Participation and experiences of students with dyslexia in higher education: A literature review with an Australian focus

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Abstract

People with dyslexia are currently under-represented in higher education throughout the world, though the extent of the shortfall in Australia is not known. Students with dyslexia face particular challenges in higher education due to the heavy reading loads required for most courses.

All Australian universities offer services for students with dyslexia through a generic 'equity' or 'disability' unit. However, it is unclear from the current literature whether these services are appropriate for students with dyslexia, or what proportion of students with dyslexia are accessing such services.

This literature review summarises and critiques the Australian and International literature regarding participation and experiences of students with dyslexia in higher education, including representation, strengths, challenges, current support practices, and potential strategies to promote more equitable access in the future.

It provides a foundation for discussion and action on this important issue among members of the Australian higher education community.

Introduction

People with dyslexia are known to be under-represented in higher education internationally. Although relevant statistics for Australian prevalence and participation are not currently available, it is highly likely

that international patterns of under-representation are mirrored in the Australian context.

International data indicate that dyslexia affects approximately 5-12% of the general population (Katusic *et al*., 2001), while students with a diagnosis of dyslexia represent only approximately 0.2-0.4% of higher education student populations (Richardson & Wydell, 2003; Stampoltzis & Polychronopoulou, 2008). Although Australian data has not yet been collected, it seems likely that it would mirror international findings.

More equitable participation and experiences in higher education by students with dyslexia is important for both social justice and legislative reasons, with inequity of education known to lead to poorer employment opportunities and economic outcomes (Elkins, 2000; Hall & Belch, 2000; Nunan, George & McCausland, 2000; Tanner, 2009). Social justice advocates would argue that an enlightened, ethical society should act to correct such an injustice (Nunan *et al*., 2000).

In many countries, including the United Kingdom (UK) and United States of America (USA), legislative imperatives also exist to promote equity and inclusion in higher education, with equitable educational and employment opportunities enshrined in law (Elkins, 2000). Current Australian disability legislation (Australian Government, 1992; New South Wales State Government, 2003; Victorian State Government, 2006) falls well short of these standards, merely prohibiting active discrimination. However, more equitable educational participation and achievement should still be key priorities for all Australian universities.

This literature review summarises and critiques the currently available published research on students with dyslexia in higher education worldwide, with a particular focus on Australian findings.

In particular, this review explores the following topics:

- What is dyslexia?
- How is dyslexia currently identified?
- What are the participation patterns of students with dyslexia in higher education?
- What are the experiences of students with dyslexia in higher education?
- What resources currently exist for students with dyslexia in higher education?

- What strategies and resources could improve participation, learning experiences and success for these students?
- What are the research gaps in this field and potential future research directions?

Literature searches were conducted in September 2013 across CINAHL, PsychLit, Education +, ERIC and the Tertiary Education research Database. The following primary search terms were used: (dyslexia OR reading difficult*) AND (higher education OR university OR vocational education OR tertiary OR post-secondary). Secondary search terms were also used to search for particular information. These included: AND Australia, AND adult, OR (learning disability OR reading disability), AND social inclusion, AND strengths-based, and AND empowerment. Reference lists were also searched for additional articles.

These literature searches revealed no coherent body of literature regarding the experiences of students with dyslexia in Australian higher education. Therefore, the information in this review is drawn from a wide range of sources including published literature from the broader disability field, education, cultural theory and neuroscience research. It is clear from this diverse literature base that the topic is a complex one, involving multiple stakeholders and issues.

Defining dyslexia

There is ongoing debate in the education and neuroscience literature regarding the nature and definition of dyslexia (Sullivan Spafford & Grosser, 1996; Doyle, 2002; Poole, 2003; Beaton, 2004; Reid, 2005; Nicolson & Fawcett, 2008).

A point of consensus in published definitions of dyslexia is that it is not associated with low intelligence (Australian Dyslexia Association, 2007; British Dyslexia Association, 2007; Morris, 2008; Tunmer & Greaney, 2009), and there is strong research evidence to support this view (Ferrer *et al*., 2010; Tops *et al*., 2012).

Another point of consensus is that dyslexia is not associated with poor visual acuity or inadequate instruction. However, controversy persists regarding most other features and the underlying causation of dyslexia.

Many experts attribute dyslexia to differences in phonological processing of speech sounds (Snowling, 2000; Muter, 2004; Halliday & Bishop, 2006; Castles & Coltheart 2004; Lehongre *et al*., 2011; Goswami, 2011). Others

suggest that the cause may lie in visual perception and processing differences (Badcock & Lovegrove, 1981; Winters, Patterson & Shontz, 1989; Stein & Walsh, 1997; Mailley 2001; Stein, Talcott & Witton, 2001; Evans, 2004; Vidyasagar & Pammer, 2009).

Other potential explanations include reduced automaticity (Nicolson & Fawcett, 1990) and reduced verbal memory (Pickering, 2004). A growing body of literature suggests that there could even be multiple causes and sub-types of dyslexia (Miles, 2006; Wolff, 2009; Zoccolotti & Friedman, 2010). Further neurological research is needed to unravel the underlying cause or causes of this condition.

