Using a Teacher Engagement Model During a Development Study to Facilitate Implementation of Large-Scale Peer Tutoring Randomized Controlled Trial

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Abstract

There is strong evidence that peer tutoring, as a form of cooperative learning, has positive impact on student outcomes. Despite the proven potential of peer tutoring interventions which can be effective at scale across wide geographic areas, evidence highlights variability in teacher implementation. A development study phase with teachers using a collaborative learning model was created to drive fidelity to treatment during the pragmatic randomized controlled trial phase that followed. The study used a model of teacher engagement with twelve teachers in three high schools in the United Kingdom during a peer tutoring development pilot with 295, 11 to 13-year-old students. Teachers engaged in research co-design grounded in social-interdependence theory to promote effective intervention and improved practice.

There is strong evidence that peer tutoring, as a form of cooperative learning, has positive impact on both tutor and tutee, with indicative average effect size of 0.48 (Higgins et al.,2012), with particular benefit to children in social disadvantage and those with special educational needs (Thurston et al.,2012). The Peer tutoring intervention used in this study and the randomized controlled trial (RCT) which followed it was similar to a previous intervention that had resulted in effect sizes=+0.2 in a RCT in 129 elementary schools (Tymms et al.,2011). Despite the proven potential of the peer tutoring intervention using paired reading, wide variability of implementation persisted despite teacher manuals and professional development (Topping et al., 2011).

Refining an intervention using a development study prior to a RCT is recognized to be a vital component of a study (Torgerson & Torgerson, 2008). The development study described here was treated as a "run-in" phase of the RCT to fully develop the intervention for the identified cohort, in readiness for a full trial (Lancaster, Dodd, & Williamson, 2004). The RCT, which this study preceded, adopted a pragmatic design, recommended for educational experimentation (Torgerson & Torgerson, 2008). There was inevitable sacrifice of some standardization for realism, expected to result in natural variability in delivery (Gorard, 2013). To enhance fidelity to treatment thereby reducing implementation variability during the RCT phase in schools, the "run-in" study designed in the development phase was particularly important.

When commencing a RCT, in order for it to be appropriate for the cohort in question, contextual factors should be addressed (Cartwright and Hardie, 2012). The intervention focus of this development study was cross-age peer tutoring, for which there is strong evidence of positive impact (Cohen, Kulik, Kulik, 1982; Higgins et al., 2014). However, only one large-scale trial in the UK had been completed, in elementary schools in Scotland (Tymms et al., 2011). The development study reported here and subsequent RCT took place in high schools in England rather than Scotland, thus required adaptation of previous materials for age and context appropriateness.

When considering the challenges posed in school reform, research suggests the need for systematic subscription to the proposed change (Ravitz, 2010), collective moral purpose and a shared theory of action (Gifford, 2010). These factors echo Social Interdependence Theory (Johnson & Johnson 2012; Johnson, Johnson, & Roseth, 2010), as school reform requires:

- Goal structure (teachers work with senior management and researchers with the goal of school improvement).
- Positive interdependence (for the new pedagogy to work teachers have set resources and pedagogies to implement in their classroom).
- Individual accountability (all working on the initiative need to buy into the process and deliver/engage with professional development).

During the development study reported here, Social Interdependence Theory shaped the structure for the teacher engagement model with the research team and during school delivery in groups.

Methods

The development study used a quasi-experimental design which included a peer tutoring intervention involving 295, 11 to 13-year-old students over 12-weeks in school, and a teacher engagement model of training and working to enhance fidelity to treatment during following RCT phase. The collaborative teacher engagement model during the development

study (ref Fig.1) enabled the adaptation of existing materials from the Primary to the Secondary stage, ensuring sufficient standardization of teacher and student resources for scalability across 120 classes during the trial (including wait-control).

Twelve professionals from three school worked with the research team addressing issues of contextualization, school structural engagement, and teacher buy-in. The group trained together, and 6 teachers delivered the peer tutoring intervention in schools (12-weeks), and collaborated to adapt and refine materials for ongoing delivery. Continued professional development events (CPD 1-3) took place between February and July 2013 (Ref Fig. 2) with a school visit by the research team between CPD 2 and 3.

All CPD events were conducted using an informal style, interweaving five elements, with teachers working as co-designers with the research team:

1. Establishing prior learning and experience
2. Presentations from research team
3. Experiential learning opportunities for teachers
4. Reflective cycle including individual reflection, co-operative pair work, school group and whole group discussions, and collaborative feedback
5. School group planning time for next steps.

CPD event 1: Teachers established trust and a structure for engagement, explored prior knowledge, completed perception questionnaires, were trained in the peer tutoring theory and technique to deliver in school.

CPD event 2: Teachers shared experiences about classroom delivery and perceptions of effectiveness, trained in social and communication activities to enhance paired reading delivery, and adapted the first teacher manual iteration.

In-school visits: Researchers provided additional teacher support, observed peer tutoring sessions, and collected digital materials from teacher and students for didactic training purposes during the RCT.

CPD event 3: Teachers analyzed student and teacher resources created in each school and agreed a standardized set, assessed the validity of digital materials created, and completed feedback questionnaire.

