

# Challenges with numeracy teaching and learning among adults

The first major challenge for the effective teaching and learning of numeracy is the lack of understanding among the general population of what the term numeracy means, as discussed in the first white paper in this series. The multitude of terms used to describe numeracy is problematic in this regard, as is the lack of distinction between numeracy and school mathematics. According to FitzSimons (2005) the distinction between numeracy and mathematics is often blurred, with the terms frequently used interchangeably. The lack of distinction between the two most likely stems from their deep interdependence. Numeracy relies on mathematical concepts but situates them in real-world contexts, whereas mathematics provides the foundational structures to better understand the world around us. As such, the lack of distinction can lead to issues in understanding the broader scope of numeracy, which extends beyond basic mathematical skills to include the ability to assess contexts, make choices about appropriate mathematical approaches, and apply them confidently (Perso, 2011). A knock of effect of this is that many adults, long after leaving school, do not recognise the extent to which they engage with and use numeracy. For example, researchers such as Strasser (2003), Wedege (2003) and Keogh (2019) found that many workers often have trouble identifying the extent to which numeracy is required in their jobs. Likewise, Swain et al. (2008) identified adults failure to recognise numeracy activities outside of the classroom as one of the five difficulties associated with effective numeracy teaching. Not recognising the extent to which they draw on their numeracy skills and knowledge leads to many adults lacking belief in their own numeracy capabilities and develop low self-efficacy in this regard (Klinger, 2009).

In addition to this, another problem that stems from the close association between numeracy and school mathematics is that the negative experiences many adults had of school mathematics often shapes their dispositions towards numeracy. According to Carpentieri, Lister and Frumkin (2009) the abstract nature of school mathematics and the perceived lack of relevance of the subject area results in many adults developing negative attitudes towards mathematics from an early age. These dispositions, when carried into adult life, can then lead to an aversion from any mathematics and numeracy related task. According to Klinger (2009), such aversion typically stems from negative early mathematics learning experiences in the latter years of primary education, at a time when students move from instruction in concrete procedures to increasingly sophisticated and abstract concepts. As such, failure to recognise the difference between school mathematics and numeracy has far reaching consequences and present a major challenge for practitioners in adult mathematics education who are tasked with “achieving effective learning outcomes in the face of prevailing negative attitudes in their students” (Klinger, 2009: 7).

A second critical issue facing the teaching and learning of numeracy to adult learners is the lack of research in the field. This is a challenge that has been reported on internationally. In 2006, the American Institutes for Education reported that there was very little noteworthy



research looking at numeracy education for adult learners in America. Likewise, in New Zealand, Benseman, Sutton and Lander (2005) point to a dearth of research in this field. More recently, Gal (2024) conducted a scoping review of recent empirical research related to adult education in mathematics and numeracy and of the 2300 papers reviewed only 39 were found to be relevant to the area of adult numeracy. The American Institutes for Research acknowledge that the vast majority of studies of cognition in the area of numeracy has been conducted with children at the expense of research into numeracy education for adults. Likewise, they conclude that research investigating the role of “learners’ affect, attitudes, and beliefs in learning mathematics, although widespread for children, has been limited on adults, focusing on attitudes and anxiety about mathematics.” (American Institutes for Research, 2006: 16). The limited research base has led to gaps in knowledge, particularly regarding practice-related aspects of adult numeracy education (Gal, 2024). This scarcity of research highlights the need for further investigation to strengthen theorizing and practice in adult numeracy education. In particular, researchers such as Cumming (1996), Rashid and Brooks (2009), Gal et al. (2020) and Perry et al. (2024) have called for further research in the areas of:

- The nature of numeracy;
- Effective numeracy instruction for a diverse range of adult learners;
- Effective professional development and training of numeracy tutors;
- Numeracy assessment for adults.

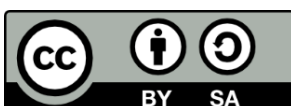
Addressing these research gaps could strengthen theorising and practice in adult numeracy education, ultimately benefiting learners and society (Gal, 2024) and ensure, going forward, that adult numeracy education and assessment is informed by research.