It is important to be aware of this controversy as it underpins poor consistency in definitions and sampling strategies used by researchers investigating participation and experiences of students with dyslexia in higher education.

Different researchers use different definitions and sampling strategies, which makes it difficult to compare results across studies or conduct a meta-analysis of the combined data. However, it is still important to summarise and critique the existing literature on this topic, as this can prompt and facilitate discussion and act as a starting point for further research in this area.

How is dyslexia currently identified?

Current practices for identifying dyslexia focus on childhood testing and remediation (Miles, 1993; Elkins, 2000; Lindsay, 2001; Doyle, 2002; Morris, 2008; Nicolson & Fawcett, 2008; Skues & Cunningham, 2011). In Australia, the predominant approach is school-based testing of children who are identified as having difficulty with their school work (Elkins, 2000; Skues & Cunningham, 2011). However, the literature regarding identification approaches is largely descriptive, providing very little evaluative research to support current methods.

Most current methods rely implicitly on subjective teacher judgments as the gateway to objective testing, meaning that children are rarely tested unless they are failing academically or exhibiting challenging behavior (Elkins, 2000). Therefore, children with dyslexia who are well-behaved or have above-average intelligence are likely to be missed.

There is growing evidence that current identification practices are allowing some children to fall through the gaps and arrive in higher education

without diagnosis or appropriate support strategies (Shapiro & Rich, 1999; Kirk, McLoughlin & Reid, 2001; McLoughlin, 2001; Madriaga, 2007; Tanner, 2009; Bell, 2010). For example, Madriaga (2007) noted that of the 16 higher education students with dyslexia they interviewed for their study, only three of them had received a diagnosis prior to entry into further or higher education.

Higher education institutions generally rely on student self-identification and self-registration for services, and do not provide screening or other pro-active identification approaches. The onus is placed on students to provide documentary evidence of their conditions (McGuire, Madaus & Litt, 1996; Richardson & Wydell, 2003), which is highly problematic for those who have not yet been diagnosed.

Until recently, attempts to identify adults with dyslexia in Australia have been hindered by lack of availability of a simple adult screening test with normative data for the Australian adult population. Adult screening tests developed in other countries, such as Study Scan (Zdzeinski, 1997), the Dyslexia Adult Screening Test (DART; Fawcett & Nicolson, 1998), and the York Adult Assessment (Hatcher, Snowling & Griffiths, 2002), do not provide normative data for the Australian population.

In 2013, an adult version of a key Australian childhood screening test, the Castles & Coltheart 2 (Castles & Coltheart, 2012), was developed and normative data collected for Australian adults (Badcock *et al*., in preparation). This important development will enable further research into representation, experiences and appropriate educational strategies and services for Australian adults with dyslexia.

Participation by people with dyslexia in higher education

It is currently not known how many Australian adults with dyslexia are participating in higher education, or how this compares to the general Australian population.

A large population-based birth cohort study in the USA (Katusic *et al*., 2001) found that dyslexia affected approximately 5-12% of the general population cohort studied. It retrospectively examined the medical and academic records of 5718 children in the US town of Rochester, Minnesota, born between 1976 and 1982, finding a cumulative incidence rate of reading disability of between 5.3% and 11.8% depending on the definition and formula used. To date, there has been no similar research

investigating the prevalence of dyslexia in the Australian general population.

Despite high prevalence estimates in the general population, students with a diagnosis of dyslexia have been found to represent only approximately 0.2-0.4% of higher education students. A UK-based study by Richardson and Wydell (2003) interrogated a database of all students in UK higher education from 1995 to 1996. It found that only 0.42% of all these students had a diagnosis of dyslexia.

A similar Greek study by Stampoltzis and Polychronopoulou (2008) collected data from 406 departments across all 32 Greek public higher education institutions. It found that the prevalence of dyslexia among students was only approximately 0.16%.

These UK and Greek studies also found that students with a diagnosis of dyslexia were more likely than their peers to discontinue their studies in their first or second year of enrolment (Richardson & Wydell, 2003; Stampoltzis & Polychronopoulou, 2008). Factors contributing to poor enrolment and continuation patterns may include discouragement experienced in high school and challenges encountered on entry to higher education (Wolf 2001; Madriaga, 2007; Tanner, 2009). No similar research on patterns of participation and continuation of students with dyslexia has been conducted in Australia.

The strength of the findings of these two studies (Richardson & Wydell, 2003; Stampoltzis & Polychronopoulou, 2008) has been undermined by poor sampling approaches, which involved examining official institutional records only. This approach is unlikely to have delivered data that is fully representative of the population of students with dyslexia in higher education in these countries. This is because some students may have been reluctant to disclose a diagnosis of dyslexia in official records (Olney & Brockelman, 2003; Fuller *et al*., 2004; Fuller, Bradley and Healey 2010; Olofsson, Ahl & Taube, 2012) or may have entered higher education without a diagnosis (Richardson & Wydell, 2003) and may therefore have been unable to self-identify to the institution.

