Continuing professional development

Using reusable learning objects to raise awareness and disseminate research findings about the impact of dyslexia on placement-based learning

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What is known on this subject
- Students and mentors require more information about what dyslexia is and how to cope with dyslexia in the workplace.
- Reusable learning objects (RLOs) can be effective in increasing knowledge and understanding.
- Use of a standardised quality-controlled development framework leads to RLOs that are fit for purpose.

What this paper adds
- It offers a rationale for translating research findings into open-access RLOs on dyslexia.
- It provides a description of the RLO development process for producing two RLOs aimed at raising awareness about dyslexia and providing guidance on coping with dyslexia in the workplace.
- It describes the benefits of the RLO format for users who want to find out more about dyslexia.

ABSTRACT

The findings from a previous study investigating the impact of dyslexia on practice learning were used to develop the content of two web-based reusable learning objects (RLOs). The aim was to provide students and mentors with evidence-based guidance and strategies for coping with dyslexia in the workplace. The RLOs were developed using a pedagogical framework to guide the use of media components, narratives and interactivity. The RLOs have been accessed by over 600 users, including students and mentors. Positive ratings and qualitative feedback suggest that the RLOs are of high quality and informative. Translation of research findings into RLOs is an effective way of achieving knowledge transfer. In this study the resources were developed for healthcare students, their mentors and others interested in finding out more about dyslexia. By releasing the RLOs as open educational resources, the barriers associated with authentication and restrictive licensing are removed, enabling many more people to learn about dyslexia and the strategies for coping with dyslexia in the workplace.

Keywords: dyslexia, placement-based learning, reusable learning objects

Introduction

Dyslexia affects 3–10% of the population (Snowling, 2000), and many students are not identified as being dyslexic until they enter higher education (Wright, 2000). Students who are dyslexic are fairly well supported in their academic studies by their tutors and institutional academic support units. However, in the practice learning setting there is evidence that students with dyslexia find some tasks difficult (Murphy, 2008; Illingworth, 2005; Sanderson-Mann *et al*, 2012). Although concerns have been raised about whether clinicians with dyslexia pose any risk to patient safety, there is no evidence of the correlation between reduced performance on certain tasks and dyslexia indicators translating into performance errors in practice (Millward *et al*, 2005).

An additional problem for students is that their practice mentors may be unaware of what dyslexia is (Wright, 2000; Price and Gale, 2004; Sanderson-Mann *et al*, 2012) and the ways in which they can support dyslexic students under their supervision. A review by Shellenbarger (1993, cited in Millward *et al,* 2005) argued that it is neither practical nor cost-effective to provide the level of support required. In an era when the volume of evidence that needs to be considered by practitioners is constantly expanding, understanding dyslexia represents yet another task. So, although useful toolkits (Cowan, 2010) and guidelines are available, practitioners have little time to spare to read through what can be fairly dry documents. In our study (Sanderson-Mann *et al*, 2012), both students and mentors indicated that web-based learning resources would be a popular way to promote and disseminate the research findings and raise awareness of dyslexia. In this article we describe how we have translated our research findings into two short multimedia-rich interactive web-based resources called *reusable learning objects (RLOs)* for students with dyslexia and their mentors.

Aims

These were as follows:

1. to describe how the findings from a research project designed to explore the difficulties experienced by students with dyslexia in practice environments have been incorporated into two RLOs
2. to evaluate the use of the RLOs when released as open educational resources.

Characteristics of RLOs

There are numerous definitions of RLOs (Wiley, 2000; Duncan, 2003). Our definition is as follows: '*an interactive multimedia web-based resource based on a single learning objective which can be used in multiple contexts.*' RLOs are bite-sized chunks of e-learning, focusing on a specific topic and offering flexibility in their use. They are visual with an audio commentary and high-quality graphics, and take the average learner about 15 minutes to complete. Visual, audio and interactive resources engage and support learners, and a key strength is the interactive functionality that can promote a sense of control. Feedback to the user can improve feelings of competence and lead to changes in behaviour (Lymn *et al*, 2008). The ability to visualise processes as computerised animations or videos appears to enhance learning, and increases test scores when compared with trying to understand from static text (Thatcher, 2006; Chew *et al*, 1994). The opportunity to choose from a selection of media to deliver the information is important, as learners prefer to be in control of how they learn (Windle *et al*, 2010a), and it also makes the RLOs particularly accessible for students with a disability such as dyslexia, or who have a particular learning style (auditory, visual or kinaesthetic). RLOs are portable, can be loaded into VLEs, websites, CDs or memory sticks, and are easily accessible because they are open educational resources (Windle *et al*, 2010b) requiring no authentication to access them.

