Supporting Radiography Learners with Dyslexia during Clinical Placement

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Introduction

Radiography education in the United Kingdom has both academic and clinical components, which are of equal importance for the development of a proficient radiography workforce [1]. Approximately half of time spent on a radiography undergraduate programme is practice based, with the primary function being to consolidate theoretical knowledge learnt in the classroom in order to produce a graduate who is *"Fit to Practice"* [2]. The successful completion of this experiential learning component is a compulsory pre-requisite for eligibility to apply for registration with the Health & Care Professions Council (HCPC) [3]. The clinical learning environment has an important function in underpinning theoretical knowledge learnt in the classroom. During clinical placements students have the opportunities to observe role models, bridge the gap between theory and practice and to reflect on their observations [4].

This article focuses on supporting radiography learners who have dyslexia in the clinical learning environment. Dyslexia is defined as:

"….. A processing difference, often characterised by difficulties in literacy acquisition affecting reading, writing and spelling. It can also have an impact on cognitive processes such as memory, speed of processing, time management and co-ordination. There may be visual and/or phonological difficulties and there are usually some discrepancies in educational performances" (p4) [5].

Dyslexia is a hidden disability and it is estimated that 10% of the UK population exhibits dyslexic traits with 4% of these cases being severely affected [6]. There is some evidence that those who have dyslexia gravitate to healthcare professions because the training and subsequent career is practical thus resulting in less administration duties and tasks [7, 8]. There is limited data for numbers of individuals who have dyslexia in the different healthcare groups. It is documented that 1.7% of medical students declare [9] however there is no information for radiography learners.

 The lack of definitive statistics is in part because individuals, as per the Equality Act (2010) [10], have the option to disclose their condition to educators and employers only if they chose to do so. According to research carried out by NHS Employers with employees who had an array of disabilities including dyslexia, 16% of respondents did not declare their disability, largely through fear that this declaration might affect their career [11].

While a diagnosis of dyslexia can be made at any point of an individual's educational journey a study of 195 institutes by the National Working Party on Dyslexia in Higher Education highlighted that 43% of the total university population who have dyslexia are only identified after their admission to university. Although there is no data on when it is realised in the radiography learner educational journeys, medical education literature concurs with this finding suggesting the rigours of a medical course may accelerate the identification of Specific Learning Difficulties (SpLD) amongst its student population [12.] Therefore learners may not be identified until after they have started their radiography degree.

A literature search on this area of radiography education returned one article [13]. Expanding the search to academic learning for radiographers identifying as dyslexic yielded two further peer reviewed articles [14, 15.] A final piece of grey literature was retrieved via snowballing [16]. Therefore the search was widened to include the nursing and medical professional evidence base as there are a number of commonalities when supporting the healthcare learner who has dyslexia. Collating the theory and evidence in these papers, together with the author's combined experience of supporting this group and personal experience, provides the following tips for practice placement- table 1.

1. Decode dyslexia.

Dyslexia forms part of a group of Specific Learning Difficulties (SpLD). This umbrella term is used to cover a range of frequently co-occurring difficulties including dyslexia (reading difficulties), dysgraphia (writing difficulties); dyspraxia (motor difficulties) and dyscalculia (mathematical difficulties). These conditions are not linked to intelligence and care should be taken not to confuse this term with learning disabilities. This term applies to individuals with global difficulties, indicating an overall impairment of intellect and function [17]

Dyslexia is identified by a complex set of assessments to gain a holistic picture of individual strengths and weaknesses. For dyslexia this is usually characterised by a spikey profile. This spikey profile means there is uneven performance level across tasks that do not correlate to expected performance in all areas. Therefore there is variance in performance and ability to carry specific tasks, with lower than expected scores in specific tasks particularly those related to reading and spelling. Examples of these are reading comprehension – needing to read a passage more than once to gain meaning from text and phonological processing – finding it challenging to link single or groups of letters to the sounds they make.