Experiences of students with dyslexia in higher education

A number of international studies have explored the experiences of students with dyslexia in higher education (Mortimore & Crozier, 2006; Madriaga, 2007; Griffin & Pollak, 2009; Collinson & Penketh, 2010; Oga &

Haron, 2012). However, only one Australian study on this topic (Tanner, 2009) has been published.

Information on the higher education experiences of students with dyslexia can also be gleaned from studies into the experiences of students with a wider range of disabilities (Borland & James, 1999; Holloway, 2001; Wolf, 2001; Fuller *et al*., 2004; Fuller, Bradley & Healey, 2010; Goode, 2007).

Mortimore and Crozier (2006) conducted a questionnaire survey of 62 male students with dyslexia and 74 without dyslexia from 17 British universities from 2001 to 2003. Students with dyslexia were recruited through the university disability and support services, and then non-dyslexic peers were approached from the same programs and year levels. Students with dyslexia were found to be significantly more likely than their non-dyslexic peers to report each of the types of difficulties included in the questionnaire. In particular, 78% of students with dyslexia expressed difficulty with note taking compared to 18% of non-dyslexic peers ($p<0.01$), 76% had difficulty organising essays compared to 8% of peers ($p<0.01$) and 72% had trouble expressing ideas in writing compared to 11% of peers ($p<0.01$).

Madriaga (2007) took a different approach to the same topic, conducting life-history interviews of 16 students with dyslexia from the South Yorkshire area in the UK from 2004 to 2005. Key issues expressed by students were insufficient availability of information to help them make choices about higher education options, high stress and anxiety regarding transition to higher education, difficulty preparing appropriately for higher education, and poor confidence in university staff and other students to understand their needs.

Six students expressed satisfaction with the helpfulness of their lecturers, while two students were dissatisfied by lack of helpfulness and negative attitudes of some of their lecturers. The authors suggest that low participation rates of students with dyslexia in higher education may be at least partially attributable to these factors.

Griffin and Pollak (2009) explored the experiences of 27 students with various learning differences including 12 with dyslexia, from 11 UK universities using a semi-structured ethnographic interview approach. Participants were recruited by personal contact or by email from university disability services or other support organisations.

Key findings were that many students did not feel adequately supported, experienced negative attitudes from lecturers or other staff, and experienced frustration trying to organise appropriate services and resources. The authors recommended introducing awareness training for university lecturers and better systems for liaison between university departments.

Collinson and Penketh (2010) conducted in-depth learner history interviews with six postgraduate students and academics with dyslexia in UK universities. It is not stated how the participants were recruited, but the authors state that all but one of the participants were members of an advocacy group.

Key themes that emerged from the resulting narratives included stories of exclusion and stories of resistance. The authors conclude that academic ability tends to be defined by the dominant discourse of literacy, but that this discourse can be challenged by personal resistance.

Oga and Haron (2012) investigated the life experiences of five Malaysian adults with dyslexia using a phenomenological semi-structured interview approach. However, it is not clear whether any of the participants in this study were enrolled in higher education and no findings were reported regarding higher education learning experiences.

Tanner (2009) conducted the only Australian study on this topic, exploring the life experiences of approximately 70 adults with dyslexia from two classes of students enrolled in a TAFE college course for adults with dyslexia. A mixed methods approach involved a brief questionnaire on course entry, focus group discussions, written or illustrated personal profiles and face-to-face interviews. Topics included students' general life and learning experiences since early childhood, but there was very little discussion of adult learning experiences.

The author analysed the study data within a pre-determined framework of the 'conundrum of failure', including five sub-types of failure: system failure, constructed failure, public failure, family failure and personal failure. While this terminology and approach were probably used with good intentions to communicate injustice and advocate for change, they also communicated strong negativity and disempowerment.

Borland and James (1999) researched the general campus experiences and learning experiences of 22 students with physical disabilities at a

single UK university. They conducted semi-structured interviews to examine the experiences of these students against the university's disability statement and the criteria for access and inclusion stipulated by the Funding Councils of England, Wales and Scotland.

Key concerns were issues that prevented or discouraged disclosure, inadequate academic and social support, poor administrative systems, poor physical access to some learning and social spaces and inadequate quality assurance monitoring of the experiences of students with disabilities. The authors highlighted the moral and ideological imperatives to address these issues at both policy and personal levels.

Fuller and colleagues (2004) explored the learning and assessment experiences of students with a variety of disabilities in one UK university from 2001 to 2003. They sent a postal questionnaire to 593 undergraduate students who had declared a disability, of whom 173 responded, 60 with dyslexia.

More than a quarter of the students with dyslexia reported choosing courses according to features such as little written work, a substantial practical element and few or no examinations. Two-thirds reported difficulties learning in lectures, including lecturers talking too quickly, visual material being removed too quickly and difficulty note taking.

Many also reported poor cooperation from lecturers, such as unwillingness to allow lectures to be tape-recorded or failing to provide user-friendly hand-outs. The researchers concluded that work was needed to train staff on how to make 'reasonable adjustments' for students with disabilities and to achieve equitable and flexible provision.

