Adjusting existing VLEs to support students with dyslexia

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Abstract

Virtual Learning Environments (VLEs) have become an integral part of the learning environment for most universities. However, they are not always as accessible or easy to navigate as they could be for students with dyslexia. This paper uses data collected via a series of focus groups and telephone interviews to identify design characteristics that are required in order for a VLE to suit the needs of students with dyslexia. The study identified three prominent themes: accessing information, interaction and personalisation. The study shows how existing VLEs can be adapted to provide a more user-friendly and inclusive virtual learning environment and suggests how specialist tutors can utilise these platforms to support independent study.

Introduction

The use of virtual learning environments (VLEs) has become increasingly popular in recent years (Jackson & Fearon, 2013; Costello, 2013; Mooney & Bergin, 2014) with 95% of UK universities employing them as an additional teaching tool by 2005 (Browne et al, 2006). Their use can vary from a ‘dumping ground’ for lecture notes to a fully integrated learning environment (Brown et al, 2006). With recent changes to the Disabled Students’ Allowance (DSA) putting the onus squarely on universities to facilitate inclusive practice, existing VLEs could hold the key to offering a more flexible learning environment to support students with dyslexia.

This paper analyses data collected for a project conducted at the University of Winchester (Sennett, 2015). The project gained feedback on the University’s VLE from students with a specific learning difference, in order to explore how the present platform could be amended for easier navigation. The insights gained can be used to guide practice on the design and operation of VLEs in higher education (HE) and provide guidance for 1:1 tutors in supporting students’ use of VLEs, further enabling independence.

Dyslexia & the DSA

The definition of dyslexia continually evolves as we begin to understand more about its impact on the individual (Moody, 2015). Dyslexia is often characterised as a difficulty with literacy skills, particularly with regards to reading (Ferrer et al, 2009; Trenta et al, 2013; Shaywitz and Shaywitz, 2005). Many suggest that this difficulty with reading is the result of cognitive and neurological deficits that impact on reading development (Cameron & Billington; 2015; Nicolson & Fawcett, 2008). They suggest these deficits create challenges with working memory (Snowling, 2000; Beneventi, 2010), magnocellular visual processing (Stein, 2001), organisational skills (Crombie & Crombie 2001; Henderson, 2001; Cooper, 2009), procedural learning (Nicolson & Fawcett, 2008) and a slow working speed (Shaywitz, 2003; Price, 2012). Studying at university can exacerbate these cognitive differences as students encounter a new environment that creates new challenges every day, both academic and personal (de Beer et al 2014). From a social model perspective, it can be argued that the socio-cultural environment at university 'creates dyslexia' (Barden, 2014:3). Therefore, without a supportive inclusive setting, university life can be challenging and stressful, for students with dyslexia (McLoughlin & Leather, 2013 and Miles & Varma, 2004), as they attempt to navigate an environment that will grade or exclude them based on their literacy skills (Herrington and Hunter-Carsch, 2001).

The Special Educational Needs and Disability Act reminds us that students with disabilities must not be put 'at a substantial disadvantage in comparison with students who are not disabled' (SENDA 2001: 27). However, in 2014 the government announced planned cuts to the DSA (Willets, 2014), impacting on the support provided for students with dyslexia in HE (Lewthwaite, 2014). The cuts are predicted to save the government a total of £24.5 million per year (Department for Business Innovation and Skills, 2015). As a result, HE providers are being encouraged to develop more inclusive support measures and consider how students can be taught without the need for additional support workers or personal equipment. This paper puts forward the idea that, with a few considered design elements, existing VLEs could form part of this support.

Virtual Learning Environments

VLEs provide an online platform where students can access course material and lecture notes. Many also provide additional integrated learning tools including interactive learning spaces, forums and assessment pages (JISC, 2012). Reid et al (2013) highlight the advantages of VLEs for students with dyslexia by suggesting that they provide a non-stigmatising learning platform. Combined with the advent of mobile technologies and the 'mobilisation' of students (Fuller & Joynes, 2014:153), VLEs have become a mobile learning tool that can enable students to become

independent learners. In addition, the use of forums can enable students to build on their learning through discussion with peers and tutors, further developing critical thinking and reflection (Huges et al., 2010; Jordan, 2009).