This work led to the final iteration of standardized resources used in the RCT phase which followed.

Analysis and Results

Having trained the teachers in the theory, research and intervention technique during CPD 1, the model enabled teachers to try the materials during peer tutoring delivery over 12-weeks, to make modifications and create additional resources. Teacher quantitative and qualitative feedback questionnaires were collected at CPD events, and CPD 1 results indicated teacher buy-in for intervention delivery and co-design process. CPD 2 teacher feedback identified improved student relationships, communication skills, and reading ability, and required for additional student resources for good technique including teacher modelling structures. This resulted in co-production of additional teacher/student resources.

The research team school visits included teacher discussions and quantitative student observations. Observation data found good adherence to technique in most classrooms including seating arrangements and book choice, with good implementation of the peer feedback and error correction. However, the level of peer questioning was quite low in the six classes observed. The school visits resulted in the co-creation of student prompts and teacher power point resources to ensure student clarity about all the elements in the peer tutoring technique, including questioning, praise, and assessment, and to help teachers structure the sessions systematically, for each element to be developed.

Using themes identified in CPD2, digital teacher and student interviews, for design of didactic peer tutoring films for training purposes were undertaken during school visits. Interviews confirmed teacher perceptions of impact from CPD 2 and were therefore used to produce training films, then tested for veracity during CPD 3 and found to be congruent with all previous feedback.

Quantitative data from teacher perceptions during CPD 3 indicated that the intervention led to students enjoying reading more and improved communication skills, confidence when reading out loud, and improved reading. CPD 3 feedback illustrated the potential of this model of engagement in cross-school working, for adapting materials collaboratively and testing them in the classroom for improved implementation.

Discussion

The model created for teacher engagement, including quantitative and qualitative feedback on the nature of the intervention, identifying improvements required, co-designing and testing resources, was instrumental to the final refinement of materials and systems used during the RCT. The process enabled contextualization of materials and training, provided structures to facilitate whole school engagement with the intervention, and promoted teacher buy-in through credible resources including authentic professional voices. The model enabled all intervention teachers to engage successfully in this process and provide the intended structures and materials for scale-up during the trial.

The implications for education and teachers are clear. To engage in effective professional development can be most effective if approached as a whole school initiative. By engaging teachers and bringing them together to share ideas and experiences during the development study (Magolda & Ebben, 2007) involvement was obtained from the school leadership and there was consensual "buy-in" from teaching professionals within the school (Muijs & Harris, 2006). This form of professional and school development seemed to provide a good model for school change and curriculum reform. It created a social interdependence between researchers, school leadership and teachers with shared responsibility for success and failure (Johnson et al., 2010). This engaged teachers as research collaborators, rather than as pawns in the decisions of school leadership and/or research designers.

Our findings suggest that incorporating teachers in a development study prior to a trial using the model described has the potential to contribute to the production of effective resources and credible teacher training necessary for effective interventions. The aim is that teacher voice and involvement of this kind results in deeper pedagogical understanding and commitment to fidelity of treatment in the classroom during a trial and beyond.

The implications of this model of engagement will be explored further during the presentation of this paper in the light of the results of the development study and RCT on student outcomes, particularly for lowest ability readers.

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Figure 1. Models and actions of professional engagement for teachers during the professional development process.

- Teachers engage with new pegagogy

Teachers embed new pedagogy into professional practice

Teachers use enhanced pedagogy in classroom

- Teachers enhance new pegagogy
- Teachers share professional practiec with others

- Teachers celebrate schieveemnts and share ideas on enhanced pedagogy

Teacher plan professional engagaemrnt for colleagues for the following year

Goal structure identified-school improvement through the use of a new pedagogy

Positive interdependence-teachers use materials and share professional practices

Individual accountability-teachers report how their pedagogy has changed

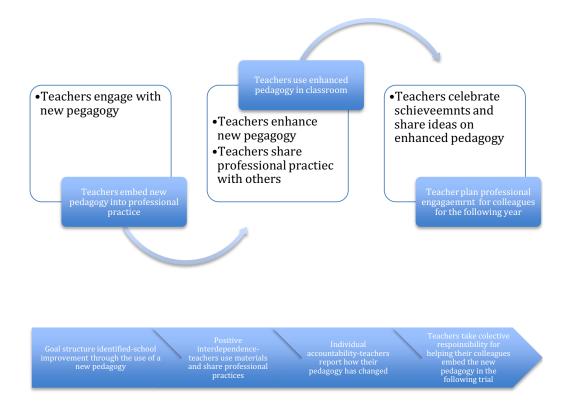Teachers take colective respoinsibility for helping their colleagues embed the new pedagogy in the following trial

Figure 2. Process of teacher engagement.

- CPD/Collaboration 1

- Introduce peer tutoring
- Begin to create resources
- Implement sessions 1- 4

- Introduce social skills
- Share/refine/create resources
- Implement peer tutoring 5-12
- Films developed

- CPD/Collaboration 2

- CPD/Collaboration 3

- Share revised resources
- Share PPT structures
- Film materials agreed
- Survey feedback