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## **DOCTOR OF PHILOSOPHY**

### **Interventions aimed at increasing literacy skills in those at risk of offending behaviour**

Hulson-Jones, Amy

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Interventions aimed at increasing literacy skills in those at risk of offending behaviour

Amy Hulson-Jones

Thesis submitted to the School of Psychology, Bangor University, in partial fulfilment  
for the degree of Doctor of Philosophy

November 2013

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## Summary

The primary focus of this research was concerned with improving the basic reading skills of those who did not achieve them during the early years of formal education. The thesis unfolds as follows; Chapter 1 provides a definition of terms, a general scope of the problems relating to low basic skills with a specific emphasis on offending behaviour. This chapter gives an overview of the research involved with adult education, its provision and impact on particular groups of adults including prisoners. Chapter 2 documents the first study that evaluated the use of a reading programme with three adult struggling readers. The programme - *Toolbox Series for Literacy*<sup>®</sup> - that combines Direct Instruction (DI), Precision Teaching (PT) and behaviour management techniques was found to be effective in improving reading ability for two of the three participants. Chapter 3 examines the barriers to participation in adult education using a qualitative approach to explore the perceptions of learners/potential learners and service providers. The study uncovers discrepancies between the barriers reported between the two groups. Chapters 4 and 5 are early intervention studies that evaluates the use MimioSprout<sup>®</sup> programmes with children at risk of engaging in criminal behaviour.

## **Chapter 1: Introduction**



The equal provision of adult education is “one of the most important conditions for overcoming social injustice and reducing social disparities in any country [...] and is also a condition for strengthening economic growth” (UNESCO, 2008a, p24).

“He who opens a school door, closes a prison.”

Victor Hugo

## **What are basic skills?**

Each member of any given developed society should have an equal opportunity to be taught basic reading and writing skills so that they are able to communicate through the multiple modes of communication that exist in the highly technological age that we now live (DES, 2011). In the UK policy literature the term ‘basic skills’ has become a common term to describe “the ability to read, write and speak in English/Welsh and to use mathematics at a level necessary to function and progress at work and in society in general” (DfES, 2003, p. 46).

The reference to the functionality within the definition of basic skills is an important distinction because it moves away from the dichotomy of literacy as being an absolute condition which either categorises someone as being able (literate) or unable (illiterate) to read or write (Kruidenier, 2002). The concept of ‘functional literacy’ acknowledges that people have varying levels of ability that can be mapped on a continuum, those at the lower end of the continuum will experience difficulties in day to day functioning in modern society. In the UK, the standard measure of basic skills is set within the national framework of qualifications (NFQ). This is a set of banded levels that serve to provide a standardised measure of academic achievements through accredited courses. There are nine levels of academic achievement: Level 1 is equivalent to GCSE<sup>1</sup> grades D-G, Level 2 is equivalent to GCSE grades A\* to C, and so on. Three bands precede Level 1; they are Entry 1, 2, and 3. Those performing at Entry Level 1 are considered to have abilities equivalent to typically developing five to seven year olds. Entry Levels 2 and 3 are equivalent to the abilities of typically

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<sup>1</sup> GCSE - General Certificate of Secondary Education, is a UK academic qualification

developing seven to nine- and nine to eleven-year old children respectively (see Appendix A and Appendix B for diagrams illustrating the full span of different levels). According to the Basic Skills Agency, an adult who is performing below the NFQ Level 1 is regarded as being functionally illiterate and therefore does not have the capacity to function adequately in work and everyday life (Basic Skills Agency, 1997). The functionally illiterate may have difficulty understanding utility bills, the instructions on the screen at a cash point and information on food packaging, or writing short notes to be read by others.

### **Low Adult Basic Skills in the UK**

Dolton and O'Neill (1996) and Feinstein, Budge, Vorhaus, and Duckworth, (2008) assert that raising a person's level of education will ultimately improve their chances of finding employment, strengthening their social relations within a wider community and therefore improving their subjective quality of life. Therefore, policy makers and government bodies acknowledge the importance of improving adult basic skills that benefit individuals, families and consequently society as a whole, thus strengthening economic growth (OECD, 1996; Rubenson & Schuetze, 2000).

Early initiatives to improve the levels of education in adults included the campaign, *'The Right to read'*, which was launched in 1973 (see Withnall, 1994, Hamilton, 1996, and Street, 1995, for overviews). The campaign marked the beginning of a long line of political initiatives within the UK and other European governments to improve adult basic skills throughout subsequent decades (Coffield, 1997). In 1999, the UK government commissioned Sir Claude Moser to formally investigate the literacy and numeracy levels of the adult population in England and

provide recommendations about how they could be improved (DfEE, 1999). The report revealed that 20% of adults in England were functionally illiterate (The Moser report, Department for Education and Employment, 1999). In Wales, a similar survey of basic skill levels was conducted with adults normally resident in the country who were between the ages of 16 and 60 years. Findings revealed that 28% of adults were performing at Entry Levels 1, 2 or 3, in literacy (i.e., below that of a typically developing 11 year old) (Bynner & Parsons, 1997).

In England a Public Service Agreement (PSA) was issued in direct response to the Moser report with the objective of improving the basic literacy and numeracy skills of over 2 million adults. The strategy involved the launch of free numeracy and literacy training for adults who had not already achieved at least Entry Level 2 qualifications co-ordinated and delivered by the Learning and Skills Council (LSC) (2001). In Wales, strategies included the launch of a road-show campaign that promoted basic skills within Welsh schools, libraries, and shopping centres. Grants were made available to post-16 educational providers to help the recruitment, and improve referral and attrition rates of potential learners (The National Basic Skills Strategy for Wales 2001-2004). However, despite the spending of approximately £5 billion over the course of 8 years by the Department for Innovation, Universities and Skills, and its predecessor, the Department for Education and Skills, recent statistics indicate that the investment had a minimal impact, and that more could be done to improve adult basic skill levels thus reducing the associated costs (Skills for Life: Progress in Improving Adult Literacy and Numeracy, 2009).

Monitoring of adult basic skills at the societal level is an important means of measuring the abilities of adults within a given population and establishing whether incentives such as “*The Right to Read*” actually work in terms of improving skills.

Countries that are member states of The Organisation for Economic Co-operation and Development (OECD) are able to gain perspective on the condition of adult basic skills in comparison with other countries. According to results published in October 2013 by the OECD the UK<sup>2</sup> adult literacy levels were found to be 22<sup>nd</sup> in the international league tables against 24 countries that were included in the survey (OECD, 2013). This is disappointing evidence for a country that prides itself on being a modern advanced society that was trying to secure future in an advancing knowledge-based economy.

### **The negative effects of having low basic skills**

Basic reading and writing skills explicitly taught during the early years of formal education and enable the learner to access information across the school curriculum (Perfetti & Marron, 1998). Children who do not achieve these skills by the age of 11 are likely to struggle throughout their remaining academic years (Francis, Shaywitz, Stuebing, Shaywitz, & Fletcher, 1996; Torgesen & Burgess, 1998) and have a greater likelihood of being classified as an ‘adult with low basic skills’ (DfEE, 1999). A large amount of research demonstrates a link between low basic skills in adulthood and a number of negative associated life outcomes. For instance, research by Bynner and Parsons (2001) indicates that unemployment rates are inversely correlated to a person’s level of basic skills; the authors found that future career prospects were severely compromised for those who had low basic skills.

Mental health and wellbeing are also thought to be impacted negatively. Bynner, McIntosh, Vignoles, Dearden, Reed, & Van Reenen (2001) for example, demonstrated that adults who had low basic skills were more likely to suffer mental

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<sup>2</sup> The OECD only collected data from England and Northern Ireland – Wales and Scotland

and physical health problems. Previous research has reported that mental disorders such as anxiety, depression, anti-social disorder and attention deficit disorder are inversely correlated with low educational attainment (Miech, Caspi, Moffitt, Wright, & Silva, 1999). Cree, Kay and Steward (2012) suggest that an adult's physical health is affected adversely if they struggle to read and understand health and nutritional related information will be less likely to adopt good hygiene practices and have a healthy diet.

The incidence of crime is also evidenced to be higher among populations where basic skills are low (Clark & Dugdale, 2008). Research suggests that adults who are functioning below their appropriate reading age have a disproportionately higher risk of engaging in offending behaviour (O'Keeffe, Otter, Roberts, & Wicks 2003; HM Government 2004). A report by the Home office (HM Government, 2005) found 52% and 71% of male and female offenders (respectively) had no qualifications whatsoever. According to the Social Exclusion Unit (2002) 50% of offenders under care orders have poor reading skills and a greater 80% have poor writing skills. The British Educational Research Association (2010) reports that teenagers who have disengaged with the education system become more likely to experiment with drugs and alcohol and are more susceptible to committing a first time offence. The report also indicates that the onset of this relationship can occur as early as 16 years of age.

In political terms populations who are socially and economically disadvantaged are regarded as being "socially excluded"—a term used to describe the process of individuals and entire communities of people becoming excluded from opportunities such as education, health, social and political resources which are usually available to the wider society (Social Exclusion Unit, 2002). Socially excluded populations are more likely to be under-skilled unemployed and experience

higher incidence of crime (Social Exclusion Unit, 2002). Such populations are more likely to be marginalised and disengaged from conventional society (Chiu & Madden, 1998).

### **The Relationship Between Low Basic Skills and offending behaviour**

It is difficult to explore and disentangle the whole spectrum of interrelated factors associated with social exclusion and the relationship between low basic skills with each factor. Therefore, the remainder of this introduction will examine the effects of low basic skills on offending and the likelihood of engaging in offending behaviour.

A number of psychological theories of crime and deviance have formed primarily from the schools of sociology, biology and criminology, with the latter field having had the largest effects on the development of behavioural theories of crime (Bartol, 1980; Hollin, 1989). The social learning theory first proposed by Burgess and Akers (1966) (see also Cloward & Ohlin, 1961; Sutherland, 1937, 1947) has been commonly applied to explain social deviance and crime. The theory is a social behavioural approach that is based on principles of behaviourism (e.g., Skinner, 1974) and broadens on Sutherland's differential association theory (Sutherland, 1947). This school of thought proposes that offending is a learned behaviour and focuses on the interaction between the environment and the individual. According to Sutherland's differential association theory, a person is more or less likely to engage in offending behaviour according to whether they had learned favourable or unfavourable definitions towards violation of the law from those around them. For example, a person is more likely to commit an offence if they have been exposed to pro-criminal definitions that encourage such behaviour. Expanding on Sutherland's differential association theory, Akers (1973, 1977, 1985, & 1994) incorporates the mechanisms

involved in classical and operant conditioning and differential reinforcement. The social learning theory has been used to explain the reasons why individuals first begin to offend, why the behaviour is maintained over time and the reasons why individuals choose to desist from offending behaviours. There are four central concepts that comprise the social learning theory: differential association, definitions, differential reinforcement, and imitation (Akers, 1985, 1994; Akers, Krohn, Lanza-Kaduce, & Radosevich, 1979).

Differential Association explains the effects of other people's behaviours have on a person's behaviour. Direct interaction with other people exposes an individual to their norms, values and attitudes, whether they are pro-social (conforming to the norms of society) or anti-social (non-conformance and deviation from social norms). The theory suggests that individuals are more likely to form stronger differential associations during early childhood, and that learning is more highly influenced by those in their immediate (primary group) contact groups (i.e., close family members or friends). However, as a person ages they begin to expand on the number of people and the type of groups they socialise with. Work colleagues, friends of significant partners, online communities, otherwise known as 'virtual groups' become secondary groups (Warr, 2002). Akers, asserts that the likelihood that an individual will engage in pro-criminal or pro-social behaviour is most greatly affected by early (priority), longer duration (duration), and higher frequency (intensity) of the interactions with the relative differential associations.

The second of Akers terms, definitions, is described as an individual's own values and beliefs surrounding crime and deviance. Akers proposes that these definitions can be separated between 'general' definitions that are based on wider social, moral and religious values and 'specific' definitions, *which* are based on



individuals' personal definitions of what is right and wrong. Akers suggests that general and specific beliefs can either be pro-social and unfavourable towards offending behaviour, naming these as 'conventional beliefs'. Alternatively he describes beliefs that are pro-criminal as 'positive' and 'neutralizing'. Therefore, Akers suggests that an individual will engage in criminal behaviour if they have weak conventional beliefs and or strong positive and or neutralizing beliefs. Those who refrain from crime and deviance are likely to have strong conventional beliefs. Of course within a behavioural model, such 'beliefs' would be described as verbal behaviour (Skinner, 1957, 1974).

The third term, differential consequences, refers to reinforcers and punishers that make the probability of behaviour more or less likely to occur (respectively). Reinforcement is a consequence of behaviour that makes a given behaviour more likely to happen again; positive reinforcement occurs when a consequence is presented, for example, gaining monetary rewards when selling stolen goods. Negative reinforcement occurs when a stimulus is removed or avoided following a particular behaviour; for example, a gangster retracts a threat of harm towards a member of his gang when that member accomplishes a 'drugs run' for him. In contrast to positive and negative reinforcement, there are positive and negative punishments. With the last two examples explaining pro-criminal behaviour, we will now explain pro-social behaviour through positive and negative punishment. An example of positive punishment is when an individual is given a prison sentence following their arrest and conviction of a criminal behaviour. An example of negative punishment is when the incarcerated individuals privileges (i.e., time spent outside of their prison cell) are removed following a deviant behaviour during their time spent in prison (i.e., fighting with other prisoners). Similar to differential association,

differential reinforcement operates in accordance with this ‘quantitative law of effect’. That is, the probability of a behaviour increasing or decreasing is influenced by the value, duration, intensity and frequency of the differential reinforcement.

Akers’ final term, imitation, refers to the observation and replication of another person’s behaviour, whether is observed directly or indirectly (i.e., observing characters on the television). Research attests that human beings have a tendency to imitate the aggressive behaviour of others (Bandura, 1977; Bandura, Ross & Ross 1961) that witnessing aggressive behaviour increases the likelihood that similar behaviours will be replicated by exposure to violent television programmes, movies and video games affect significantly increases aggressive and violent behaviour of those witnessing them (see Anderson & Bushman, 2001; Anderson & Dill, 2000; Bushman & Huesmann, 2001; Huesmann et al., 2001).

A model proposed by Bonta in 1996 outlined risk factors that increase the likelihood a person will engage in criminal behavior; Bonta describes the risk factors as either ‘static’ or ‘dynamic’. Static risk factors include factors that cannot be changed such as criminal history, age and sex of the individual. Dynamic risk factors are transient such as education, moral reasoning, work experience and substance misuse. Using this model we might assume that it may be possible to reduce the likelihood of individual’s engaging in offending behaviour by focussing on education as a dynamic risk factor.

### **Basic Education for Adults**

Adult education has been described as “any form of education that takes place after an adult has completed his or her uninterrupted full time education” (Lynch and Drudy 1993, p.264). Knowles (1970) made a distinction between the teaching of

children and adults naming the models ‘pedagogy’ and ‘andragogy’ respectively. Pedagogy (derived from two Greek words) is the teaching of children ‘*paid*’ meaning ‘child’ and ‘*agogus*’ which means ‘to lead’. Alternatively, andragogy is the teaching of adults, ‘*andr*’ meaning ‘man, not boy’, Knowles (1970) describes andragogy as “the art and science of helping adults learn” (p. 43) and assumes that a child learner is a dependent role whereas an adult learner has a greater responsibility for self-directed learning. This concept highlights the fact that teaching adults may require additional techniques that promote engagement and the desire to learn. Often, illiterate adults have become de-motivated and disengaged from reading because of their previous negative experience with reading and learning in general (Ackerman & Dyckman, 1996; Cunningham & Stanovich, 1997).

Despite the differences associated with levels of motivation between teaching adults and younger children to read Stanovich and Siegel (1994) assert that a person of any age, who has difficulties reading, will share the same deficits in the same fundamental reading skills. Research conducted by the National Reading Panel (NRP, 2000) identified there to be five foundation components that were considered to be essential pre-requisite skills needed to read successfully. They are: phonics (relating sounds to letter symbols); phonemic awareness (the understanding that words are built from sounds (phonemes)); fluency (the ability to read accurately with speed and expression); vocabulary (developing a repertoire of words to which meaning is attributed); and comprehension (the understanding of text as a whole) (NRP, 2000).

The procedure of teaching an illiterate adult to read is the same as teaching young beginning readers, the same essential components of reading are explicitly taught in both cases (Curtis & Kruidenier, 2005). Chapter 2 of this thesis reports a pilot study with three typically developed adult struggling readers.

Targeting adults who failed to achieve a basic qualification and encouraging them to return to education can be difficult (Munn & McDonald 1988; McGivney, 1990; Sargant, 1991). Participation rates for adult education within the UK and other European countries are low UNECSO (2009) and have been in a trending decline since the early 2000s (Aldridge, Tuckett, & Fullick, 2008, 2009; Mason & Bishop, 2010). A report by Mason (2010) revealed that participation rates reduced from 33% in 2002 to 31% in 2009 for adults between the ages of 25-59 years; with the greatest decline in adults between the ages of 30-49 years who were regarded as economically inactive. As a means to maximise participation in adult education, some higher education organisations offer financial incentives, learner-centred programmes, and flexible course schedules (MacLeod, Taylor, Zwart, & Sachdev, 2005). (Chapter 3 of this thesis reports on a study to attempt to determining the nature of these barriers).

The types of adult educational courses available in the UK vary between formal, non-formal and informal adult education. Formal adult education is based on a developed curriculum that, upon completion, leads to a formal government-recognised credential. Education and training institutions such as colleges and universities usually provide this type of education. Non-formal education is a type of education delivered in a formal capacity (i.e., community courses and workshops), but may not follow a formal curriculum, and its completion does not result in an accreditation recognised by government. Finally, informal education does not follow a formal curriculum or offer any sort of accreditation. It can occur anywhere where there is an opportunity to learn in its most broad sense, for example, in the home, workplace or through normal daily activities (OECD, 2000).

Unfortunately, because there is a distinct lack of a evidence-base within the adult education system (Comings, Beder, Reder, Bingman & Smith, 2003) no

politically mandated standardized criteria for the methods of teaching adult education programmes exist. Therefore, different programmes and courses will have different methods of teaching and measuring participant progress and consequently, it is difficult to gain a true reflection of effective and ineffective programmes. Such a lack of scientific framework would be unheard of in a field such as medicine (Shavelson & Towne, 2002).

### **Educating Offenders and those at risk of offending**

It seems that for the majority adults who are already engaged in offending behaviour prison alone does not serve as a deterrent those who continually re-offend. Cunliffe and Shepherd (2007) report that 65 percent of prisoners are reconvicted within the first two years of release. The importance of reducing re-offending (also known as recidivism) is highlighted by the subsequent costs to society that ranges between, £9.5 and £13 billion per year (National Audit Office, 2010). Government and policy makers therefore have a vested interest in understanding the research and subsequent theories of crime so that they are ultimately in a better position to develop and implement crime-reducing strategies (Home Office, 2011). Researchers such as Gottfredson, () have urged Governments and policy makers to equal their attention between the punitive law enforcing outcomes and rehabilitative measures that focus on reducing the risk factors associated with committing and recommitting criminal offenses.

The criminal justice system in the UK adopts a framework that aims to rehabilitate the offender and therefore, reduce the likelihood of their re-offending. Rehabilitation interventions generally focus on dynamic risk factors (outlined by Bonta, 1996) that can be altered. The rehabilitation programmes and courses available

to offenders whilst incarcerated vary from cognitive-behavioural programmes such as; Enhanced Thinking Skills (ETS), Controlling Anger and Learning to Manage It (CALM), to drug and alcohol programmes (Ministry of Justice, 2012). According to Caddick and Webster (1998) such intervention programmes place a greater emphasis on changing offender attitudes and values and thereby attempting to improve their chances of gaining employment upon release. The authors however suggest improving poor literacy skills of offenders should be of higher priority, and that by targeting the basic skill deficits by providing educational training courses in prison is an integral component to the successful rehabilitation of the individual. Improving basic literacy skills will have subsequent positive effects on other criminogenic factors, such as, increasing the likelihood of employment, increasing self-esteem and broadening social networks (Gunther et al, 2004). The most recent Ministry of Justice Analytical Series report which documents a summary of evidence on reducing reoffending (MOJ, 2013) focuses attention toward education as a dynamic risk factor and its critical role in reoffending rates.

In the last few decades there has been a greater focus surrounding literacy problems among juvenile delinquents and incarcerated adults (see outlines by Gellert & Elbro, 1999; Grigorenko, 2006). The UK criminal justice system placed a greater emphasis on improving the literacy levels of those coming into contact with the system (Home Office, 2004). Cumulative data from basic numeracy and literacy skills assessment, which offenders take upon induction into the probation service, generally indicated that the majority of individuals who are assessed at intake have low levels of literacy and numeracy skills (McMahon, Hall, Hayward, Hudson, Roberts, Fernández & Burnett, 2004).

Research into the effects of educating offenders whilst under care orders suggests that a public net benefit of between £10,500 and £97,000 can be made by reducing reoffending rates (NIACE, 2009). Although the precise mechanisms of how improving levels of education work in reduce offending are unknown, some speculate any reduction in reoffending following a prison education course is due the increased likelihood of post release employment (Gould Weinberg & Mustard, 2002; Piehl, 1995; Raphael & Winter-Ebmer, 2001). Farrall (2002) suggests that employment provides structure and routine to an otherwise unstructured lifestyle. The newly reformed individual is able to establish a legitimate identity and thus reduce the probability that they will reoffend by up to 50% (Rhodes 2008). Encouragingly, the benefits of correctional education are not limited to post release behaviour; Gonzalez, Romero, & Cerbana, (2007) found that there were fewer reports made by prison staff about unruly prisoner behaviour were for those who were participating in educational programmes.

Current educative programs include, OLASS (the Offenders' Learning and Skills Service) was employed in prisons across England in 2006. The objective of OLASS is to provide prisoners with basic literacy skills in order to make them more employable upon release. Used in many HMS prisons, the programs are strongly based on enhancing vocational skills and prisoners are given the chance to achieve nationally recognized awards (i.e., National Vocational Qualifications (NVQ) and Business and Technology Education Council (BTEC) awards).

Despite the UK criminal justice system placing educational attainment as a primary rehabilitative approach within the prison and probation system (Gerber &

Fritsch, 1995) there is a distinct lack of scientific research being conducted that investigates the effects of literacy improvements on post-release re-offending rates. Therefore, there exists no standardized model for the provision and delivery of education and recording of offenders' progress within the criminal justice system. The absence of a single national system causes variation of programs between institutions, which consequently reduce the continuity of learning when an offender moves institution or is released.

There is a desperate need for educational programmes to be investigated in a scientific manner (e.g., using randomised controlled trials, Kazdin, 2010) if we are to adequately evaluate the effectiveness of the educational programmes currently in use. Unfortunately to the best of the author's knowledge there exist no published research in the UK to date that incorporates a true experimental design. The majority of literature examining the effects of corrective educational programmes offered to offenders are quasi-experimental designs that primarily focus on comparisons between rehabilitative programmes and the research base derives primarily from the United States and Canada. Prison education programmes in the USA include vocational courses, general equivalency diploma (GED), post-secondary education (PSE), Adult Basic Education (ABE) (programs that are equivalent to British GCSE level (Batiuk, Lahm, McKeever, Wilcox & Wilcox (2005)) state such programs gain the student pre-college qualifications and are therefore qualifications gained at the end of secondary school.

A number of studies conducted in the USA and Canada found that that re-offending rates were consistently lower for the prisoners that took part in the prison educational programs while incarcerated when compared to those who did not participate.



Studies by Linden Perry, Ayers and Parlett (1984) and Walsh (1985) investigated the effects of prison education programmes on post-release re-offending rates. Both studies attempted to match participating and non-participating prisoner groups based on demographic information such as, the length of their criminal history, living arrangements (or lack thereof), the severity of crime that they were convicted for and whether the offender has difficulty or not with substance abuse, such characteristics affects the probability of offending. Both studies found that prisoners who took part in the prison educational programs had a lower re-offending rate than those who did not participate. Walsh (1985) reported this to be true at a statistically significant level.