Fuller, Bradley and Healey (2010) also studied the learning experiences of students with various disabilities, six of whom had dyslexia, from a single UK university. Participants were invited by letter from Central Services. Group interviews were conducted with approximately 4-6 students per group. Participants were asked to reflect on their teaching and assessment experiences in various types of classes including lectures, seminars, group work, oral presentations, laboratory, fieldwork and other practical sessions.

A wide variety of positive and negative experiences were reported with no clear patterns emerging. Positive experiences included good support material, helpful teaching staff and effective use of technology such as a

dictaphone. Negative experiences included poor support from lecturers, difficulties with note taking, and difficulties participating and interacting in class. The authors concluded that further research in this area was needed, especially on a larger scale and with an integrated approach.

Goode (2007) conducted in-depth interviews of 20 students with a range of disabilities from one UK university in 2004. Students were recruited through the academic support service, and it is not stated how many students with dyslexia were included in the sample. The interview explored aids and obstacles to an inclusive learning environment.

Most students were found to be expending considerable personal energy actively 'managing' their disabilities in the learning environment. They used proactive strategies to manage identity, disclosure, perceptions of lecturers and peers and access to learning and teaching materials and experiences. The authors concluded that inclusive education practice lagged behind policy at the study university. Results were presented widely among university audiences to encourage discussion and action.

Holloway (2010) conducted semi-structured interviews exploring the general campus experiences of six students with various disabilities at a single UK university. Participants were recruited via a letter sent by the university's disability unit and it is not clear from the information reported whether any of these students had dyslexia.

Data analysis revealed that most students experienced marginalization and disempowerment at university despite acceptance for university entrance. Furthermore, the provision model experienced by students individualised disability and did not address social factors.

They concluded that policy and practice would need to be addressed both centrally and at the departmental level, including changing central policies to better support accessibility, developing practical guidelines for departments, better co-ordination and evaluation of services, providing staff training and awareness, and encouraging student advocacy.

The strength of the findings of all the published research articles on this topic has been weakened by heavy reliance on sub-optimal sampling approaches. Most of these studies invited volunteers through the institution's disability service (Fuller *et al*., 2004; Fuller, Bradley & Healey, 2010; Erskine & Seymour, 2005; Griffin & Pollak, 2009), and one study

(Bell, 2010) used a small convenience sample. None used a validated screening test to select the study sample from the broader student body.

Such sampling methods rely heavily on student self-identification and would have excluded students with dyslexia who arrived in higher education undiagnosed, and therefore would not enrol for services. Such a sampling bias may have skewed the study results.

Another shortcoming of many of these studies was that they used non-empowering models of disability. All research in this field should empower students with dyslexia in higher education by including them in research design and implementation, and by disseminating research findings in accessible formats (Charlton, 2000).

Only one of the studies reviewed (Goode, 2007) stated that study findings were disseminated to the original study participants and other university audiences in audio-visual or other accessible formats. These types of approaches should be adopted by all researchers in this area.

Synthesis and critique of student experience literature

Despite these shortcomings, a synthesis of the available literature reveals some interesting patterns regarding the experiences of students with dyslexia in higher education. The majority of the published literature focuses on the challenges experienced by these students.

These challenges can be summarised as:

- Learning and assessment challenges
- Institutional challenges
- Political and legislative challenges
- Societal and personal challenges.

It also becomes clear from the body of literature that students with dyslexia can bring a number of important strengths and abilities to the higher education setting and achieve impressive successes in this context.

Strengths and successes in higher education

Various authors have reported that people with dyslexia bring a range of valuable attributes, skills and aptitudes to higher education (Jordan, 1989; Gilroy & Miles, 1996; Fink, 1998; Lock & Layton, 2001; Madriaga, 2007; Kirby *et al*., 2008; Collinson & Penketh, 2010; Hutcheon & Wolbring, 2012). These include creativity, high-level reasoning and critical thinking skills, excellent problem-solving skills, deep approaches to

learning, lateral thinking, tenacity and determination. These are characteristics and capabilities that most higher education institutions claim to value highly and aim to foster in their graduates.

However, no researchers have systematically studied these strengths and abilities. Therefore information regarding these skills and characteristics had to be gleaned from studies that primarily dealt with challenges and barriers and from anecdotal reports.

There are also accounts in the literature of people with dyslexia succeeding in their chosen fields despite the challenges they've faced along the way. For example, becoming successful business professionals (Fink, 1998), health professionals (Howard, 1999; Price, 2006), school teachers (Ferri *et al*., 2001), and even post-graduate students and university lecturers (Collinson & Penketh, 2010).

Historic records also suggest that a number of highly accomplished historical figures may have been dyslexic, including Albert Einstein, Winston Churchill, Charles Darwin, Thomas Edison and Hans Christian Andersen (Jordan, 1989; Sullivan Stafford & Gossner, 1996). However, to date there has not been any systematic study of long-term education and career outcomes of students with dyslexia.

Two published studies have provided limited evidence of success for students with dyslexia in higher education. A small study by Collinson and Penketh (2010) explored the experiences of six postgraduates and academics with dyslexia in UK universities. Despite a dominant discourse of literacy that tended to exclude these students from formal education, they told stories of resistance and success that challenged the dominant discourse.

