ABSTRACT. It is widely accepted that mathematical learning builds upon students’ prior knowledge and understandings, and their identities. In this study, this phenomenon is explored with indigenous students in remote community schools in outback Australia. Through one-on-one task-based interviews, it was found that these students had some clear understandings of the measurement concepts involved, although these understandings were often idiosyncratic to these students in this context. The task-based one-on-one interview gave better insights into students’ knowledge than the written form of the National Assessment Program–Literacy and Numeracy assessment. Nevertheless, the students’ conceptions provide a useful basis upon which to build subsequent knowledge, understanding and skills in the forms required by the formal mathematics curriculum.

KEY WORDS: assessment, contexts, indigenous learners, measurement

It is well known that students’ learning builds on what they already know and understand (Hattie & Timperley, 2007; Tzur, 2008). Indeed, new learning that can connect with students’ broader mathematical identities is more likely to be understood and retained. While the above authors were drawing on results from middle class and/or metropolitan students, it can also be assumed that the learning of indigenous students will also build on what they know already. Unfortunately, there appears to be limited research into the formal mathematical knowledge and understandings these students bring to their learning. This study seeks to investigate the measurement knowledge of some (n = 56) Indigenous students in remote Aboriginal schools in Australia.

EDUCATION AND INDIGENOUS LEARNERS

Despite research and theorizing about what constitutes good pedagogy with indigenous learners in a range of contexts, there has not been consensus about what might constitute good practice. However, studies conducted in Australia have identified some general principles and pedagogical approaches that appear to work well with indigenous students (e.g. Frigo, Corrigan, Adams, Hughes, Stephens & Wood, 2003). The principles included sound school leadership working in partnership with local indigenous leaders and the promotion of active student engagement in their
learning. Furthermore, Aboriginal leader and educational academic Paul Hughes (2010) argued that what indigenous students need is the opportunity to achieve in the standard Australian curriculum that is experienced by all Australian students—that is, not a special modified curriculum. Indeed, Gutierrez (2002) strongly advocated that students who have historically been marginalised in mathematics education, including indigenous learners, should learn and achieve in “standard mathematics”. She suggested that “equity is threatened by the underlying belief that not all students can learn mathematics” (p. 146). Our position is that schools should offer indigenous students access to the same experiences that other students receive, and the expectations for their achievement should be as for all other Australian students.

Indigenous Students and Learning Mathematics

Given this position advocated by Hughes (2010) and Gutierrez (2002), there is a need for renewed and revitalised understandings of what might constitute good mathematical pedagogy with indigenous learners, because the evidence suggests that, in general, current practices are not proving effective (Meaney, McMurchy-Pilkington & Trinick, 2008). While ideally all students across Australia should have access to a conventional mathematics curriculum, indigenous learners, and particularly those in remote communities, have not achieved well. Thus, there is a need to reconsider mathematical pedagogy in these sites and with these students.

In their seminal study in the USA, Boaler & Staples (2008) found that the mathematical performance of disadvantaged students improved markedly when the pedagogies matched their expectations and backgrounds. The approach was characterised by demanding (conventional) mathematical content and high expectations, and students’ achievement in standardised assessments improved to be above the state average. In Australia, Frigo et al. (2003) noted a number of features of effective numeracy education in schools that had a significant proportion of indigenous students, including using ‘real-life’ contexts, having an explicit focus on the language of mathematics, and building on students’ existing knowledge, understandings and skills. However, these ideas do not seem peculiar to indigenous learners, but in many respects seem consistent with notions of good mathematics teaching.

Emphasizing ‘Building-On’ in Mathematical Pedagogy

One of the successful approaches noted by Frigo et al. (2003) was to begin instruction from what the students already know. However,