RLO pedagogy and design principles

The theoretical framework underpinning the pedagogical design of the RLOs is IMS Learning Design (Koper, 2003). This framework emphasises the *environment* in which the learning occurs, the *roles* played by the learner and the *activities* undertaken. IMS Learning Design ensures that the most appropriate multi-media environment is created, and that learners take an active role within the RLO. The content is supported by help and feedback mechanisms; self-assessments allow learners to gauge their progress against the learning goals. The RLOs consist of a stand-alone collection of four key elements.

1. *Presentation*: the concepts and facts to be understood by the learner to support the learning objective are presented in text, audio and imagery formats.

2. *Activities*: interactivities are carried out by the learners in order to enable them to engage with the content and improve their understanding.
3. *Self-assessment*: learners are able to apply and test their understanding of the content.
4. *Resources*: there are external links to further resources to reinforce the content and aid understanding.

RLO development methodology

The development and quality assurance process has been described in detail elsewhere (Boyle *et al*, 2007). Figure 1 shows a schematic diagram of the process and is briefly described here. The evidence-based content for the RLOs is identified following a scoping process that may take one or more forms, for example, workshops, literature reviews, or a bespoke piece of research as was the case in this study. The output of this first scoping stage was a storyboard which was then distilled into a written specification. The specification was peer (quality) reviewed by two content experts (in this case they were Disability Liaison Officers within the University of Nottingham) who also later reviewed (quality review 2) the prototype RLO following the media development stage. Following various iterative review cycles the RLO was ready for user evaluation with mentors and dyslexic students.

Dyslexia RLOs

The learning goal of the first RLO was to raise awareness of the positive characteristics of dyslexia and the different skills that those with dyslexia possess. The short RLO uses images of famous dyslexic people in public life to emphasise their special talents. Other
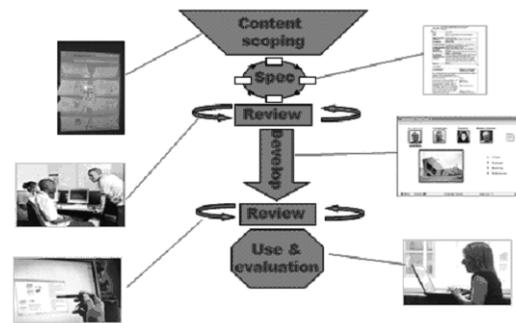

Figure 1 The schematic diagram shows the stages of the RLO development process, beginning with team meetings to scope the content and ideas for analogies and media to illustrate the concepts. The written storyboard is sent to experts for peer review prior to development. Once a prototype has been developed, the RLOs go through a second peer review before packaging and release.

visual imagery is used to illustrate other traits and skills that dyslexic people have. Learners can complete interactive tasks to enable them to gain an insight into how it feels to have dyslexia. A screenshot from this RLO is shown in Figure 2.