A larger study conducted by Richardson and Wydell (2003) analysed data from a database of all students enrolled in UK universities from 1995 to 1996. Although students with dyslexia were found to be less likely to complete their university degrees, approximately 40% of those who completed a first degree program achieved first-class or upper second-class honours. The authors concluded that "dyslexia is by no means incompatible with a successful outcome in higher education, given an appropriate level of commitment on the part of the students and an appropriate level of resources on the part of their institution." (p.500)

Learning and assessment challenges

It seems self-evident that students with dyslexia must experience challenges relating to learning and assessment in higher education. However, very little research has been conducted in this area, especially regarding the lived learning experiences of learning formats such as lectures, tutorials, independent reading and e-learning.

The few published studies into the learning challenges experienced by adults with dyslexia have measured specific reading and writing skills under laboratory conditions (Gilroy & Miles, 1996; Simmons & Singleton, 2000; Erskine & Seymour, 2005). The findings of these studies were broadly consistent, reporting persisting differences in reading speed, reading and writing accuracy, reading comprehension and written language skills.

Two UK-based studies (Fuller *et al*., 2004; Fuller, Bradley & Healey, 2010) investigated the campus and learning experiences of students with a wide range of disabilities, some of whom had dyslexia. They found that students with various disabilities had a wide range of positive and negative experiences, especially with regard to lecturer helpfulness and note taking in lectures. However, results were highly variable and it was often difficult to determine patterns specific to students with dyslexia.

Institutional challenges

Institutional structures and processes in higher education also present various challenges for students with dyslexia (Hall & Belch, 2000; Konur, 2003; Riddell & Weedon, 2006; Hanafin *et al*., 2007; Madriaga, 2007). In fact, Hanafin and colleagues (2007) suggest that institutional failure to adequately conceptualise access issues for students with physical and learning differences is one of the biggest barriers to equitable participation in higher education for students with any disability. Three key themes emerge with regard to institutional challenges: attitudinal challenges, resource challenges and policy and administrative challenges.

The first theme relates to negative attitudes of university staff and reluctance to alter their teaching practices (Fuller *et al*., 2004; Fuller, Bradley & Healey, 2010; Konur, 2006; Mortimore & Crozier, 2006; Hanafin *et al*., 2007; Madriaga, 2007). Many students found staff to be reluctant or unwilling to make appropriate adjustments. Some academics stated that this reticence was due to their desire to maintain high academic standards (Riddell & Weedon, 2006; Madriaga, 2007).

However, this is refuted by Nunan and colleagues (2000) who argue that greater inclusion actually raises standards and produces better graduates. Madriaga (2007, p.400) attributes negative staff attitudes to the underlying 'disablist' nature of society, stating that "everyday practices of society members, including those in education (i.e. both staff and learners), perhaps unbeknown to them, may perpetuate oppressive structures upon those who identify or are categorised as being disabled".

Other factors such as poor awareness may also play a part (Miles, 2006), though these may also be ultimately attributed to a 'disablist' society in which people are poorly educated regarding social inclusion principles and behaviours.

The second theme relates to the resources available to establish more inclusive teaching environments. While many higher education staff members express willingness and motivation to better accommodate students with dyslexia, they may not have the resources required, including knowledge and skills, to implement such changes (Fuller *et al*., 2004; Fuller, Bradley & Healey, 2010; Hanafin *et al*., 2007; Konur, 2006; Miles, 2006; Scott, McGuire & Foley, 2003). This could arise partly or wholly from poor prioritisation and funding for social inclusion initiatives.

The final theme relates to poor institutional systems, policies and procedures, and their impact on learning support and provisions for students with dyslexia. This includes poor communication with students about available resources, poor co-ordination between learning support units and academic departments, poor accessibility of learning support resources, poor signage of learning support units, and strict eligibility and documentation requirements for support services (McGuire, Madaus & Litt, 1996; Holloway, 2001; Mortimore & Crozier, 2006; Riddell & Weedon 2006). These systemic issues place an undue burden on students with dyslexia (Holloway, 2001; Madriaga 2007).

Political and legislative challenges

Many countries including the UK and USA enshrine equality of educational and employment opportunities in law, requiring that higher education institutions ensure that students with dyslexia and other learning difficulties do not experience any disadvantage compared to other students (Elkins, 2000).

Current Australian legislation (Australian Government, 1992; New South Wales State Government, 2003; Victorian State Government, 2006)

imposes a much weaker requirement, merely prohibiting active discrimination against students with disabilities and requiring 'reasonable adjustments' to be made.

Interpretation and implementation of 'reasonable adjustments' are largely at the discretion of educational institutions. Consequently, although students with dyslexia cannot be refused admission to university, they are left with a weak legal basis for negotiating appropriate adjustments during their studies. Introduction of stronger legislation will be a crucial step towards achieving full equity in higher education opportunities for students with dyslexia.