Gaes (2008) also outlines the difficulty in deriving a true approximation of the effects of correctional education on post-release outcomes. Gaes conducted a review and reported on four meta-analyses and several “vote-counting” reviews that had been conducted up to 2008 on the effects of correctional education programmes on recidivism and employment rates. From his research Gaes concluded that overall correctional education had positive effects on post-release outcomes (i.e., lower recidivism, and higher employments rates post-release). However, Gaes also found that there were many variations between studies that made the meta-analytic process difficult and therefore outcome questionable. For example, many studies did not implement true scientific methodologies such as conducting randomised control trials (RCT’s), some studies failed to report on the type of correctional programmes prisoners’ received, or the amount of time prisoners engaged in the programme or whether they completed them before release. Furthermore, that the manner in which recidivism was measured varied between studies. Gaes (2008) argued that the way in which recidivism was is measured is important because some methods might inflate

recidivism rates, for example, recidivism measured as ‘re-arrest’ rates as opposed to ‘re-commitment’ rates (individual is arrested, trailed, found guilty and re-committed to prison) will reflect a higher over all recidivism rate if many of the re-arrests are later proven to be innocent.

The largest longitudinal study - referred to as the ‘Three state recidivism study’ – collected data collected on 3,200 prisoners released from prisons across the states of Maryland, Minnesota and Ohio between 1997 and 1998 (Steurer & Smith, 2003). The study aggregated data including prisoners demographic data, criminal history, reasons for conviction, and whether they participated in prison education. Post-release data included employment rates and re-offending rates (measured as re-arrest, re-conviction and re-incarceration rates). Results showed that prisoners who participated in educational programs during incarceration had significantly lower rates of re-offending than those who did not participate. Furthermore, those who took part in prison education were more likely to be employed and for every year following release (across three years) the amount of wages increased.

### **Early intervention**

Early intervention is regarded to be the most effective form of intervention whether it is within the realm of health and social care, education, or crime and is preferred over later treatment interventions which work out to be more costly (Department of Children and Youth Affairs, 2013). A government report written by Allen (2011) outlined the importance of early intervention in improving the life chances of children. Allen (2011) highlights the need to redress the imbalance between spending on later interventions and early intervention that serve to address problems such as mental and physical ill-health, drug and alcohol misuse, domestic

violence, crime and unemployment (to name but a few key societal problems). The report reassuringly demonstrates that the government and policy makers are acknowledging the need for early intervention and the importance of incorporating evidence-based knowledge into policy and practice. Much of the report focuses on the need to improve the social and emotional development and capabilities of children, within the first three years of life. Allen proposed that by promoting and improving parenting skills we are able to influence the development of early social and emotional foundations for children who are at a disproportionately higher risk of experiencing later life difficulties due to the low socio-economic status of their parents (Allen, 2011). The report placed emphasis on the promotion of early years learning and “school readiness” through improved parenting strategies, and pre-school education for two- three- and four-year-old children as part of the Foundation Years programme (0-5 year-olds). Despite there being a distinct lack of research on remedial reading interventions for older children (i.e., those over five years of age), Allen produces a list of programmes, policies and practices deemed effective using a rated standard of evidence (See Annex C of the report). A total of 72 evidence-based programmes were catalogued, 21 of which were based on improving academic progress (see Allen, p. 120 for a detailed explanation of the selection process).

It is of course inevitable that a minority of children will enter secondary education without having gained the foundation literacy and numeracy skills. According to a 2012 Estyn report forty percent of secondary school children in Wales are reading six months below their chronological reading age. However, interventions should already be in place within the education system to ensure that such groups are identified as early as possible and provided with remedial intervention. Biancorosa and Snow (2004) assert that immediate intervention to remediate reading deficits for

those struggling will increase their chances of becoming competent readers and improve their understanding and engagement of the curriculum material. According to the National Reading Panel (NRP; 2000) children who do not gain essential reading skills before the age of seven will have a 90% probability of remaining a poor reader throughout the rest of their school career and into adulthood. Research by Williams and McGee (1994) suggests that these children become disengaged with the school system, often their behaviour becomes disruptive and rebellious and they are more likely than their academically successful counterparts to drop out of or become excluded from compulsory education. It is thought that deviant, antisocial behaviours are established early on in childhood and are learned from close family members or caregivers who promote pro-criminal behaviours and or who do not adequately promote pro-social values (Farrington, Ohlin, & Wilson, 1986; Forehand, King, Peed, & Yoder, 1975; Collins, Maccoby, Steinberg, Hetherington, & Bornstein, 2000). Therefore, the implementation of interventions with groups vulnerable to engaging with offending as early as possible will help to offset such outcomes.

Chapters 4 and 5 of this Thesis describe two studies evaluating the use of an internet-based reading programme called MimioSprout® with a group of 11 to 14 year old children. Relative to interventions aimed at improving adult reading abilities the aforementioned interventions could be regarded as an early intervention.

Those interested in determining best practice for teaching reading skills to adults and older children such as those included in the studies described in chapters 4 and 5 need to look at the research based on child populations. This is because there is a distinct lack of research evaluating effective instructional methods designed to increase the reading abilities for teaching the older children and adults (Brooks, Miles, Torgerson, & Torgeson, 2006). Although, Lindsley (1992) argues that there are

numerous effective teaching methods available that remediate reading deficiencies that are largely ignored and fail to be implemented.

A number of reviews and meta-analyses have recently been conducted on teaching literacy methods (e.g. Vaughan, Gersten & Chard, 2000; National Reading Panel, 2000; Scammacca, Vaughn, Roberts, Wanzek, Torgesen, 2007; Roberts, Torgesen, Boardman and Scammacca, 2008; Faggella-Luby and Deshler, 2008). These reviews have concluded that the most effective teaching practices combine explicit instruction of phonological awareness, decoding and word study that are delivered in a systematic manner. In addition frequent short instruction and practice sessions are more effective than longer ones that occur at a lower frequency.

Direct Instruction (DI: Adams & Carnine, 2003; Bereiter & Englemann, 1966; Carnine, Stein, & Silbert, 1997) is a method of teaching instruction delivered explicitly and in a systematic manner. The skills being taught through this method are broken down into their composite parts and taught until mastered, learners' responses are continuously monitored and immediate feedback is delivered from the instructor. A number of research studies over the past 40 years have supported the effectiveness of DI, and these have been summarised in a number of reviews and meta-analysis (see Adams, & Englemann, 1996; Hattie, 2009, Przychodzin-Havis et al., 2005). DI was also one of the programmes included in the Government report conducted by Allen (2011) mentioned above as an effective evidence-based strategy for improving academic outcomes. In the largest educational experiment conducted, 'Project Follow Through', made comparative evaluations between teaching models that were in use across 51 school districts over a ten-year time period (Stebbins, St. Pierre, Proper, Anderson, & Cerva, 1977). Findings revealed that DI was by far the most effective instructional teaching method for children at risk of reading failure. Unfortunately

however, for reasons involved with educational politics and clashes of educational ideologies and philosophical approaches these important findings were not adequately communicated to the field of education. More than that, certain bodies actively discredited the results by criticising the evaluation process undertaken by Project Follow Through, arguing that the teaching models should have been evaluated independently as opposed to comparatively (See Carnine, 1983 & Grossen, 1996 for a more in depth review for the lack of dissemination).

DI is still implemented into teaching practices today and continues to produce successful outcomes, enabling those who have fallen behind academically to be taught more in less time and therefore catch up to their peers (Binder & Watkins, 2013). DI has also been combined with an effective measurement of learning known as Precision Teaching (PT). PT is a technology that is based on the collection of data (i.e., specific learning outcomes such as the number of words read per minute) thus allowing instructors to measure learner progress and therefore be able to predict learner progress and adapt instruction accordingly (Hughes, Beverley, & Whitehead, 2007). For a detailed description of PT see the Special Education of EJOBA published in 2003. DI and PT have also been integrated to form effective teaching reading programmes for children and those who are older but still have significant reading issues. One such programme includes the *Toolbox Series for Literacy* (Maloney, Brearley, & Preece, 2002). The programme offers an explicit and structured method of instruction for teaching of phonological awareness to older children and adults. Chapter two of this thesis documents a pilot study that examined the feasibility of using the reading programme to teach three typically developed adult struggling readers who were at a disproportionately higher risk of engaging in offending behaviour (i.e., they were receiving support from agencies who aim to

support offenders or those at risk of offending). Both DI and PT are also approaches that have heavily influenced the development and teaching procedure used within MimioSprout internet-based reading programmes. These programmes are described in more detail and form the focus of the two evaluations in Chapters 4 and 5 of this Thesis.

## **Methods and Research**

Quantitative and qualitative methodologies were utilised during the course of this research, and we used a mixture of group and single-case designs. Data analysis across the quantitative designs also varied between single subject and group level analysis. Bloom, Fischer and Orme (1982) outline the benefits of using a combination of methodological approaches when investigating a particular research question, suggesting that the researcher is able to draw upon the different opportunities and strengths offered by each method.

Single-subject experimental designs have been argued to demonstrate a better functional relation between the intervention and the change in the behaviour being measured (i.e., reading skills) (Johnston, 1988; Johnston & Pennypacker, 1993). Study 1, Chapter 2 analysed data for the three adult participants' who took part in the single-case design. Continuous measures of reading skills throughout intervention time in addition to pre- and post-intervention using a standardised reading assessment. Reading skills were continuously measured as the number of correct and incorrect words read per minute. Therefore, participants reading abilities were measured using frequency as a measure of performance as opposed to percentage correct. Although the percentage correct technique is more widely used within education as a performance measure, the decision to use frequency as a measure within this study

was chosen for three main reasons. Firstly, it offered a means to measure the number of correct and incorrect words with more sensitivity and within a given time frame. Secondly, this short time frame (one-minute timing) served to motivate participants who expressed enthusiasm towards the one-minute assessment. Thirdly, the participants monitored themselves on a chart, which provided a ‘picture’ of their performance over time. This again was both rewarding for participants who were able to witness their performance improve and also allowed the researchers to monitor and adapt instruction according to participant’s performance.

A qualitative approach was adopted to investigate the perceptions of educators and adult learners and potential learners (*Study 2, Chapter 3*). Data were yielded through semi-structured interviews and Thematic Content Analysis (TCA: Braun & Clarke, 2006) was used to analyse the data. The TCA is a common method of analysis in qualitative research and provides a thorough exploration of novel research such as the area investigated during this study (Guest, 2012). The ‘bottom up’ approach of TCA ensures that the data are analysed without reference to previous research and so themes emerge independent to previous findings, which may otherwise influence interpretation.

*Study 3 (Chapter 4)* was an educational case series design that compared individual data at pre- and post-intervention using statistical analysis. *Study 4 (Chapter 5)* utilized group data analysis between an experimental and waiting-list control group at pre- and post-intervention. In addition to analysing the groups’ mean scores a method was also used which measures the effectiveness of an intervention at the individual level. The method known as the Reliable Change Index (RCI) was first used by the medical profession to determine clinical significance (Jacobson & Traux,



1991). However, the RCI has since been used to evaluate educational interventions with children with autism (Eldervick, et al., 2010; Eldervik, Hastings, Jahr, Hughes, 2012; Remington et al., 2007). The RCI identifies whether an individual score has 'significantly improved' (at the .05 level) between pre- and post-intervention. When generating an index that can be regarded as a level that is significantly different, the RCI takes into account the group variation of scores and the stability of the measure over time.

### **Overview the Thesis**

This PhD was partially funded by Bangor University, the Knowledge of Economy Skills Scholarship (KESS) and the crime reduction organisation Nacro. The primary focus of this research was concerned with improving the ways in which basic reading skills of those who did not achieve them during the early years of formal education. The theme of this research focuses on evaluating effective teaching methodologies and understanding the motivations and barriers that existed to adult education. All of the research was conducted within an applied setting, however there was a shift in focus mid-way through the PhD when I had the opportunity to work with older children who had poor foundation reading skills in a large secondary school.

During the early part of the PhD I worked closely with the organisation Nacro, and was fortunate to receive training through the organisation and to gain experience shadowing the staff that delivered the basic skills courses to the service users. The first two research studies that were conducted mainly sourced participants either directly through Nacro or other associated organisations that were working alongside Nacro.

Chapter 2 evaluates the use of a reading programme with three adult struggling readers, two of the three participants were recruited through Nacro and had a history of offending. The reading programme - the *Toolbox Series for Literacy* – combines two evidenced-based instructional methods of teaching, Direct Instruction (DI) and Precision Teaching (PT) (these are described in more detail below). This particular investigation demonstrated that the three adults who participated successfully engaged with the programme and subsequently improved reading performance as measured by continuous progress assessments.

Chapter 3 examines the barriers to participation in adult education. The study presented here is of a qualitative study that explores the perceptions of educators and adult learners and potential learners surrounding barriers to adult education. Many of the participants that took part in the interviews were recruited from Nacro and other similar organisations. All of the participants that took part had either a history of offending or were at a disproportionately higher risk of engaging in criminal behaviour (e.g., those who were not in employment, education or training (NEET), had low socio-economic status (SES) and who could be classed as being socially excluded).

As time progressed over the course of the PhD a number of key members of staff with whom I had worked closely with left the organisation, this included two different company supervisors. During this time I was beginning to explore further avenues of research and the possibility of working with a younger population who were experience academic failure and were statistically at greater risk of poor educational outcomes in a mainstream – secondary school setting arose. The final two studies, (comprising Chapters 4 and 5) evaluated an online reading suite known as MimioSprout® that was used on an adolescent cohort. The participating children had

behavioural difficulties within the school system and were at risk of academic failure. MimioSprout<sup>®</sup> combines the methods of DI and PT and had a growing literature of literature evidencing its effectiveness in improving the reading abilities of typically developing and children with learning disabilities who are struggling academically. Chapter 4 reports a pilot study, which evaluates and assesses the feasibility of using MimioSprout<sup>®</sup> *Early Reading* and MimioReading<sup>®</sup> *Comprehension* with a group of eight 12 to 13 year old mainstream children. Following the successful implementation of the programme and the improved reading results a second study was conducted with a larger group of students (n=33). Reading outcomes and student self-perceptions were compared with a waiting list control group who received treatment as usual pre- and post-intervention.

The final chapter (Chapter 5) provides a general discussion for this thesis, summarizing the research findings and implications of each of the four studies and offers recommendations for directions for future research.

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## **CHAPTER 2: Using the Toolbox Series for Literacy with Adult Struggling**

**Readers: A pilot case study**

## Abstract

The aim of the present study was to improve basic literacy skills for three underperforming adults using the *Toolbox Series for Literacy* (Maloney, Brearley, & Preece, 2002) programme that combines Direct Instruction (DI), Precision Teaching (PT) and behaviour management techniques. Both DI and PT methods have been used to remediate reading difficulties with children, but rarely with adult struggling readers. Intervention consisted of 36 hours of one-to-one tuition for three adults with deficit literacy skills using a pre-post measures single case design. Results yielded increases in reading performance measured using continuous progress assessments in each participant. Two of the three participants made at least one level gain between pre- and post-test on the norm referenced reading assessment. The results are discussed with consideration to the feasibility of improving the reading ability of adult struggling readers using the *Toolbox Series for Literacy*.

Reducing adult illiteracy as a global agenda still occupies a strong position along with many other political priorities, including environmental sustainability, the eradication of poverty, and reduction in child mortality rates (UNESCO, 2010). A growing body of research indicates that low-levels of education are associated with lower income rates, higher rates of unemployment (Bynner et al., 2001), mental health problems (Schuller, Preston, Hammond, Brassett-Grundy, & Bynner, 2004), and criminal behaviour (Lochner & Moretti, 2004). Thus many governments and policy makers attempt to increase and improve the provision of adult education as one way to strengthen long-term economic growth (OECD, 1996; Rubenson & Schuetze, 2000).

European initiatives to increase participation in adult education include literacy campaigns (promoted on television and radio by famous advocates), learning festivals, learning workshops and the Education Maintenance Allowance that offers financial support to learners (European Union, 2012). Despite efforts such as these, in Europe alone there are an estimated 73 million adults who are deemed 'functionally illiterate' (Vassiliou, 2012). Functional illiteracy is a term that describes a person that is performing below Level 1<sup>3</sup> in literacy. At this level they would be expected to lack the necessary skills to function effectively within modern society (DfEE, 2001). There does not appear to be a consistent approach or clear guidelines on the teaching methodology for delivering adult literacy programmes; as a result there exists a wide variation in the teaching practices adopted by educational providers, and often with little reference to an evidence base. For example, Brooks (2007) explored the strategies used within 59 adult educational providers across England, UK. The findings revealed that the most common strategy to teach a group of adults

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<sup>3</sup> In the UK system, Entry Level 1 is equivalent to attainment at age 5-7; Entry Level 2 equivalent to attainment at age 7-9; Entry Level 3 equivalent to attainment at age 9-11; and Level 1 equivalent to GCSE grades D-G.

was to open the teaching session with whole group instruction followed by independent work that mostly consisted of silent reading. This study concluded that the teaching strategies observed did not incorporate or comply with the literature that outline effective evidence based practices, such as the use of phonics based reading strategies, fluent oral reading, reciprocal teaching, and explicit comprehension strategies (Brooks, 2007). Similarly, Besser et al. (2004) concluded that there exists a clear gap between teaching practice and what is deemed effective in the evidence-based pedagogical literature.

The objective of this study was to examine the feasibility of using the reading programme the *Toolbox Series for Literacy* (known as the *Toolbox Series* from hereon in) (Maloney, Brearley, & Preece, 2002) to teach typically developed adult struggling readers who are at a disproportionately higher risk of engaging in offending behaviour. The feasibility of implementing this reading programme on a larger scale with this type of population is considered across three areas; acceptability, practicality, and adaptation (Bowen et al., 2009). This reading programme was chosen because it offers an explicit structured instruction for teaching of phonological awareness using a combination of behaviour management techniques and the teaching technologies Direct Instruction (DI) and Precision Teaching (PT). Originating from the work of Bereiter and Englemann (1966) DI provides a teacher directed method of instruction that is systematic and unambiguous. Student progress is continuously reviewed and performance feedback is provided. DI has been described in detail in a number of previous publications (see, Becker, 1992; Marrchand-Martella, Slocum, & Martella, 2004; Slocum, 2004). PT is a system of measuring learning outcomes on specified targets (e.g., word reading, basic numeracy skills) and is a technique that allows a teacher to measure and adapt instruction according to the level of progress the student makes

(Hughes, Beverley, & Whitehead, 2007). PT has been described in detail in a number of previous articles and in detail in the Special Education of EJOBA (2003).

Although there exists little published evidence specifically evaluating the *Toolbox Series* when used with adults, there is a growing and consistent literature validating and endorsing DI and PT as effective teaching reading techniques when used both on a one-to-one basis or as part of group or class-wide interventions (see, for example, Adams & Engelmann, 1996; Carnine, Silbert, Kame'enui, & Tarver, 2009; Kubina, Common & Heckard, 2009; National Reading Panel, 2000). The *Toolbox Series* is designed for older learners who continue to experience reading problems and therefore offers an alternative to other beginning reading programmes that might be more orientated towards a younger audience.

This article presents a series of three single case studies that attempt to add to the small evidence base for the use of these approaches with adults and specifically to evaluate the feasibility of using the *Toolbox Series* (Maloney, Brearley, & Preece, 2002) with this population. The three participants that took part in this study were either classed as NEET<sup>4</sup>, long-term unemployed (LTU)<sup>5</sup>; and or had a history of offending but were no longer serving their probationary service. According to the literature individuals who are NEET, LTU and have a criminal history are more likely to engage in offending behaviour (Andrews, Bonta & Wormith, 2006).

Participants were assessed on their reading ability and placed at an appropriate stage of the programme to begin their learning. A combination of continuous measures were taken throughout the intervention period and a normative standardised reading assessment

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<sup>4</sup> NEET – UK government classification acronym for those between the ages of 16-25 who are 'Not in Education, Employment or Training'

<sup>5</sup> In the UK system, anyone unemployed for 6 months or longer is classed as long-term unemployed.

measured reading progress at pre- and post-intervention. In addition to the Toolbox series manual it was necessary to introduce a method of practice and assessment known as SAFMEDS (Say All Fast Minute Every Day Shuffled; Graf & Lindsley, 2002) into the intervention to assist one participant who required further learning support.

## **Method**

### **Participants and settings.**

Following the ethical approval from the School of Psychology at Bangor University participants were recruited via advertisements posted in third sector organisations in the area of North Wales, UK. Participants who were interested in taking part either contacted the instructor directly or asked a member of the organisation staff to make contact on their behalf. Nine adults in total enquired about the study and were keen to find out if they would be paid to participate. Six of those nine that expressed interest in participating withdrew interest upon learning that they would not be paid. Ultimately, three participants agreed to take part in the programme.

One male and two females participated: GD, CK, and KJ. All were of white British origin. Participants were considered for inclusion if they were 18 years and over; had a reading ability at or below the UK National Standards literacy level 2 (i.e., below the UK national standards minimum level deemed appropriate for an adult). Participants were also required to be in contact with a third sector organisation with which they received support (i.e., regarding housing services, finance, employment and/or education); it was at these premises where the intervention took place.

During the time of the study GD was 34 years old and he had been unemployed for the four years since leaving prison. GD wanted to retrain to become a chef. According to the Basic Skills Initial Assessment he was performing at Entry Level 2, the equivalent attainment



of a typical 7-9 year old.

The second participant, CK, was 43 -year-old female. She was classed as long term unemployed, CK stayed at home with 5 children under the age of 14 while her husband worked as a chef. According to the BSIA, CK was also performing at the equivalent attainment of a 7-9 year old (Entry Level 2 - Literacy). CK expressed a desire to improve her reading skills so that she was able to assist her children with their homework.

The third participant, KJ, was a 22-year-old female, unemployed and in receipt of incapacity benefits allowance. According to the Basic Skills Initial Assessment she was performing at Entry Level 1, the equivalent attainment of a typical 5-7 year old . After leaving school without qualifications KJ wanted to improve her reading and writing skills.

## **Measures**

### ***Standardised reading assessment.***

The Basic Skills Initial Assessment (2002) referred to just as the Initial Assessment (IA) from hereon in was taken at pre- and post-intervention. Developed by the Basic Skills Agency, it is a reading assessment aligned with the UK National Standards for Adult Literacy and Numeracy (2000) from Entry Level 1 to Level 1<sup>6</sup>. The IA levels are equivalent to the national school curriculum attainment. The assessment is used within the probation service as a means to identify the level at which an adult is currently performing. This is mapped against the levels within the UK national standards.

### ***Dynamic Indicator of Basic Early Literacy Skills.***

Measures taken from the Dynamic Indicator of Basic Early Literacy Skills (DIBELS®) were used to take continuous performance using the assessments of Oral

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<sup>6</sup> Entry Level 1 is equivalent to attainment at age 5-7; Entry Level 2 equivalent to attainment at age 7-9; Entry Level 3 equivalent to attainment at age 9-11; and Level 1 equivalent to GCSE grades D-G.

Reading Fluency (ORF; Good & Kaminski, 2009) and Nonsense Word Fluency (NWF). The ORF assesses reading accuracy and fluency, using text that is calibrated in accordance with a particular reading equivalent age. Performance is measured by calculating the amount of correct words read per minute. Errors are classed as any words that were omitted, substituted, mispronounced, and hesitations of more than three seconds. Errors are then subtracted from the total amount of words, resulting in the amount of correct words read per minute. The NWF assessments measure the reader's ability to sound phonemes that comprise a nonsense word, thus preventing participants retrieving the word from memory this therefore provides a pure measure of participants decoding ability.

We chose to use DIBELS® because it assesses reading up to 12 years of age; this was appropriate for this study because the three participants involved had a reading age below the level of an average 11 yr old. The assessment provides multiple parallel assessment passages conducive for frequent and repeated usage over time, thus reducing performance effects. An initial DIBELS® benchmark test informed the instructor at which level of DIBELS® Progress-Monitoring to allocate participants.