The second RLO (see Figure 3) incorporated the findings from the research study (Sanderson-Mann *et al*, 2012), and the learning goal focused on strategies for coping with the difficulties that dyslexic students encounter when learning in the workplace. The RLO provides guidelines that mentors can use to help students to learn in this sometimes challenging environment. These were drawn directly from the research findings, and true anonymised personal experiences from students with dyslexia were used to convey strategies for overcoming difficulties experienced during nursing placements. A simple colour changer that allows learners to choose their preferred background colour was added to both RLO interfaces. The two
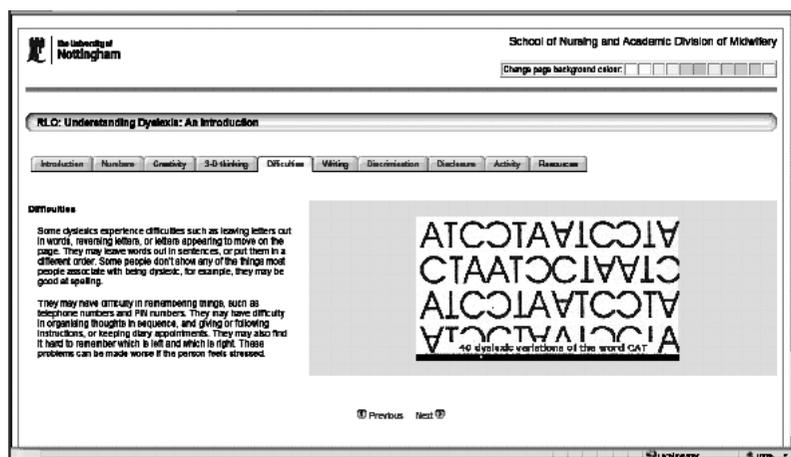

Figure 2 Screen shot from 'Understanding dyslexia.'
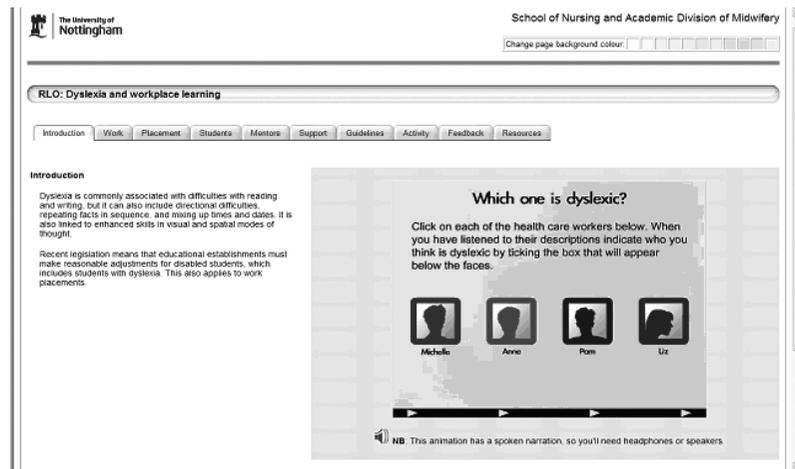
Figure 3 Dyslexia and work-based learning.

RLOs 'Understanding Dyslexia' (released in September 2005) and 'Dyslexia and Workplace Learning' (released in January 2007) are freely available under a Creative Commons licence (at www.nottingham.ac.uk/nmp/sonet/rlos/placs/dyslexia1/index.html and www.nottingham.ac.uk/nmp/sonet/rlos/placs/dyslexia2).

Evaluation

Each RLO was packaged with a short online survey that was added in January 2006, for learners to complete. The survey was a tool available from an evaluation toolkit devised by the Centre for Excellence in Teaching and Learning for Reusable Learning Objects (www.rlo-cetl.ac.uk). This evaluation strategy was based on activity theory and has been widely deployed (Morales *et al*, 2006). The tool consisted of 10 open and closed question types and used a four-point Likert scale; it was short in order to encourage a response. The questions included the following: 'How do you rate the RLO?', 'How easy was it to use?', 'How helpful has the RLO been for learning this subject?', 'Would you recommend it to others?', 'What did you like most?' and 'What did you not like?' Other questions requested biographical information.

Data analysis

Responses to closed questions were collated automatically within the survey management tool Zoomerang (www.zoomerang.com) and exported into Microsoft Excel. Open responses were organised into key themes by one of the authors and shared among the others for verification. Quotations representing the key themes

were later selected (see Table 1) and used alongside evidence from the literature to illustrate the key issues.

Results and discussion

At the time of writing this article, 608 people have used the RLOs and 33 (5%) have completed the feedback form. This is a disappointingly low response rate, but is not unusual for an optional survey of this kind. Figure 4 summarises the combined quantitative feedback for the two RLOs. Learners included students (53%), tutors (35%) and mentors (12%). In total, 39% were external to the host university; 96% said that they would recommend the RLOs to others. Overall the feedback was very positive, and individual comments suggest that the RLOs have raised awareness and increased understanding about dyslexia.