In healthcare education there is additional concern in whether professionals who have dyslexia can practice safely [18, 19]. This includes understanding medical terminology, interpreting information at speed and writing of notes [19]. There are specific concerns for dyslexia in the radiography profession where left/ right orientation of images is a routine task and for some viewing cross-sectional images [16]. Yet such apprehensions are not supported by evidence [18]. Alternatively, it is noted is that people who have dyslexia often have increased abilities in visual-spatial reasoning, mental manipulation of images and transferring 2D into 3D images. This would be well suited to radiography though it is important to remember all individuals will have different abilities and life experiences- point 3.

2. Consider your philosophical view on disability.

Research highlights widespread concealment of learner disability as student's feared ridicule and found staff had negative attitudes and perceptions of dyslexia [19]. This is despite dyslexia being recognised as a disability under the Disability Discrimination Act (1995) [20] and a protected characteristic under the Equality Act (2010) [10]. There are many philosophical views on disability and the intricacies of these are beyond the scope of this paper. Hence the authors have chosen two mains viewpoints as a starting point.

Beliefs on dyslexia can be linked to the medical model of disability which views disability as a 'problem' that belongs to the disabled individual. It is not seen as an issue to concern anyone other than the individual. Observations made by staff include how learners would be able to manage as qualified practitioners if adjustments needed to be made during their training. This belief contrasts the social model of disability which emphasises how individuals with a disability are disabled by society's failure to accommodate their particular needs, thereby further disadvantaging them. Later tips in this article address active development of coping strategies for clinical practice [21] that can be incorporated as part of the social model.

3. Be aware of the "dyslexic advantage".

There is much theory on the "dyslexic advantage" and it is important to explore the evidence that underpins this. Geshwind [22] describes a "pathology of superiority" which suggests that those who have dyslexia are a natural variation amongst mankind which leaves some with talents in one area, and others with talents in other areas. This is idea is further developed by West [23], who provides anecdotal evidence that "super successful" individuals who have dyslexia have the ability to see things differently. This is echoed by Watts [24]. In their case study of a Professor, their interviewee notes an ability to identify structures in ultrasound when the modality was in it's infancy and they had started their career radiology

Research proposes that people who have dyslexia tend to perform well clinically because of attributes such as creativity, greater oral recall, intuition, multi-dimensional thinking and innovation [25]. Previous research has also found high levels of empathy and interpersonal skills among nurses with SpLDs [26, 27]. Furthermore, having a disability can bring with it an insight into what it is like to be disabled, which promotes the development of caring skills [28]. These areas are also identified by radiography students alongside the ability to view 3D images [15]. There is also evidence to suggest that those who have dyslexia are faster at identifying "impossible figures" than those who do not have dyslexia i.e. those that appear three dimensional but could not exist in reality [29].

4. Implement clinical needs assessments

It is important that support afforded to learners who have dyslexia is transferred across to the clinical setting. One way of achieving this is to implement a clinical need assessment designed to identify the necessary support for radiography learners undertaking work integrated learning. Collaboration between the placement provider and the university is crucial to the successful implementation of support to ensure active development of personalised coping strategies are adopted by the learner and practitioner during the placement episode [25].

Those who have SpLDs exhibit a range of strengths and weaknesses many of which are not exclusive to those who identify with the condition. Students should be invited to meet with the university link lecturer, disability services and key practice educator prior to the commencement of the placement. During this meeting they should be encouraged to bring their educational physiologist and disabled student need assessment reports. Emphasis at this meeting is the learner's individual needs and the identification of effective strategies for this learner. This will include the learning environment but may also include shift-patterns and accommodation arrangements whilst on placement [26].