### ***The Toolbox Series – Reading Programme.***

The *Toolbox Series* (Maloney, Brearley, & Preece, 2002) offers a structured DI reading programme divided into a series of four levels, with each level consisting of 60 lessons. In addition to the DI instructional element, the programme combines fluency building exercises in a student workbook, and motivational systems to help keep learners engaged. The manual suggests that the average time spent on each lesson is around 20-30 minutes. Working on this assumption participants were offered 36 hours of tuition across a 12-week period.

Before beginning the programme, participants were asked to complete a placement

test to determine whether they should begin at series one or two. The placement test is a short story. Following the requirements of the placement test, the instructor asked each participant to read a passage aloud from *Toolbox Series for Literacy 2*. If they made more than four mistakes (i.e., words omitted, added, or mispronounced), they were to begin at level 1. All three of the participants began at level 1.

Participants then followed the same general procedure as prescribed in the *Toolbox Series*; however, an additional teaching technology was employed for GD who required extra support (see Procedural Adaptations). The participant was provided with a ‘Student Reader’ and the instructor followed an Instructors’ manual. Each lesson has a set of objectives and the instructor ensured the learner has mastered these skills before moving onto the next lesson.

### **General Procedure**

The instructor met each participant at the premises of the organisation they attended; in all cases a member of staff from the organization was present during the first two meetings. Each organisation offered a room with a glass-panelled door, at least two chairs and a table. The door was left ajar for health and safety reasons.

The initial meeting involved the instructor explaining the objective of the study and what taking part would entail. Participants were provided with an information sheet that they were able to go through with staff at the organisation. A second meeting time and date was agreed if the participant decided that they wanted to take part in the study. During the second meeting, participants signed a consent form indicating that they understood and were happy to take part in the study. A member of staff from the organisation was present and read the consent form to the participant to ensure they understood the contents. On the third meeting, each participant completed the Initial Assessment that gave their level of reading ability in accordance with the national UK standards.

The first three sessions were utilised to take pre-measures using the Initial Assessment tool, the DIBELS benchmarking measures of Oral Reading Fluency and Nonsense Word Fluency. Once the pre-measures were taken the instructor and participant agreed to a provisional sequence of meetings. Each session involved the instructor sitting adjacent to the participant with the manual placed between them on a desk. The instructor followed the scripted lessons and methods of correction directly from the manual of the *Toolbox Series*. Lessons one to four involve teaching short and continuous sounds, blending and decoding. During lesson four, the student was introduced to reading sentences using the Student Reader. After lesson five and every successive fifth lesson, the student is required to complete a Fluency Check before moving on to the next lessons. The programme describes the Sound and Word Fluency Checks as ‘quality control’, serving to ensure the student is fluent in the skills they had learned before they are able to move on. It was necessary for the participant to sound out 30 words and 25 sounds correctly in one minute with two or fewer errors to successfully complete the task. If the participant was unable to achieve this, the previous four lessons were reviewed until the fluency check was successfully completed.

### **Instructor Training**

Direct Instruction programmes present key concepts in a clear sequenced format. The instructor is expected to be able to deliver the programme fluently, thus maintaining a smooth flow of instruction. The instructor had experience of delivering a Direct Instruction reading programme and also developed the skills required for fluent delivery during training sessions with experienced colleagues before delivering the programme. In addition, the instructor also practiced signaling, praise, pace of delivery and correction procedures. To maintain uninterrupted and consistent instruction, the instructor ensured that she had mastered each lesson before delivering it to the participants.

## **Procedural adaptations**

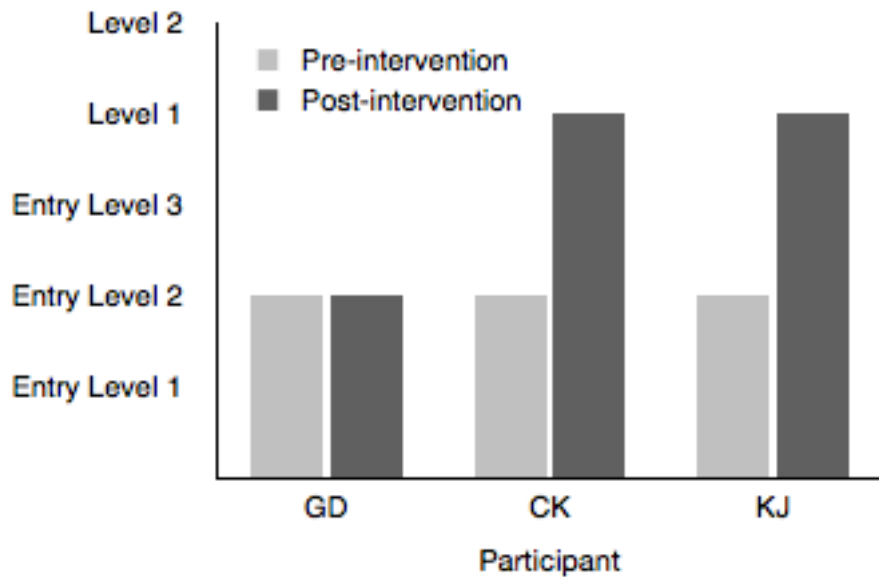
It was necessary to adapt the general procedure for GD because he was unable to successfully complete the Sound and Word Fluency Check 1 presented after lesson 5. To pass the sound Fluency Check successfully the programme stipulates that learners must be able to say aloud at least 25 sounds and 30 words within 30 seconds with less than two errors.

Therefore, upon the recommendation of the *Toolbox Series* it was necessary for GD to revisit the material in the four previous lessons until he was able to successfully complete the Sound and Word Fluency Check. When this was explained to GD it became apparent that he was resistant to return to lessons he had already covered. Therefore, an alternative method was employed; the instructor extracted the tasks that he struggled with from the manual and presented them independently from the manual. In the session that followed GD was informed that instead of working from the manual the session would be spent practicing some skills he had already covered. A fluency-based, PT procedure known as SAFMEDS (Say All Fast Minute Every Day Shuffled; Graf and Lindsley, 2002) was introduced to help GD build fluency and successfully pass the fluency checks. SAFMEDS were comprised of two separate packs of 9 x 4 centimeter cards, divided between sounds and words. The sound pack contained 30 cards -15 sounds from the Fluency Check 1 that were each printed twice, and the word pack contained 100 different words from the Fluency Check 1. The AIMS for reading the SAFMEDS were set at  $\geq 50$  sounds per minute and  $\geq 60$  words per minute with two or less errors.

## **Results**

Only the two female participants successfully completed 36 hours of intervention. Intervention for GD was discontinued after 21 hours due to health and safety reasons. The Initial Assessment demonstrated that CK and KJ made improvements on their reading

performance improved following 36 hours of intervention.



*Figure 1* illustrates the changes in levels for the Initial Assessment tests for each participant pre- and post intervention. CK and KJ increased their literacy scores by at least one level while GD remained at Entry Level 2 post intervention.

All participants were measured on the DIBELS Nonsense Word Fluency (NWF) as a pre-/post- measure. The first three- and the last three one-minute timings were averaged (see Table 1 below), all participants increased the number of nonsense words that they were able to sound out aloud between pre- and post intervention.

Table 1. *The table displays the mean scores (M) and standard deviations (SD) for Nonsense Word Fluency (NWF) at pre- and post-intervention for each participant*

Participant	Pre-intervention <i>M</i> ( <i>SD</i> )	Post-intervention <i>M</i> ( <i>SD</i> )
GD	0.33 (0.58)	9.7 (0.58)
CK	17 (2.00)	26.7 (3.51)
KJ	5.7 (1.53)	23 (2.65)

### **Continuous Measures**

All three participants showed improvements on their specific continuous measures of Oral Reading Fluency using the *Toolbox Series* material. In addition, all participants made a reduction in the rate of words read incorrectly per minute.

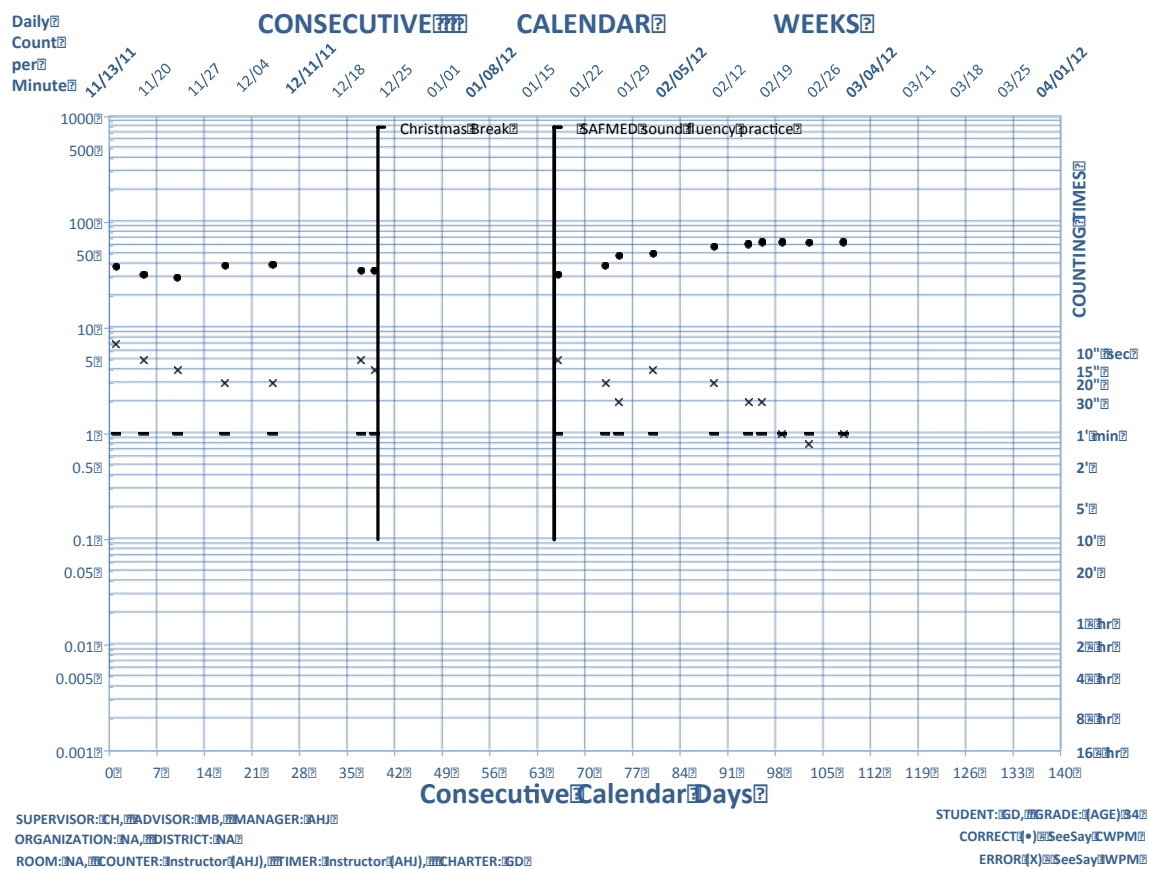


Figure 2 presents the number of correct words and incorrect words read per minute for GD. GD, increased oral reading fluency from 38 to 65 cwpm (correct words read per minute) and reduced the number of incorrect words read from 7 to 1 per minute. The number of cwpm GD read was variable. Following intervention of using SAFMEDS to increase sound fluency GD increased the number of words read per minute from an average of 35 cwpm between the first and seventh data point. Following intervention which involved sound fluency practice using SAFMEDS, GD began to increase the number of cwpm from 39 to 65 cwpm with no errors.



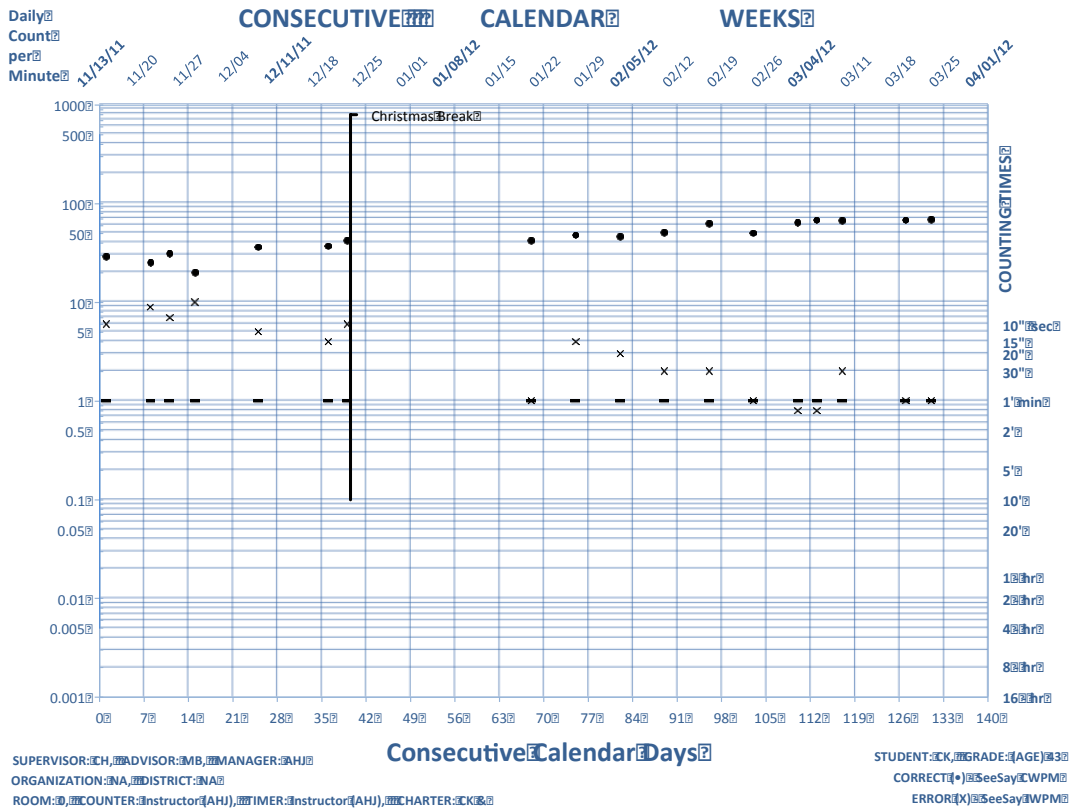


Figure 3 presents the number of correct words and incorrect words read per minute for CK. CK made a consistent increase in the number of correct words read per minute (from 29 to 69 cwpm) over a five month period. The first seven data points has greater variation (X 1.69 bounce) when compared to the final seven points in the data (X 1.10 bounce). The data demonstrates that CK managed to maintain the number of cwpm across the christmas break when intervention ceased for 3 weeks, and then further improve throughout the remainder of the intervention.

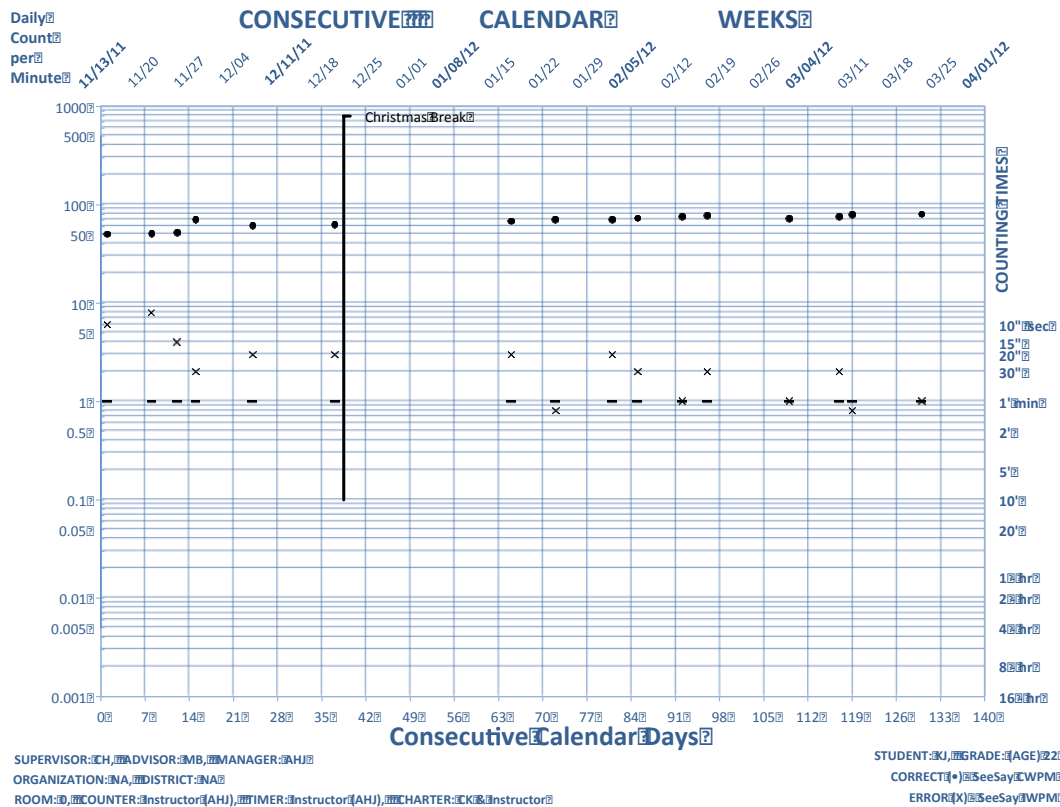


Figure 4 presents the number of correct words and incorrect words read per minute for KJ. The data demonstrates a steady increase from 50 to 91 cwpm across the intervention period (X 1.82). The first six data points displayed similar variation (X 0.70 bounce) when compared to the final six data points (X 0.79 bounce); however the trend of data supports the increase in performance from the start of the intervention to the end.

## Discussion

The objective of the current case study was to examine whether the *Toolbox Series* could be used successfully with adults performing below their expected reading ability. A norm referenced Initial Assessment (IA; Niace, 2002) was taken at pre- and post-intervention and continuous progress monitoring assessments were taken in order to track progress

development. For the three participants who completed 36 hours of intervention (CK & KJ), reading ability increased by at least one level. Continuous progress monitoring assessments were taken throughout intervention as a means of tracking progress development; all three participants made improvements on each of the particular assessments on which they were measured.

The results of this study offer some preliminary evidence that the *Toolbox Series* could be beneficial as a literacy intervention for adults at risk of engaging in criminal behaviour who are also significantly behind in their literacy skills. The findings of the current study add to the body of research evidencing the efficacy of DI and PT as effective teaching reading techniques (see, for example, Adams & Engelmann, 1996; Carnine, Silbert, Kame'enui & Tarver, 2009; Kubina, Common & Heckard, 2009; National Reading Panel, 2000). This study may also help shed some light on feasibility issues with using the *Toolbox Series* to teach an adult cohort from this population. Feasibility issues have been discussed in the context of acceptability, practicality, and adaptation (Bowen et al., 2009).

Acceptability refers to how the individuals involved reacted to the intervention. During the early stages of setting up the study, it became apparent that establishing a level of commitment from participants with regard to attending meetings was proving difficult. In all cases, the time span of the intervention was extended by at least one quarter of the expected duration because participant's on average only attended 1.5 sessions per week as opposed to the pre-arranged 3. In the majority of cases, participants cancelled session in advance. However it was common for participants to fail to attend without prior warning. That said, once intervention was running and participants had turned up to a session they often expressed a desire to extend the session length. This is consistent with the research that suggests Direct Instruction and Precision Teaching methods are successful in maintaining

student attention and motivation (Binder & Watkins, 1990). However, in future research some thought needs to be given to the practicality of running multiple sessions per week with this population. It was also clear from the recruiting process that many adults who find themselves in these kinds of situations are motivated to engage in programmes because of the potential to earn money, or at least offset some of the costs of attending classes (e.g., travel costs). Future research should consider building in financial payment into the motivational system for starting, continuing, and completing the programme.

Practicality refers to the viability of the intervention with regard to time and financial constraints. The programmes' systematic instruction offers a number of advantages in the context of the population in this research. First, with the trainer following a clear structured arrangement teaching of reading material, they are better able to deliver the material without the need for extensive training, thus providing an inexpensive solution to delivering effective instruction to either an individual or a small group. This will be likely a significant issue in services where resources to employ or train educator will be severely limited. Second, the programmes based on two highly research and evidenced based approaches to teaching literacy; again, the pressure to use programmes that are backed by evidence is increasing within the context of limited resources. Third, the programme can be purchased easily and for a relatively small amount. And finally, the program provides a systematic instruction that can be used on one to one or even with a small group of learners who have similar levels of reading.

Adaptation refers to the level at which the programme needed to be adapted or modified to suit the population or context for example. During this study we found that additional tasks were introduced to increase fluency and accuracy of responding for one participant to be able to progress to further lessons. According to the instructors' manual, a

learner who is unable to correctly say 25 sounds or 30 words in a 30 second time period with less than two mistakes for each task should not progress on to further lessons. The instructor is then encouraged to review the previous four lessons with the learner and attempt the Fluency Check again. However, apart from advising that the learner should return to the four previous lessons the manual did not suggest alternative ways for the instructor to help the learner achieve a level of fluency to be able to pass the tasks. Therefore, instructors who may be unaware of techniques such as SAFMEDS may be unsure of what to do if revisiting previous lessons does not help the learner reach fluency.

The aim of this study was to evaluate the feasibility of using the *Toolbox Series* programme with adults at risk of engaging in offending behaviour, and thus offer some preliminary findings to examine the potential of up-scaling this programme and agency staff using it as one intervention to help those who they support. On the whole, we found the programme to be an effective stand-alone agent in allowing an instructor to teach and deliver the materials without having any previous experience. However, more research needs to be done to evaluate the use of the *Toolbox Series* programme with larger numbers of adults, and the potential financial impact that may result from using the programme.

Further research may wish to evaluate the use of the programme with larger numbers of a similar population and to be delivered as a group. It may have also have been interesting to explore post-intervention outcomes such as employment status and whether participants who go through the programme continue to engage with further education or training.

It is also clear that further research is needed to identify the reasons why adults do or do not engage in adult education. Further research into systematic instructional programmes such as the *Toolbox Series* may reveal further support for their effectiveness in teaching an adult population. This study has added to the limited research that looks at using manualised

reading programmes with adults and more specifically, adults at a disproportionately higher risk of offending behaviour. However, there remain a number of areas that require further investigation, such as whether this type of programme could be rolled out and delivered to larger cohorts of adult learners, and what are the key barriers to engaging in adult education. In conclusion, this represents an interesting approach to teaching basic literacy skills to underperforming adults, and in particular, those who are regarded as socially excluded due in part to their inability to read.

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**CHAPTER 3: Barriers to Adult Education as perceived by Adult learners,  
Potential Learners, and Educators**

## **Abstract**

Adulthood functional illiteracy puts substantial strain on the UK economy, and in the last few decades, increasing basic skills among adults has become an important area of investment.

However, little is known about how adult learners regard adult education and even less about the perspectives of staff members who work for adult education organisations. We

interviewed eight educators and ten adult learners using a semi-structured interview.

Thematic Content Analysis was used to analyse the interview data. Three themes emerged:

(i) The impact of low academic achievements on later life, (ii) Motivations to engage in adult education and, (iii) Barriers to adult education. There was high congruence between the learners and the educators, although they differed in the importance of particular barriers to education. For example, educators spoke of the negative attitude and low self-confidence of learners, whereas learners spoke of financial and practical issues that prevented them from engaging in adult education courses.

Adulthood functional illiteracy costs the UK economy approximately £81.3bn per annum (Cree, Kay, & Steward, 2012). ‘Functional illiteracy’ is the term used to define anyone performing below a Level 1<sup>7</sup> in literacy and Level 3 in numeracy. According to the Department for Employment and Education guidelines, any person who is functionally illiterate lacks the necessary skills to function effectively within modern society (DfEE, 2001). Those who are functionally illiterate are at a higher risk of being unemployed and more likely to be marginalised from health and social aspects of life including general and mental health care, housing, and employment (Cree, Kay, & Steward, 2012; Silver, 1994). Bynner and McIntosh (2001) also suggest that illiterate adults are susceptible to greater mental and physical health problems, and other researchers have identified a relationship between low educational attainment and increased criminal behaviour (Sampson & Laub, 2003).

