Knowledge Exchange Seminar Series (KESS)

Better Reading for Better Outcomes-
Working Collaboratively to Narrow the Attainment Gap

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Abstract

Literacy levels and educational attainment serve as indicators of the knowledge and skills that a population possesses. Literacy and other skills gained through education provide fundamental tools for life-long learning. They also enhance opportunities for economic participation and social engagement. For societies, improved literacy and educational attainment bolster human capital resources and economic growth, and they are also linked to social welfare and poverty reduction. Northern Ireland still has one of the highest percentages of children failing to reach the lowest literacy benchmark. Research shows that if children do not learn to read well, they can form a disaffection with the education system from an early age. Research investigating remedial action suggests that explicit, systematic phonological training is the most effective method of increasing reading accuracy and fluency. The National Reading Panel has also outlined the effectiveness of supplementary computer assisted instruction (CAI). However, not all commercially available CAI packages are equally effective Headsprout Early Reading© is an online instructional program that targets each of the 5 sub-skills identified by the National Reading Panel through intensive systematic phonics training. Experimental evaluations of Headsprout© have shown clear efficacy and efficiency (when compared to conventional instruction, and to other commercially available programmes), in improving reading skills of individuals with autism, typically developing learners, and looked after children. This seminar will discuss proposals for collaborative research and interventions to empower schools and parents in NI to better recognise evidence based approaches, and to use these effectively to remediate literacy difficulties and increase attainment of children most in need.

1.Background

Recent findings from The Department for Education’s ‘Effective Pre-school, Primary & Secondary Education Project’ (EPPSE-2014), show that the life chances of children are shaped by family, home and school experiences. Effects of disadvantage in one or more of these environments (multiple disadvantage) emerge early and continue to shape later educational outcomes. The impact of being ‘disadvantaged' during Primary School has implications beyond that of educational outcomes, posing risks to health and employment, and increasing the probability of criminal activity (McIntosh & Vignoles, 2001; Programme for Government Consultation Document, 2016). At the end of KS2 boys, pupils on free school meals, disadvantaged, SEN pupils, and the ethnic groups Gypsy/Roma, traveller of Irish heritage, Pakistani and Black Caribbean all tend to have the lowest attainment in numeracy and literacy (Department for Education, 2017). Low attainment is often due to complex interactions of a variety of social/demographic factors.

Although not the only indicator, disadvantage is often identified by the percentage of pupils entitled to free school meals (FSME). Schools in NI have a higher percentage of pupils entitled to FSME than anywhere else in the UK. A review by the Joseph Rowntree Foundation (2012) found that 30% of children in the most deprived fifth of schools in NI did not reach their expected level in English prior to leaving Primary School in comparison with 18% of all other schools. Further, 28% of children in the most deprived fifth of schools did not reach their expected level in Mathematics, compared with the 17% average across all other schools. More recent NI statistics show that while the percentage of school leavers receiving FSM achieving at level 2 in English and Math has increased from 27.7% in 2007-8 to 41.3% in 2014-15, the percentage not entitled to FSM has also increased by approximately the same proportion (61.6 – 73.7%) (Programme for Government Consultation Document, 2016).Therefore, although educational outcomes are slowly improving for this population of children, the attainment gap is not closing.

Phonics Based School Interventions-Research has shown that if children do not learn to read well when they are young, they can form a disaffection with the education system and, as adults, get fewer qualifications leading to potential unemployment or low-paid work (Bishop & Snowling, 2004). While reading comprehension interventions generally have a positive effect on older pupils’ attitudes towards reading; It is widely recognised that phonics based instruction is an effective approach for younger readers (aged 4 - 7) (DfE, 2017). Phonics approaches aim to teach pupils the relationship between sound patterns (‘phonemes’) and the written spelling patterns (‘graphemes’) which represent them. Phonics emphasises the skills of decoding new words by sounding them out and combining or ‘blending’ the sound-spelling patterns (Higgins, Katsipataki, & Coleman, 2014). Research investigating remedial action for disadvantaged children suggests that explicit systematic phonological training is the fastest most effective method of increasing word recognition and subsequently reading accuracy (Bradley & Bryant, 1983; Hatcher, Hulme & Ellis, 1994; Johnston & Watson 2004; Lundberg, Frost & Peterson, 1988)**.**

