u osnovi pristupa učenju s ciljem utvrđivanja njihove statistički značajne prisutnosti i stabilnost u dvije grupe ispitanika. Testiranje invarijante u SEM-u pokazalo je da su tri istraživana koncepta slična i prisutna u obje grupe učenika. Osim toga, korišteni instrumenti testiraju iste konstrukte u tim grupama, što predstavlja važan rezultat i doprinos akademskoj raspravi o konceptu nadarenosti, kao i o potencijalnim razlikama u pristupu učenju i percepciji učenja između nadarenih i prosječnih učenika. Drugim riječima, ustanovljeno je da su dvije skupine ispitanika u istraživanju upotrebljavale slične pristupe učenju, tj. tri jedinstvena koncepta (elaboraciju, zapamćivanje i kontrolu). Navedeni rezultati vode zaključku da su gradivni koraci učenja konceptualno i statistički jednaki u obje skupine.

Ipak, strategije učenja u dvije grupe učenika značajno se razlikuju. Daroviti učenici tijekom učenja značajno više koriste strategije elaboracije i kontrole, a manje strategiju zapamćivanja. Otkrivene razlike u pristupima učenju vode zaključku da bi darovite učenike trebalo odvojiti od prosječnih tijekom procesa učenja. Prilikom objašnjavanja obrazovnih iskustava nadarenih učenika, otkrivene razlike možda nisu problem same po sebi, već mogu biti više ukorijenjene u diferencijaciji nastave koja nije dostatna za istovremeno zadovoljavanje potreba nadarenih i prosječnih učenika.

Entwistle i Ramsden (1981) koristili su fenomenološki pristup koji je doveo do identifikacije četiri pristupa učenju: smisleni (dubinski), reproduktivni (površinski), strateški i neakademski (utilitarni). Prema Entwistleu i Ramsdenu (1983), dubinski pristup učenju zasnovan je na namjeri učenika da reproducira dijelove sadržaja pasivno prihvaćajući ideje i informacije. Strateški pristup učenju zasniva se na učiteljskim zahtjevima, dok je neakademski pristup stabiliziran u već iskušanim načinima, s jakom preferencijom prema određenom, konkretnom i praktičnom, često lako primjenjivom znanju. Verzija PISA upitnika iz 2009. godine obuhvaća tri podskale za istraživanje pristupa učenju: strategije zapamćivanja, strategije elaboracije i strategije kontrole. One općenito uključuju zamisao o pristupima učenju i korisne su za identifikaciju nadarenih učenika među njihovim prosječnim vršnjacima.

H-1: Nadareni učenici koristit će niže razine strategija zapamćivanja od svojih prosječnih vršnjaka.

S obzirom na zapamćivanje, može se tvrditi da je sposobnost nadarenih učenika da pamte sadržaj veća od one njihovih prosječnih vršnjaka, koji izvješćuju o nižim razinama navedene sposobnosti. Muir-Broaddus i Bjorklund (1990) navode da je sposobnost zapamćivanja darovitih učenika veća zbog njihove više inteligencije. Jednako tako, Gaultne i suradnici (1966) navode da zapamćivanje prosječnih učenika nije tako brzo ni učinkovito kao ono njihovih darovitih vršnjaka. Ipak, pristupi učenju mogu se okarakterizirati učeničkom percepcijom akademskoga okruženja i, stoga, kao dijelom zasnovanim na individualnim potrebama i željama učenika. Kao što je prije nadvedeno, nadareni učenici žele biti angažirani u procesu učenja i vode računa o razinama elaboracije. Čini se da sljedeće izjave proturječe tim tvrdnjama: „*Kada učim, pokušavam zapamtiti što je više moguće detalja*"; „*Kada učim, čitam tekst puno puta.*" Štoviše, prosječni učenici obično su manje samostalni u učenju (Heller, 1999), pa se zato više fokusiraju na sadržaj ili tekst kako ne bi odstupili od zahtjeva učitelja. S druge strane, daroviti učenici nastoje ne samo reproducirati sadržaj, već ga i razumjeti (Q31F: „*Kada učim, provjeravam razumijevanje pročitanoga")* i primijeniti nove informacije u svojim životima (Q31J: „*Kada učim, pokušavam bolje razumjeti sadržaj povezujući ga s vlastitim iskustvima").*

H-2: Nadareni učenici koristit će više razine strategija elaboracije od svojih prosječnih vršnjaka.