Survey results revealed that the UK adult literacy levels were found to be lower than 14 other member countries of the Organisation of Economic Co-operation and Development (OECD, 1997). The UK government have since made adult basic skills a priority, when this area had previously been ‘marginalised and under-resourced’ (Vorhaus, Litster, Frearson & Johnson, 2011, p10). In the last few decades, adult education has become an important area of investment (Coffield, 1997) and evidence demonstrating the positive effects of improving adult literacy has since emerged. Improved levels of education in the general population are associated with increased subjective quality of life, strengthened social relations within a wider community and broader career opportunities (Dolton & O’Neil, 1996; Feinstein, Budge, Vorhaus, & Duckworth, 2008).

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<sup>7</sup> Entry Level 1 is equivalent to attainment at age 5-7; Entry Level 2 equivalent to attainment at age 7-9; Entry Level 3 equivalent to attainment at age 9-11; and Level 1 equivalent to GCSE grades D-G.

To maximise participation in adult education, some higher education organisations offer financial incentives, learner-centred programmes, and flexible course schedules (Taylor, MacLeod, Houghton, Zwart, & Sachdev, 2005). However, despite educational provision being available, research suggests that a large proportion of adults who could benefit from such courses do not engage with these services and organisations that provide adult education (Cummings, Dyson, Jones, Laing, Scott, & Todd, 2010). Past research has investigated the circumstances relating to non-participation through qualitative and quantitative methods and a number of common ‘barriers’ and ‘deterrents’ have been identified. In 1990, Beder and colleagues interviewed 129 adult Iowa residents who did not complete high school or a General Education Diploma and had never attended an adult basic education course. Their main findings were that participants: 1) had a low perception of need to improve levels of education as adults, 2) felt that there was high effort involved, 3) had a previous dislike for school that meant that they had a disregard for returning to such an environment, and 4) reported situational barriers such as not having the availability of time and finances. Beder (1991) later refined the reasons for nonparticipation down to two main categories: *Structural* barriers that included external circumstances such as time restraints and lack of course availability, and *attitudinal* barriers such as the perception that education is pointless or effortful. The barriers outlined by Beder (1990; 1991) correspond closely with other research. Cross (1981) independently described structural and attitudinal barriers (although labelled them *situational* and *dispositional* barriers), and furthermore identified a third type of barrier: *institutional*. Cross (1981) described institutional barriers as any sort of policy or practice by the adult education centre that may cause barriers to potential adult learners (e.g., courses that require prior academic qualifications to be eligible to enrol).

Although there has been research about the perceptions of adult learners towards education, we could find no research investigating the perceptions of those who provide education services. Some information comes from ‘grey’ literature, in the form of a Learning and Skills Council report conducted by Bates and Aston (2004). Educators (those were responsible for the delivery of adult basic skill courses) and adult learners were interviewed. However, the authors did not draw out any differences between educator and learner responses.

The aim of the present study was to examine the perceptions of education provision and barriers to learning from two groups: 1) adult learners, and 2) education providers. Our aim was to explore similarities and discrepancies between the two groups’ perceptions. In the remainder of this paper, adult learners and potential learners will be referred to as ‘adult learners’ and the service providers as ‘educators’.

## **Method**

### **Participants**

Following ethical approval from the School of Psychology at Bangor University a total of 18 participants were recruited to take part in the study: ten adult learners, and eight educators. The mean age of learners was 33.5 years (range 19 to 58 years) and the mean age of educators was 36.5 years (range 23 to 47 years). Tables 1 and 2 summarise participants’ demographic details. All names have been changed to protect anonymity. Inclusion criteria for educators were as follows: 1) employees of an organisation that provided advice on or delivered adult basic education courses<sup>8</sup>, 2) had a direct experience of working with the

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<sup>8</sup> of note, one of the organisations included a crime reeducation charity of which a proportion of the learners accessed. Although this organisation provided educational courses they also provided many other services such as housing and financial advice.

adults that accessed the service, and 3) had been employed for a period of six months or longer. The inclusion criteria for learners were as follows: 1) learners accessed and received support from organisations or services that provided advice on or delivered adult basic education courses such as The Job Centre, crime reduction charities and libraries, and 2) had left compulsory schooling without achieving a qualification at GCSE level or they were currently seeking or attending a basic adult education course.

Table 1. *Participant information for the adult learner group.*

Name	Age	Gender	Currently in Education	Currently in Employment	Organisation*
Jane	34	F	Yes	No	2
Jacqueline	29	F	Yes	No	2
Alice	24	F	Yes	No	2
Abbie	29	F	Yes	No	2
Stephen	38	M	No	Yes	1
Alan	32	M	No	Yes	1
Neil	42	M	No	No	1
George	30	M	No	No	4
Glen	58	M	No	No	4
Michelle	19	F	No	No	4

\* 1= crime reduction charity; 2= community-learning centre; 3= women's centre; and 4= church run community outreach service

Table 2. *Participant information for the educator group.*

Name	Gender	Time employed by current organisation	Organisation*
William	M	15 yrs	1
Bruce	M	10 yrs	1
Sarah	F	8 yrs	3
Owain	M	6 yrs	1
Daniel	M	2 yrs	2
David	M	2 yrs	3
Sam	M	18 months	1
Adam	M	10 months	2

\* 1= crime reduction charity; 2= community-learning centre; 3= women's centre

## **Methodological Approach**

Thematic Content Analysis (TCA: Braun & Clarke, 2006) was chosen as the method of analysis because of its suitability for exploring novel areas of research. Through using TCA and its characteristic 'bottom up' approach, we could ensure that the data were analysed without reference to previous research. We used a semi-structured interview, because this allowed for any topics introduced by participants to be explored, thus responding to the dynamics of conversational exchange and collecting information on the subject matter that may otherwise have been missed (Kvale, 2008; Seidman, 2006).

Once all of the audio recordings had been transcribed, they were divided up according to participant type (educator and adult learner), and were analysed separately. To enhance the quality of the data analysis, data were triangulated by comparing the coding with other researchers at each stage of analysis and throughout write up (Yardley, 2007).

First, the first author familiarized herself with the data, and read each transcript multiple times noting emergent 'codes' within the margin of the transcripts. 'Codes' are described by Boyatzis (1998) as "the most basic segment, or element, of the raw data or information that can be assessed in a meaningful way regarding the phenomenon" (Boyatzis, 1998, p. 63). Second, the codes were extracted to form themes, such as 'school experience', 'perception of adult education', and 'barriers'. These themes were tabulated and compiled into a single document, so each transcript had a corresponding theme table. Third, the researcher extracted the tabulated themes and associated quotations from each transcript into a separate word document – a 'master-theme' document, which encompassed all identified themes for each group. At this stage there were two master theme documents, one for the learners, and one for educators. Finally, key similarities and differences between the two groups were drawn out and noted in a separate 'comparative' document, and then the write



up of data began, with close reference to the master themes document throughout the writing up process

## **Procedure**

Following institutional ethics review and approval, nine organisations that were either advisors or providers of adult education in the North Wales area were approached. The researcher visited each of the organisations and informed the staff about the opportunity to take part in the study. Posters were distributed to the organisations detailing the study and contact details were provided so that potential participants could contact the researcher directly. All nine organisations agreed to display the posters on notice boards around the organisation. An email was also sent out to all of the organisations asking if they could forward the information on to anyone they thought might wish to take part in the study. A pdf version of the poster was attached to the email.

If a potential participant contacted the research team and expressed an interest in participating, then a face-to-face interview was arranged. Written and verbal consent was gained before the interview began. Participants did not see the interview schedule. However, they were provided with a general idea of what would be covered.

Interview questions differed slightly between educators and learners, although both had a general focus on experiences with, and perceived barriers to education; learners were asked about their personal experiences of adult education, whereas the educators were asked about how they perceived adult learners. Pilot interviews were trialled with two educators and two adult learners, whose data is not included in this study. As a result, minor alterations

were made to the interview format to facilitate the flow of conversation and exclude ambiguous questions.

For all participants, Interview times lasted between 15 and 55 minutes (Mean = 38.16 minutes). Following the interview, all participants were debriefed, thanked, and given the opportunity to be later informed about the results of the study.

## Results

Three master themes were drawn from the data: 1) The impact of low academic achievements on later life, 2) Motivations to engage in adult education, and 3) Barriers to adult education (see Table 3).

Table 3. *Summary of themes and subthemes*

Themes	Subthemes
1 The impact of low academic achievements on later life	
2 Motivations to engage in adult education	
3 Barriers to adult education	
	3.1 Practical barriers
	3.2 Dispositional barriers
	3.3 Institutional barriers

### **Theme 1:** The impact of low academic achievements on later life

All educators reported that low academic achievement impacted adversely upon the later life of the adult learners. The two areas they felt were most affected were employment prospects, and the overall self-confidence of adult learners. The majority, (n=7) of educators spoke of how low academic achievement led to either low paid jobs without much hope of

career progression, or long-term unemployment. David (educator) said: *'Not only have they got a lack of qualifications, quite often they've got a lack of skills too, so obviously they are not going to progress, they are not going to go into the highly paid job; They tend to move from job to job as well, so that they don't get the support.'*

Mirroring this opinion another educator Adam spoke of how low academic achievement was a barrier to proceeding onto the usual route of higher education:

Adam (educator): *'They feel limited by what they can apply for and what they can do if they didn't achieve results at GCSE English and maths, if they see that in a job or they see that's a stumbling block and they don't apply and it has an effect on them. They're ruled out of further education because they didn't have a good education from school.'*

Four educators reported that adults who have low academic achievement are often lacking in self-confidence, which could permeate their whole lives, and affect their ability to pro-actively seek employment. Sarah (educator) explained: *'It's affected how they see themselves, their confidence to find a job; they don't feel they are worthy to get one.'*

Similarly, another educator suggested that low confidence was a contributing factor to unemployment: William: *'Yeah, it really affects them in a big way. It knocks their confidence and they feel they are unable to do anything, get a job, carry on as a normal person would.'*

Similar to educators, the group of adult learners also reported that low academic achievement lowered their job prospects, although fewer adult learners than educators spoke

of this link. Four of the ten adult learners stated that a lack of academic attainment limited them to low paid jobs, Alan (learner) said: *'[I] Probably wouldn't of ended up working as a grafter, [I would] be sat in an office making loads of money.'* Similarly, Neil stated: *'Well coming out of college I went into security work, no great prospectus [sic] type of thing.'*

In contrast to the educators, three adult learners did not feel that low academic achievements had a negative impact on their later life. Steve (learner) who said: *'I've done alright without them [qualifications]'* worked for a friend as an assistant plumber. Similarly when asked how having no GCSE's<sup>9</sup> had affected her, Michelle replied: *'Affected my later life? No not really, it has not stopped me doing anything really.'* Jane (learner) had a clear goal to pursue a career in child-care and believed that she had *'Caught up'* since leaving compulsory education.

While both educators and learners on the whole believed that leaving school with low academic achievements would impact negatively on later life experiences, the reasons provided differed somewhat. Educators tended to focus on the effects on learners' self-confidence and the practical difficulties of finding work, whereas the learners just spoke of low employment prospects as the sole negative outcome, or did not regard their low academic achievement as having a negative impact on their life. Although educators talked of the low self-confidence of adult learners as a result of being a low academic achiever, this was not spoken of by adult learners themselves.

## **Theme 2: Motivations to engage in adult education**

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<sup>9</sup> GCSE - General Certificate of Secondary Education, is a UK academic qualification

All educators said that adult learners were motivated to engage with education to make a positive change in their lives, and to improve the way they feel about themselves. Educators also believed that learners wanted to improve the way that others perceived them, and said that some learners wanted to improve their reading skills to be able to read to and help with the homework of children and grandchildren. Sarah (educator) noted: *'We have people you know that want to read stories to their grandkids.'*

Sam (educator) said: *'It's not just about getting a job, it's about having respect for yourself and we try and put that across to them you know that it's gaining confidence and self-esteem and being proud of something.'* Likewise William (educator) told us: *'[learners want to] Prove to others that they can do it, you know, like for so long they've felt like a failure. I think they reach a point and they feel they want to show what they're capable of doing.'*

Two educators talked about education as serving as a means to help learners who had difficulties with drugs or alcohol, in helping them in their recovery to abstain. Educators reasoned that educational courses offered a structured day-to-day focus for adult learners, especially to those who lived *'Chaotic lives'*. Bruce (educator) stated: *'A lot do it alongside their recovery, they throw themselves into education and courses and training and what not to help with their recovery, from drink or drugs or whatever.'* Similarly, Daniel (educator) reported that without the *'Structure'* of educational courses some adult learners are prone to falling back into the *'Old patterns of [drug taking] behaviour.'*

All of the learners regarded adult education as positive and a *'Really good idea'* in principle. Three learners referred to adult education as a second chance, and four others described the benefits of participating in an adult educational course as an *'Opportunity to*

*broaden skills*’ and a way to *‘Better yourself’*. One learner (George) stated: *‘If you can get a second chance then why not. Its a chance to better yourself through proving you can work hard and achieve something in your life.’*

Alan (learner) described adult foundation education as an opportunity for himself and others like him: *‘Getting the right people around them, who are encouraging them, then they’ll go into higher education. That could be health and social care, it could be plumbing, it could be bricklaying.’*

Both educators and adult learners had shared views about how beneficial education could be, and all spoke of the motivation to engage with further education as a means to better oneself and to enhance future prospects. Although adult learners felt that education was a good thing in principle, when asked about how they personally might engage with education, they started to identify many barriers that prevented them personally from enrolling on or completing a course (see Theme 3).

### **Theme 3: Barriers to further education**

There were many similarities between the learners’ and educators’ perceptions of barriers to accessing further education. However, the two groups had very different emphases on how pertinent particular barriers were. Adult learners spoke at length about the practical barriers they faced, whereas educators placed much more emphasis on the barriers arising from the attitude and low self-confidence of adult learners.

#### *Sub-theme 3.1 Practical barriers*

The majority of learners (n = 8) identified financial issues as the biggest barrier to accessing adult education, and spoke of both short-term costs, such as course fees, and long-term costs, such as compromising state benefits. Short-term costs such as course fees meant that one learner (Glen) had to discontinue a catering course: *'[I] Couldn't afford to keep up with the payments because I was trying to do it privately so I had to drop out as well. Basically, it's all come to nothing'*. For others, financial help with small costs made a big difference, Alice (learner) reported that she would not have been able to attend a course without getting subsidized bus tickets

Furthermore, three learners reported a fear of having their government financial support stopped if they were enrolled on an educational course. The possibility of having his financial support reduced deterred Neil (learner) from even considering enrolling on a course, he stated *'Not a chance would I even consider it like [returning to adult education] 'Cause I want to keep the money [government financial support] coming in don't I?'*

Another practical issue reported by three adult learners was the difficulty of juggling a course with the demands of parenthood, Jacqueline (learner) stated: *'My kids. It's more to do so with. I've got one with ADHD and I was always taking 'phone calls, come and get him from school and so that held me back.'* Another issue was finding suitable childcare for when adult learners were attending a course. Jacqueline said she would not have been able to attend a course without the provision of free childcare, and spoke of the additional benefits this had for her child: *'It's not only good for me but it's also good for my little one. It gives me the break I need, and it also helps with her because she probably wouldn't be going to nursery if it wasn't for them.'*

Although the majority of learners named difficulties with finance as a significant barrier to accessing basic education courses, educators saw financial issues as less of a problem, only half (n=4) of educators spoke of financial issues being a barrier, and did not elaborate on this issue as much as the adult learners did; William (educator) said: *'Finances, if they haven't got money that's a key one.'* Two educators spoke about the fear surrounding benefit losses, and the unhelpfulness of an inflexible benefit system.

Sarah (educator): *'If they attend the course, whether with it's with us or college that's deemed full time, regardless of what the contact time actually is, if it says full time, then they lose their benefits. They lose housing benefit. How on earth are they ever going to engage? How are they ever going to progress when we can't offer them that security and support? Nobody's going to engage in training when they are going to lose their income and their home.'*

Childcare was named as a barrier by two educators, one of which suggested that single mothers in particular struggled when trying to complete a course, noting the inflexibility of the course timeframes in regard to childcare responsibilities. Daniel (educator) also related the costs associated with paying childminders to financial implications stating: *'For a lot of people it's expensive and although the college will support with childcare costs, it's still expensive.'*

Other practical barriers included unstable personal circumstances of learners. Two educators spoke of homelessness, family issues, ongoing court cases, and drug abuse as factors that prevent learners from engaging in education. Sam (educator) said that *'All these things have to be addressed first'* before learners could fully engage with education. Another



educator (Sarah) stated that adult learners could sometimes be too highly medicated to focus on courses, stating: *'People on scripts (prescribed medication) are too highly medicated to remember what they're doing or remember appointments.'* Although none of the learners stated that drug or alcohol use was a current problem for them, one said it had affected her in the past, and had caused her to stop attending a higher education course, Abbie (learner) stated: *'It spiralled out of control a bit there so I left after a year to sort myself out.'*

### *Sub-theme 3.2: Dispositional Barriers*

The majority of educators (n = 6) felt that the biggest barrier facing learners was their low self-confidence and negative attitudes towards education. Educators frequently referred to the *'low self-confidence'*, *'low self-esteem'* and *'self-worth.'* they encountered with adult learners. See examples below.

Owain (educator): *'I think a lot of it comes down to confidence. Going into a room full of people. So, I think they could come up with every excuse under the sun. Because don't forget we're working with a lot here that have had substance misuse issues, so their self esteem and confidence is at zero so I think that's the thing.'*

David (educator): *'Oh barriers. Well I think the main one would be self-belief. You know the sheer fact that they don't believe that they are worthy or good enough or you know, entitled I suppose. They have learnt to class themselves as second-class citizens.'*

William (educator): *'Doubting themselves and doubting their abilities... it can be a bit embarrassing for them.'*

Three educators also observed that learners who had previous bad experiences of education would often have a negative attitude towards adult education, and would thus be less likely to participate.

Sarah (educator): *'The most difficult thing that you come against is obviously the people away from work, probably dropped out of school, purely for the fact that they don't like classroom work they're not academically that brilliant at stuff, so it's difficult to then get them back in to that sort of environment. I would think that is the main barrier, just sort of trying to get them in a classroom environment, that's the reason they dropped out of school in the first place.'*

Adam (educator) felt that some learners had difficulties in realising that education might benefit them: *'Attitude. Thinking they don't need it because some really think that they don't need to do any learning and that to get on in life. They don't think they need basic skills.'*

Three educators suggested that some learners' attitudes differ according to age group. Two educators suggest that older adults are more difficult to engage because they have fewer skills than the younger learners and thus more likely to *'Have a barrier before they even come in and they think that it's not going to work'* (David - educator). Neil (educator) explained: *'Yes, and there's all sorts of reasons isn't there, from negative experiences to the*

stigma, to “I’ve done 50 years and I’ve never needed to so why now?” In contrast, Daniel (educator) stated that some people in their late teens/ early twenties were ‘*really difficult to get hold of*’ because of their ‘*chaotic*’ life style.

In contrast to the views of educators, adult learners very rarely identified a lack of confidence or their attitude as problematic. Only two adult learners reported that their own anxieties and lack of confidence prevented them from enrolling on an adult education course, although, unlike educators, they placed little importance on this. When asked whether he would consider enrolling on a course George (learner) replied: ‘*No because I had the trouble in school with reading and that so I didn’t bother. All these years down the line I didn’t think about it because I haven’t got any qualifications.*’ Michelle (learner) reported feeling ‘*nervy*’ about attending a course alone. Unlike the educators, learners who did mention confidence as a barrier did so very briefly, and did not seem to feel that their own attitude toward education was in itself a barrier.

### *Sub-theme 3.3: Institutional barriers*

Both groups identified problems with the institutions that provided educational programmes. Two adult learners did not regard the courses as easily accessible, reporting that they were either ‘*unsuitable*’ or ‘*unavailable.*’ George (learner) stated: ‘*They hadn’t really got anything that I wanted to do.*’ Abbie (learner) expressed that she felt as though some courses were not aimed at an appropriate level for her skill set: ‘*This is going to sound a bit condescending but some of it [was] very, very basic, yes.*’ Additionally, Abbie reported frustration with the administration process, which was not always organised, and had led to her missing out on placements in the past.

Abbie: *'You leave your details and then they get lost and then you ring people up, they don't ring you back. And then when they do ring you back, the places have all gone. It's just ridiculous really.'*

In accord with this sub-theme, two educators recognised that their own organisations could generate barriers. Owain spoke of how the organisation he worked for could be disorganised and not work closely with learners, which led to adult learners being enrolled on courses that they have no interest in. Owain explained that learners can *'lose faith in the organisations'* if they receive what they believe to be an *'unacceptable service'*. Sam (educator) also suggested that organisations could be a barrier, for example, if they are unable to provide a particular course due to unavailability of suitable teachers.

### **Discussion**

Our findings revealed largely congruent accounts of the perceptions of education provision and barriers to learning, albeit with distinct patterns emerging between adult learners and educators on some issues. Both groups spoke of how low academic achievement had negative impact on later life, such as lowered employment prospects (although three adult learners felt their lives were unaffected by a lack of qualifications). Educators also felt that low academic achievement had an impact on learners' feelings of self-worth, although this was not identified by any of the learners in this study.

Both groups were unanimous in regarding adult education as being a positive move for adults in principle, and many learners regarded adult education as a *'second chance'*. However, while acknowledging that learning basic skills was likely to be beneficial, some

learners did not intend to enrol on education course, and said this was due to financial barriers.

The key differences between learners and educators were the importance they placed on particular barriers. Learners tended to speak of practical issues such as financial issues, childcare difficulties and availability of courses. Some learners received support for short-term costs such as bus tickets and childcare, which enabled them to engage in education. For others, the fear of losing government financial support meant that they did not consider enrolment on a course as a viable option. Conversely, the majority of educators felt that learners did not engage because of their negative attitudes toward education and their low levels of self-worth.

The discrepancy between educators and learners might be due educators having a broader outlook than the adult learners as they are likely to see a wide variety of learners with differing ages and backgrounds, and may see how the attitudes of learners can be a barrier. Although learners did not see their own attitudes as a barrier, some claimed that a lack of basic skills has not hindered their career prospects, although given that higher academic achievement is associated with better job prospects and other life outcomes, this may not be the case.

We found that our categorisations of barriers (see Theme 3) were similar to previous research (Bates & Aston 2004; Beder, 1991; Cross 1981), which also identified dispositional barriers, situational barriers, and institutional barriers. We extended previous research by including the perceptions of educators, which also fell into similar categories.

The findings in this report are subject to two main limitations. First, these data apply only to the small number of participants, recruited from the area of North Wales. Therefore, we should be cautious in generalising the results to the greater population. Second, all of the

adult learners interviewed were already accessing support from a particular service and were therefore exposed to and / or had access to information on the adult education courses that were available. Consequently, it is possible that other adult learners / potential learners who did not have access would report different barriers.

Further research might increase the number of participants and recruit from a wider source of regions. Additionally further studies may survey what provisions and incentives organisations provide as a way of increasing adult education participation, and how effective these are. It would be interesting to investigate whether the provisions available address more internal attributes, such as increasing the self-confidence of learners, or practical assistance, such as childcare and financial support. We also found that educators also noted a difference in barriers depending on the age of the adult learner, with younger people leading more chaotic lives, whereas older people felt that they did not need education. Future research investigating differences between younger and older adult learners may help elucidate any differences and thus make more tailored interventions for different age groups.

The finding that practical issues, such as not having enough money to travel to a course or pay course fees, are so key for learners but are not seen as a priority by educators, may have implications for practice. Educators and institutions might increase the participation rates of learners by addressing the importance of practical issues of their learners, help with a simple cost such as a bus fare may mean the difference between engagement and non-engagement for some adult learners. This might be achieved by offering financial assistance in the form of travel expenses or reduced course costs, providing childcare options and offering a wider variation of course types.