5. Promote disability awareness to all clinical staff and support disclosure

Disclosure in the clinical learning environment is complex. While Universities give incentives to students to disclose their SpLDs, i.e. access to a computer, extra time for exams and assignments, access to a note-taker, enhanced software including medical dictionaries, the benefits of disclosure in the clinical areas are less obvious. Subsequently support is likely to vary considerably between these two settings and learners may inadvertently disadvantage themselves [15]. Yet even when students disclose, lack of awareness of SpLDs coupled with understanding of acceptable accommodations and perceived "dangers" can lead to lack of consistency in support deemed appropriate between placements. Hence a clinical needs assessment is useful to provide some consistency of support across placements and one way of minimising different approaches by individuals.

The responsibility to foster equality and diversity within practice placement is the function of clinical sites hosting radiography learners, although everyone has a personal responsibility [30]. It is important that learners feel safe to discuss their specific needs without fear of discrimination or negative attitudes [31]. Staff in practice may not recognise dyslexia and/or SpLD. This contrasts the academic setting whereby anecdotal evidence has highlighted that academic staff are often good at highlighting when a student is struggling and subsequently referring them to disability services [32]. Therefore promoting awareness amongst all clinical staff of the profile of dyslexia and referral mechanisms is important [33].

6. The philosophy of support

Underpinning the approach to supporting SpLD learners is the use of social interactions as a means for cognitive development proposed by Vygotsky [34] and the

"Three M" approach described by McLoughlin [34.] Much of the work on cognitive development [35] relates to children however some of it is transferable to adult learning. In work carried out by Vygotsky [34] the researcher noted the gap between where the learner is and where they need to be. This end point can be reached through scaffolding of learning with the scaffold removed once the learning is achieved. A second aspect of Vygotsky's theory [34] is the idea that the potential for cognitive development depends upon the "zone of proximal development" (ZPD): a level of development attained when children engage in social behaviour. Full development of the ZPD depends upon full social interaction and the range of skill that can be developed with peer collaboration exceeds what can be attained alone

McLoughlin [35] advocates the "Three M" approach to helping adults who have dyslexia learn; the three M's being manageable, multisensory and memory. While points one and three are self-explanatory, the second is a little more complicated. Learning has three principle elements, input of information, cognition and output [36]. It is thought that by using all the senses to input information, the channels and pathways to neurological processing and retrieval are most effective [37.]

7. Harness technology

Technology is an enabler for all learners particularly learners who have dyslexia. In the academic setting, there is an array of hardware and software options available to accommodate needs. This includes text to speech, speech to text, mind-mapping and advanced electronic medical dictionary software. Hardware can include smartphones, digital voice recorders, digital pens, laptops and printers [25]. Yet despite these supplementary tools, the use or availability of such technologies does not translate well to the clinical setting [15].

The advent of the smart phone makes software adjustments available on one device. An area this can prove useful is learning new medical terminology. There is consensus in dyslexia theory on issues arising from phonological processing [38.] This is particularly an issue for medical terminology which can be more challenging for the

student who has dyslexia to read, understand and encode in long term memory. Whilst students can cope with this new language if they are able to re-read it at their own pace, situations such as hand-overs are often presenting the information at a faster pace than the student feels comfortable with [39.] With smart-phones audio recordings of new words can be made which learners can replay and documents can be converted from text to speech. This echoes Mayer's [40] multimedia learning theory, which posits that optimal learning occurs when visual and verbal materials are presented simultaneously. By using dual channels, information can be transferred from working to long-term memory. Yet despite the advantages of this technology, their use is often prohibited in clinical learning environments.

8. Factor In Time

Mayer's [40] learning theory is applicable to all learners irrespective of disability status. However it is accepted that people who have a SpLD will be slower at processing information which has implications for length of time it takes for materials to be learnt and recalled. Additional time also aids with ensuring the correct sequencing of written information [36.] In the academic setting extra time is allowed, up to 25%, to sit examinations and notes will often be available prior to a lecture delivery.   However these reasonable accommodations are not readily translated into the clinical setting. Extra time may be required to write up clinical documentation including reflective logs and appraisal documentation [31]. Furthermore the Central Radiology Imaging System (CRIS) software used to log patient visits does not have spell-check so can involve copying and pasting from a word-document.