Although usually embedded as part of a balanced approach, typically these supplementary programmes, such as ‘Rapid Phonics’, and ‘Butterfly Phonics’, involve group or one-to-one sessions with pupils, delivered by teachers over periods ranging from 6 to 33 weeks. The estimated cost of these programmes range from £108 up to £205 per pupil. The evidence on how effective they are at helping struggling pupils catch up is inconsistent, with some reportedly having moderate effects and others none at all. Some of the inconsistency across findings is down to limitations in the research methods used when trailing these interventions, so more research would help to clarify if these approaches work, and if so why, and how much is needed?

Computer Assisted Instruction-For various reasons, current strategies to target literacy in disadvantaged children appear to have had limited success in closing the attainment gap in NI. Many educators hold the belief that strategies in current use, or that come recommended, have the support of an empirical evidence base relating to efficiency and effectiveness. Unfortunately, this is often not the case (Tobin & Calhoon, 2009). Practitioners are reminded to choose systematic phonics-based interventions that have been empirically evaluated (National Reading Panel 2000). As well as choosing evidence-based interventions, the National Reading Panel (NRP, 2000), has outlined the effectiveness of computer assisted instruction (CAI). CAI is used to describe specific computer applications in education such as simulation, drill and practice and tutorials offered as independent activities or supplementary to general classroom instruction (Cotton, 1991). Singleton (2009) and Linehan et al. (2011) report that the use of computers increases student motivation by providing fast-paced, individualized lessons while offering students the ability to make more numerous and different kinds of responses, not otherwise available through conventional teaching methods. The results of a summary of 59 CAI studies found that, (a) the use of CAI alongside conventional instruction produced greater results than conventional instruction alone; (b) students learn material faster with CAI than conventional instruction alone; (c) CAI is more beneficial for younger students than older students and lower-achieving students than higher-achieving students; (d) students with specific learning difficulties achieve better results with CAI than with conventional instruction alone; and (e) student’s enjoyment of CAI activities is a direct result of the delivery of immediate feedback (Hall, Hughes & Filbert, 2000).

Computer usage has expanded greatly during the past decade, and is seen by many as an efficient and promising tool for students who have difficulty learning in larger classroom settings. With computers more accessible in today's classrooms, educators have implemented a number of computer-based programs and supports to provide struggling readers with additional assistance. Most schools in NI currently have some kind of Internet access. However, this does not necessarily mean that computers are being used for explicit instruction, with much of the computer usage in school devoted to reading items online on Web sites or e-books. In addition, the methodological quality of the research on CAI to enhance literacy for struggling readers is mixed. Many of the studies reviewed had several limitations, such as a weak or absent comparison group, insufficient information about the sample and outcome measures, as well as small sample sizes that made it difficult to generalize the findings. Research shows that while some interventions have had a positive effects, others with limited teacher involvement have shown less positive effects (Dynarski et al., 2007; Setter & Hughes, 2010). Thus, the use of computers for literacy instruction in the classroom is an expanding field, and research is needed to help it grow