A number of participants reported that they had received a negative past experience during the time they spent in compulsory education. They believed that this was one of the reasons they did not want to engage in adult education. With this in mind, it is important that research continues to investigate ways that improve the school experience for those who find it aversive. The following studies focus on secondary school children who are struggling academically and are beginning to disengage from the education system.

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**Chapter 4: A pilot evaluation of online reading programmes as a literacy teaching aid for secondary students at risk of academic failure: Practice-based evidence**

## **Abstract**

The purpose of the present study was to conduct a practice-based pilot evaluation of using MimioReading® *Comprehension* (MRC) (with some MimioSprout® *Early Reading* (MSER)) with an adolescent cohort from a mainstream school who were reading below their chronological reading age. Eight 12-13 year old students took part in the study and received the MRC programme for five months in place of their normal English lessons. One student who required additional reading instruction also received 23 episodes of MSER before beginning MRC. MRC was implemented with this cohort with only minor adaptation - an additional token economy was incorporated to supplement students' on-task behaviour. Students were assessed at pre- and post-intervention time using a standardised reading assessment (Dynamic Reading Analysis; DRA) and a self-perception scale (The Self-Perception Profile for Children; SPPC). The students made improvements in their reading abilities according to the DRA between pre- and post- intervention. In terms of self-perception, students scored lower (i.e., rated themselves more negatively) on the measure of global self-worth and behavioural conduct post-intervention, whereas there was no change in their perception of scholastic competence between pre- and post-intervention.

Children with reading difficulties who do not receive any form of intervention are at a significantly greater risk of experiencing difficulties throughout their school career (Kamil, 2003) and will quickly fall behind their peers who can read at the level expected for their chronological age with the gap widening exponentially (Juel, 1988; Stanovich, 1986). Following an investigation into offending behaviour of adolescents, Graham and Bowling (1995) also found that students who underperformed academically were more likely to truant and drop out of school, and that the average age of beginning to engage in offending behaviour is around 15 years.

An effective intervention that enables a child to learn more in a shorter amount of time is essential if they are to achieve their age-appropriate reading ability and prevent the negative effects associated with academic failure (Johnson & Layng, 1994; Johnson & Street, 2004). Remediation of reading deficiencies is most successfully achieved with an intervention that happens earlier rather than later (Cooke, Kretlow & Helf, 2010; McIntyre et al., 2005; Wanzek & Vaughn, 2007). However, it is unfortunately the case that many children do not receive intervention early on in their academic years and they subsequently fall progressively behind. Recent research conducted in the United Kingdom (UK) revealed that one in five children at the age of 11 were performing below their age appropriate reading ability (Ofsted, 2012). Studies have found that interventions that focus on basic reading instruction can benefit students who have reading deficiencies regardless of their age, suggesting that the reading difficulties of older students can be remediated effectively (Abbott & Berninger, 1999; NICHD, 2000).

The most effective intervention types rely on systematic, explicit instruction and provide maximum opportunities for students to practise the skills they have learned with immediate feedback (Swanson, 1999; Vaughn, Gersten, & Chard, 2000). The National

Reading Panel (2000) outlined five essential components (determined by empirical research) that an effective reading instructional programme should possess— phonemic awareness, phonics, vocabulary, fluency, and comprehension.

A particular type of reading intervention includes Computer Assisted Instruction (CAI), developed to teach a variety of academic skills (Fletcher-Flinn & Gravatt, 1995). CAI's have been used within the classroom setting to help children of all ages to become proficient at the basic reading skills (Hall, Hughes, & Filbert, 2000; Soe, Koki, & Chang, 2000). The effectiveness of CAI may be related to several factors: (a) individualised instruction delivered by the CAI saves the amount of time spent during teacher instruction, (b) the teacher is therefore able to facilitate learning and monitor on-task behaviour while the students continue their learning through the CAI, (c) programmes are tailored to the individual needs of each student, (d) CAI can maintain high levels of student motivation and attention and, (e) students can be provided with immediate feedback (Boone & Higgins, 1993; Carnine, Silbert and Kameenui, 1997; Lewis, 2000; Rieth & Semmel, 1991).

A CAI known as MimioSprout<sup>®</sup> *Early Reading* (MSER) and the sequel programme MimioReading<sup>®</sup> *Comprehension* (MRC) are online instructional reading programmes that function as a comprehensive package. A unique characteristic of the programmes is that they are a responsive technology, meaning that every click of the mouse made by the student is collated to comprise individual data of learner responses. Consequently, the programmes are then able to adapt instruction according to the learner's progress and performance. Repeated exposure of tasks where the student is struggling allows them to practice the skill until they become fluent within each component.

The MSER programme provides instruction for early reading skills and incorporates the five essential components outlined in the National Reading Panel report (NRP, 2000).

MRC is designed to follow on from MSER and focuses on developing the fundamental reading skills, teaching the learner how to implement the skills to aid reading comprehension. MRC expands on vocabulary and encourages the active use of multiple comprehension strategies (Leon, Layng, & Sota, 2012; NRP, 2000). Either programme can be used as a stand-alone intervention and delivered separately, or students can complete all or part of MSER before going on to MRC.

The MRC and MSER programmes have a rich evidence base advocating their effectiveness with younger children (see, for example, Layng, Twyman & Strikeleather, 2003; Layng, Twyman, & Strikeleather, 2004a; Layng, Twyman, & Strikeleather, 2004b). However, at this time no research exists on the effectiveness of MSER or MRC for older typically developing children with reading deficiencies.

The need to address the issue of underachieving readers in school is further emphasised by the research by Cunningham and Stanovich (2001) who found that struggling readers are likely to develop a negative attitude towards reading and subsequently begin to engage in a particular set of behaviours that serve to help them avoid the work assigned to them (Finn, 1995). These behaviours might include non-compliance within the classroom, such as refusing to complete class-work and may quickly graduate to more serious types of behaviour such as truancy and dropping out of school (Hibbert, 1990; Rutter, Maughan, Mortumirem Ouston, & Smith, 1979; Snow & Biancarosa, 2003). Researchers suggest that school children begin to construct an image of themselves in accordance with their abilities in the classroom and in comparison with their peers (Byrne, 1984; Gold and Mann, 1984; & Ruble, Boggiano, Feldman and Loebel, 1980). Bloom (1976) argues that children who receive continual evidence of personal academic success (i.e., continually high-grade results and a good relationship with teachers) will undoubtedly hold a high self-regard with respect to their

academic self. Alternatively, students who consistently perform poorly in the classroom are more likely to have a lowered self-perception of their academic ability (Bloom, 1976).

A perception of the self, that is an individual's view of him- or her-self, has most commonly been operationalised as self-esteem, self-concept, or self-image. The perceptions of school age children have commonly been measured using the Self-Perception Profile for Children (SPPC; Harter, 1985). The SPPC is designed to measure the perceptions of children between the ages of 8 to 15 years across six different domains: social competence, athletic competence, physical appearance, scholastic competence, behavioural conduct, and global self-worth. Encouragingly, research has demonstrated that students' self-perceptions can be improved alongside academic performance and Huffman (2000) suggests that such changes also result in positive behavioural changes within the classroom.

The present study is a pilot evaluation that sought to investigate the feasibility of using the suite of MimioSprout® *Early Reading* and MimioReading® *Comprehension* programmes with a group of 12 to 13 year old children from a mainstream school who were reading below their chronological reading age. We also explored outcomes over a school year of using primarily MRC with a group of children. Outcomes measured were reading attainment and also self-concept.

## **Method**

### **Participants**

Following ethical approval from the School of Psychology at Bangor University the participants (who will be referred to as students from hereon) were comprised eight students. Students included seven males, one female between the ages of 12 years 0 months and 12 years 10 months ( $M = 12.5$  years) at the time of pre-test. The students were recruited from a

mainstream secondary school in North Wales, UK, and were identified by the school to take part because they were underachieving academically. According to the standardised reading assessment we conducted prior to intervention one student from the group was only two months behind their chronological reading age. However, he was included in the study because the school had identified the him as being ‘at risk’ of academic failure, evidenced by low outcomes on school test scores. In addition, all of the students were classified as being on ‘referral’, which, indicated that the students had some behavioural difficulties. The referral system was implemented by the school to monitor students’ behaviour following an initial incident that the school deemed as inappropriate. An inappropriate behaviour by a student might range from refusal of work to hitting another student. Those who were on referral were required to carry a card to every class and ask the teacher to sign it at the end of the lesson. Each teacher would report on the student’s behavioural conduct and the amount of work output during their class. At the end of each school week, the card would be assessed by the student’s Head of Year, who would then resolve to monitor the student’s behaviour further and issue the student with another card, or to recognise the student’s appropriate behaviour by taking them off the referral system. See Table 1 for the student information.



Table 1.

*Student information*

Student	Gender	Age pre- (Y:M)	DRA predicted reading age (at pre-test)	Discrepancy between chronological age and reading age (-/+)*
Andrew	Male	12:04	10:11	-17mths
Chris	Male	12:10	10:04	-30mths
Kate	Female	12:04	09:10	-30mths
Kevin	Male	12:05	12:03	-2mths
Harvey	Male	12:02	08:03	-47mths
Keiron	Male	12:00	10:11	-13mths
Liam	Male	12:07	08:03	-52mths
Sion	Male	12:09	09:06	-39mths

**Setting**

Scheduling for intervention sessions was carefully integrated into the school timetable. Normal English classes were replaced with four separate intervention sessions per week, and lessons lasted 50-minutes. Students attended the school library, which housed a total of ten computers, for each intervention session.

**Materials and Apparatus**

The MimioReading® *Comprehension* (MRC) programme composed of 50 online episodes that took approximately 20 minutes to complete per episode. Additional materials accompanying the online programmes included, (a) Progress Maps and Stickers (that were placed over each episode the students had completed), (b) Printable MimioReading®

*Comprehension Companion Books and Worksheets*), and (c) *Completion Certificates*. The MimioSprout® *Early Reading* (MSER) programme was also used in addition to MRC because one student was required to complete a certain number of episodes before he began MRC. MSER was composed of 80 online episodes that took an average of 15-20 minutes to complete, however, the student was placed at episode 57 and therefore only completed the last 23 episodes from this programme.

The apparatus comprised of either a computer, with a mouse or a laptop with a tracker pad; a web browser with a Macromedia Flash plug in and the MimioSprout® *Early Reading* and MimioReading® *Comprehension* online programmes. A tactile prompt known as a Motivaider® was used for momentary time sampling along with a scoring sheet (See Appendix A and B respectively). For the pre- and post-intervention assessments, physical copies of the DRA marking sheets and SPPC scales were printed, an audio recorder and a stopwatch were used to record and time the students reading the passages and answer questions from the DRA.

## **Design**

The study used an educational case series design with eight children identified by the school as underachieving academically. The school uses a system of separating students into different levels or 'set groups' for each class subject. The students are assigned to set groups according to their level of academic ability that is determined by their performance on standardised tests conducted during the previous school year. The sets are not resolute and students can be moved up or down according to their performance. The students used in this study comprised of the lowest set English (of which there were four possible levels).

## Measures

### Diagnostic Reading Analysis

The *Diagnostic Reading Analysis* (DRA; Crumpler & McCarty, 2004) is an oral reading assessment designed for those between the ages of 7 to 16 years old. The assessment is a standardised measure of reading accuracy (total number of correct words read), fluency/reading rate (number of words read per minute) and comprehension, and provides standardised scores, percentile scores and reading ages for each participant. The DRA is made up of two parallel forms (A and B) which when used separately prevent practice effects during pre- and post- measures. Both forms are bound within one booklet that includes colour illustrations, which accompany each passage. The assessor first reads a short passage to the a child and then asks them questions immediately after; the number of correct answers the child makes determines where and at what level of difficulty the child will begin in the either form A or B. The assessor then listens to the child read a passage of text and records the number of errors the child makes on a separate recording form. The recording form is a copy of the form A or B with an additional section for the assessor to mark down the number of errors the child makes, the time it took for the child to read the passage and answer the comprehension questions and the number of questions the student answered correctly. The test is carefully structured so the child does not need to read every passage. Instead the administrator is instructed to direct the child to each passage according to their performance on the last until the child reaches a ceiling.

### The Self-Perception Profile for Children

Students were also assessed using *The Self-Perception Profile for Children* (SPPC; Harter, 1985). This is a multidimensional scale that examines children's perceptions of

themselves across six separate domains: social competence, athletic competence, physical appearance, behavioural conduct, and scholastic competence. Although, for this study the decision was made not to include all six domains that comprise the SPPC and therefore only the three aforementioned domains were included. One reason for this decision included the need for efficiency in the delivery of the assessments because of the applied nature of the study. Working around the school timetabling system brought about difficulties, for example, it was not always possible to predict where the students would be and whether it was even possible to take them out of certain lessons to administer the assessments. Therefore using just three domains (18 items) reduced the administration time by half (i.e., average administration time took approximately 15 minutes as opposed to half an hour).

Each domain is separated into six items that incorporate a “structured alternative format” (Harter, 1982), this means that the student is first asked to read two different statements that reflect two different types of child. The student is then required to make a judgement on whether they are more like the child in the first statement or the child on the second. Once they have chosen one child they are asked to determine whether the statement is “sort of true” or “really true” for them. Figure 1, provides an example of one of the items from the scholastic competence domain.

Really True for me	Sort of True for me				Sort of True for me	Really True for me
<input type="checkbox"/>	<input type="checkbox"/>	Some kids often <i>forget</i> what they learn	BUT	Other kids can remember things <i>easily</i>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 1. An example of an item from the scholastic competence domain of the SPPC scale.

Statements were specific to the particular domain, an example of two different statements from the Behavioural Conduct domain is “Some kids behave themselves very well BUT Other kids often find it hard to behave themselves.” An example from the Global-Self Worth domain was; “Some kids don’t like the way they are leading their life BUT Other kids do like the way they are leading their life.”

Items in the SPPC are counterbalanced, so for example, three items are worded so that the first statement reflects a positive perception of their competency or adequacy and the second reflects a negative perception and vice versa for the remaining three items. The student should only mark down one choice for each item. Administrators are provided with a marking system that scores items as 1, 2, 3, 4 for the negative or 4, 3, 2, 1 for the positive items. The total score for each domain is then divided by the number of items (i.e., six) to provide an average score, the lower the score the more negatively the student perceives their level of competency or adequacy.

#### Interobserver agreement (IOA)

IOA was established for 25% of the pre-intervention DRA assessments and 25% of the post-intervention DRA assessments to ensure that there was a minimum level of 80% IOA between the three researchers who were administering the assessments. IOA was calculated as follows; two assessors simultaneously recorded the results for four of the eight pre- and post-intervention assessments, marking independently from one another. The number of agreements (i.e., the total number of words that both assessors scored as accurate words) were divided by the total number of agreements plus the number of disagreements (the difference between the accuracy scores for each assessor). This coefficient was then multiplied by 100 to give a percentage of agreement. The same procedure was carried out for IOA on comprehension scores. IOA for pre-intervention was calculated to be 97.5% for the

DRA comprehension measure and 94.7% for the DRA accuracy measure. IOA at post-intervention was calculated to be 98.9% for the DRA comprehension measure and 95% for the DRA accuracy measure.

## **Procedure**

The DRA and SPPC were taken prior to intervention and took an average of 30 minutes per student. Assessments were administered by three different researchers all of whom had received the appropriate training and an opportunity to practice administering the two tests. Students were taken out of the classroom and completed the assessment with one of the researchers in a separate room.

Once all of the pre-intervention assessments were complete the students were then required to complete the MimioSprout® *Placement Test 2* so that researchers could determine at which episode to place the student. The student is required to read the MSER story ‘What lives in the sea?’ The assessment is delivered by the instructor who records the student’s performance as the total amount of words read accurately within a two-minute timed period. See Appendix C for the MSER story and the placement criteria. If the student was able to read more than 140 words in two minutes without making more than 10% errors then they were placed in the MRC (see table 2 for placement test outcomes). If the student was unable to reach this fluency criterion they were placed at an appropriate episode in the MSER programme. Only one student did not manage to achieve above this fluency level.

Table 2

*The total number of words read in two minutes and the amount of errors made and the subsequent programme the student was placed for the experimental group.*

Student	Words read	Errors	Programme
Liam	236	11	MRC
Chris	190	3	MRC
Andrew	110	0	MSER (starting at episode 57)
Sion	285	7	MRC
Kevin	233	6	MRC
Harvey	165	2	MRC
Kate	193	9	MRC
Keiron	192	8	MRC

Before the students could begin intervention they were required to complete the MimioSprout® ‘Mousing around’ introductory programme, which offered brief exercises to aid familiarisation with the programme and acclimatise the students to the instructional language used within the programme. Once the researcher was satisfied that all of the students were familiar and competent at using the basics of the programme they were able to begin their first episode.

At the start of each session, the student would retrieve their folder and headphones and sit at a computer. They would then access the Internet from the school server and log on to their personal accounts. From the first episode to the last, all instructions were provided by the programme, which allowed the researchers and teaching staff to facilitate on-task behaviours, answer any student questions, and deliver stickers to students who had completed episodes. Before each session commenced the researcher checked the Class-wide Performance Reports to gain an ‘at a glance’ summary of the students’ performance for the previous session. The MimioReading® programme allocates one of three possible outcomes for a student’s individual performance for each episode, represented as three colour coded

letter: ‘E’ - Excellent means that the student answered 75% of the questions correctly on their first attempt; ‘S’ – satisfactory symbolises that the student answered between 50% and 75% of the questions correctly on their first attempt; and ‘N’—needs attention, which means that the student answered less than 50% of the questions correctly on their first attempt. Student data were monitored closely and if a student received either two consecutive Ns or three consecutive Ss then their individual episode data were examined to determine whether the student was struggling within a particular area of the episode.

The intervention continued until each student had completed all 50 of the episodes of the MRC programme. Andrew completed 23 episodes of the MSER programme before going on to complete the MRC programme. Post-tests were taken using the same measures, the DRA and the SPPC.

### *Procedural adaptations*

A token economy system was implemented during the sixth week of intervention because the level of off-task behaviour within the group was causing students to become distracted during session time. The purpose of this observation procedure was not used for research purposes but only to facilitate the delivery of the intervention. Thus, no outcome data will be reported or analysed and no formal reliability data were gathered. At the beginning of session 16, the students were asked not to log onto the computers but to turn and listen to the researcher who then explained the new rules of each session. The students were told that their behaviours would be observed each session and particular behaviours would be rewarded with points that would later lead to a class outing if enough points were achieved. The researchers then explicitly described the types of behaviours that would be classed as ‘appropriate’ (on-task) and would earn them points and also the ‘inappropriate’ (off-task) behaviours. Appropriate (on-task) behaviours were described as the following: facing the



computer with headphones on and covering ears, listening to or executing instruction, asking teachers or researchers a question related to the programme by putting up a hand and waiting for assistance. Inappropriate (off-task) behaviours were described as: not-facing the computer, facing the computer but not listening to or executing instruction, not having the headphones on their heads or having them on their heads but not covering ears. More severe types of off-task behaviour (throwing objects, hitting (pushing, pulling) other students, being out of their seat without permission, leaving class without permission) were also described to the students to be inappropriate and would be dealt with by the teaching staff (e.g., the student might be asked to leave the classroom).

Student behaviour was recorded using a momentary time sampling method that involved the researchers checking the behaviours of all of the students every 5 minutes. One of the researchers wore a tactile prompt known as a Motivaider<sup>®</sup>, which is a small battery-operated device that can be set to activate (vibrate) either at random time intervals or specified schedules. During intervention, the Motivaider<sup>®</sup> was set to activate every five minutes, beginning five minutes into the start of the lesson (to allow for folder retrieval and logging on time). This meant that during a normal session students were observed 8 times. The researcher wearing the Motivaider<sup>®</sup> signalled to the other researchers it was time to take a recording by either verbally saying 'time', or visually by holding up the recording sheet (See Appendix D). At the end of each session, the students were eager to review their scores and the researchers provided a brief summary of how they had done. Throughout each session on-task behaviour was rewarded with verbal praise.

## **Results**

### **Reading assessments**

All of the students were reading below their expected reading age a pre-intervention. Following intervention, post-assessments revealed that seven out of the eight students had increased their reading ages (gains ranging from 12 to 65 months over the five month period of intervention). One student did not make any change in their reading age according to the DRA; Chris had a reading age of 10 years four months at pre and post-intervention. However, because he was five months older he had and effectively 5-month decrease in reading age between pre- and post-intervention, see Table 3 for the individual data.

Table 3.

*Shows the students' chronological ages (at pre- and post-test), the reading ages as derived from the DRA (at pre- and post-test), and the discrepancy in months between the two*

Student	Age pre- (Y:M)	DRA reading age	Difference*	Age post- (Y:M)	DRA reading age	Difference	Overall change
Liam	12:04	08:03	-49mths	12:08	14:00	+16mths	+65mths
Chris	12:10	10:04	-30mths	13:03	10:04	-35mths	-5 mths
Andrew	12:04	10:11	-17mths	12:07	15:00	+29mths	+50 mths
Sion	12:09	09:06	-39mths	13:02	12:06	-8mths	+31 mths
Kevin	12:06	12:03	-3mths	12:10	14:06	+20mths	+23 mths
Harvey	12:02	08:03	-47mths	12:06	12:03	-3mths	+44 mths
Kate	12:04	09:03	-37mths	12:07	10:06	-25mths	+12 mths
Keiron	13:00	10:11	-25mths	13:05	15:03	+22mths	+47 mths

\* -/+ depicts whether the student is above (+) or below (-) their chronological reading age.

Scores for the DRA subtests in reading accuracy, and reading fluency, comprehension questions correct and comprehension processing time are displayed in Table 4. All of the students improved their accuracy (calculated by subtracting the total number of errors from the total amount of words in the last three passages read) between pre- and post intervention.

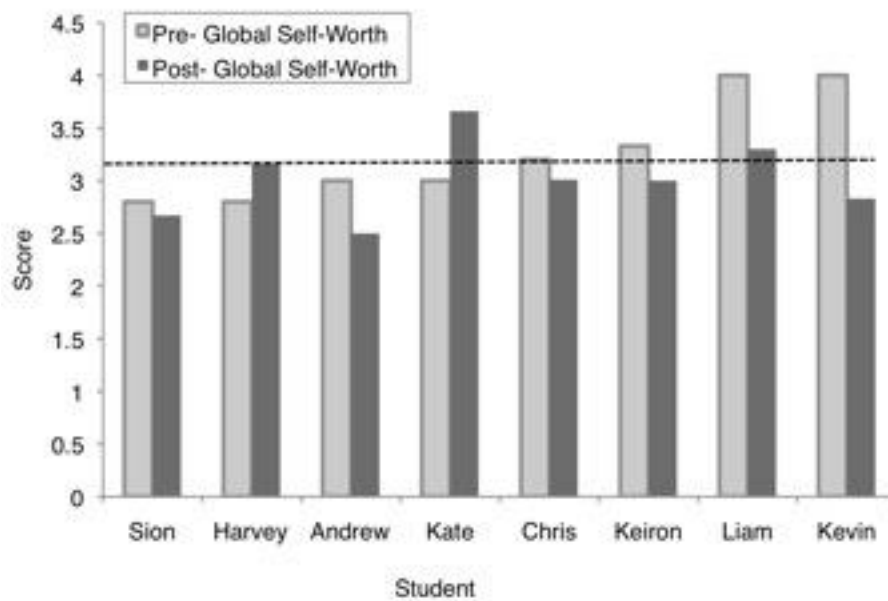
Seven out of eight students read fewer words per minute fluency scores (calculated as the total number of words read divided by the number of time in seconds multiplied by 60) between pre- and post-intervention. Comprehension scores were calculated by taking the total number of correct answers from the last three passages the student read. Five students increased the number of correct questions answered between pre- and post-intervention (ranging between one and six), two students stayed the same and another decreased from 7 correct questions to six between pre- and post-intervention. Students were also measured on the amount of time taken in seconds to process the comprehension questions. Six students took longer at post-intervention to process the questions (ranging from two to eight seconds). Kevin and Chris processed the questions faster and overall took one and two seconds faster respectively.