Činjenica da daroviti učenici koriste više razine elaboracije može se povezati s Hielatovom i Al-Shabatatovom (2012) i Sternbergovom (1985) idejom o nadarenim

učenicima kao boljim u analizi i praksi. Vještine analize nadopunjavaju želju nadarenih učenika za učenjem zasnovanom na raspravi, s fokusom na povratnoj informaciji (Wolfensberger, 2012) i željom da se bude dio razrednoga iskustva učenja (Pyryt, 1998). Drugim riječima, elaboracija se može definirati kao težnja za dubinskim značenjem zasnovanim na angažmanu: aktivno propitivanje u učenju - Q31H: „*Kada učim, pokušavam bolje razumjeti sadržaj povezujući ga s prijašnjim znanjem iz drugih predmeta*"; povezivanje ideja, tj. povezivanje teksta s ostalim sadržajem - Q31D: „*Kada učim, pokušavam povezati informacije s već stečenim znanjem iz drugih predmeta*"; upotreba dokaza, tj. izvođenje zaključaka na osnovi dokaza i intrinzična motivacija, tj. interes za učenje zbog učenja (Entwistle i Ramsden, 1981). S obzirom na navedeno, može se zaključiti da je elaboracija temelj pristupa učenju darovitih učenika.

H-3: Nadareni učenici koristit će više razine strategija kontrole od svojih prosječnih vršnjaka.

Vezano za strategije kontrole, nadareni učenici upotrebljavaju više metakognitivni pristup učenju. Ovaj koncept sličan je pozitivnom strateškom pristupu (svijest o nastavničkim zahtjevima) i karakteriziran željom za postignućem (kompeticija i samopouzdanje) (Entwistle i Ramsden, 1981). Na primjer, svijest o zahtjevima učitelja oslikava se u tvrdnji Q31B: „*Dok učim, prvo razmišljam o tome što točno trebam naučiti.*" Osim toga, ovaj koncept obuhvaća elemente Biggsova SPQ strateškoga pristupa (1985) u smislu provjeravanja razumijevanja, traženja glavnih pojmova i samoprocjene (Entwistle i Ramsden, 1981). Na primjer, izjava Q31F predstavlja primjer navedenoga koncepta: „*Dok učim, provjeravam razumijevanje pročitanoga.*" Činjenica da nadareni učenici koriste više razine strategija kontrole također se može povezati s Renzullijevom idejom posvećenosti zadatku, ne u smislu izvršenja zadatka, već više u smislu fokusa na razumijevanje i aktivne identifikacije praznina u poznavanju sadržaja koji se uči. Primjer navedenoga je tvrdnja Q31K: „*Kada učim, trudim se zapamtiti najvažnije dijelove teksta*" i „*Kada učim i nešto ne razumijem, tražim dodatne informacije kako bi to shvatio/la.*"

Ontologija razlike

Budući da se sva djeca (nadarena i prosječna) razlikuju u smislu razvoja i kognitivnih sposobnosti (Bruna, 2009), može se zaključiti da u fokusu ne bi trebale biti specifične razlike između darovite i prosječne djece, već opće. Navedena pretpostavka može predstavljati zdravu alternativu za razvijanje obrazovnih politika koje bi podupirale razvoj ne samo darovitih, već općenito svih učenika. Naslanjajući se na tu mogućnost, Roth (2008) se zalagao za „ontologiju razlike" kao vodeći faktor u obrazovanju nadarenih i prosječnih učenika u istom razredu. Budući da učenici zajedno sudjeluju u nastavnim aktivnostima (Howell, 2007), ne bi trebalo pridavati toliko pozornosti sadržaju poučavanja, koliko individualnoj stvarnosti svakog učenika, nadarenoga ili prosječnoga (Tomlinson, 2004). Činjenica da nadareni učenici usvajaju više različitih

strategija učenja i pristupa učenju od prosječne djece, možda je manje važna od nužnosti da učitelji budu svjesni te razlike i, shodno tome, podržavaju razvoj svih učenika, primjenjujući tehnike poučavanja koje potpomažu razvoj, kako darovitih tako i prosječnih učenika (Oswald i de Villiers, 2013, str.6).

