Chapter 19
An Application of Cognitive Diagnosis Model in the Evaluation of Physical Literacy Among K–12 Graduates in the Philippines

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ABSTRACT

Despite recent enhancements in the PE curriculum in the Philippines, a substantial gap persists in actualizing educational outcomes, as evidenced by low activity levels and the discrepancy between expected and actual physical literacy competencies among college freshmen. This chapter leverages Cognitive Diagnosis Modeling (CDM) to assess the attributes of physical literacy among K-12 graduates. It discusses foundational information about cognitive diagnosis modeling and the processes done prior to formal analysis. By using real data in physical literacy assessment, this chapter provides a pragmatic orientation on CDM. Employing an adapted assessment tool alongside an empirically validated Q-matrix, it evaluates the mastery of specific physical literacy attributes within a freshman cohort at a state university in the Philippines. The chapter concludes with recommendations for curriculum reforms to create a balanced and comprehensive PE program in secondary education, emphasizing the need for enhanced teacher training to improve instructional quality and effective skill transfer.

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INTRODUCTION

The integration of physical education (PE) and health education in the Philippines aims to develop holistic health and physical literacy among students (Ibañez, 2022; Panganiban, 2019), aligning with several Sustainable Development Goals (SDGs), particularly SDG 3 (Good Health and Well-being) and SDG 4 (Quality Education). Physical literacy, conceptualized as the motivation, confidence, physical competence, understanding, and knowledge to maintain physical activity throughout life (Chen, 2015; Lynch, 2019; Mota et al., 2021), is essential for promoting lifelong healthy behaviors and contributing to the overall well-being of individuals (SDG 3). Moreover, physical literacy fosters a culture of inclusive and equitable education (F. Zengaro & S. Zengaro, 2024), supporting SDG 4 by ensuring that all students acquire the knowledge and skills needed to engage in healthy, active lifestyles. However, despite the enhancement of the PE curriculum in both basic and higher education, recent studies have revealed a significant gap in achieving physical literacy. The 2022 Philippine Report Card on Physical Activity highlighted this disparity, showing low levels of physical activity among youth and indicating a crucial need for effective physical education interventions (Cagas et al., 2022). Furthermore, Peñas (2022) have highlighted the gap between the curriculum's goals and the actual physical activity levels of students, which remain low. The COVID-19 pandemic further exacerbated these issues, causing a significant decline in students' physical activity due to lockdowns and social isolation (Tegero, 2022). Limbo and Viva (2021) also found that while motivation levels are generally high, competence in certain physical skills remains low, particularly in sports like volleyball.

Additionally, further research has delved into students' attitudes toward PE and their levels of physical literacy (Cruz et al., 2021; Ma et al., 2020; Wickens et al., 2020). Studies focusing on middle school students revealed that attitudes and satisfaction with PE vary based on teacher-student gender dynamics and curriculum content (Lai et al., 2018). Additionally, high school students engaged in sports tend to show higher physical literacy levels, emphasizing the role of active participation in enhancing physical skills and knowledge (Castelli et al., 2015). As students continue to progress in higher education, the assumption is that they have developed a significant degree of physical literacy, which is foundational for specialized PE courses. However, this assumption often does not align with the actual competency levels of incoming college students, according to Zhang et al. (2022). This phenomenon highlights the necessity for targeted intervention programs in higher education physical education curricula, especially considering that these students are already considered graduates from secondary schools. Consequently, the findings from such studies can also provide valuable insights for the basic education sector, informing

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