Table 4

*Individual scores on DRA subtests at pre- and post-intervention*

Name	DRA subtest	Pre-	Post-
Andrew	Accuracy	187	260
	Fluency	102	98
	Comprehension score	13	13
	Comprehension processing time (secs)	3.8	5
Chris	Accuracy	169	173
	Fluency	77	103
	Comprehension score	9	13
	Comprehension processing time (secs)	5.11	4
Harvey	Accuracy	128	221
	Fluency	108	73
	Comprehension score	7	11
	Comprehension processing time (secs)	2.6	10
Kate	Accuracy	160	174
	Fluency	89	88
	Comprehension score	6	7
	Comprehension processing time (secs)	4.1	6.3
Keiron	Accuracy	187	269
	Fluency	59	55
	Comprehension score	7	7
	Comprehension processing time (secs)	5.6	10.9
Kevin	Accuracy	221	256
	Fluency	73	57
	Comprehension score	9	12
	Comprehension processing time (secs)	8.7	6.5
Liam	Accuracy	133	253
	Fluency	110	83
	Comprehension score	10	16
	Comprehension processing time (secs)	2.5	6.1
Sion	Accuracy	156	160
	Fluency	102	89
	Comprehension score	7	6
	Comprehension processing time (secs)	5.6	10.9

Results for student self-perceptions as measured by The Self-Perception Profile for Children (SPPC) are illustrated in Figures 2, 3 and 4 across the domains of global self-worth, behavioural conduct and scholastic competence respectively. Each chart displays the scores for each individual student and depicts the norm-referenced scores for children of the same age group (shown as horizontal dashed line).



*Figure 2.* Illustrates the individual scores at pre- and post-intervention on the domain for global self-worth. Six out of the eight students scored more negatively for global self-worth at post-intervention. One student who scored higher at post-intervention exceeded the norm-referenced score. Half of the students scored higher than the norm-referenced scores (shown as a horizontal dashed line) at pre- intervention. However, at post-intervention all but two students scored more negatively, falling below this line.

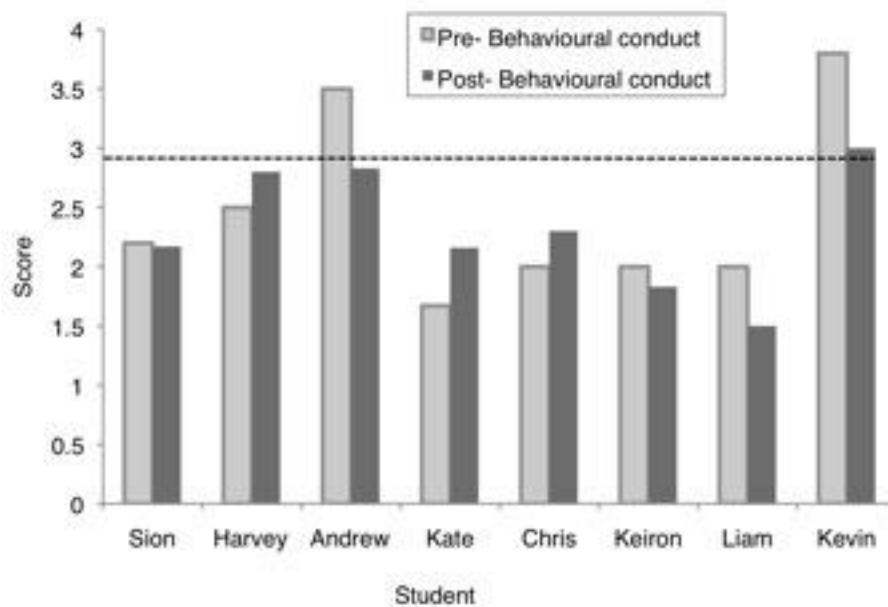
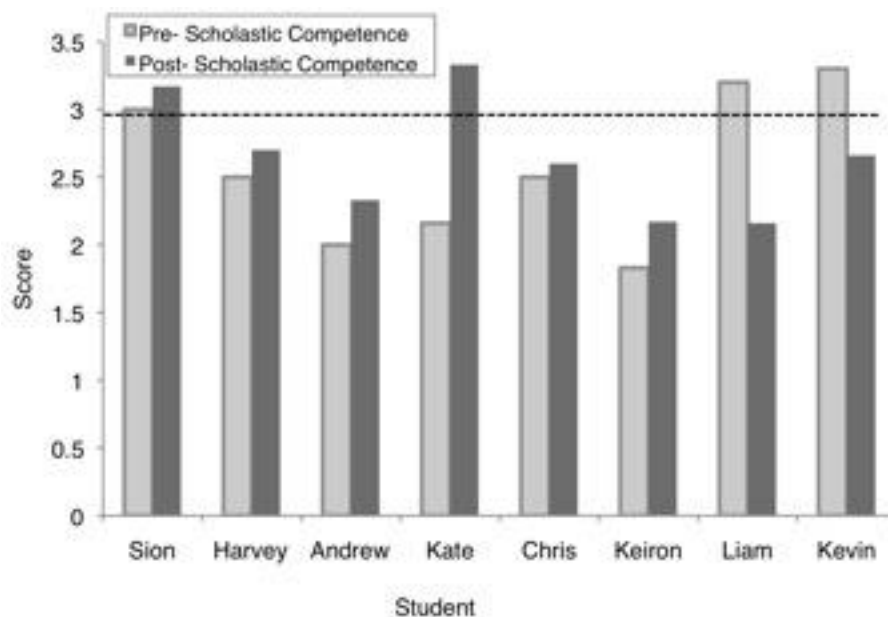


Figure 3. Shows the individual scores at pre- and post-intervention on the domain for behavioural conduct. Five students scored lower between pre- and post-intervention, rating their behavioural conduct more negatively at post-intervention. Two students scored higher than the norm referenced scores at pre-intervention and Kevin was the only student who scores above this threshold post-intervention despite scoring lower between assessments.



*Figure 4.* Illustrates the individual scores at pre- and post-intervention on the domain for scholastic competence. Six out of eight students rated themselves as being more competent or adequate post-intervention. Two students scored higher than the norm referenced scores at pre-intervention and Kevin was the only student who scores above this threshold post-intervention despite scoring lower between assessments.

### **Discussion**

All but one of the students made improvements between pre- and post- intervention according to the Diagnostic Reading Assessment. Four of the eight students were reading at or above their chronological reading age post intervention according to the DRA. These outcomes might be regarded to be an educationally significant improvement. Students on average increased the number of correct words read per reading passage (accuracy rate), whereas the number of words read per minute (fluency rate) decreased. We might infer from these preliminary results of reading accuracy and fluency that the students were taking more time and care to process each word as they read a passage and as a consequence they were on average making fewer mistakes.

On average, the number of comprehension questions that were answered correctly increased between pre- and post-intervention and students were found to take longer to answer the comprehension questions at post-intervention. This might indicate that the students may be applying the strategies they had learned through the MRC programme.

Student self-perceptions were measured pre- and post-intervention using the Self-Perception Profile for Children (SPPC) across three different domains; Global self-worth, behavioural conduct and scholastic competence.

Six out of the eight students scored more negatively for global self-worth at post-intervention. This means that the students were associating more with the negative self-perceptions (i.e., “other kids are often not happy with themselves”) than they were with the positive (i.e., “some kids are happy with themselves as a person”). Some possible reasons for this outcome might be due to them having a more realistic idea of their academic performance in relation to their average peer which therefore may have left the student feeling less happy with themselves in general. However, this is only an assumption and more research into the area of student self-perception following improved academic performance might shed more light on this issue.

In the domain of scholastic competence six out of eight students perceived themselves to be more competent following intervention than they did pre-intervention. This trend reflected their actual academic improvements except for Kevin and Liam who had in fact improved their reading performance according to the DRA, however, they still scored contrary to this on their scholastic perceptions.

Six of the eight students scored lower on their self-perception of their behavioural conduct following intervention. Therefore, students were relating more to statements such as “some kids usually get in trouble because of things they do” as opposed to “Other kids usually don’t do things that get them in to trouble.” It may be that the students’ scores on behavioural conduct were influenced by the fact that they knew the researcher had witnessed their behaviour over the course of the last four months and therefore answered the questions more honestly. It is possible that the baseline reports in this domain were less valid.



It is also important to reflect on the feasibility of using the MSER and MRC programmes with older students reading below their average reading age who attend a mainstream school. With the students were older than the targeted age range of the programmes (3 to 7 years for MSER and 8 to 9 years for MRC) we were concerned that the students might perceive the programmes as being too childish. Secondly, the students who took part in this study were regarded as having behavioural difficulties, and thus potentially disposed to noncompliance and disengagement from the class work.

Despite some initial remarks by the students about the programme being 'babyish' we did not find that the students reacted adversely to the programme. We did, however, experience some difficulties with regard to the way the students were behaving within the classroom. For example, it was common for students to argue and even fight with one another during a session; students would often leave their chairs and sometimes even try to leave the classroom without asking for permission, or having a valid reason. By the sixth week of intervention it became apparent that the amount of off-task behaviour experienced during each session was beginning to become a problem and if students were to complete intervention in an environment that was conducive to learning then their behaviour needed modifying. The token economy system was added to the intervention to reduce student's level of off-task behaviour. When a class outing was suggested as a possible reward all of the students agreed that they were happy with this. At the end of each session, the students were eager to find out score that the class had achieved for that session and whether they were on target to achieving their reward. In the absence of observational data, anecdotally students' off-task behaviours reduced and on-task behaviours increased following the token economy.

Some methodological weaknesses were encountered during this study, namely the relatively small cohort of students used (n=8) of students, therefore we are unable to

generalise our findings to the wider population of this age group. In addition, we did not evaluate the outcomes with a comparison group.

The decision to only include three of the six domains from the Self-Perception Profile for Children limited our ability to gain more information into other areas of an individual's self perception. Furthermore, because behavioural data was not sufficiently collected during the implementation of the Token Economy we were unable to establish whether behaviour improved over time. Also it would have been interesting to compare the behavioural data with the students self reported answers on the Behavioural Conduct item of the SPPC scale.

These data suggest that further research, using a controlled design, is warranted to explore the putative effects of the combined MSER/MRC intervention for secondary school students with reading difficulties. Given the difficulties we encountered in engaging the students in the programme it might be interesting for future research to investigate the outcomes of using the programme with a younger year group. This would help to identify the age boundaries of relative acceptability for the programme.

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**Chapter 5: An evaluation of online reading programmes as a literacy teaching aid for secondary students at risk of academic failure: A controlled study**



## **Abstract**

The purpose of the present study was to evaluate of the use of MimioSprout® *Early Reading* (MSER) and MimioReading® *Comprehension* (MRC) with a group of 11-12 year old typically developing students who were reading below their chronological reading age. Thirty-three students took part in the study, 19 received either the MSER or the MRC programme in place of their normal English lessons, and 14 students comprised the waiting list control group and received education as usual. Pre- and post-intervention measures included a reading ability using a standardised reading assessment (Diagnostic Reading Analysis; DRA) and student self-perceptions using the Self-Perception Profile for Children (SPPC; Harter, 1985). Compared to the control group students in the experimental group made significant improvements in reading accuracy and comprehension and in self-perceptions of scholastic competence.

The ability to read and write is one of the core skills of society today, those who are ill-equipped with these skills are likely to experience difficulties in many domains of a modern information driven society (Doyle, 1983). Children who do not read at a level expected for their age range will lack the ability to access the majority of what is taught in schools and will therefore have difficulty progressing through core curriculum areas (Barber, 1997). Research by Francis, Shaywitz, Stuebing, Shaywitz, and Fletcher (1996) and Torgesen and Burgess (1998) suggests that the poor readers at the primary education level almost invariably continues to struggle with reading at the secondary education level and throughout their adult lives. Poor literacy skills seriously disadvantage young people and greatly increase their risk of underachievement and truancy at school. Further more the child is at a higher risk of experiencing social exclusion and unemployment in later life (eg. Patterson et al, 1989).

The present study is based on the findings from a pilot intervention study that investigated the feasibility of using the MimioReading<sup>®</sup> *Comprehension* programme with an older cohort (mean age: 12 years 5 months) of typically developing students with reading deficiencies. Other than the pilot study there is no known published research that has investigated the use of the Mimio<sup>®</sup> programmes in an applied mainstream secondary school setting with typically developing students. Therefore the pilot study provided pioneering foundations on which the present study is based. There were a number of methodological weaknesses found within the pilot study that the current research attempted to address. This study investigates the use of both MimioReading<sup>®</sup> *Comprehension* (MRC) and MimioSprout<sup>®</sup> *Early Reading* (MSER) programmes. The pilot study used a relatively small group (n=8) of students and did not have a comparison group. The present study used a larger

cohort of students (n=33) that were divided between an experimental group (n=19) who received intervention, and a waiting list control group who received treatment as usual (n=14) (i.e., attending English lessons as normal). The present study was a year group younger (mean age: 11 years 5 months) than those in the pilot intervention. One issue that arose during the pilot study was that the 12-13-year-old cohort were difficult to engage in the Mimio® programmes. Therefore, the reason for working with a younger cohort was to establish the feasibility of engaging a group of 11-12 year old students. Both groups comprised of students who had been allocated to the lowest performing English set groups for their year. The school operates a system that separates each academic subject into tiers, ranging from set 1 that houses the most academically proficient students to set 4, housing the least proficient. All of the students in the pilot- and present study had been allocated to the lowest set group based upon their performance outcomes on school test results from the previous year. Despite that the students involved in the present research were a year group younger than those in the pilot study, both groups shared similarities in behavioural characteristics. Both groups of students presented with ‘problem’ behaviours within the classroom, such as non-compliance (e.g. refusing to complete class work) disruptive behaviours (e.g. talking out aloud, getting out of their seat without permission, hitting or being verbally abusive to peers and/or teaching staff). Therefore, the younger cohort group could be regarded to be on a similar trajectory as the students in the pilot study that were one year group older.

The aim of the present study was to investigate the use of both MimioSprout® *Early Reading* (MSER) and the MimioReading® *Comprehension* (MRC) programmes, extending on the pilot study by employing a larger group of students and comparing outcomes with waiting list control group who received treatment as usual. Six students were placed on the

MSER programme, five of who went on to MRC and achieve an average of 18 episodes. The present study used the same standardised reading assessment (the Diagnostic Reading Analysis; DRA) and measure of students' self-perceptions (using The Self-Perception Profile for Children; SPPC) as the pilot study.

## **Method**

### **Participants**

Once ethical approval was granted from the School of Psychology at Bangor University, 33 participants (referred to as students from hereon in) were recruited from a mainstream secondary school in North Wales, UK. The school identified the students to be academically underachieving (based on test outcomes taken from the previous school year) and placed the students randomly into two of the lowest English set groups. The experimenter then assigned the largest group (n 19) to become the experimental group. This group comprised of five males and 14 females aged between 11 years 2 months and 12 years (Mean: 11 years 5 months) at the time of pre-test. The smaller of the two groups (n 14) was allocated to be the waiting list control group (WLC). In this group there were seven males and seven females who's ages ranged between 11 years 1 month to and 12 years 3 months (Mean: 11 years 6 months) at pre- intervention. See tables 1 and 2 for the experimental and WLC group student information.

### **Setting**

Intervention sessions for the experimental group replaced four of their usual English classes per week. Intervention sessions lasted 50-minutes, the duration of a normal class. Intervention sessions were delivered either in the school library or the ICT (information and communications technology). The school library housed a total of ten computers and the ICT room houses 40 computers. The WLC group attended their usual English classes as normal.

## **Materials and Apparatus**

Materials included the MimioSprout® *Early Reading* (MSER) programme and the MimioReading® *Comprehension* (MRC) programme. There were 80 online episodes in MSER, which, on average, took 15-20 minutes per episode to complete, and 50 episodes in MRC that took approximately 20 minutes to complete.

Accompanying materials to the online programmes included, (i) Progress Maps (ii) Printable stories (including MimioSprout *Readers with Me Stories* and MimioReading *Comprehension Companion Books and Worksheets*), and (iii) *Completion Certificates*. Each student had their own folder where they kept their progress maps and any other materials such as worksheets and the Companion Books and they needed to keep safe, stickers were also used to cover each completed episode on the students progress map. The apparatus comprised of headphones, a computer that had Internet access, a web browser with a Macromedia Flash plug.

## **Design**

The study used a between subjects experimental-control group design. At the beginning of the school year students were allocated to class groups based on assessment data from standardised tests conducted the previous school year. The school where we conducted this research had two streams of classes within each year group of comparable ability levels. For the purpose of this study we worked with the lowest performing class in each stream (i.e., the lowest performing class in stream one and the lowest performing class in stream two). The largest group (n=19) was selected to receive the intervention, while the other acted as a WLC (n=14). The WLC group received the intervention in the following school year.

## Measures

### Diagnostic Reading Analysis

The *Diagnostic Reading Analysis* (DRA; Crumpler & McCarty, 2004) is an oral reading assessment designed for those between the ages of 7 to 16 years old. The assessment is a standardised measure of reading accuracy (total number of correct words read), fluency/reading rate (number of words read per minute) and comprehension, and provides standardised scores, percentile scores and reading ages for each participant. The DRA is made up of two parallel forms (A and B) which when used separately prevent practice effects during pre- and post- measures. Both forms are bound within one booklet that includes colour illustrations, which accompany each passage. The assessor first reads a short passage to the a child and then asks them questions immediately after; the number of correct answers the child makes determines where and at what level of difficulty the child will begin in the either form A or B. The assessor then listens to the child read a passage of text and records the number of errors the child makes on a separate recording form. The recording form is a copy of the form A or B with an additional section for the assessor to mark down the number of errors the child makes, the time it took for the child to read the passage and answer the comprehension questions and the number of questions the student answered correctly. The test is carefully structured so the child does not need to read every passage. Instead the administrator is instructed to direct the child to each passage according to their performance on the last until the child reaches a ceiling.

### The Self-Perception Profile for Children

Students were also assessed using *The Self-Perception Profile for Children* (SPPC; Harter, 1985). This is a multidimensional scale that examines children's perceptions of themselves across six separate domains: social competence, athletic competence, physical

appearance, behavioural conduct, scholastic competence and global self-worth. Students in this study were evaluated on their perceived adequacy and competence across three of the six different domains: scholastic competence, behavioural conduct and global self-worth. The tool was too long to be used in its full form alongside other measures, therefore only three of the six domains were incorporated. These domains were selected because they were most relevant to the focus of the intervention, which was to improve reading skills. In accordance, behavioural conduct and global self-worth were also chosen because they were thought to be subsequently influenced by possible improvements in reading performance.

The scale was structured as follows; the student was first asked to read two different statements that reflect two different types of children. One statement reflects a child that is less competent or adequate, for example, “some kids worry about whether they can do the school work assigned to them” whereas the second statement reflects a child that is more competent or adequate (e.g. some kids feel that they are very good at their school work. Each statement is specific to the particular domain it belongs to; the given examples were taken from the scholastic competence domain. Example statements from the behavioural conduct domain include “some kids usually get in trouble because of things they do BUT other kids usually don’t do things that get them in trouble” and examples from the global self-worth domain include “Some kids are happy with themselves as a person BUT other kids are often not happy with themselves.”

The student is required to make a judgement on whether they are more like the child in the first statement or the child on the second. Once they had chosen just one statement they are then asked to determine whether the statement is “sort of true” or “really true” for them.

The six items in each domain were counterbalanced, three items presented with the competent or adequate statements first and the second half were the less competent and



adequate statements. Subsequently, when scoring the completed scale the items are either scored in ascending (i.e., 1, 2, 3, 4) or descending (i.e., 4, 3, 2, 1). The total score for each domain was then divided by the number of items (i.e., six) to provide an average score, the lower the score the more negatively the student perceives their level of competency or adequacy. The student should have only marked down one choice for each item.

#### Interobserver agreement (IOA)

IOA was conducted on 25% of the pre- and post-interventions tests of the DRA assessments. IOA was calculated number of agreements (i.e., when both assessors agreed on the total number of words read) were divided by the total number of agreements plus the number of disagreements. This was then multiplied by 100 to give a percentage of agreement. The same procedure was carried out for IOA on comprehension scores. IOA for pre-intervention was calculated to be 95% for the DRA comprehension measure and 96% for the DRA accuracy measure. IOA at post-intervention was calculated to be 97.9% for the DRA comprehension measure and 96% for the DRA accuracy measure.

#### **Intervention**

Each student in the experimental group was required to complete the MimioSprout<sup>®</sup> *Placement Test 2*, a brief reading assessment that measures the percentage of words read correctly from a passage in a two minute period. The student was required to read the MSER story 'What lives in the sea?' The assessment was delivered by the instructor who records the student's performance as the total amount of words read accurately within a two-minute timed period. The student's performance on the placement test determined which programme the student should begin, and at which episode for those placed in MSER. Students unable to read more than 140 words at or above 90% correct words within two minutes, were placed at

MRC. Six students did not achieve this criterion and were placed at the appropriate level within MSER. See Table 1 below for each student's performance scores.

Table 1.

*The total number of words read in two minutes and the amount of errors made and the subsequent programme the student was placed for the experimental group.*

Student	Words Read	Errors	Programme
E-3	176	6	MRC
E-4	193	6	MRC
E-6	140	8	MRC
E-7	209	5	MRC
E-8	171	5	MRC
E-9	262	4	MRC
E-10	140	13	MRC
E-11	231	8	MRC
E-12	125	0	MRC
E-15	209	6	MRC
E-17	225	9	MRC
E-18	183	19	MRC
E-19	273	3	MRC
E-14	42	26	MSER Episode 1
E-5	168	121	MSER E41
E-1	108	10	MSER E57
E-13	98	21	MSER E57
E-16	138	9	MSER E57
E-2	138	9	MSER E57

## **Procedure**

### **Pre-intervention assessments**

Each student from the experimental and the WLC group met with a researcher one-to-one to complete a DRA assessment. The student was removed from their classroom and the assessment was delivered at a desk in an empty classroom with another member of teaching staff present. The DRA provides two parallel forms A and B, which allows for re-testing without having practice effects. Therefore, all of the students were tested on form A during pre-intervention assessment. Each assessment began with a brief explanation to the student, informing them that they would be recorded reading aloud to the researcher and also timed.

They were reminded to read the words carefully and without rushing, and also informed that they would be asked questions relating to the passage they had read and that they were able to look back over the passage when answering the questions. Students were asked for their names and date of birth, which was recorded, on the front of the DRA form. The test begins with an initial listening comprehension question, which determines at which passage the student should begin. The test administrator is then directed by the DRA in accordance to the student's performance as to which passage they should read next. Throughout the test administration the experimenter noted the amount of time taken to read each passage, the number of errors made and the time taken to answer comprehension questions and the number of comprehension questions and the number answered correctly.

Students were also asked to complete the SPPC scale at pre-intervention, this was delivered to the whole class as opposed to a one-to-one level. The SPPCs were delivered once all of the children had completed a DRA assessment. The researcher addressed the whole class and explained that they would be answering questions about themselves and that they should answer as honestly as possible, indicating their choice by circling one of the four possible answers on the scale. The researcher then read aloud each question and waited for the students to make their choice. At least one other researcher along with the teacher was present in the classroom during this time to answer any of the student's questions and help facilitate the process.

### **Intervention**

Before the students could commence the programme they had been allocated to they were required to complete the MimioSprout® 'Mousing around' introductory programme, which, enabled the students to become accustomed to the instructional language used within

the programme. All of the students successfully completed the brief exercises provided in the introductory programme and were therefore assumed competent to begin their first episode.

The students quickly entered a routine each session, at the beginning of each class the students retrieved their folders and headphones and sat at a computer. After accessing the Internet from the school server they would log on to either the MSER or the MRC programme using the log in details written in their folders and find their personal accounts.

The students followed the instructions provided by the programme, only putting their hands up to ask a question. The teaching staff and researchers were at hand to monitor class behaviour, answer questions and award stickers to those who had completed episodes. Prior to each session one researcher would log onto the Mimio<sup>®</sup> website and check the students performance from the previous session.

