

Searching for stages of teacher's skills in assessment



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ABSTRACT

This study investigates teachers' skills in using various techniques of assessment in mathematics by taking into account the four phases of assessment and the five measurement dimensions of the dynamic model of educational effectiveness. A questionnaire measuring assessment skills was administered to a 10% sample of Cypriot teachers ($n = 240$) and a high response rate was obtained (74.2%). Semi-structured interviews provided support for the internal validity of the study. Assessment skills are grouped into four types of behaviour which are discerned in a distinctive way and move gradually from skills associated with everyday assessment routines to more advanced skills concerned with differentiation in assessment. Teachers implementing more advanced types of assessment behaviour have better student outcomes. Implications of findings are drawn.

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Introduction

Assessment can be a powerful force for supporting learning and a mechanism for individual empowerment (Broadfoot & Black, 2004). Formative assessment in particular has been prevalent in the educational discourse over the past decades, shifting the attention towards assessment practices that aid the learning and teaching process (e.g., Brookhart, 2011; Earl, 2003). This, in addition to the recognition of assessment as a key lever for promoting effective education, has led to classroom assessment being a centrepiece of various educational improvement efforts. The impact of formative assessment on student achievement has been widely documented (Black & Wiliam, 1998; Hattie & Timperley, 2007; Wiliam, Lee, Harrison, & Black, 2004); leading to the recognition of formative assessment as a determining factor of educational effectiveness at both the classroom and the school level (Teddlie & Reynolds, 2000). In addition, studies investigating teachers' perceptions of assessment suggest that they are in favour of formative assessment; recognising its role in supporting teaching and learning (Brown, 2004; Kyriakides, 1997; Sach, 2012).

In line with international research, a series of effectiveness studies, which have been conducted in the context of Cyprus,

provided empirical support for the impact of formative assessment on student learning outcomes (e.g., Kyriakides, 2005; Kyriakides, Campbell, & Gagatsis, 2000; Kyriakides & Creemers, 2008). These studies have demonstrated that primary school teachers who conduct assessment for formative reasons are more effective in terms of promoting student learning outcomes (both cognitive and affective outcomes were taken into account) than those who conduct assessment for summative reasons (Kyriakides, 2005). In addition, it has been found that schools with an established policy on formative assessment are more effective than schools with no policy on assessment (Kyriakides & Creemers, 2008). In this way, formative assessment at the classroom level and school policy on assessment have been identified as factors associated with student achievement gains. However, despite research findings suggesting that Cypriot teachers hold positive attitudes towards formative assessment (Kyriakides, 1997), only a limited number of teachers actually implement such practices in their teaching (Creemers, Kyriakides, & Antoniou, 2013). This finding is in line with international research suggesting that classroom assessment practice still appears to be outcome-oriented (Earl & Katz, 2000; Herman, Osmundson, Ayala, Schneider, & Timms, 2006; Lock & Munby, 2000). In this context, a large body of research has emerged on teacher education and professional development with particular reference to assessment (e.g., Black, Harrison, Lee, Marshall, & Wiliam, 2002; Borko, Wolf, Simone, & Uchiyama, 2003; Hayward, Priestley, & Young, 2004; Marshall & Drummond, 2006; Poskitt & Taylor, 2007; Torrance & Pryor, 2001; Webb & Jones, 2009).

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Taking the above into consideration, this paper supports the view that teachers' skills in each aspect of the assessment process should be evaluated in order to develop appropriate and suitable professional development programmes to address teachers' professional needs and priorities for improvement in their assessment practice. The difficulties in effective implementation of assessment need to be identified and tackled by researchers and policy-makers, if teacher assessment is to fulfil its promise (Baird, 2010). Specifically, this paper emphasises the need for the development and validation of an instrument measuring teacher assessment skills. This instrument must be in line with current conceptions of effective teaching and assessment and must also enable the identification of teachers' specific needs in order for appropriate corrective actions to take place. In particular, this study focused on teachers' skills in assessing students in mathematics recognising the need for assessments that are aligned and able to support current conceptualisations of effective mathematics instruction (Suurtamm, Koch, & Arden, 2010). Although the framework that was developed to measure assessment skills is not subject-specific, the study focused on a single subject due to the fact that the impact of assessment skills on student learning outcomes in mathematics was examined.

