



Cross-age tutoring in kindergarten and elementary school settings: A systematic review and meta-analysis



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ARTICLE INFO

Article history:

Received 6 October 2014

Received in revised form 13 March 2015

Accepted 19 March 2015

Available online 27 May 2015

Keywords:

Tutoring

Systematic review

Literacy

Peer learning

Volunteer effectiveness

Cooperative learning

ABSTRACT

This systematic review summarizes effects of peer tutoring delivered to children between 5 and 11 years old by non-professional tutors, such as classmates, older children and adult community peer volunteers. Inclusion criteria for the review included tutoring studies with a randomized controlled trial design, reliable measures of academic outcomes, and duration of at least 12 weeks. Searches of electronic databases, previous reviews, and contacts with researchers yielded 11,564 titles. After screening, 15 studies were included in the analysis. Cross-age tutoring showed small significant effects for tutees on the composite measure of reading ($g = 0.18$, 95% CI: 0.08, 0.27, $N = 8251$), decoding skills ($g = 0.29$, 95% CI: 0.13, 0.44, $N = 7081$), and reading comprehension ($g = 0.11$, 95% CI: 0.01, 0.21, $N = 6945$). No significant effects were detected for other reading sub-skills or for mathematics. The benefits to tutees of non-professional cross-age peer tutoring can be given a positive, but weak recommendation. *Effect Sizes* were modest and in the range -0.02 to 0.29 . Questions regarding study limitations, lack of cost information, heterogeneity of effects, and the relatively small number of studies that have used a randomized controlled trial design means that the evidence base is not as strong as it could be. Subgroup analyses of included studies indicated that highly-structured reading programmes were of more benefit than those that were loosely-structured. Large-scale replication trials using factorial designs, reliable outcome measures, process evaluations and logic models are needed to better understand under what conditions, and for whom, cross-age non-professional peer tutoring may be most effective.

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1. Introduction

Individualized tutoring is considered to be one of the most effective ways to promote improved educational outcomes (Bloom, 1984; Elbaum, Vaughn, Hughes, & Moody, 2000). Non-professional peer tutors can deliver tutoring programmes at schools with reduced costs compared to professional teachers or tutors (Goodlad & Hirst, 1990; Leung, Marsh, & Craven, 2005). Our review considers tutoring schemes, in which children, university students and community volunteers tutor kindergarten and elementary school pupils. These non-professional tutors are considered peer tutors here because they do not have the status of professional educators and are either close in age to the tutees (in the case of school or university student volunteers), or close in terms of background and spatial proximity (in the case of community peer volunteer

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tutors), and share the local environment with tutees. Therefore, we take a wide, inter-generational view of what constitutes a peer within a community.

Tutoring by school pupils, university students and community volunteers has been reported as an effective intervention for improving academic and attitudinal outcomes among school-aged children (Medway, 1995; Ritter, Denny, Albin, Barnett, & Blankenship, 2006; Higgins et al., 2013). Conversely, several studies have found null or negative effects for non-professional tutoring on academic results of tutees (Jensen, 1991; McKinney, 1995; Ritter, 2000). Therefore there is need for a systematic review to assess what high quality studies report in terms of the efficacy of peer tutoring.

1.1. Theoretical background

There is no single dominant theory of change for peer tutoring. Students are expected to improve academic outcomes through elaborating thoughts in the tutoring process, thus cooperatively constructing knowledge within the so-called *zone of proximal development* (ZPD). The ZPD is loosely defined as the distance between child's independent level of problem solving and the level of problem solving under the guidance of a more advanced peer or an adult (Vygotsky, 1978; Chi et al., 2001; Webb, 1989). In this manner peer tutoring is often reported as being a form of cooperative learning (Pesci, 2015). Peer tutoring can provide students with timely feedback (Bloom, 1984; Merrill, Reiser, Merrill, & Landes, 1995), increased time on task (Delquadri, Greenwood, Whorton, Carta, & Hall, 1986) and more appropriate pacing (Shanahan, 1998).