The Class-wide Performance Reports provide a summary of each of the students' performance as indicated by one of three colour-coded letters. An 'E' for excellent, means that the student answered 75% of the questions correctly on their first attempt, an 'S' for satisfactory meant that the student answered between 50% and 75% of the questions correctly on their first attempt, and finally an 'N' which means that the student answered less than 50% of the questions correctly on their first attempt. For those who received two consecutive N's or three consecutive S's their individual data would be examined to identify which particular area of the episode the student was struggling. The researcher would then decide whether the student would need further practice and ask the student to complete the relative exercises, or whether the student just needed to be reminded that they needed to concentrate on the instructions given to them and consider their answers carefully.

Intervention continued until two weeks before the end of the academic year, thus allowing enough time for post-intervention assessments to be taken. The intention was for all

of the children to at least complete the programme they were placed at. The students who began on MSER had the opportunity to then begin MRC however, given the relatively short time-scale of the academic year it was expected that it would be unlikely that a student would completed both programmes. All Thirteen students successfully completed MRC during this time; five of the six students placed at MSER completed the programme and began MRC; leaving only one student who did not completed 50 of the 80 episodes of the MSER programme. See table 2 for student progress through the relative programme/s.

Table 2.

*The table displays the students' progression through the MER and subsequent MSER programmes.*

Student	Programme	Episode achieved
E-3	MRC	50 (complete)
E-4	MRC	50 (complete)
E-6	MRC	50 (complete)
E-7	MRC	50 (complete)
E-8	MRC	50 (complete)
E-9	MRC	50 (complete)
E-10	MRC	50 (complete)
E-11	MRC	50 (complete)
E-12	MRC	50 (complete)
E-15	MRC	50 (complete)
E-17	MRC	50 (complete)
E-18	MRC	50 (complete)
E-19	MRC	50 (complete)
E-14	MSER Episode 1	MSER Episode 50
E-5	MSER E41	MRC Episode 15
E-1	MSER E57	MRC Episode 28
E-13	MSER E57	MRC Episode 1
E-16	MSER E57	MRC Episode 10
E-2	MSER E57	MRC Episode 36

### Post-intervention assessments

Following intervention all of the students completed the SPPC assessments and parallel versions of the DRA assessment. The same procedures were followed at pre-intervention.

### **Data Analysis**

A two-way mixed ANOVA was used to analyse the reading and self-perception scores generated from the DRA assessment and SPPC scale respectively. Outcomes at the individual level were also explored in addition to the group based statistical analysis, by using the Reliable Change Index (RCI; Jacobson & Traux, 1991). The RCI identifies whether an individual score has ‘significantly improved’ (at the .05 level) between pre- and post-intervention. When generating an index that can be regarded as a level that is significantly different, the RCI takes into account the group variation of scores and the stability of the measure over time. RCI was only calculated for students’ accuracy scores and was calculated by first working out the difference in students’ accuracy scores between pre- and post-intervention and then dividing it by the standard error of the difference. The decision was made not to include fluency scores because the DRA did not differentiate between correct and incorrect words when calculating fluency scores.

## **Results**

### *Group Analysis*

Mean scores on the Diagnostic Reading Analysis (DRA) subtests of accuracy, fluency, and comprehension pre- and post-intervention for the experimental ( $n = 19$ ) and WLC ( $n = 14$ ) groups are shown in Table 3.

A 2 (Group: Experimental vs. Control) \* 2 (Test Time; Pre vs. Post) mixed factorial ANOVA was used to analyse the DRA assessment components and scores of self perception

using the Self-Perception Profile for Children (SPPC) across the three different domains (scholastic competence, behavioural conduct and global self-worth).

Table 3

*Mean scores (M) at pre- and post-intervention for experimental and waiting list control groups.*

DRA scores	Experimental Group		Waiting List Control Group	
	Pre- Intervention <i>M (SD)</i>	Post- Intervention <i>M (SD)</i>	Pre- Intervention <i>M (SD)</i>	Post- Intervention <i>M (SD)</i>
Subtest				
Accuracy	148 (58.5)	200 (72.1)	180 (47.4)	196 (52.7)
Fluency	78 (32.9)	70 (20.6)	77 (19.8)	76 (18.8)
Comprehension score	8 (3)	10 (3.3)	9 (3.1)	10 (3)
Comprehension processing time (seconds)	6.14 (4.8)	7.62 (4.2)	6.31 (2.2)	5.84 (1.6)
SPPC scores	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
Scholastic competence	2.36 (.66)	2.86 (.52)	2.56 (.37)	2.59 (.67)
Behavioural conduct	2.81 (.52)	2.91 (.57)	2.93 (.47)	2.89 (.50)
Global Self Worth	2.88 (.78)	2.99 (.69)	3.05 (.36)	3.11 (.47)

These reading results mirror the outcomes that were found from the pilot intervention. On the whole, students in both the pilot intervention group and the students in the current experimental group all scored higher on accuracy and lower on fluency rate. Both groups also increased the number of comprehension questions they answered correctly post intervention and also increased the time it took them to process the questions and answer.

*DRA Statistical Analysis*  
**Accuracy**



A two-way mixed ANOVA revealed that there was no significant main effect of Group,  $F(1, 31) = .495, p = .487, \eta_p^2 = .016$ ; however there was a significant main effect of Test Time,  $F(1, 31) = 21.26, p < .001, \eta_r^2 = .407$ ; and a significant interaction,  $F(1, 31) = 6.20, p = .018, \eta_r^2 = .167$ . Although overall, scores in both groups increased over time, the increase was larger in the experimental group.

### **Fluency**

The number of words read per minute reduced for both groups between pre- and post-intervention. However, analysis revealed that there was no significant main effect of Group,  $F(1, 31) = .093, p = .763, \eta_r^2 = .003$ ; no effect of Test time,  $F(1, 31) = .769, p = .387, \eta_r^2 = .024$ ; and no significant interaction  $F(1, 31) = .601, p = .444, \eta_r^2 = .019$ .

### **Comprehension**

The average number of comprehension questions answered correctly increased between pre- and post intervention for both groups. However, analysis showed no significant main effect of Group,  $F(1, 31) < .001, p = .984, \eta_r^2 < .001$ . There was a significant main effect of Test time,  $F(1, 31) = 10.42, p = .003, \eta_r^2 = .251$ , with participants across both groups showing higher comprehension scores at post test. The interaction was not significant,  $F(1, 31) = 2.10, p = .157, \eta_r^2 = .064$ .

### **Comprehension processing**

Comprehension processing time increased for the experimental group and decreased for the control group. There was no main effect of Group,  $F(1, 31) = .468, p = .499, \eta_r^2 = .015$ , or Test time,  $F(1, 31) = 0.940, p = .340, \eta_r^2 = .029$ , and no significant interaction,  $F(1, 31) = 3.381, p = .076, \eta_r^2 = .098$ .

### *SPPC Statistical Analysis*

Self-perception scores were also analyzed using a two-way mixed ANOVA for each domain, scholastic competence, behavioural conduct and global self-worth.

#### **Scholastic competence**

The experimental group increased their scores on scholastic competence between pre- and post-intervention while the control group's scores decreased. A two-way ANOVA revealed that there was no significant main effect of Group,  $F(1, 31) = .040, p = .843, \eta_p^2 = .001$ ; and no effect of Test time,  $F(1, 31) = 2.244, p = .144, \eta_r^2 = .067$ . However there was a significant interaction,  $F(1, 31) = 5.185, p = .030, \eta_r^2 = .143$  showing that the increase in perceptions of scholastic competence increased in the experimental group only.

#### **Behavioural conduct**

The experimental group scored higher at post-test on behavioural conduct than at pre-intervention, whereas the WLC group scores remained relatively similar. According to the analysis there was no main effect of Group;  $F(1, 31) = .052, p = .820, \eta_p^2 = .002$ ; or Test time,  $F(1, 31) = .142, p = .709, \eta_p^2 = .005$ , and no significant interaction,  $F(1, 31) = .138, p = .713, \eta_p^2 = .004$ .

#### **Global-self worth**

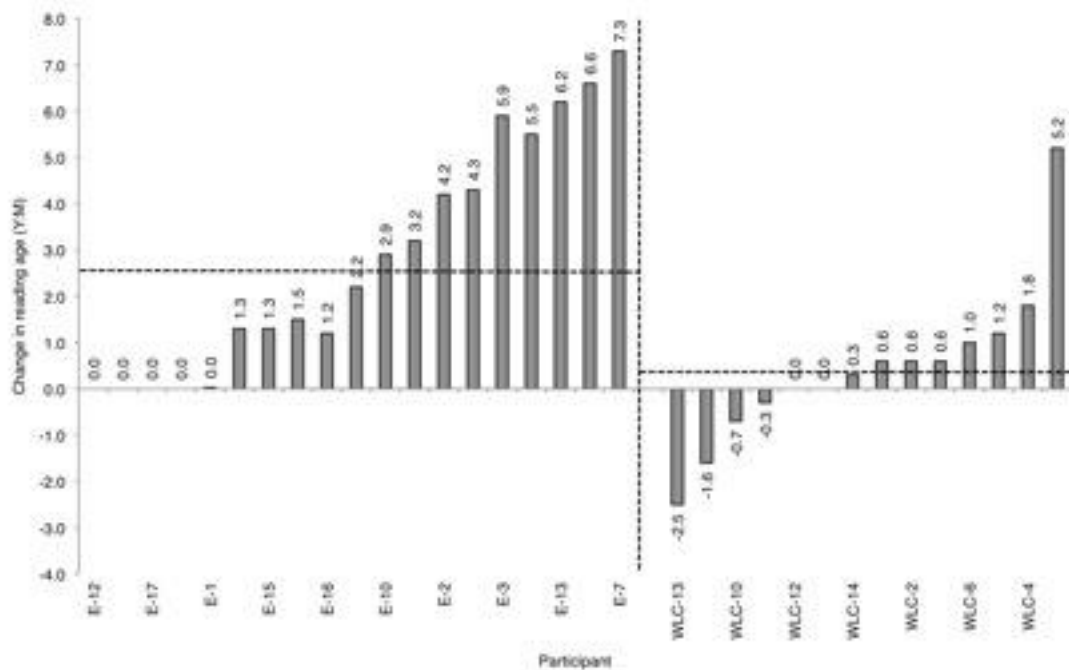
Both groups' scores on global-self worth increased between pre- and post-intervention. However, analysis found no main effect of Group;  $F(1, 31) = .172, p = .200, \eta_p^2 = .052$ ; or for Test time;  $F(1, 31) = .360, p = .553, \eta_p^2 = .011$ , and no significant interaction,  $F(1, 31) = .020, p = .890, \eta_p^2 = .001$ .

In comparison with the outcomes from the pilot study, the students' self-perception scores were not consistent with the scores from the present experimental group. The pilot study students on average scored higher on the scale for scholastic competence, mirroring the trend found in the experimental group scores. However, the pilot study students scored lower on the scale of behavioural conduct and global self-worth, whereas the experimental group student in the present study increased their scores on both scales.

*Analysis of individual performance*

**Reading outcomes**

The individual changes in reading age (post- minus pre-intervention reading age score in years and months) are presented in Figure 1.



*Figure 1.* The scores display reading age changes in years and months along the y-axis for individual students and are organized in ascending order separately for the experimental and WLC groups. Hashed lines show the mean group change. The data demonstrate that the

students in the experimental group made larger reading age increases (average increase of 2 years 7 months – ranging from maintenance of reading age – no change - to a 7 year 3 month increase). The students in the WLC group made a 4-month mean overall improvement on their reading ages (ranging from a reduction in reading age by 2 years 5 months to improving by 5 years 2 months).

A Reliable Change Index (RCI) was also used to demonstrate the significant changes of individual accuracy scores at pre- and post-intervention between the experimental and WLC groups (see Figure 2).

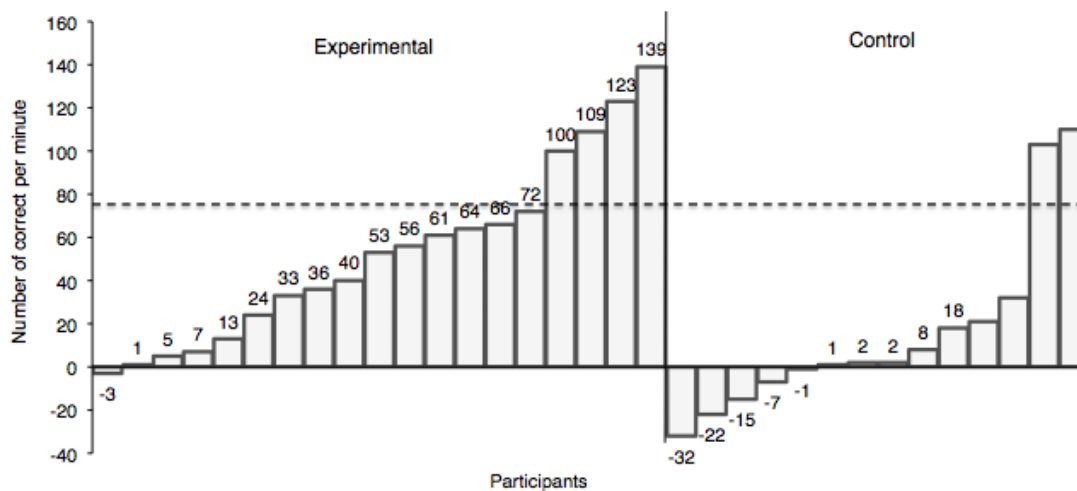


Figure 2. Displays the individual data for the change in accuracy scores between pre- and post-intervention for the experimental and WLC groups. The dashed horizontal line illustrates the level measured by the *Reliable Change Index* (RCI) regarded to be a significant level of improvement. Four students in the experimental group exceeded this threshold and were therefore considered to have made significant gains. All of the other students made gains following intervention except for one who read less accurately at post-intervention. Of

the WLC group, nine students made improvements, two of which exceeding the level of improvements indicated by the RCI. Five students from the WLC read less accurately at post-intervention.

## Discussion

Following a five-month intervention period our results suggest that teaching the students using the MSER/MRC programmes led to improvements in reading in the experimental group compared to the controls. Seven students in the experimental group exceeding their age appropriate levels and were reading at least one year above their chronological ages at the end of the intervention period.

At pre-intervention the WLC group, on average scored higher on the DRA assessment for accuracy than the experimental group. When the students were tested again post-intervention the experimental group outperformed students in the WLC group and were reading more accurately.

A visual display of the accuracy scores was plotted on the *Reliable Change Index* (RCI) graph (Figure 2), which displays the difference in scores for accuracy at pre- and post-intervention for each individual student. Only one student in the experimental group did not make an improvement on reading accuracy at post-intervention. Four of the students made significant levels of improvements as measured by the RC Index. Individual scores for accuracy in the WLC group showed that five students read less accurately at post-intervention. From the statistical analysis and the RCI we might infer that intervention had a positive effect upon the ability to increase overall accuracy of reading. Although, the MRC programme did not specifically provide instruction on developing reading accuracy, the

students were given adequate opportunity to practice their reading skills when following the comprehension tasks (e.g., reading through numerous passages to derive answers to the questions). Our findings that demonstrate improved accuracy scores supports previous literature, such as Hughes, Beverley, & Whitehead, (2007) who claim that the measures of Precision Teaching that build fluency therefore increase accuracy rates. The MRC programme incorporates PT fluency building through the ongoing monitoring of student responses (i.e., number of correct/incorrect responses), and consequently adapting instruction according to the students' performance. This procedure might have taught the students in this study to re-read the passage more carefully after being informed that they had made an incorrect response and were required to make another attempt at the question.

Interestingly, both groups decreased the total number of words read per minute when tested post-intervention. The experimental group made a greater reduction in the total number of words read than the WLC group, and although not significantly different there was an interaction found within the statistical analysis. Lower fluency scores indicate that words are being read slower; according to Hasbrouck and Tindal (2006) a typically developing 11 to 12 year old child should have a fluency rate of between 98 and 127 words per minute. On this assumption, the students in this study were reading below their expected age average even following intervention. However, the reduction in reading fluency may not necessarily be a counterintuitive outcome. It may be an indication that the students are taking more time and care to decode the written text (Stahl & Kuhn, 2002), the improved accuracy scores also adds support to this case.

Another possible explanation for the reduction in fluency scores could be due to students reading more complex passages in the post-intervention assessments thus slowing

down the fluency rate. Stahl and Kuhn (2003) suggest that when text difficulty increases, fluency rate decreases. The DRA assessment directs more competent readers towards more difficult passages until they reach their ceiling, consequently with the experimental group improving on their accuracy scores they were progressing further through the assessment and therefore accessing progressively more difficult text.

The experimental group performed marginally better on the test for comprehension when compared to the WLC group over time. These results mean that the experimental group answered more comprehension questions correctly than the WLC group. We may therefore infer that the students who had received intervention and taught explicit comprehension strategies were applying these skills during the post-intervention assessment. However, not all of the students completed MRC, which focussed specifically on comprehension.

The average amount of time it took students to answer the comprehension questions increased in the experimental group and decreased in the WLC group between pre- and post-intervention. Although these differences were marginal (a couple of seconds difference) and were not statistically significant the experimental group scores were closer to the level of significance than the WLC group were. The increase in post-intervention comprehension processing times might mean that the students in the experimental group were employing the comprehension strategies and therefore taking longer to consider their responses.

Student's self-perceptions were measured using the SPPC scale prior to and following intervention to examine whether there would be any change in attitudes according to possible changes in reading performance. Results found that the experimental group scored higher at post-intervention on scholastic competence than at pre-intervention when compared to the WLC group, thus demonstrating a significant interaction. The improved self-perception on scholastic competence might have been a direct reflection of the students improved reading

abilities. These findings corroborate findings that suggest that student's self-perception is influenced by their academic achievements (Byrne, 1984; Gold and Mann, 1984; & Ruble, Boggiano, Feldman and Loebl, 1980).

Both groups' scores on global-self worth increased between pre- and post-intervention. Whereas scores on behavioural conduct decreased in the WLC group and increased in the experimental group between pre- and post-intervention. However, the differences in scores were very small and statistical analysis revealed that they were not significant.

The findings of the present study provide additional support to the existing literature on the efficacy of Mimio<sup>®</sup> programmes (Layng, Twyman & Strikeleather, 2003; Layng, Twyman, & Strikeleather, 2004). Extending on this research the present study provides an insight into a previously un-researched area of using these programmes with typically developing older children.

However, with a relatively small sample size and a lack of a randomised controlled trial we should view the findings with a certain amount of caution. Furthermore, running a study such as this within an applied setting generated some difficulties; we mainly encountered logistical problems associated the timetabling intervention sessions. Therefore, future research should investigate these encouraging findings with a larger sample and a randomised sample. A further study with more focus on academic self-perceptions and possibly a measure of behavioural conduct is therefore suggested.

To conclude we found that this study, which was based on an initial pilot study conducted in the same school with a smaller group (n=8) of struggling readers, reflected similar positive outcomes. We found that the students in the experimental group improved on



their reading abilities as measured by the Diagnostic Reading Analysis assessment. The students made significant improvements on their accuracy and comprehension scores and 15 of the 19 students in the experimental group made gains on their reading ages, seven of these students were reading above the level expected for their age. We did not find that students reacted adversely to working on a programme that was targeted towards a younger age group.

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## **Chapter 6: Discussion**

## **Discussion**

### **Broad Overview**

Ensuring that every person within society has an equal opportunity to learn and build upon basic reading and writing skills is a sure way to maximize the positive life outcomes that the individual will experience, which, in turn has a favourable effect on the wider society. A wealth of literature exists, evidencing the relationship between low basic skills and negative associated outcomes such as unemployment, poor mental and physical health, and crime (Bynner & Parsons, 2001; Bynner, McIntosh, Vignoles, Dearden, Reed, & Van Reenen, 2001; Miech, Caspi, Moffitt, Wright, & Silva, 1999). Such factors often coincide and interrelate and contribute to disengagement from educational achievement and work activities common in conventional society.

The aim of this thesis was to contribute to our knowledge in ways we can impact educational success with populations that have typically failed and struggle to engage in education and other forms of personal development with respect to the job market. This thesis has begun to extend on finding ways to improve the basic reading skills in older children and adults by examining effective teaching methodologies and by also understanding the motivations and barriers that might exist to adult education. All of the research was carried out within applied settings using a mixed methods approach, combining qualitative and quantitative research methods.

The structure of the thesis can be separated into two parts. The two studies in part 1 focused on adults, many of who could be regarded as being socially excluded (i.e., they were either long-term unemployed, had a history of offending, a lack of or low level basic skills).

The second part of the research involved working with a group of young adolescents (aged between 11 and 14 years) who were at risk of failing in mainstream academia. Many of these adolescents were at increased risk of poor educational outcomes and the associated risk of poor life outcomes as noted previously. Although taking data specifically on offending behaviour was beyond the scope and resources of this project, all of the studies recruited participants who had either a history of offending or were at a disproportionately higher risk of doing so.

During the initial stages of research I received training and first hand experience of working at Nacro - the crime reduction charity that part funded this research. During this time I learned about partner organisations, gained an understanding of how basic skills were assessed and delivered and was able to meet many of those who used the services. Working alongside staff at Nacro and meeting service users helped to inform the conception and development of the first two research studies in particular and recruit participants through their service. From this research it became clear that educating adults was of great importance not only to those individuals, but to society as a whole; the social and financial cost of offending are incalculable, and the focus on 'dynamic' factors (Bonta, 1996), such as education, seems to be an effective approach to alleviating these issues. That said, ensuring the successful education of children is imperative as a preventative means to reduce the likelihood that they will be affected by the negative outcomes (i.e., unemployment and crime) in later life.

It was around the mid-point of the PhD I was beginning to explore alternative avenues of research that concerned conducting reading interventions with vulnerable groups before they reached adulthood. The shift in focus away from the adult population to working with a younger cohort was due to a combination of both pragmatic and academic factors. First, the



close relationship with Nacro staff was becoming more difficult to maintain simply because a number of key staff had left the company and it was proving more difficult to create new productive relationships. Second, the opportunity to conduct research with a group of adolescents who had reading difficulties in a large mainstream secondary school arose because we had a good working relationship with the local education authority and heads of schools locally. And third, during the early experience of induction and working with Nacro and the findings from the first two studies, it became clear that the problems faced by adults had clearly not started in adulthood, and a key milestone in the 'journey' to educational failure was the end of primary and the start of secondary education. Although it was clear that we would not be able to answer longitudinal questions about the outcomes of earlier interventions with those at risk, I became very interested in the possibility of possibly impacting young adolescents who came from disadvantaged catchment areas and who had already started to show clear signs of educational failure.

## **Chapter Analysis**

**Study 1 (chapter two)** was an investigation into the use of the Toolbox for Literacy<sup>®</sup> reading programme with three adults who had a reading ability below that of a typically developing 11 year old. This study involved working one on one with three adults, one male aged 34 and two females aged 43 and 22 years old. Two of the participants had a history of offending while one was classed as long-term unemployed. The objective of the intervention was to assess the feasibility of using such a programme with adult learners, and to improve their reading skills. Combinations of continuous measures were taken throughout the intervention period along with a normative standardised reading assessment that measured

reading progress at pre- and post-intervention. The intervention lasted an accumulated 36 hours distributed between four and six months. Results yielded increases in reading performance measured using continuous progress assessments in each participant. Two of the three participants made at least one level gain between pre- and post-test on the norm referenced reading assessment.

The findings of this study added to the limited research that looks at using manualised reading programmes with adults and more specifically, adults at a disproportionately higher risk of offending behaviour. By conducting the research in an applied manner (i.e., actually running the reading programme with adults with reading difficulties) as opposed to conducting desk-based research we were able to identify the successes and difficulties encountered when applying a programme such as this.