Drawing on research on classroom assessment and teacher developmental theory (Berliner, 1994; Dall'Alba & Sandberg, 2006), this study had three main aims. Firstly, a framework measuring teachers' skills in assessment was proposed and a teacher questionnaire based on this framework was developed. Using the Rasch model, the construct validity of the questionnaire was investigated. Secondly, the study examined whether teachers' skills in assessment can be situated on a common scale and whether these skills can be classified into developmental stages. Thirdly, classifying teacher skills into levels of difficulty has important implications for teacher professional development, especially if this classification can be related to student achievement, since training programmes could be developed to address teacher needs and priorities for improvement in each stage. Therefore, this study also investigated whether teachers found to be situated at higher stages of assessment skills are more effective in promoting student learning outcomes in mathematics.

A framework for investigating teachers' skills in assessment

Previous attempts to define what teachers should know and be able to do in relation to assessment have not addressed assessment skills in a systematic way (Brookhart, 2011). Nevertheless, researchers have long recognised assessment skills as a crucial element of effective teaching practice (Gullickson, 1986; Schafer, 1991). As a result, various lists outlining basic assessment competencies have been developed (e.g., American Federation of Teachers, National Council on Measurement in Education & National Education Association [AFT/NCME/NEA], 1990; Schafer, 1991; Stiggins, 2009). These lists describe assessment competencies in relation to general standards of assessment practice without providing details of the specific skills involved. In addition, these lists are not linked to a specific theoretical background and empirical evidence supporting their validity has not been provided to any significant extent (Brookhart, 2011).

Having recognised the need for a comprehensive framework based on which skills associated with classroom assessment can be defined and measured, a framework of teacher assessment skills was proposed. The proposed framework takes into account the dynamic nature of assessment and thus skills associated with each phase of the assessment process were examined. In addition, assessment skills were defined and measured in relation to teachers' ability to use various assessment techniques in measuring different types of learning outcomes. Traditional as well as

alternative assessment techniques were taken into consideration, since the literature supports the use of a combination of assessment techniques to assess student learning (Shepard, 2000; Suurtamm et al., 2010). Moreover, a measurement framework developed within the field of Educational Effectiveness Research (EER) was adopted and both quantitative and qualitative characteristics of the assessment process were taken into account. Finally, teachers' skills in using assessment results not only for summative but also for formative purposes were taken into consideration. Each aspect of the framework is briefly described below.

Main phases of the assessment process

Classroom assessment is frequently presented in the literature as a cycle subdivided into a number of phases (e.g., Birenbaum, 2007; Bright & Joyner, 1998; Calfee & Masuda, 1997), the most common of which being planning, gathering and interpreting evidence, and using the results. In addition, other important and distinctive aspects of the process are discussed in the literature, such as the construction of assessment tools (Brookhart, 1997; De Lange, 1993), assessment administration (Anderson, 2003; Shepard, 2007), recording of assessment information (Goldhaber & Smith, 2002; Kroeger & Cardy, 2006; Schmoker, 2006) and communicating assessment results (Anderson, 2003; Stiggins, 2004). In order to measure teachers' assessment skills, this study took into account four phases of the assessment cycle (see Fig. 1). Even though the main phases of the assessment process were considered as one of the three aspects on the basis of which the framework was developed, this does not imply a view of assessment as a step-by-step model that is 'done' by the teacher. On the contrary, the framework was based on current thinking in assessment that views it as an ongoing, iterative, dynamic process that engages both teacher and learner in the process (Shepard, 2000; Gardner, Harlen, Hayward, Stobart, & Montgomery, 2010; Wiliam et al., 2004). The literature also highlights the dynamic relationship between the various phases of the assessment process (Birenbaum, 2007; Black & Wiliam, 2009). Without neglecting the sequential character of the four phases involved in the process of the design and implementation of assessment, this study considered all phases as interrelated and interchangeable. The division of the assessment process into particular phases was done to make sure that each aspect of assessment practice was taken into account in measuring teacher skills. Specifically, these phases were based on the assumption that effective teachers should make sure that:

- appropriate assessment instruments are used to collect valid and reliable data
- appropriate procedures in administering these instruments are followed
- data emerging from assessment are analysed and recorded in an efficient way and without losing important information

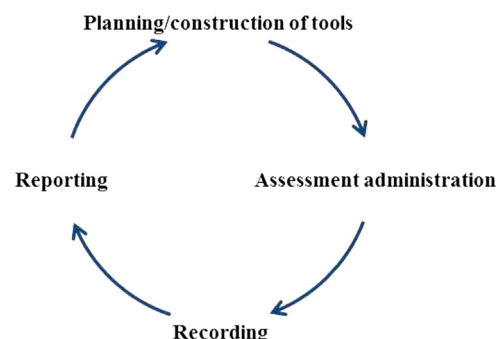


Fig. 1. The assessment cycle illustrating the phases of assessment.

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