One such CAI programme that is showing promising results in emerging literature is Headsprout Early Reading© (HER). This is an online instructional program that targets each of the 5 sub-skills identified by the National Reading Panel (2000) through intensive systematic phonics training. Headsprout© claims to bring a beginning reader to a proficient level of reading in 80 20-minute episodes, with an additional 50 episodes offered to target Reading Comprehension skills. Consistent with the principles of behaviour analysis and Direct Instruction (Watkins, 1998) aiming to teach 'more in less time', Headsprout© breaks the reading curriculum into clear systematic parts that are taught in a specific order without assuming the child's background knowledge. No stage will be taught without the previous stage being mastered, and thus decisions to progress to the next stage of the curriculum are data-driven (i.e., based on the child's performance in the previous stage). Headsprout© incorporates four key learning frameworks consistent with effective instruction; Reduced errors- teaching begins at a very basic level where children respond in unison with the computer and errors are used as teaching opportunities; Mastery criterion- children do not progress to the next stage of the curriculum until they have mastered their current stage; Guided practice- with the introduction of new words or phonemes a timing schedule is also introduced to target fluency as well as accuracy of reading. Cumulative review and application-previously learned skills are revisited and built upon in the introduction of newer more difficult skills. Experimental evaluations of Headsprout© to date have shown clear efficacy and efficiency in increasing the reading skills of individuals with autism and with typically developing learners within the classroom setting (Layng, Twyman & Strikeleather, 2003; 2004; Huffstetter et al. 2010; Grindle, Hughes, Saville, Huxley & Hastings, 2013; Tyler, Hughes, Beverley, & Hastings, 2015; Storey, McDowell & Leslie, 2017). In addition, Bangor University, in collaboration with GwE, are piloting the use HER in over 45 primary schools in North Wales. Initial results appear to be very positive. In addition, the cost of HER is very low compared to other phonics based programmes, at just over six US dollars per child.

Despite the evidence suggesting the cost effectiveness and efficacy of evidence based CAI, few schools in Northern Ireland appear to have implemented them in a way that is impacting the literacy crisis. Our finding is that even when there are demonstrably superior results for one programme, schools do not continue to implement the most effective strategies, but rather under the remit of 'innovation', source and implement, other programmes from year to year.

2-Current project

Social disadvantage has the greatest single impact upon attainment. However, educational influences have an important role to play in promoting better outcomes for those at risk because of disadvantage. In line with the objectives of The Northern Ireland Programme for Government aimed at giving young people the best start in life, the general aim of our research is to address persistent levels of underachievement in literacy in disadvantaged children. The EPPSE report indicates that no single educational influence will act to overcome all effects of disadvantage, but that a combination of parental actions, and supportive pre, primary and secondary schools can make a difference to children's educational outcomes, and so improve more long-term outcomes. Over the past decade, a new form of research-practice collaboration has emerged- *design research*. Working together, practitioners and researchers design, test and refine interventions to improve practice and refine theoretical principles. (Coburn & Stein, 2010). The overall goal of this research project is therefore to investigate the feasibility of implementing evidence based computer assisted instructional (CAI) packages in primary schools in NI to target reading skills to narrow the literacy gap. It will do this through utilisation of existing CAI literacy programmes, combined with the use of empirically validated behavioural change interventions to provide effective, individualised literacy interventions, in such a way that can be implemented, evaluated and supported in the school without long term support by researchers.

The combination of technology and behavioural intervention specifically designed to support individuals with literacy difficulties will be delivered as part of whole school packages that will involve staff from participating schools in both communities, and foster school-to-school collaboration. In addition, the parents of children who participate will be involved to allow learning to be supported in all environments. To this end, teaching staff and parents will be explicitly trained in the delivery of the interventions and continuous assessment of pupil progress throughout implementation. This will create a systems support framework allowing the intervention to continue in the schools, whilst being supported at home, without the need for researchers to be present at all times. To achieve this aim, the research project will incorporate the skills and knowledge held by the research team in the areas of behaviour analysis, behaviour change systems and education. This intervention will empower schools and parents to better recognise interventions based in sound scientific principles, to utilise existing CAI technology to ease the burden on teachers struggling to address barriers to literacy faced by some children in their classrooms. It will also allow a joined up approach between teachers and parents in remediating literacy difficulties, to achieve better educational outcomes, increase overall attainment and increase aspirations of children most in need.

Methodology- The project employs a combination of mixed methods data collection and experimental design to meet the aims. In addition, the project will aim to produce a comprehensive support package for schools in relation to understanding, recognising and implementing evidence based practice to target literacy.
Participant recruitment is facilitated through the established professional networks and contacts of McDowell, Storey & Leslie as well as collaborating researchers Dr Una O'Connor-Bones, and full time PhD student Gerry McWilliams. Participants are those pupils, teachers and parents in primary schools in disadvantaged communities in Northern Ireland.