The findings of this study offer some preliminary evidence that the Toolbox Series could be beneficial as a literacy intervention for adults. In addition the results of this study add to the body of research evidencing the efficacy of DI and PT as effective teaching reading techniques (see, for example, Adams & Engelmann, 1996; Carnine, Silbert, Kame'enui & Tarver, 2009; Kubina, Common & Heckard, 2009; National Reading Panel, 2000). Anecdotally, the participants become increasingly engaged in the programme. This I believe was due to the use of the techniques of DI and PT instruction, and having explicit targets broken down into achievable goals, achieving goal highly rewarding. Participants were at first very difficult to engage - participants often provided reasons as to why they would be unable to stay for the full session that ranged from dentist appointments to suddenly remembering that they had left the back door unlocked. However, once the session commenced and both researcher and participant were working through the programme together they usually stayed until the end. At times participants even asked to stay an extra

hour or to at least stay long enough to complete another lesson before they left. One participant, who was the mother of five children, explained how she “hated reading and writing” and had developed strategies to avoid it at all costs. At the start of the study this particular participant was the most difficult to engage. Initially it was not uncommon for her not to turn up to sessions and sometimes unexpectedly leave during the middle of a session through frustration. However, by the midpoint of the study she began to make significant progress and in her own words “get it”. At the end of intervention she wrote a letter of thanks to the researcher expressing her gratitude for the opportunity to take part in the study, explaining that it had given her a “second chance” and most importantly it had given her the skills and “confidence” that she felt she needed to help her children with their homework. Anecdotal evidence also suggested that participant’s felt better equipped and more motivated to find a job following intervention.

A limitation of this research included the small number of participants that we used. The primary reason for not recruiting any more than three participants was because there was only one researcher available to deliver the programme. Each participant received 36 hours of tuition across a 12-week period and met with the researcher between once and three times per week. Given that the researcher also needed to factor in preparation time before each session three participants was decided to be a practical amount. Although the Toolbox Series for Literacy programme can be used to teach a class of students simultaneously, instruction was delivered one-to-one during this study. The reason for this decision was primarily due to the logistical implications of getting all three participants together at the same time. The primary difficulty we encountered during this study was getting the adult participants engaged in the reading intervention. Participant attendance was low particularly during the initial stages of

intervention. It was not uncommon for participants not to show up to pre-arranged session times without prior warning. In addition all three participants lived in three separate towns and therefore it was more practical for the researcher to drive to the respective areas to deliver sessions as opposed getting all of the participants together. Consequently, we failed to investigate the feasibility of delivering the programme to a class of adult learners.

Furthermore we did not measure post-intervention outcomes, which may have included, employment status and continued education, which meant we were uncertain about whether there were long-term effects following this brief intervention.

Study 1 examined the use of the Toolbox Series for Literacy to improve the basic literacy skills for three underperforming adults. Further research may wish to evaluate the use of the programme with larger numbers of a similar population and delivered the programme to a group as opposed to on-to-one. It may also be interesting to explore post-intervention outcomes such as employment status and continued education. Further research into systematic instructional programmes such as the Toolbox Series may reveal further support for their effectiveness in teaching an adult population.

Overall the Toolbox Series for Literacy programme is based on two highly researched and evidenced based approaches (DI and PT) to teaching literacy and can be purchased easily and for a relatively small amount. A programme such as this may be of significant value to services that have limited resources and the added pressure to use programmes that are backed by evidence.

This first study highlighted some of the difficulties of engaging adults with reading difficulties, who I found to be eager to want to improve their reading skills but often found it difficult to attend sessions and commit entirely to the programme.

This informed the formation of the second study that set out to investigate the perceptions of adult learners, potential adult learners and educational service providers surrounding barriers to adult education.

**Study 2 (Chapter 3)** documents a qualitative research study that used a semi-structured interview design to interview eight educators and ten adult learners about their perceptions that adult learners face when trying to enrol on a course. A total of eleven hours and 40 minutes of interview data was analysed using the Thematic Content Analysis (TCA: Braun & Clarke, 2006). From the data three themes emerged: (i) The impact of low academic achievements on later life, (ii) Motivations to engage in adult education and, (iii) Barriers to adult education. There was high congruence between the learners and the educators, although they differed in the importance of particular barriers to education. For example, educators spoke of the negative attitude and low self-confidence of learners, whereas learners spoke of financial and practical issues that prevented them from engaging in adult education courses. We found that participants reported a number of barriers that were consistent with previous research (Bates & Aston 2004; Beder, 1991; Cross 1981).

One of the methodological weaknesses of this study was that only a small number of participants was recruited from a relatively limited area of North Wales. Therefore, we cannot assume that the results drawn from this study are representative of the general population. In addition the adult learners that took part in this study were already accessing

support from a service that offered financial, housing, and educational advice and information. Therefore, the participants had already been exposed to and / or had access to information on the adult education courses that were available. It is therefore possible that adult learners and potential learners who were not in contact with such services and therefore did not have access to information would report different types of barriers.

Study 2 explored the perceptions of adult learners and potential learners and educational providers using a small number of participants. The findings, therefore, should be approached with caution. However, the themes drawn from the participant responses did mirror previous findings (Bates & Aston, 2004; Beder, 1991; Cross 1981). Future research might explore similar perceptions with the same groups using a larger number of participants and recruit from a wider regional area. It may also be interesting to investigate the types of provisions and incentives that organisations provide as a means of increasing participation and attrition rates, and how effective these are. Our findings demonstrated that there was a discrepancy between what the learners and educators perceptions surrounding particular barriers. The key differences were that educators placed more importance on practical assistance, such as childcare and financial support whereas educators placed more emphasis on internal attributes, such as increasing the self-confidence of learners. It would be interesting to investigate whether the educational provisions actually reflect this perception. Therefore, future research might examine the resources educational providers make available to learners or potential learners to improve participation rates. In practical terms, research such as this might help to inform providers of educational courses policy makers on how best to focus their resources.

**Study 3 (Chapter 4)** was a practice-based pilot evaluation of MimioReading<sup>®</sup> Comprehension (MRC) and MimioSprout<sup>®</sup> Early Reading (MSER) with a small group (n=8) of 12-13 year old mainstream students who were reading below their chronological reading age. The intervention involved implementing the reading intervention (i.e., MER and MSER) with eight students who had been identified by the school to be failing academically and who had behavioral difficulties. The students received intervention for five months in place of their normal English lessons. Students were assessed at pre- and post-intervention time using a standardised reading assessment (Dynamic Reading Analysis, DRA). In addition students' self-perception was measured pre- and post-intervention using the Self-Perception Profile for Children (SPPC). Results found that all of the students made improvements in their reading abilities according to the DRA between pre- and post- intervention. In terms of self-perception, students scored lower (i.e., rated themselves more negatively) on the measure of global self-worth and behavioural conduct post-intervention, whereas there was no change in their perception of scholastic competence between pre- and post-intervention. Anecdotal, evidence from the teaching staff suggested that the behaviour of the students who took part in this study had improved throughout the course of the intervention. During an interview with one of the teaching staff that was most involved with the study she stated: (see appendix E for the full transcript of the interview).

“I’ve seen enormous changes in all of the individuals in the group. From when they started to when they finished . . . I think the most significant change has been behavioural changes from the way they interact with each other . . . Their behaviour was challenging in a way that I don’t usually get in a class. They found it very difficult to even sit next to one another and interact with each other . . . The MimioSprout really grew on them and they went

into the phase of being interested and then suddenly after a couple of lessons we got to the point where everybody was quiet and working.”

During this study we encountered a number of methodological limitations, namely the relatively limited group (n=8) of students used and the lack of a comparison group. Conducting research within applied settings also meant that we could not exert the same control over variables that would otherwise be possible in a laboratory environment. We were therefore met with a number of methodological weaknesses. (Further difficulties relating to the applied nature of this research are discussed in more detail in study 4 along with implications for future research).

**Study 4 (Chapter 5)** continued the theme from study 3 in the evaluation of the use of MimioSprout<sup>®</sup> Early Reading (MSER) and MimioReading<sup>®</sup> Comprehension (MRC). However, the group of students in this study older cohort (mean age: 12 years 5 months) of typically developing students with reading deficiencies. Thirty-three students took part in the study, 19 received either the MSER or the MRC programme in place of their normal English lessons, and 14 students comprised the waiting list control group and received education as usual. Pre- and post-intervention measures included a reading ability using the same standardised reading assessment as the pilot study (Diagnostic Reading Analysis; DRA) and similarly student self-perceptions were also measured within this study using the Self-Perception Profile for Children (SPPC). Results of this study found that the experimental group made significant improvements in reading accuracy and comprehension in comparison to the control group. In addition students in the experimental group increased their self-perception scores of scholastic competence at post-intervention.



Study 4 attempted to address some of the methodological weaknesses encountered within study three, and a larger sample size (n=33) was used however this number could still be regarded as being relatively small. The students in this study were not randomly selected into groups, with this in mind the findings should be approached with a certain amount of caution. During the course of studies 3 and 4 we encountered a number of logistical difficulties when implementing the intervention into the structure of the school timetable. The sessions for the experimental group replaced the students' normal English lessons; however, because intervention required each student to have access to a computer we needed to negotiate a fixed weekly time slot into the library timetable. Difficulties were also encountered when taking the pre- and post- assessments with the control group students because it was necessary to take the control students out of their normal lesson time. The majority of staff were happy for this to happen following a polite email that requested that we take up to three students out of their lesson for approximately 15 minutes; some members of staff however were less willing for us to do this.

Despite the issues encountered through conducting research in applied setting, a great deal of important information and experience was gained throughout this time and was therefore regarded as a worthwhile exchange.

Further research might replicate studies 3 and 4 and enhance the research we conducted by addressing the methodological weaknesses. Evaluating the use of the Mimio programme with a larger sample of a similar population may be a valuable starting point.

Although study 3 implemented an additional token-economy to keep the students on task no data was taken on this aspect of the design. Anecdotally we found that students' off-task behaviours reduced and on-task behaviours increased following the token economy, however a study with more focus on academic self-perceptions and possibly a measure of behavioural conduct might yield some interesting results with respect to students changes in perception and their actual behavioural conduct within the classroom. Future studies could also investigate the effects of the Mimio<sup>®</sup> programmes separately. During study 4 in particular when more students (n=5) completed a number of episodes from MimioSprout<sup>®</sup> Early Reading (MSER) before beginning MimioReading<sup>®</sup> Comprehension (MRC), we did not evaluate students reading performance after they completed the first programme.

The preliminary findings of Study 3 and 4 offered support of the use an online reading programme with adolescents at risk of academic failure. Although the Mimio<sup>®</sup> programmes were developed for a younger age range studies 3 and 4 demonstrated that children between the ages of 11 and 13 were happy to engage. Therefore it might be interesting for future investigations to evaluate the use of the programmes with older children to distinguish the ceiling age of acceptability for typically developing children. Rolling out the programme in a mainstream school, either as an alternative or as supplementary instruction to help students falling behind academically to catch up with their peers.

## **Conclusion**

Those who leave compulsory education having not received the minimum level of qualifications should have multiple opportunities to revisit academia and gain an education. However, such adults must be first made aware of such opportunities, and encouraged to take

part. Similarly, the instructional teaching methods used within adult education programmes should also be based on solid research foundations to prevent this. However, these individuals should not have fallen through the academic net as children and interventions should have been put in place within compulsory education. Prevention is always better than cure. Thus early intervention for children at risk of academic failure should be implemented.

According to the National Reading Panel (NRP; 2000) children who do not gain essential reading skills (phonics, phonemic awareness, fluency, vocabulary and comprehension) before the age of seven will have a 90% probability of remaining a poor reader throughout the rest of their school career and into adulthood. Therefore, it is essential that the children who struggle academically receive immediate intervention to remediate their deficits so that they become competent readers (Biancorosa & Snow, 2004) and are therefore better able to understand the curriculum material that gets progressively more difficult through each school year (Barber, 1997).

Carnine (1991) argues that educational policy-makers who are ultimately responsible for ensuring the field of education implement the same rigorous scientifically informed methods and technologies. Unfortunately however, there is a lack of research that investigates the effective interventions that are designed to increase reading attainment of older children and adults (Brooks, Miles, Torgerson, & Torgeson, 2006). Therefore, there is an urgent need to investigate the types of teaching methods that are already in practice, the methods of teaching they use and the measurement system by which success is measured. This information will enable us to discover the most effective methods so that governments and policy makers can mandate that educational providers only implement effective teaching methods into schools and adult education provisions. Ben Goldacre recently stated that there was a desperate need to develop and cultivate evidence based teaching culture, allowing the

teaching profession to become “[. . .] free from governments, ministers and civil servants who are often overly keen on sending out edicts, insisting that their new idea is the best in town” (Goldacre, 2013, p. 7).

The investment in and implementation of effective teaching methods that are based on evidence-based research methods should ensure all learners receive the best possible chance at gaining a sufficient education that equips them with the necessary skills to enter the workplace, whether it be as a manual labourer or an office worker.

The primary focus of this research was to explore the ways in which basic reading skills can be improved in those who did not achieve them during the early years of formal education. The overarching theme of this research was to focus on the use of effective evidence-based methods of teaching basic reading skills that can be applied successfully in real life settings. Over the course of the research it was necessary that we incorporated a combination of quantitative and qualitative methods of research to insure we met our investigation aims. We initially focussed on working with adults who had not achieved the minimum level of qualifications that are necessary to function effectively in modern society. During the first study a common issue arose, whilst evaluating the use of a reading programme with three adult struggling readers, we soon found that all of the adults who took part were lacking the motivation to learn and improve their reading skills. In an attempt to explore this issue further we developed a second study, which used a qualitative research method. Using the semi-structured interview design we were able to effectively investigate the perceptions of potential adult learners and service providers surrounding motivations and barriers to adult education.

One of the barriers reported by the participants was the fact that they felt they did not want to return to education because they had had a negative past experience during their compulsory education years. This led us to turn our focus towards working with a younger cohort, in particular those at secondary school age. We wanted to establish whether it would be feasible to use an online reading programme (MimioSprout®) with secondary school children to improve their reading skills. Despite the fact that the children ranged between 11-14 years of age we still regarded these studies to be an early intervention that is relative to the adult interventions. It is therefore important to identify those children in secondary education who have already ‘fallen through the net’ and apply effective evidence-based interventions to remediate their reading deficits.

This research extended on the current research through evaluating and examining effective teaching methodologies with those who had not been previously tested. We also extended on research surrounding motivations and barriers to adult education and provided foundation research into the differences that might exist between service users and service providers.

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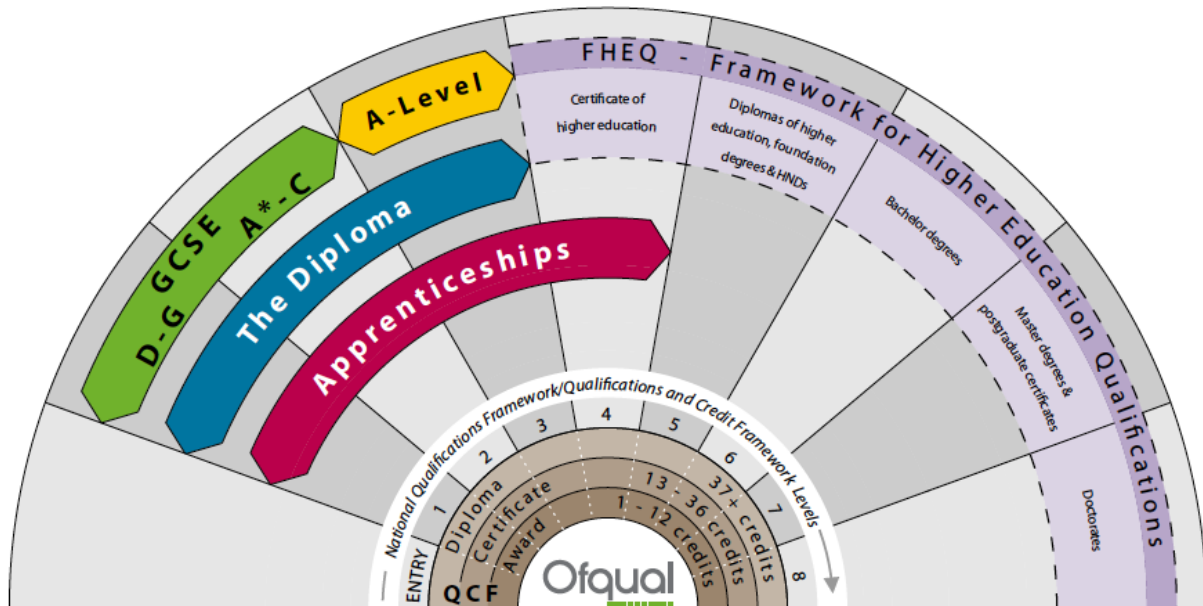
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## Appendix A

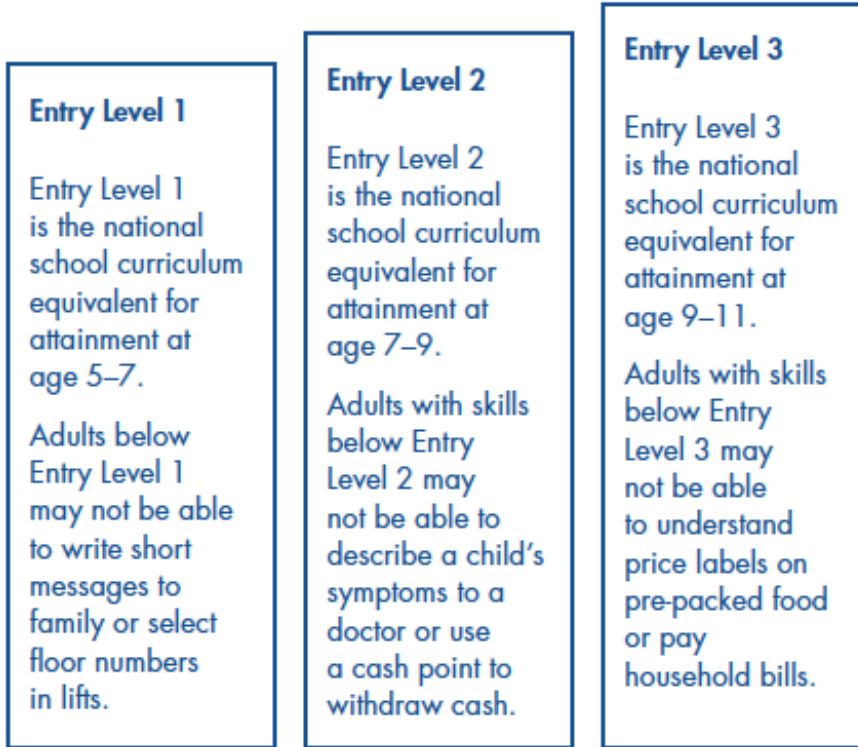
Diagram illustrating the different levels of accredited qualifications.  
<http://ofqual.gov.uk/help-and-advice/comparing-qualifications/>





## Appendix B

Diagram illustrating the levels that precede Level 1.



## Appendix C

### Motivaider®



## Appendix D

Transcription of interview: Amy (A) and member of teaching staff (F).

12/7/2013.

A: So I just want you to give me an overview of whether you see any differences in the children before and after the Headsprout programme.

F: Erm I've seen enormous changes in all of the individuals in the group. From when they started to when they finished. I think the most significant change has been behavioural changes from the way they interact with each other and the way that they have become more confident. Like if they've got a piece of text in front of them then they would just not look at it or . . . So I taught the group last year. I had them twice on a Thursday, and I found the experience really disturbing . . . and I'd been teaching since 1984 and probably they seemed to me to be the weakest class that I have ever taught in terms of literacy. I was teaching them music where you would hit literacy every now and again. Also I taught them for my only non- for a subject outside of our own training, which was RS.

A: Right

F: So we had to do reading and writing and access the normal literacy skills you'd expect from that sort of a group. So I was given a scheme of work that I had to work with which would have been suitable for them in year 7 which included things like reading PowerPoint looking at simple pieces of text, discussing ideas, answering simple kinds of comprehension type questions. Erm. And I found initially in RS it was for a start too difficult for them. I had

to do very simplified versions of them (PowerPoint). Then when they had to write in the books they were unsure . . . because they couldn't read properly they I had to ask what to write. A lot of the time they couldn't. You had to give them alternatives to the lesson and keep them engaged with lots of different ways of working. Trying to get the same idea across. It was almost as though they were giving up. Their behaviour was challenging in a way that I don't usually get in a class. They found it very difficult to even sit next to one another and interact with each other. So it was a very basic level. Erm, what else? Oh yes and it was at that point I think that I spoke to (researchers name) because to me, if you can't read what's in front of you or write down what's in front of you then... They just seem to be struggling and crying out for help. I knew that setting up this type of project in the school would be really hard, and that we'd have to jump through so many hoops, try to make it work within the tight timetable of a school. I knew we'd also be upsetting a number of people along the way too. So I think when we first started off Headsprouts they actually had a similar sort of approach. They were of course a little bit older by this stage but it was still sort of interaction they had with one another, that they weren't able to listen to each other to respond, they talked over each other. They bickered there was this competition with each other, erm quite aggressive. They weren't even terribly excited about working at a computer because I think what had happened was probably by the time they'd got to about the end of the year 7 was that a lot of the other teachers had been finding something similar so they were looking for a lot of different ways and they probably thought that if they had stuck them in front of a computer they would engage. But in fact there was probably less interaction but I think with Headsprouts there was constant interaction. Not just with the computer, because there was yourself, (name of second researcher) and (name of third researcher). You know

lots of people asking questions and trying to get them back on task, I think having the headphones worked.

A: yeah, yeah.

F: There was. They definitely needed them . . . and they were terrible at listening. I think what was great about the group was that they didn't edit what they said. They just said what was in their heads, usually they wouldn't bottle things up. So when they were irritated we knew about it. When they were hungry we knew about it and we knew they couldn't sit still because somebody had hit them the previous lesson, and they would tell us. So there was something quite unique about their honesty. Which come across in them disclosing things that were actually quite personal, so it was actually quite helpful when you're working with them. You could see the difficulties in them when they were sitting down. But they really. The Headsprout really grew on them and they went into the phase of being interested and then suddenly after a couple of lessons we got to the point where everybody was quiet and working. They were a few real magic moments in my teaching career.. and I don't mean just because it was quiet I often get periods of great quiet, its not quiet we're after you know it is everybody engaged. And you see them of being quite excited about it.

## Appendix E

### Semi Structured interview Service Provider Staff

‘Warm up’ questions

- a. What is your position in the organization?
- b. How long have you been here?

Q1. What kind of qualifications do most of your service users have?

Q2. How do you think leaving with these grades affected their lives?

2a. With respect to their current employment?

Q3. Are many of the SU’s you see eager to access education?

3a. What are their reasons/incentives for doing this do you think?

Q4. What type of SU is least likely to enquire about education/learning?

4a. Why do you think this is?

Q5. What kind of barriers do you think potential learners face?

5a. What do you think can be done to overcome such barriers?

5b. Do you believe the SU can try harder to overcome learning barriers? If ‘yes’ –

5c. If ‘no’ Q6.

5c. Why do you believe they are not trying to their best ability?

5d. What do you think could be done by your organization to help SU’s overcome barriers?

Q6. If you had a hypothetical pot of money and it was up to you to spend it the way you would on encouraging adults into education how would you spend it?

Q7. What do you believe would encourage SU’s back to education?

### Semi Structured interview Service User

‘Warm up’ questions

- a. Where did you go to school?
- b. When did you leave school?
- c. What qualifications did you leave with?

Q1. What Kind of learning experience did you have at school?

Q2. How do you think leaving with \_\_\_\_\_ GCSE’s affected your life?

2a. How has it affected your current employment?

Q3. What do you think about adults who want to have another go at education and retake their GCSE’s for example?

3a. Do you think it is worthwhile for an adult to get an education later in life?

Q4. Have you tried to get onto any courses such as Basic Literacy and Numeracy? **If No – Q5**

4a. Who did you do the course with?

4b. Did you get onto the course and complete it?

4c. How did you find it?

4d. Did you find it easy to get onto the course? **If 'No' - Q5**

4e. Can you give an example of how things were made easier for you to get onto a course?

Q5. What kind of things got in the way of you finding and/or getting onto a course?

5a. Did you have enough money to cover the costs of the course/child care/travel?

Q6. What things do you believe would encourage you to go back to education?