Societal and personal challenges

The main societal challenge experienced by students with dyslexia is social stigma. Ridsdale (2004, p.249) points out that "in our society, the association between bad spelling and stupidity is so strong that it is almost taken for granted". Negative societal attitudes and responses can have major implications for student disclosure, service registration, and requests for assistance (Mortimore & Crozier, 2006).

Research has found that disclosure and assistance seeking attempts are often met with negative responses (Holloway 2001; Olney & Brockelman, 2003; Madriaga, 2007). However, there are many potential benefits of disclosure, including service access and advocacy (Skinner 1998; Tanner, 2009). Therefore, it is important to explore and address social stigma and other societal challenges.

People with dyslexia may also face emotional challenges such as anxiety, low self-esteem, poor self-concept, lack of confidence, frustration and anger (Ridsdale, 2004; Carroll & Iles, 2006; Mortimore & Crozier, 2006; Madriaga, 2007; Burden 2008; Tanner, 2009). Social inclusion advocates suggest that these issues can be largely attributed to negative experiences interacting with other people and organisations within society (Ridsdale, 2004; Madriaga, 2007; Riddick, 2011). Students with dyslexia and other disabilities require emotional strength to manage these interactions and overcome prejudice experienced during them (Goode, 2007).

However, it is important not to assume that all students with dyslexia will necessarily have emotional difficulties or poor self-concept. In fact, many people with dyslexia have been found to have high self-esteem and

positive self-image (Olney & Brockelman, 2003; Burden, 2008), possibly as a result of overcoming adversity.

Researchers and advocates in the field of social inclusion (Nunan *et al*., 2000; Madriaga, 2007; Riddick, 2011) would argue that almost all types of challenges faced by people with dyslexia are actually societal in nature. Although many people perceive dyslexia and other differences as predominantly personal or individual issues, a social inclusion approach would place greater responsibility on society to rectify current inequities. Poor understanding and acceptance of the socially constructed nature of disability may be the single greatest challenge facing students with dyslexia and other learning differences.

Current resources for students with dyslexia in higher education

Most universities offer services for students with dyslexia, coordinated through 'learning support', 'equity and access' or 'disability support' units. Surveys have been conducted of the resources available to students with dyslexia in higher education institutions in the UK (Mortimore & Crozier, 2006) and Sweden (Olofsson, Ahl and Taube, 2012), but no similar survey has been conducted in Australia.

Mortimore and Crozier (2006) investigated service provision as part of a larger questionnaire study of study skills in students with dyslexia in higher education. Olofsson, Ahl and Taube (2012) also explored service provision as part of a larger survey, with the overall topic being learning and study strategies at university. However, they obtained their data by questionnaires and interviews with 53 students with dyslexia and interviews with 42 of their lecturers.

Both studies listed the resources and adjustments available to students with dyslexia through the universities' support services. These included dyslexia tutors, extra time on examinations and assignments, use of a reader or writer in examinations, use of word processors and other assistive technology in examinations and throughout semester, use of a scanner to scan images and text onto a computer, and use of audio and multi-sensory books.

However, many unmet needs were also reported, especially regarding subject-specific support, organising coursework, learning in lectures and academic writing skills, and practical issues such as long time delays in receiving resources.

Both studies found that student uptake of the available services was surprisingly low. Mortimore and Crozier (2006) reported that only two resources used by more than half of students with dyslexia, these being extra time in examinations and use of a scanner. They stated that: "despite their greater use relative to the comparison group, the students with dyslexia reported less use than might have been expected of the potential resources" (p.244).

Olofsson and colleagues (2012) also gave examples of this, stating that "remarkably few students appreciate help with note-taking by a fellow student because not all fellow students are capable enough to summarise and structure the lecture in an understandable way" (p.1190). They also found that additional time in examinations was not useful to all students, with some reporting that they were unable to benefit from extra time due to fatigue.

Neither of the studies (Mortimore & Crozier, 2006; Olofsson, Ahl and Taube, 2012) investigated the background or justifications of how these adjustments were originally determined to be appropriate and adequate for students with dyslexia.

Lack of student consultation in this process may have contributed to this mismatch between student needs and services available, which may partially explain poor uptake of these services. Olofsson, Ahl and Taube (2012) concluded that there are significant knowledge gaps regarding the needs of students with dyslexia in higher education institutions.

An important shortcoming of these two studies is that they retrospectively surveyed students already successfully registered with disability service units. It is unclear whether these registered students represent the full range of eligible students or whether some eligible students may have remained unregistered for various reasons. For example, some may have been unaware of the available services, experienced difficulties in the registration process, or refrained from registering due to social stigma. Therefore, the sample could be skewed towards students who are more empowered to seek and utilize services, and the study results could have therefore been more positive than the reality.

Strategies and resources that could promote more equitable access

A variety of strategies have been suggested in the literature to promote greater participation and attainment in higher education by students with

dyslexia. Only two of these strategies has been described well in the available literature, namely staff awareness training using a dyslexia simulation experience (Wadlington, Elliot and Kirylo, 2008) a multi-modal assistive technology (Taylor, Duffy & Hughes, 2007), but neither has been supported by robust evaluative research. A great deal of work is needed in this area to create an evidence base for best practice.

