Studies in Educational Evaluation 53 (2017) 41–54

Contents lists available at ScienceDirect

Studies in Educational Evaluation

journal homepage: www.elsevier.com/stueduc

Measuring teachers' perceptions about differentiated instruction: The DI-Quest instrument and model

Catherine Coubergs*, Katrien Struyven, Gert Vanthournout, Nadine Engels

Educational Sciences Department, Vrije Universiteit Brussel, Belgium

ARTICLE INFO

Article history:
Received 29 August 2016
Accepted 20 February 2017
Available online xxx

Keywords:
Differentiated instruction
Differentiated Instruction Questionnaire
Validation
DI-Quest
Student diversity
Academic diversity
Primary education
Secondary education
Teacher perceptions
Reliability

ABSTRACT

Within a democratic and multicultural society, diversity is a reality, and differences between students are a fact which teachers have to deal with on a daily basis. Differentiated instruction aims to meet these differences in learning in order to provide all students with the best possible learning opportunities. However, to date no validated instruments exist to measure teachers' perceptions of differentiated instruction and their related classroom practices. This study, therefore, examined the factor structure and reliability of the Differentiated Instruction Questionnaire, called the DI-Quest instrument. A list of 87 items was constructed, building on existing prevalent theoretical models of Differentiated Instruction (e.g. Tomlinson, 2014; Hall, 2002). An exploratory and confirmatory factor analysis was undertaken to investigate the factor structure of the questionnaire. As a result, five factors emerged: two factors related to the teachers' philosophy of differentiated instruction (the teachers' *mindset* and their *ethical compass*), two factors referred to the practical principles that teachers apply to differentiate (*flexible grouping* and *output = input*) and the last factor (*differentiated instruction*) covered the self-reported extent to which teachers differentiated their instruction related to three types of differences in learning (students' interests, readiness and learning profile). As a result, the DI-Quest instrument entailed 31 items with a five-factor structure indicating a good fit (CFI = 0.919; TLI = 0.911; RMSEA = 0.041 [0.037–0.044 – 90% confidence interval, $p(0.05) = 1.000$]; SRMR = 0.048; $\chi^2 = 5888.338$, df = 465, $p = 0.000$). In addition, assuming theoretical relatedness between the factors, the validation of a DI-Quest model was empirically validated. We compared the model fit for two models by investigating which model had a lower BIC and AIC value and by comparing their chi square values. The best-fitting DI-Quest model showed four factors (teachers' mindset, ethical compass, flexible grouping and output = input as dependent variables) functioning as significant predictors of the fifth factor (the self-reported adoption of Differentiated Instruction, which served as an independent variable). Moreover, this paper also discusses the psychometric properties of the DI-Quest instrument and the implications of the model for schools, educators and researchers.

1. Introduction

Within a multicultural society, one of the main challenges of education is to prepare all students to build their lives, to participate in and contribute to society, and to live together in harmony (Belfi, Goos, De Fraine, & Van Damme, 2012). Diversity in education is a fact and, therefore, differences between students are inherent in classroom contexts. Failing to take these differences into consideration could disadvantage or inhibit students' learning (Belfi et al., 2012). Differentiated instruction aims to deal with these differences in learning, in order to provide all students with the best opportunities for learning. This fundamental goal of providing all students with a maximum number of learning opportunities presents challenges for the school, the teachers and other stakeholders (Tomlinson, 2001). This study aimed to develop and validate a theory-driven instrument with the objective of describing the extent to which teachers think and act according to the philosophy and principles of Differentiated Instruction in their classrooms, called the DI-Quest.

The concept of Differentiated Instruction can be seen as a philosophy and praxis of teaching. Bade and Bult (1981) defined differentiated instruction as the collection of all measures that interact with differences between students. Tomlinson (2001) described differentiated instruction as a form of adaptive teaching, with the aim of providing all students with optimal learning

* Corresponding author.

http://dx.doi.org/10.1016/j.stueduc.2017.02.004
0191-491X/

possibilities, whereas Woolfolk (2010) elaborated and referred to differentiated instruction as a variety of different components of education and teaching, taking into account the specific characteristics of students. More recently, Tomlinson (2005) expanded differentiated instruction as a proactive method of teaching involving modifying curricula, teaching methods, resources, learning activities and student products to address the different needs of students, in order to maximize learning opportunities for every student in the classroom. This highlights the carefully planned, positive and proactive nature of differentiated instruction.

In academic literature, two models of Differentiated Instruction tend to reoccur. One was developed and continuously refined by Tomlinson (2014), namely the Differentiated Instruction Model (Fig. 1), the other was described by Hall (2002) (Fig. 2). Since both models form the basis on which the survey instrument, which is central to this study, was constructed, more details are provided.