3. Implementation

Phase 1 – A mixed method design to investigate teachers' understanding and experience of evidence based practice relating to literacy. The initial study is underway and is in collaboration with colleagues from Bangor University and University of Warwick. An online survey has been created and will be disseminated to a large number of primary and special needs schools across the UK and Ireland. The study will gather information on teaching professionals' current knowledge and understanding of evidence based practice in their schools and their experience of evidence-based practice relating to literacy. In particular, the measure asks for information relating to factors that inform their choice of teaching strategies, curricula and packages- specifically, techniques and resources currently being used to support literacy-learning needs of pupils, where educators go to for information concerning available resources, strategies etc., assessment methods, positive benefits and negative outcomes experienced, perceived barriers to positive outcomes.

Phase 2 - Development of information, training and support package for teaching staff and parents. Based on findings from phase 1, and from several small pilot studies conducted by Storey, McDowell & Leslie on the use of literacy CAI packages in schools in NI, a training and support package for school staff and parents will be designed. The aim of this package will be to teach participating staff and parents of pupil participants, how to understand and identify different levels of 'evidence' relating to best practice in education. In addition, training will focus on how to implement and support a CAI literacy programme across the school for pupils most at risk, as well as how to easily and frequently monitor pupil progress, and adjust teaching as necessary.

Phase 3 - Implementation of literacy interventions in schools - incorporating evidence based CAI packages. This phase involves the experimental element of the project in the form of a pilot feasibility trial across 6-8 schools, with high numbers of pupils receiving FSM and demonstrating difficulties in literacy. Potential participants will be assessed on a number of literacy measures, using standardised reading and comprehension tests. Children who demonstrate that they are below expected literacy levels for their age will be included in the samples for each of the schools, and randomly assigned to either a treatment group or a waiting list control group. Schools will be paired according to several demographic variables, including percentage of FSME and pupils' profiles. This will also provide a school-to-school collaboration system. With the help of the researchers, each school will introduce the CAI literacy programme (Headsprout Early Reading). Throughout the implementation phase, measures of additional dependent variables, will occur allowing comparisons across groups. Results of standardised reading assessments will be compared at pre and post intervention stages for both groups. If demonstrated to be more effective, the intervention will then be introduced for children in the control groups across the schools.

Phase 4 - Analysis and dissemination of results & applications for funding

This phase will consist of distilling the results of the project into a package of support for schools and parents, and disseminating the results of the project to ensure maximum circulation of results, through a) Journal Publication, b) Conference Presentation, and c) Professional networks that McDowell et al are active within. The objectives of the proposed project are in line with the strategic plan for research at Ulster University. UU seeks to be a leading centre for applied psychological research through drawing upon and enhancing our cutting edge expertise in design and analysis of intervention research, and are committed to multidisciplinary approaches to help address complex health, social and educational issues. The proposed research capitalises on the expertise of all members of the research team, and combines several of the areas of research strength, namely, behaviour analysis, behaviour change, and educational research. The multidisciplinary nature of the project will take advantage of Ulster University's proven track record of intervention strategies that leverage the intersection between behavioural and education specialists. Applications for funding will be made at a later stage, to support larger scale evaluations of school based CAI.

Conclusion

Previously identified, traditional approaches to promoting literacy skills in disadvantaged children have had limited success in closing the attainment gap in education. Technology has the potential to broaden access to evidence based interventions, ease the cost for schools and the burden on teachers, and promote learning across environments by involving parents more fully in the education process. Supporting both educators and parents in the introduction of evidence based CAI in schools is a new departure in developing interventions within this area. The research adopts a user-centred design approach and will involve stakeholder participation at the design and all implementations stages. Combining technology and behavioural principles in the development of cost effective, individualised literacy interventions is an efficacious delivery system for behavioural intervention to promote lasting behaviour change and skill development. The importance of the proposed research will be found in the impact on educational attainment and aspirations for disadvantaged pupils. The proposed research capitalises on prior collaborations between behavioural psychologists and educational researchers in UU. This project will provide opportunities for informing policy and expansion of stakeholder adoption of the intervention package and technology to include users in the United Kingdom and Ireland.

Disadvantage; Literacy; Reading; Computer Assisted Instruction.

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