Strategies suggested in the literature can be summarised as:

- Specific resources and adjustments for students with dyslexia
- Programs to improve student uptake of current services
- Universal adjustments to teaching methods and learning formats
- Greater range of assessment options
- Staff and student awareness and training programs
- Improvements to university policies and procedures
- Student support groups.

Specific resources and adjustments for students with dyslexia

One of the dominant approaches recommended in published literature is to provide specific resources and adjustments designed for students with dyslexia, usually delivered through equity or disability units. These specific resources include tailored study skills training (Price, 1997), mentoring (Fink, 1998), peer support groups (Griffin & Pollak, 2009) and multi-modal assistive technology tailored specifically to the needs of students with dyslexia (Day & Edwards, 1996; Griffin & Pollak, 2009).

While it seems likely that some of these strategies could be effective, insufficient well-designed evaluative research has been conducted to either support or refute their effectiveness.

This reflects the tendency towards individualist or medical models of dyslexia, addressing the challenges faced by students with dyslexia by providing services designed to 'remediate' the individual to better fit the current system. Services are viewed as a privilege which must be requested, re-requested, negotiated and administered by the student.

Many of the other strategies listed seek to address underlying social foundations and attitudes and to shift the responsibility from the individual student to the broader academic community.

With regard to the efficacy of multi-modal assistive technologies for students with dyslexia, the evidence is limited and contradictory (Badge

et al., 2008). Some authors have supported their use, suggesting benefits for both dyslexic and non-dyslexic students (Day & Edwards, 1996; Griffin & Pollak, 2009). However, only two studies were found that evaluated such technologies.

Taylor, Duffy and Hughes (2007) described and evaluated animated slide presentations with voice-over, finding that they were more useful to non-dyslexic participants than dyslexic participants. Alty, Al-Sharrah and Beacham (2006, cited in Badge *et al*. 2008) evaluated technologies that provide simultaneous text and voice presentations, finding that they could actually be counter-productive for students with dyslexia. Further research is needed to determine best practice in this area.

Programs to improve student uptake of current services

Some authors suggest that students with dyslexia would benefit from greater utilisation of resources currently available to them (Fuller *et al*., 2004; Fuller, Bradley & Healey, 2010; Mortimore & Crozier, 2006). Mortimore and Crozier (2006) state that "the lack of take-up of resources is not a matter of unavailability, but of increasing students' awareness of what is available and overcoming barriers to take-up". However these authors did not provide evidence for the lack of awareness or discuss the suitability of the available resources for the students' needs.

Key strategies put forward to promote uptake of services include more effective dissemination of information about available services (Fuller *et al*., 2004; Fuller, Bradley & Healey, 2010; Mortimore & Crozier, 2006), and delivery of student self-advocacy training (Lodato Wilson, 1994; Skinner, 1998; Lock & Layton, 2001).

While these strategies may seem sensible, appropriate dissemination strategies are not well described in the current literature and no evaluative evidence for them has been published to date. Self-advocacy programs conducted in the USA have been well described in the education literature, but no evaluative data has been published . No programs of either type have been trialled or evaluated in Australia.

Universal adjustments to teaching methods and learning formats

There is good support in the literature for offering all students a wider range of learning and response formats, and more inclusive teaching and learning environments (Griffin & Pollak, 2009; Konur, 2006; Scott *et al*., 2010). Such approaches may provide better learning opportunities for all students. They also have the potential to remove many of the challenges

faced by students with dyslexia without requiring them to take on the additional challenge of applying and administering individual adjustments. However, there is currently no evaluative research data available to support such approaches.

Greater range of assessment options

Hanafin and colleagues (2007) suggest that all students would also benefit from being offered a greater range of assessment options. They state that "current assessment practices are not diverse enough to suit students' diverse ways of showing their knowledge, understanding or skill.

They cite research by Tynjala (1998) which found that diverse, continuous assessment methods fostered deep learning and development of critical thinking skills more so than high-stakes written terminal examinations. However, further research on this topic will be needed to ensure that any changes are well-designed and effectively implemented.

Staff and student awareness and training programs

Staff knowledge and attitudes have been found to be very important in determining students' access to appropriate accommodations within a positive academic environment (Elkins, 2000; Shevlin, Kenny & McNeela, 2004). Shevlin, Kenny and McNeelas (2004, p.15) state that: "A positive and informed staff/college attitude proved crucial in ensuring access and equitable treatment." However, research suggests that staff awareness and support can be highly variable (Griffin & Pollak, 2009).

Therefore awareness programs for university staff have been widely recommended in the published literature. However, only one has been well described (Wadlington, Elliot and Kirylo, 2008), and only minimal evaluative data was provided to support its efficacy. Wadlington, Elliot and Kirlo (2008) described a dyslexia simulation training program designed to promote awareness and empathy among university students training to be school teachers. The evaluation findings were overwhelmingly positive, but only covered participant perceptions of the program, not their behaviours or other tangible results.