Many of the positive comments related to the underlying pedagogical design features of the RLOs (i.e. the ways in which the material was delivered as activities and exercises, visually and with commentary; see Table 1, T2 and T3 columns 2 and 4). Visual learning approaches have been shown to enhance learning by providing multiple representations of a topic and by supporting learner preferences (Ainsworth, 1999; Ainsworth and Loizou, 2003). However, learning was not directly measured in this study. The visual and interactive elements along with the use of analogies and narratives to describe dyslexia seemed to contribute to the RLO users' positive impressions of the resources as illustrated by the quotes (see Table 1, T2 and T3 columns 2 and 4), although some users would have liked more detailed information. Learners who take more active control of visual learning approaches are said to construct a deeper understanding of the subject (Farrell, 2006). The visual, audio and

Table 1 Themes from the open questions 'What did you most like about this RLO?' and 'What did you not like about this RLO?' Responses from different users (students, mentors and teachers/lecturers) have been combined

Theme	RLO 1: Understanding dyslexia		RLO 2: Dyslexia and work-based learning	
	'What did you like most ...?	'What did you not like?'	'What did you like most ...?	'What did you not like?'
T1. Clarity of the content	'Sets out exactly what dyslexia is and the difficulties' 'Clear information and not time consuming' 'It was clearly displayed and easy to understand' 'I like it all'	'It gave a lot of information and spoke about getting a test to see if you are dyslexic, but didn't say who and where to go to get one' '... the overall negativity about dyslexia focusing on what "they" can't do or have problems with' 'Would like more information on practical things that you can do in class to help young, newly diagnosed children ...'	'It had more focus than the "understanding dyslexia" and offered practical solutions instead of focusing on what might go wrong' 'Easy to follow – good practical advice for mentors' 'It provided a very good overview of strategies when working with students with dyslexia' 'Helpful advice on spelling and taking time' 'Just the fact that dyslexia is recognised and offering examples of support available' 'In a nut shell it gave some great advice and gave me some more advice on things I could do on a placement or workplace to make life easier for me and to deliver the best quality of care' 'Clarified dyslexia and gave me some good ideas of how to support students with it'	'Nothing' 'It is open to one's own interpretations' 'Nothing'
T2. Value of interactivities, narratives and animations	'I found the activities thought-provoking and entertaining!' 'It had mini activities that got me thinking what it would be like to be dyslexic'	No comments	'Hearing explanations of experiences much better than reading only' 'Visual and audible presentation and that it was interactive'	No comments

