A predictive structural model for gifted students' performance: A study based on intelligence and its implicit theories

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ABSTRACT

The current study aimed at identifying to what extent gifted students' academic performance differs in light of their emotional, social, analytical, creative, practical, and implicit intelligence, and to explore which of these are more effective for differentiating students' performance. This study was also an attempt to determine the direct effects of different kinds of intelligence on student performance, and to generate a structural model that could explain the relationship among different kinds of intelligence, students' implicit theories of intelligence, and student performance. The 174 participants were randomly chosen from primary school students who participated in summer enrichment programs. An emotional intelligence scale, a social intelligence scale, the analytical, creative, and practical intelligence tests of the Aurora Battery, an implicit intelligence scale, and performance assessment inventory were administered. A cluster analysis revealed that there were three profiles for students. The structural equation model confirmed that the predictor factors had positive and significant effects on performance. These predictor variables accounted for (68%) of the percent of the variance in performance. Ultimately, the factors affecting student performance were, in order of decreasing magnitude, emotional intelligence, analytical intelligence, practical intelligence, creative intelligence, implicit intelligence, and social intelligence. Furthermore, there were strong effects of implicit theory of intelligence on the different kinds of intelligence.

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1. Introduction

The concept of intelligence has become central to the field of psychological studies and has permeated the research of many aspects of life. Over the years, researchers have suggested several theories that tried to explain the nature and importance of intelligence through various models. The original objective of measuring intelligence was to assign optimal educational settings for typical and atypical students by using intelligence scores to predict students' academic performance (hereafter simply "performance"). Differentiating the performance of gifted students and other students has since become a crucial point for many researchers to study. Are gifted students those who have high IQ? If gifted students are those who exhibit high intelligence, what are the factors that contribute to the performance variance among them?

McClain & Pfeiffer (2012) have stated that for >100 years, gifted students have been identified by scores obtained on IQ tests. Dutton, te Nijenhuis, & Roivainen (2014) have proposed that high intelligence scores may predict high academic performance more often than low intelligence scores, but that this is not a general rule.

Intelligence as indicated by IQ scores predicts around 25% to 50% of the variance in students' performance (Deary, Strand, Smith, &

Fernandes, 2007; Gomes, Golino, & Menezes, 2014). However, while an important factor and a good predictor in the classroom, IQ is not enough to explain the variation in student performance or real-world success (Nisbett, 2009; Worrell, 2009). During childhood, intelligence seems to adequately explain school performance in students, but as the transition into adolescence begins, other non-cognitive variables may be equally relevant to explaining student performance (Hébert, 2011; Kappe & Van der Flier, 2012).

It has been generally acknowledged that success in various fields of life is dependent upon a broader range of abilities than what conventional intelligence tests measure. This is consistent with several modern interactive models of giftedness that present the concept of intelligence as a complex structure that consists of different cognitive, emotional, social and environmental factors (e.g., Heller, Pertelh, & Lim, 2005; Ziegler & Stoeger, 2007). According to such models, the development of gifted student performance requires the interaction between both cognitive and non-cognitive factors, in addition to the areas where the talent appears. These factors may exert great effects or make varying relative contributions to the development of gifted student performance.

Interest in the concept of a multi-dimensional intelligence has increased dramatically in recent years. Thus, researchers have tried to predict and explain the role of emotional intelligence (de Haro Garcia & Costa, 2014; Jiménez-Morales & López-Zafra, 2013), social intelligence (Boyatzis, Good, & Massa, 2012), successful intelligence (Mandelman,

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Barbot, & Grigorenko, 2015; Sternberg et al., 2014), and implicit theories of intelligence (Blackwell, Trzesniewski, & Dweck, 2007; Todor, 2014) in student performance.

The present study investigated variation in student performance as a dependent variable in light of the differences in gifted students' profiles on emotional intelligence, social intelligence, analytical intelligence, creative intelligence, practical intelligence, and the implicit theories of intelligence as independent variables. Moreover, it aimed at identifying the direct effects of these variables on gifted student performance. The main objective of this study was to generate a model of the relative effects of these variables on the development of gifted students' performance.

1.1. Performance

Performance is the most important indicator for measuring the quality of education and the excellence of students, who represent future leaders and those who are going to be responsible for the economic and social development of society. As a result, student performance has come under unprecedented scrutiny in our society today. Academic institutions have increasingly considered student performance more broadly than traditional intellectual achievement. Specifically, the concept of performance now includes soft skills, such as dealing with others and personal qualities, along with students' cognitive abilities (Kaplan, Satterfield, & Kington, 2012; Lievens, 2013; Lievens & Sackett, 2012).

Academic performance is thus currently considered a complex psychological construct. It is both multidimensional and influenced by multiple factors. Consequently, researchers face many complexities when studying academic performance (Hintsanen, Hintsa, Merjonen, Leino, & Keltikangas-Jarvinen, 2011). Moreover, despite these research efforts, those who are responsible for identifying giftedness are almost exclusively directed to measure only performance, regardless of the studies that have revealed that other factors contribute to the development of gifted students' performance. How to select and weigh the different variables that contribute to academic performance remains an issue in educational research and practice (Martín, Martínez-Arias, Marchesi, & Pérez, 2008).