Konur (2006) points out that the views of non-disabled students are often neglected and should also be taken into consideration. Therefore, awareness programs that extend to the broader student community may also be warranted. Such programs may reduce stigma and facilitate more positive experiences by promoting awareness and understanding and improving expectations for academic success and social acceptance.

However, it is not clear how this might be done. Konur (2006) also suggests that specific skills training should be provided to assist staff to re-design teaching and learning methods and materials for greater accessibility. However, such skills training is neither described nor evaluated by this author.

Improvements to university policies and procedures

Various authors suggest that improvements are needed to institutional policies and procedures, including better communication between departments and support services, greater efficiency and co-ordination of services, and greater consistency of response.

For example, Shevlin, Kenny and McNeela (2004, p.28) state that their research "highlights the piecemeal institutional response to a marginalized group". They go on to state that access to services should be inclusive rather than medical, and should provide both integrated and differentiated services, meaning efficient management of common requirements and individualised management of specific requirements. While it is clear that improvements are required in this area, no guidelines are provided as to how such improvements might be achieved.

Implementation considerations

In order to implement any of these strategies or resources, some important issues will need to be addressed. These include:

- Who will be responsible for funding and implementation?
- How will inclusion and empowerment principles will be incorporated into the design and implementation?
- How will the strategy or resource be evaluated?

It is beyond the scope of this literature review to discuss these issues in detail. However, it is important to consider them when planning or commencing design and delivery of any strategy or resource.

Research gaps

This review has revealed a number of gaps in the literature.

- Australian prevalence and higher education participation statistics
- Australian Research into experiences of students with dyslexia in higher education, including strengths and successes and how these can be maximised

- Research into the lived experiences of students with dyslexia when interacting with learning formats such as lectures, tutorials, independent reading and e-learning.
- Well-designed evaluative research on various strategies and resources.

It is important to determine the prevalence of dyslexia in the Australian population, as well as participation patterns in higher education in particular. The Australian Bureau of Statistics (ABS) does not currently collect specific data on dyslexia, but groups reading and writing difficulties as types of 'intellectual disabilities'.

Official ABS reports state that approximately 8% of primary school students have some kind of disability (ABS, 2000), and that approximately 60% of children with a disability are categorised as having an 'intellectual disability' (ABS, 2012). However, no data is provided regarding sub-categories of intellectual disabilities. Similarly, no data is provided regarding prevalence in adults or higher education participation.

There is also a major gap in the literature with regard to Australian student experiences. Most of the student experience research in this area has been done in the United Kingdom and Europe (Madriaga, 2007; Mortimore & Crozier, 2006; Griffin & Pollak, 2009; Bell, 2010; Oga & Haron, 2012).

Only one small Australian study (Tanner, 2009) was found, which did not look closely at higher education experiences. Generalisation of international findings to Australia is problematic due to differences in educational systems, cultural attitudes and political contexts (Richardson & Wydell, 2003; Tops *et al*., 2012).

Therefore, it would be highly appropriate to conduct student experience studies in Australia to compare and contrast with the available international findings. It could also be beneficial to conduct experience research that looks at the successes and strengths of students with dyslexia, not just the challenges. This could provide valuable insight into attributes or skills that could be fostered or maximised to help improve outcomes.

Another important gap in both the Australian and international literature is research into the lived learning experiences of students with dyslexia as they interact with authentic learning and assessment activities. Formats

such as lectures, tutorials, independent reading and e-learning may each present different challenges and potential solutions.

Fuller, Bradley and Healey (2010) conducted a study of this type with 20 students with a wide range of disabilities, with highly variable results. A similar study specifically for students with dyslexia would be very valuable. Research in this area should be student-focused with no pre-conceived conclusions (Johnson & Christensen, 2012). It should ask students what they are experiencing in each context and what would help them, rather than making assumptions based on current practice.

There is also a need for further evaluative studies to determine effectiveness of strategies and resources recommended in the literature. In particular, further research is required to describe and evaluate staff and student awareness training, staff skills training, multi-modal teaching and learning approaches, and multi-modal learning technologies. Such research must use robust sampling strategies to ensure that participants represent the full population of students with dyslexia.

Conclusions

To date there has been limited research into the participation and experiences of students with dyslexia in higher education. The current literature indicates that students with dyslexia are vastly under-represented in higher education worldwide, and encounter a variety of successes and challenges in the higher education context.

Successes include positive traits such creativity, determination and a tendency towards deep learning and analysis, as well as objective successes such as higher education completion and career success.

Potential challenges may relate to learning and assessment features, political and legislative factors, institutional factors, and societal or personal factors.

It is clear from the current body of literature that further research on the participation and experiences of students with dyslexia in higher education is urgently needed, especially in Australia. Important research areas will include collection of Australian data regarding prevalence of dyslexia in both the general population and higher education populations, Australian student experience studies, and student experiences of lived learning formats used in higher education such as lectures, tutorials, independent reading and e-learning.

Such research will underpin development and evaluation of best practice strategies and services for students with dyslexia in higher education. All such research should use robust sampling strategies (Johnson & Christensen, 2012) and report the findings in formats accessible to study participants.

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