Tutoring programmes are also expected to improve socio-emotional outcomes, such as self-efficacy (Elliott, Arthurs, & Williams, 2000), self-confidence (Margolis, 2005), and child's confidence in the academic subject tutored (Koh, Sanders, & Meyer, 2012). Peer tutoring is reported to result in improved social ties between tutees and tutors (Goodlad & Hirst, 1989), strengthened attachment to the school, and improved attendance at school (Pridmore, Stephens, & Stephens, 2000). Many authors have also suggested that peer tutors can serve as role models for the tutees (Potter, 1994; Topping & Hill, 1995). In this way, peer tutoring by non-professional educators is expected to be qualitatively different from tutoring delivered by professionals and employed teaching staff.

1.2. Ongoing programmes

In the USA since the late 1990s America Reads Challenge has mobilized tens of thousands of college students as volunteer reading tutors for children in Kindergarten through Third Grade (Fitzgerald, 2001). In this context, several manualized programmes were developed, such as Book Buddies which involved 45-minute biweekly sessions consisting of rereading a familiar book, word studies, writing, and reading a new book (Meier & Invernizzi, 2001). In India, a programme called India Reads was managed by the largest educational non-governmental organization, Pratham. The programme is reported to have enabled communities to mobilize and train volunteers to work in schools both during and after school hours. The initiative involved nearly 450,000 community volunteers acting as tutors using techniques described in programme manuals (Poverty Action Lab, 2009). Other programmes have less formal structures for tutoring interactions. The UK literacy charity Beanstalk connected adult community volunteer tutors with 6400 primary school children in England during the 2011–2012 academic year. It provided community volunteers general guidance, such as “Use open-ended sentences to encourage conversation” and “Be generous with your praise” (Beanstalk, 2013).

Most reports available in English have described tutoring programmes in high-income English-speaking countries, such as USA, UK and Australia, but there are also reports of similar projects in other countries, such as China, India, Jamaica, Lithuania, South Africa, Tanzania and Thailand (Goodlad, 1995, 1998). Banerjee and Dufo (2011) reported that tutoring programmes involving community volunteers are currently being tested in Ghana, with plans for similar programmes drafted in Senegal and Mali.

1.3. Existing studies and reviews

Following a number of narrative reviews (Rosenshine & Furst, 1969; Devin-Sheehan, Feldman, & Allen, 1976), Hartley (1977) carried out the first meta-analysis on the topic, identified by this review. Hartley summarized peer tutoring studies in mathematics with child tutors and found a mean Cohen's *d* of 0.6. The widely cited Cohen, Kulik, and Kulik (1982) review examined 65 randomized and matched studies based in elementary and secondary schools with schoolchildren as tutors. It reported significant overall Cohen's *d* Effect Sizes of 0.29 for reading (95% CI 0.17, 0.41) and significant Effect Sizes of 0.6 (95% CI 0.29, 0.91) for mathematics. However, Rohrbeck, Ginsburg-Block, Fantuzzo, and Miller (2003) reported that older meta-analyses may have serious methodological limitations, such as 'lax and 'non-transparent' study inclusion criteria. More recent reviews (Wasik & Slavin, 1993; Shanahan, 1998; Wasik, 1998; Elbaum et al., 2000) looked at one-to-one tutoring undertaken by adults, including professional tutors. It was reported that, “college students and trained, reliable adult community volunteers were able to provide significant help to struggling readers” (, p. 616).

More recently, Slavin and Lake (2008), Slavin, Lake, Chambers, Cheung, and Davis (2009a), Slavin, Lake, Cheung, and Davis (2009b), Slavin, Lake, Chambers, Cheung, and Davis (2009c), Slavin, Lake, Davis, and Madden (2010) Slavin, Lake, Davis, and Madden (2011), Slavin and Madden (2011) carried out large Best Evidence Encyclopedia syntheses of various reading programmes in Kindergarten to Fifth Grade. The reviews reported significant standardized mean difference Effect Sizes of 0.26 for cross-age tutoring. Leung et al. (2005) conducted a meta-analysis of 68 published studies, in which children

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