Poznavanje različitih stilova učenja nadarene i prosječne djece temelj je i neophodan element osiguravanja primjerenih obrazovnih prilika za sve tipove učenika. Trebalo bi težiti osiguravanju primjerenih obrazovnih prilika, bez obzira na probleme s kojima se susreću učitelji prilikom iznalaženja pravoga načina za premošćivanje nesklada između obrazovne politike vlade, učiteljskih uvjerenja, lokalnih školskih inicijativa i školske stvarnosti (Engelbrecht, 2006, str. 254).

Implikacije za praksu i zaključak

Utjecaj ovoga istraživanja uglavnom se odnosi na diferencijaciju nastave. Budući da nadareni učenici teže elaboraciji u učenju, trebalo bi stvoriti prostor za tu mogućnost u kurikulu. Osim toga, ako se kurikulom nastoji postići da svi učenici upotrebljavaju dubinske strategije tijekom učenja, dodatna pažnja trebala bi se posvetiti prosječnim učenicima kako bi im se pomoglo pri učenju i razvoju nužnih vještina za primjenu navedenoga pristupa učenju. Na primjer, objašnjavanje i davanje primjera procjene znanja i vještina s naglaskom na razumijevanje i analizu (dubinski pristup) pomoglo bi razviti svijest prosječnih učenika o ocjenjivanju koje nadilazi puku reprodukciju. Osim toga, tehnike učenja poput izrade mentalnih mapa ili bilješki mogu pomoći prosječnim učenicima, kod kojih te vještine nisu dovoljno razvijene, pa tako imaju teškoća prilikom učenja na dubljoj razini. Prosječne učenike treba podržati u prijelazu sa zapamćivanja na dubinski pristup. Osim toga, s obzirom na manje učestalu upotrebu strategija zapamćivanja među nadarenim učenicima, karakteristike obrazovnih aktivnosti ponuđenih darovitim učenicima trebale bi izbjegavati jaki naglasak na zapamćivanju. Prosječni učenici općenito koriste niže razine strategija kontrole, kao i elaboracije, stoga trebaju pomoć u procesu stjecanja tih vještina.

Obrazovna iskustva pokazuju da nadareni učenici koriste metakognitivne vještine prilikom razvoja strategija učenja i raznolikih pristupa učenju bolje od prosječnih vršnjaka. Ipak, suprotno navedenome, daroviti učenici zahtijevaju više pažnje, pomoći i podrške učitelja u redovnoj nastavi. Čak i uz obrazovnu i profesionalnu pomoć u kontekstu obrazovne prakse, podrška vlade nije dovoljna. U skladu s navedenim, Oswald i de Villiers (2013) pokazali su da se, kao dodatak obrazovnoj politici vlade, roditelji i članovi lokalne zajednice trebaju aktivno uključiti u osiguravanje trajne podrške intelektualno darovitoj djeci, kako bi ona ostvarila visok školski uspjeh u inkluzivnom sustavu obrazovanja. Ipak, prije primjene inkluzivnih nastavnih praksi poput diferencijacije nastave, točna identifikacija intelektualno darovite djece u razrednoj okolini ostaje esencijalna (Sattler, 2002). Prilikom identificiranja darovitih učenika, učitelji trebaju biti svjesni činjenice da dječji kapacitet za učenje izvire iz nejednakih akademskih i psiholoških potencijala (Jewell, 2005). Ipak, u uključivom

obrazovnom sustavu diferencijacija nastave trebala bi za cilj imati jednak razvoj svih učenika (Winstanley, 2006), uz njegovanje profesionalne osviještenosti o učeničkoj upotrebi različitih strategija i pristupa učenju.

Nedostatci istraživanja

Glavni nedostatak ovoga istraživanja je upotreba samoizvještaja, zbog čega se ne mogu donositi objektivni zaključci o stvarnoj kompetenciji učenika. Osim toga, podatci u istraživanju dobiveni su u jednoj zemlji. Istraživanje na međunarodnom uzorku moglo bi polučiti drugačije rezultate.