Measuring gifted student performance in various ways has received much more attention recently, as it has been recognized that student performance may be significantly affected by cognitive, social, psychological and personal factors (Mushtaq & Khan, 2012). In addition, their impact on student performance may differ according to a student's gender, age, social background, and culture.

In the current study, the researchers used portfolios to evaluate gifted students' performance in different fields. Portfolios can show a student's progress and achievement through a collection of their best work produced during a specific period of time. They are considered to be a main indicator of gifted students' academic performance and progress.

1.2. Different kinds of intelligence and their implicit theory

Emotions play an important role in both academic and non-academic situations. It is the most prominent and essential construct supporting individuals' ability to lead a successful life. Emotional intelligence is defined as encompassing social, practical, and personal intelligences (Mayer, Salovey, & Caruso, 2008). In the education literature, emotional intelligence refers to a set of abilities that allow individuals to process and reason through emotional information in an efficient way about, using that information to regulate and guide feelings and actions to achieve better problem solving (Jiménez-Morales & López-Zafra, 2013). Etemadi, Etemadi, Kamvar, Keshtkar, Shahamati, and Shahamati (2015) refer to gifted students as those students who are different from ordinary students not only in fields of cognitive intelligence and academic talent, but also in emotional and social domains. Thus, gifted students may be defined not only by their cognitive aspects, but also their emotional and social aspects. So, determining gifted students' levels of potential emotional intelligence is important (Saygili, 2015).

Some studies have indicated that emotional intelligence plays an important role in improving students' academic performance (GolestanJahromi, Pourshahriary, & Asgharnejad, 2009; Hogan et al., 2010; Mayer et al., 2008). Several studies report that there is no significant association between traits of emotional intelligence and academic performance (Mavroveli, Petrides, Sangareau, & Furnham, 2009).

Another predicator that may affect performance is social intelligence. It has been found to be an important factor in learning and in the development of gifted social skills (Castedo, Juste, & Alonso, 2015). Additionally, it helps individuals gain high levels of self-esteem (Kostelnik, Gregory, Soderman, & Whiren, 2012). Modern work requires that students not only possess the ability to complete tasks on their own, but also to pool their knowledge and skills to effectively collaborate with others (Jackson, Joshi, & Erhardt, 2003). Gifted students show higher levels of cognitive skills, social strategy planning, and social consequence anticipating, which are all aspects of social intelligence (Machů & Červinková, 2014).

School and the classroom environment are dominated by educational, emotional, and social challenges, which may play a decisive role in the social adaptation of students. Social intelligence was proposed as a construct as early as 1937 by Thorndike and Stein, followed by other researchers who enriched the concept by refining it in multiple ways (Cherniss, 2010). Another term for social intelligence is social competence, which refers to the ability to understand others, and to act and behave intelligently and wisely in relationships with others (Safarinia, Solgi, & Tavakoli, 2011). Substantially, several definitions of social intelligence have been offered by theorists, but they all share two common components: the awareness of others, and the ability to respond and adapt to others within social situations (Dong, Koper, & Collaço, 2008). Machů and Červinková (2014) also found that social behavior appears to be a significant positive predictor of academic success.

In addition to emotional and social intelligence, successful intelligence is another variable that may affect performance. Many theories and models that deal with how students learn and how they actually apply what they have learned in their daily life have recently emerged. One of these theories is the theory of successful intelligence. The basic idea of successful intelligence theory is that an individual in almost any field of life needs creativity to generate new and exciting ideas, analytical intelligence to ascertain the value of their new ideas, and coping strategies and practical intelligence to execute their ideas and to persuade others of their value (Aljughaiman & Ayoub, 2012; Sternberg, 2010). Successfully intelligent students adapt to, shape, and select environments through a balance in their use of analytical, creative, and practical abilities (Mandelman et al., 2015). The theory of successful intelligence was developed as a framework for understanding how individuals apply their skills across the academic and nonacademic domains of their lives to attain success.

The theory of successful intelligence, then, also provides a strong theoretical basis for the identification of gifted students (Sternberg, 2010). There is evidence that assessment tools based on the theory of successful intelligence can provide valuable predictive information about individuals' cognitive functioning at various stages of the life span and in various settings (Sternberg et al., 2014). Furthermore, it has been shown that successful intelligence can improve the prediction of grade-point average as well as the prediction of success in extracurricular and leadership activities (Sternberg, Bonney, Gabora, Karelitz, & Coffin, 2010). According to successful intelligence theory analytical, creative, and practical skills play independent and prominent roles in performance and learning outcomes.

Analytical skills are very necessary, but not sufficient to succeed in the professional world. It is typified by the ability to break a problem into its components and understand those components (Sternberg, Jarvin, & Grigorenko, 2009). Analytical thinking is invoked when components are applied to fairly familiar kinds of problems abstracted