When taking a closer look at the Differentiated Instruction Model of Tomlinson (2014) in Fig. 1, the concept of mindset arises. Sousa and Tomlinson (2011) stated that a teacher's mindset can affect the successful implementation of differentiated instruction. Dweck (2006) distinguished two types of mindsets: the fixed and the growth mindset. In a fixed mindset, the teachers tend to believe that the students' qualities, like their talent or intelligence are fixed traits determining their success, without taking effort into account. Typical presumptions are: 'Some students have what it takes to be successful, others do not'. However, in a growth mindset, teachers believe that most learning can be achieved through dedication and hard work. In this perspective, every student can be successful if they put in effort. Intelligence and talent are just a starting point for learning to happen. Hattie (2005) assumed that teachers with a growth mindset are more likely to accept differences between students and tend to consider student diversity as part of a rich learning environment (Hattie, 2005).

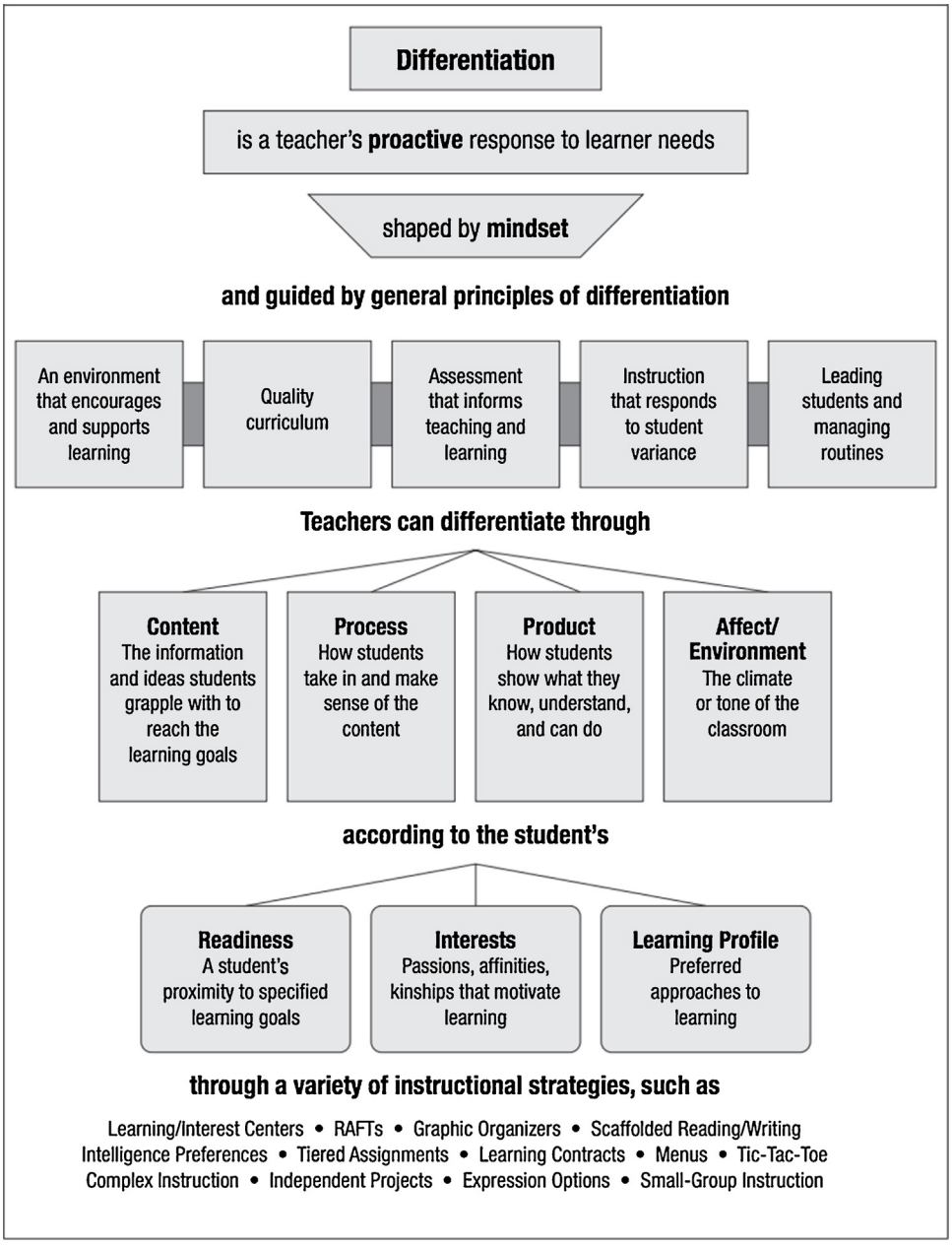

Fig. 1. Model on Differentiated Instruction (Tomlinson, 2014).