A third issue facing numeracy instruction for adult learners, and one with close ties to the previous challenge is in relation to financial support and the availability of funding to support adult numeracy education. While research has shown that there is currently an appreciation among policy makers and academics in relation to the importance of numeracy provision, the funding provided to enhance the teaching and learning of numeracy to adult learners continues to be deficient. Perso (2006) highlights that government bodies in Australia place a strong emphasis on improving the literacy and numeracy skills of young people but the focus is predominantly on literacy. There is an abundance of funding for literacy programmes which has improved teachers’ understanding of literacy, which in turn improved the literacy skills of the young people. On the other hand, Perso (2006) explains how there is a lack of funding for numeracy programmes. While literacy is an essential domain for numeracy, given that the development of numeracy skills among adults would be extremely difficult without those adults having good literacy skills, it is still important that a balance, in terms of the funding made available for literacy and numeracy programmes, is achieved internationally. Similar issues were reported in Germany by Mania and Troster (2015). They detailed how in all 16 federal states the term literacy encapsulates numeracy however, of the 25 literacy initiatives across the 16 states that received funding under the Decade for Literacy and Adult Basic Education’ Policy (2016–2026) only one focussed on numeracy. More recently, O’Meara et al. (2024) found that this issue of a lack of funding being made available for adult numeracy



education was prevalent across many European countries. A large proportion of adult education providers in their study outlined how policy documents afford equal importance to both numeracy and literacy but when these policies are enacted there is an imbalance in relation to the support, financial and otherwise, afforded to both. This was best summarised in the following response provided by a co-ordinator of adult education programmes in one of the European countries involved in the study: “financial flows, public awareness and the political will to support reading, writing and language skills are disproportionately higher compared to support for numeracy.” (O’Meara et al., 2024: 114). Until adequate funding is made available for adult numeracy education very little change will occur and the challenges being reported on here will continue to undermine the numeracy learning experiences and opportunities for the adult population worldwide.

The fourth and final issue to be considered in this white paper concerns the qualifications of and professional development available to those who teach numeracy to adult learners. In a study conducted by Gal (2002) it was found that less than 10% of adult education tutors were certified in mathematics. As such, the availability of professional development for these practitioners is critical. Such professional development should seek to equip tutors with robust numeracy knowledge and develop their awareness of teaching methodologies suitable for adult learners who may often enter numeracy lessons with negative attitudes towards the subject. Furthermore, adult numeracy tutors play a vital role in shaping adults' attitudes toward mathematics, and professional development should, according to Piotrowski (2016), also focus on fostering critical thinking, inquiry and an appreciation of the utility value of numeracy. Unfortunately, however, research has indicated that there is currently a lack of systematic professional development opportunities available for adult numeracy tutors (Morton et al., 2006). In Ireland, for example, a study conducted by the National Adult Literacy Agency [NALA] found that over 60% of adult numeracy tutors reported that they did not believe they received enough training in teaching numeracy to adults while 15% reported that they had no training at all (NALA, 2013). The lack of training and professional development being reported in the research has numerous consequences. For example, Ngware et al. (2010) highlighted how inadequate training directly affects educational outcomes, as adult numeracy tutors often struggle to master subject content effectively. If tutors themselves do not have a deep knowledge and understanding of numeracy then one would be remiss to think that they can develop this knowledge and understanding among the adults they teach. Due to the far reaching consequences of a lack of professional development for tutors it is also important to consider why this problem persists in the area of numeracy education. In the research there are two primary reasons proposed. Firstly, according to the American Institute of Research (2006) issues around the training of adult numeracy tutors stem from the lack of a standardised definition of numeracy, as previously discussed. Without a common understanding of numeracy, they report that it is difficult to identify quality practices and interventions to train and upskill adult numeracy tutors. In essence they report that the lack of a standardised definition of numeracy, complicates the conceptualization and advancement of effective professional development programmes. Secondly, a significant portion of adult numeracy tutors work part-time. This



which restricts their access to professional development opportunities (Prendergast et al., 2024). Furthermore, Smith and Gillespie (2007) report that funding is not made available to these part-time tutors to engage in professional development which may be offered to them. Without substantial reforms in professional development opportunities, progress in adult numeracy education will remain limited.

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