Table 1 Continued

| Theme	RLO 1: Understanding dyslexia		RLO 2: Dyslexia and work-based learning	
	'What did you like most ...?	'What did you not like?'	'What did you like most ...?	'What did you not like?'
T3. Use of different media	'The audio aspect helped me hugely in my note taking'	'Unable to access the picture screens that go with the commentary' 'My computer has not got speakers, so could not listen to narration' 'The sound track took ages to load, but that could have just been the computer system at that time'	'The animated boxes were very interesting and raised my knowledge'	'It took a while to load'
T4. Relating to personal experiences and roles	'It reinforced and explained things about my dyslexia that I had been thinking but couldn't explain' 'I was using the website as a planning tool for some research I am doing at college' 'I am a teaching assistant with a newly diagnosed boy in my class, and the site gave me loads of information that I can use to (hopefully) get this boy the kind of teaching he deserves and the resources he needs to access it'	'It only touches the surface. I want to know more about why I am different. What is it that happens in my brain to make me different? Understanding is the key to helping me to deal with my dyslexia' '... the boy in my class is only seven, has only just been diagnosed with dyslexia, and is currently doing his SATs with no additional support or resources. I desperately want to help him but, at the moment, don't know how'	'Very useful within my role, will give mentors a clear idea of how they can support students with dyslexia' 'This was very good as it was directed at nurses, I felt I could relate to it more. It was good to hear the statements from other students and scary how familiar the strategies are' 'The scenario about the newly qualified nurse being a mentor and the first student being dyslexic applied to me perfectly!' 'It has helped me to understand myself a bit more, having just recently found out that I have dyslexia'	'I don't think there is time in a busy ward setting for students to have individual attention, I feel that I am just another hindrance in an increasing workload. However, the staff are helpful in helping me meet my learning needs'
T5. User control	'The ability to change the background colour, the use of text and sound together for inclusivity' 'Being able to change the background colour, as this made reading easier'	'The fact that you have to change the background colour every time ...'	No comments	'Still a bit irritated that the colour change has to be actioned each time!'
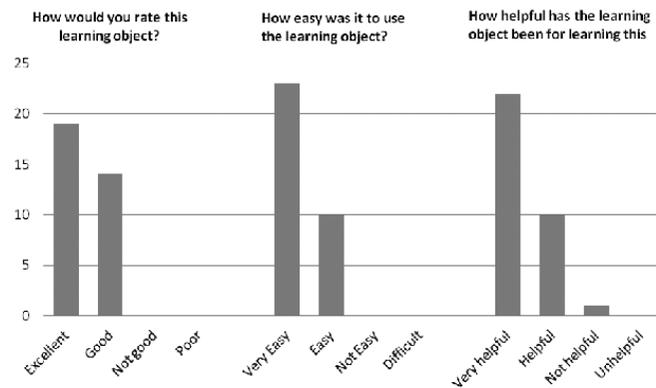
Figure 4 Feedback (*n* = 33) from users of the dyslexia RLOs. Data for the two RLOs have been combined since responses were similar. Users included students (53%), tutors (35%) and mentors (12%). In total, 39% were from users external to the host university.

interactive nature of these RLOs means that they have an appeal for visual, auditory and kinaesthetic learners. This is an important issue, bearing in mind data which suggest that learning style is important in web-based e-learning (Manochehr, 2006). Some of the negative comments related to technical difficulties, such as not being able to see the images or hear the audio (see Table 1, T3 column 2) due to settings on the personal computer.

Previous investigations of the effectiveness of e-learning technologies for health professionals and students identified a number of barriers to its success, including cost, poorly designed packages, lack of skills, the need for a component of face-to-face teaching, the time-intensive nature of e-learning, and computer anxiety (Childs *et al*, 2005; Wilkinson *et al*, 2004). The content of the RLOs in this study was pedagogically designed to address many of these issues in that they were small, self-contained and easy to use (see Figure 4). Our data suggest that individual RLOs do not require more than around 15 minutes to complete. Therefore they do not require time-intensive input, which makes them more flexible for learners to use at work or at home, attributes that have previously been shown to be valued (Wharrad *et al*, 2001; Wilkinson *et al*, 2004). One of the reasons for making our resources freely and openly accessible was the difficulty in accessing materials that require usernames and passwords, and remembering how to access them. The RLOs can be used flexibly, giving learners a sense of control, which is particularly important for healthcare students and staff who are coping with demanding curricula and work commitments (Childs *et al*, 2005; Windle *et al*, 2010a).

Research findings from a study of the placement experiences of nursing students with dyslexia have been successfully translated into web-based multi-media RLOs. The RLOs benefit healthcare students,

their mentors and others interested in finding out more about dyslexia. By releasing the RLOs as open educational resources, the barriers associated with authentication and restrictive licensing are removed, enabling many more people to learn about dyslexia and the strategies for coping with it in the workplace.

Limitations

This was a small-scale evaluation study, and the intention is not to claim learning effectiveness or impact of the RLOs, but simply to provide potential future users with some confidence in the quality of the RLOs based on user feedback.

Conclusion

Research findings on the strategies used by nursing students with dyslexia, and their mentors, for coping with dyslexia in the workplace have been translated into two web-based RLOs. These RLOs were developed using a quality-controlled framework and released as open educational resources. User feedback suggests that this form of knowledge transfer of research findings is a useful approach.

Louise Bramley for peer reviewing the RLOs, and to student nurse Jessica Ellis for providing extensive comments from a student's perspective.

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CONFLICTS OF INTEREST

None.

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