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Self-Directed Learning Oriented Assessments in the Asia-Pacific

Edited by Magdalena Mo Ching Mok

Education in the Asia-Pacific Region: Issues, Concerns and Prospects 18,

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Based on recent research and innovations in assessment, assessment reform has been employed widely by education systems in the Asia-pacific region to drive changes and continuous improvement in the 21st century. This book examines the various ways that assessment has been reformulated in countries in the region, with the goal to enhance self-directed learning of students. This focus is not only crucial for students' academic growth in school, but also important to develop their habits of mind for lifelong learning. This volume introduces the theories underpinning self-directed learning oriented assessments and examines how the new developments in psychometrics and information technology can be used to facilitate self-directed learning oriented assessments. In addition, it also presents some case studies in the region, including some intervention studies, under the framework of self-directed learning oriented assessment. Presented in a non-technical way, this book is accessible to both educational researchers and practitioners and provides readers an enriching learning experience.

This large volume comprises three parts and twenty chapters. Part 1 focuses on the theory of self-directed learning oriented assessments. In the very first chapter, Mok delineates the theoretical framework of self-directed learning oriented assessments, which integrates assessment of, for, and as learning as a recurrent three-component learning process. Although assessments of and for learning are important for identifying gaps and potentials to inform

teaching and learning, Mok argues that the ultimate goal is assessment as learning where learners are engaged as active and critical self-assessors exercising the self-regulatory process of metacognition.

According to Mok in Chapter 1, four theories in assessment, psychometrics and learning underpin the self-directed learning oriented assessment framework: standards-referenced assessment, cognitive diagnostic assessment, Rasch measurement and metacognition. These four theories are further discussed in the following Chapters 2-8. In Chapter 2, Tognolini and Davidson contrast norm-referenced and standards-referenced assessments, and explain how standards-referenced assessments can be used to inform what students know and can do in relation to the content and performance standards as defined in the curriculum. They also discuss how to set standards along a developmental continuum to monitor students' growth in a domain and improve the reporting of student performance.

Chapters 3-5 are devoted to the introduction of cognitive diagnostic assessments, which aim to address the limited value of traditional assessments for diagnosing students' specific strengths and weaknesses. Undergirded by cognitive learning theories, cognitive diagnostic assessments assume that performance in a domain is a function of multiple latent traits or attributes, and the correct response to an item in the domain is decided by mastery of some or all of the attributes. The relationship between attributes and items is often given in a Q-matrix. Based on the assumption regarding how the various attributes work together to lead to correct response to an item, there are various psychometric models for analysing data in cognitive diagnostic assessments. Through data analysis, a set of fine-grained diagnostic information can be generated regarding students' mastery of the various attributes underpinning the learning of a domain. In Chapter 3, Kalyuga introduces a rapid way to collect diagnostic information, called

rapid diagnostic assessment. It is carried out either as a first step method (Students are presented a task and asked to rapidly indicate the first step) or a rapid verification method (Students are presented with a series of possible steps and asked to rapidly verify the correctness of the steps). In Chapter 4, Choi, Rupp and Pan use some concrete examples to illuminate the key ideas in cognitive diagnostic assessment design and analysis, including Q-matrix and some psychometric models to analyse data from cognitive diagnostic assessments. In Chapter 5, de la Torre highlights one type of psychometric model to analyse cognitive diagnostic assessment data, the deterministic, input, noisy “and” gate (DINA) model. This model assumes that all the attributes corresponding to an item as defined in the Q-matrix need to be simultaneously present for an individual to answer the item correctly. Although cognitive diagnostic assessments have the potential to provide fine-tuned diagnostic insights into learning, as highlighted by the authors of these chapters, its use is still limited due to technical and psychometric complexities in assessment design, Q-matrix validation and data analysis.