Automaticity is the ability to complete tasks without occupying the mind with the low-level details [41]. Time learning in the practice environment as supervised practitioners is an ideal opportunity to develop this [42]. For learners who have dyslexia the point of automaticity can take longer to achieve [15] however once achieved this learner group are as safe and competent as their peers. This can be supported by repeated learning opportunities to overlearn material meaning it is transferred from working to long-term memory. Consequently, learning in the clinical environment offers this

group the opportunity to develop coping strategies which they can implement once they are qualified autonomous practitioners [35.]

9. Embed breaks into a shift

Another theory links dyslexia to poor working memory [43]. Subsequently those who have dyslexia may struggle with understanding what they read take longer to process information and find it hard to connect letters to sounds. It is theorised that this extra processing means those who have SpLDs tire easily [17]. The intensity of tiredness can heighten when assimilating new knowledge. There is overwhelming evidence within nursing that staff fatigue can impact patient safety [44, 45, 46]. Hence it is important to have regular breaks for learners. Breaks for learners with dyslexia are vital as per mentioned above, they can overlearn new material so that it moves from working to long-term memory. To protect these, breaks can be incorporate in the clinical needs assessment.

10. Nurture learner confidence

Those who have dyslexia often lack self-confidence. While diagnosis can bring relief, there can also be frustration to why it has not been picked up earlier [39]. Furthermore the label of disability can be emotive. Individuals who chose not to disclose their disability may experience stress as they fear discrimination and they can often lack self-confidence [31]. Many practitioners who have dyslexia have developed complex skills and success strategies to ensure the required level of proficiency [15]. However these are often not shared openly with others. This can be in part due to fear of discrimination as strategies may be deemed odd or silly. Subsequently it is highlighted that the opportunity to talk to someone in the same position and support groups offer an opportunity to voice concerns and develop life-long skills [31].

11. Student responsibility

All learners, irrespective of gender, race age or disability need to take responsibility of their learning in the academic and clinical environment [30]. Learners are encouraged to be proactive in identifying their own learning needs and to articulate these clearly. They are also encouraged to contribute as a partner in the achievement of their learning outcomes. As noted previously learners may chose not to disclose their dyslexia. However in doing so they disadvantage themselves as if a placement provider is not aware of the disability they are unable to make the necessary adjustments.

It is important that students are made aware of the implications of non-disclosure. Academic and clinical settings should provide multiple opportunities and methods of disclosing alongside staff who are "dyslexia aware". When a learner has disclosed local policy should protect the student from multiple disclosures to multiple people especially when sharing of such information can be very personal and emotionally draining.

Conclusion

Much of the educational theory and evidence used in this document is relevant to all learner types however this piece has looked at how these areas need further considerations for learners who have dyslexia. As highlighted, it is important for academic and clinical educators to work together as often coping strategies adopted in the academic setting can be more challenging to transfer to the clinical setting. Furthermore the healthcare learner who has dyslexia needs to take responsibility for their personal learning and their responsibilities of disclosing their disability so they can practice as safe registered healthcare professionals.

While there are many theories on dyslexia and how it affects the learning process, evidence on supporting radiography learners who are dyslexic during clinical placement is limited. It is mostly derived from small-scale, short term studies with data collected through interviews. Links can of course be made with other healthcare dyslexia/ SpLD studies and comparisons can be made, however radiography has unique skills and working environment and this is only partly addressed in the current literature. Ideally to broaden knowledge and understanding of improving the dyslexic learner consolidation of learning in the clinical setting larger samples would be recommended however given issues with self-disclosure this may be difficult to achieve.

Declaration.

Janice St. John-Matthews is a radiography educator with dyslexia. Identified as having a SpLD during the second year of her radiography degree Janice has experiences of clinical placement before and after coping strategies were put in place. Subsequently she has been able to draw on personal experience of challenges presented in the clinical environment while appreciating that those identified with a SpLD require a personalised learner centred approach through their educational journey.

Kerry Pace is the founder of diverse learners, has multiple SpLDs. For 10 years Kerry had specialised in supporting healthcare students who have SpLDs across the UK. Kerry lectures on undergraduate and postgraduate healthcare courses and offers consultant advice to Higher Education Institutes relating to SpLDs.

Table 1

	Clinical Management	Practice Educators	Clinical Staff	HEI	Individual Student
Decode Dyslexia					
Read RCN. Dyslexia, Dyspraxia and Dyscalculia: • A guide for managers and practitioners [31] • A toolkit for nursing staff [39]	x	x	x	x	x
Familiarise yourself with the radiography evidence base [13,14,15,16]	x	x	x	x	x
Consider your philosophical view of disability					
Reflect on your viewpoint on disability and staff members who have dyslexia	x	x	x	x	x
Adopt a holistic and multi-sensory learner-centred approach	x	x	x	x	
Be aware of the "dyslexic advantage"					
Identify your understanding of dyslexia	x	x	x	x	x
Compare your understanding with current theories and evidence in this area	x	x	x	x	
Implement clinical needs assessments					
Organise for the key practice educator, clinical link lecturer, HEI student support services and learner to meet prior to the placement to agree and finalise learning strategies	x	x	x	x	x
Agree who will take responsibility for implementing each of the recommendations i.e. placement site, link lecturer and/ or learner.	x	x		x	x
Promote disability awareness to all clinical staff and support disclosure					
Highlight the disability section in the Equality Act (2010) to clinical staff [13]	X				

As part of the department continuous professional development workshops arrange a session on SpLD linking to the CPD Now framework		X			
Develop a local induction pack which includes contact details for the disability services at the hospital site and University		x			
The philosophy of support					
Work with the learner to break appraisals into bite-size chunks. Write out the areas they need to focus their learning i.e. anatomy, positioning, physics, image viewing. Discuss steps and sequencing of these activities and links to each. Record these in a multisensory way that best helps the learner – colours, numbers, mind maps, audio recording, videoing		x	X		
Demonstrate radiography skills alongside verbalising the skill to the learner. Allow time for "over-learning" and multisensory learning approaches		x	x		
Harness Technology					
Consider the inclusivity of local policies relating to the use of smartphones in the clinical area	x				
Provide a locker to store personal electronic devices i.e. smartphones, electronic tables, smart watches. Provide labels that identify that item as being a required learning tool.	x	x			
Embed breaks into a shift					
Ensure regular breaks in the working day and these are protected and listed in the learning plan.		x	x		
For shift working ensure that the working day or night is not too long and reasonable rest time is given between shifts.	x	x			
Nurture learner confidence					
If you suspect a learner is dyslexic refer them to the local higher education	x	x	x		

institute student support services					
Read the blog posts: • "The Dyslexic Radiographer": https://janicestjohnmatthews.wordpress.com/2015/04/06/the-dyslexic-radiographer/ • "The Dyslexic HealthCare Academic: Dyslexic-friendly teaching". http://www.diverse-learners.co.uk/the-dyslexic-healthcare-academic-dyslexic-friendly-teaching/	x	x	x	x	x
Advise learners of any hospital wide disability support networks for staff. Allow opportunities for learners to attend these meetings and also scheduled SpLD tuition.		x			
Student responsibility					
Access Disability Student Allowance (DSA) and support sessions					x

CPD Reflective Questions:

- Consider local departmental disability policy in relation to inclusivity for all learners. How might you contribute and/or advise amendments to it in relation to the needs of health care settings?

- Read the following blog: http://www.diverse-learners.co.uk/the-dyslexic-healthcare-academic-dyslexic-friendly-teaching/ Consider how you may adapt your teaching in the clinical environment to include multi-sensory learning

- Find out the named equality and diversity team lead within your Trust/ Organisation – be able to signpost students and colleagues to support services in the healthcare setting and work.

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