In a non-technical way, Boone, Staver, and Yale in Chapter 6 introduce the rationale of the Rasch model, the advantages of Rasch ability measures relative to raw total scores, how to do Rasch analysis using the software Winsteps, and how the Wright map generated in Rasch analysis can be used for identifying the zone of proximal development of both individuals and groups. In Chapter 7, Earl and Katz discuss how to help students develop metacognition and become active self-assessors. They emphasise that teachers can and have the responsibility to foster this development, such as through providing examples of good work, teaching skills of self-assessment, and providing targeted feedback, opportunities for discussion, reflection, and practice, and an emotionally safe environment. In Chapter 8, Kleitman, Stankov, Allwood, Young, and Mak introduce the construct of metacognitive self-confidence and discuss how it can

be measured, how it is related to other self-beliefs, how it can be used to effectively predict cognitive performance, and how it can be shaped by environmental factors.

In six chapters, Part 2 of this volume discusses six tools for the implementation of self-directed learning oriented assessments. Most of these tools are based on the developments in psychometrics and information technology, such as item response theory by Wu in Chapter 9, a concurrent-separate approach to vertical scaling by Yan, Lau, and Mok in Chapter 10, student-problem chart by Mok, Lam, Ngan, Yao, Wong, Xu, and Ting in Chapter 11, user-defined fit statistic for analysing two-tier items by Tam, Wu, Lau, and Mok in Chapter 12, and computerized adaptive assessment by Hsu, Zhao, and Wang in Chapter 14. These different tools share the commonality of being able to analyse assessment data at the item level and generate valid diagnostic feedback regarding both students' learning and items' functioning. In Chapter 13, Tzuriel introduces dynamic assessment as an important tool for tightly integrating assessment, teaching and learning. It aims to identify students' learning potentials and deficient cognitive functions, especially those with learning difficulties, and provide targeted mediation/teaching to improve their cognitive functions in the test context. Tzuriel argues for a shift from standardized testing to dynamic assessment, despite some criticisms about its lack of efficiency, reliability and validity.

Part 3 of this book introduces six case studies in six chapters on assessment reform under the self-directed learning oriented assessment framework. In Chapter 15, Pitiyanuwat and Pitiyanuwat discuss how the concept and practice of assessment has gradually developed from "to prove" to "to improve" in Thai education in six developmental eras starting from the year of 1283. In Chapter 16, Goh and Matthews report a study that aimed to identify the concerns faced by Malaysian student teachers during their practicum by asking them to self-assess their thoughts

and feelings, and fears and worries experienced in practicum. In Chapter 17, Ho, Leung, Mok, and Cheung present a study that examined Hong Kong in-service teachers' attitudes towards the desirability and feasibility of Rasch measurement. The researchers introduced to the participants the functions of Rasch analysis, such as the Wright map for providing information on students' zone of proximal development and item fit statistics for identifying problematic items. Based on both quantitative and qualitative data, they found that teachers welcomed the Rasch model for providing useful and detailed feedback to improve student learning, but teachers also showed some reservation to use it because of contextual and technical issues, such as the time and difficulties involved in learning and using the software.

Chapters 18, 19 and 20 report three invention studies that aimed to improve assessment practices or attitudes of participants towards assessment for learning. In Chapter 18, Yu presents an intervention study that aimed to enhance primary school English education in mainland China. In Chapter 19, Lee reports a study that examined the short-term and long-term effect of an intervention on Hong Kong pre-service sports coaches' attitudes towards different types of feedback. In Chapter 20, Yu again shares a study that aimed to enhance student English learning in a secondary school in Hong Kong through promoting self-assessment and peer assessment. All the three studies reported some positive effects of the interventions on teacher's professional development and/or student learning.

In conclusion, this book provides a variety of up-to-date developments in assessment in the Asia-Pacific region. The six case studies in Part 3 suggest the potential usefulness of both the theories and tools in Parts 1 and 2 of this book for improving assessment practices and learning. It is certainly a key reading for educational researchers, policy makers and practitioners who are enthusiastic about enhancing students' self-directed learning through reforming assessment.