However, despite these advantages, it is important that we use VLEs solicitously and do not fall into the trap of considering technology to be a 'panacea' for dyslexia (Smyth, 2010: vii). Dyslexic differences can impact on a student's ability to access e-learning materials just as they can with the more traditional paper formats. In fact for some students, a written online source can reduce their ability to apply active reading strategies such as annotation or highlighting (Beacham & Alty, 2006). Additionally, a deficit in working memory may make it difficult to access information displayed on multiple pages or within layers of multiple folders. Having to input complicated passwords creates a further challenge (Habib et al, 2012). Consequently, many students will need support to adapt the strategies they have learnt in 1:1 tuition to accommodate the challenges of this unique platform.

In order to minimalize these challenges, careful consideration also needs to be paid to the design of the VLE in order to allow flexibility and support the unique learning approaches of students with dyslexia. Many studies have investigated the specific design characteristics needed in order for a VLE to support an inclusive pedagogy (Yuknis, 2014, Mueller & Strohmeire, 2010). Mueller and Strohmeire (2010) investigate how specific design characteristics are rated, suggesting a list of vital areas to be considered, including interaction, accessibility and reliability. They advise that applying design characteristics that are specific (and not general) can have a direct impact on the success of the VLE as a learning tool. This highlights the need for focused investigation into what students want from a VLE, in order to avoid unspecific design criteria.

Methodology

The data for this qualitative study was collected through a combination of three focus groups and seven individual telephone interviews. A total of twenty participants were interviewed from a sample of students across faculties and year groups. Both focus groups and telephone interviews were conducted via a semi-structured method, giving the participants a degree of authority over the direction and content of the interview (Lincoln & Guba, 1985). All participants had received a diagnosis of dyslexia, with two students having an additional diagnosis of dyspraxia. The interviews were transcribed and coded using a thematic approach. Multiple displays were used in order to limit decontextualisation of the data (Grbich, 2007). A sample of the codes was analysed by a research colleague to ensure trustworthiness of the themes.

The project adhered to the ethical guidelines of the University of Winchester (UoW *Code of Practice for Research*, 2013) as well as external guidelines (UK Research Integrity Office, 2009). The study was carried out on a small scale and the researcher acknowledges the limited number of participants. Therefore, the results reflect opinions of students from the University of Winchester and should not be viewed as being indicative of wider opinions (King and Horrocks, 2010). It is also important to acknowledge the researcher's empathy with the participants, as a dyslexia tutor who is currently pursuing further study. However, as Burr (1995:152) reminds us, 'No human being can step outside of their humanity and view the world from no position at all.' The researcher was aware of this potential bias and how this might influence the project.

Findings and Analysis

Three dominant themes emerged from the discussions, highlighting what students wanted from the VLE: accessing information, interaction and personalisation.

Accessing Information

It was apparent from the data that many students found accessing information via the VLE to be challenging. The reasons for this will be displayed in three subsections.

Few Steps as Possible

Participants wanted to be able to access the information quickly and with as few steps as possible

> **A1** - I don't have to keep logging onto the intranet through explorer. I just click on it and I get the Learning Network right there and it's amazing. It's a lot better at efficiently using my time. (A1, Telephone Interview)

> **J2** - having that like direct link because I'm a social work student. Having a link for me, for relevant resources, specifically for my course, you know, somewhere that I can find it more easily accessible (J2, Telephone Interview)

> **B1** – but just to have like a little section where you can click on there and it has everything that's going on today (B1, Telephone Interview)

Having direct links to the information they find the most relevant, was a common wish among the interviewees. They suggest that this would make information easier to access and be a much more efficient use of their time.

Navigation

Having to go through various steps consequently created difficulties with navigating the VLE.

> **S1** – Sometimes navigating through the Learning Network to the specific item you want can be quite challenging for people. (S1, Focus Group 1)
>
> **T1** – A contact list, Beth. Like email, telephone numbers. … I know there's a kind of structured thing on the Intranet, so it's kind of there already, but it's a little bit complicated to use. (T1, Focus Group 2)
>
> **C1** - … sometimes when I put into the search box to search something and I haven't got the right keyword so it won't come up. (C1, Focus Group 2)

It is interesting to note here that T1 comments on how information is there but that it is 'complicated to use'. This is echoed by C1 who remarks on the difficulty of using a search box when you are unable to recall an appropriate word to input. Both comments suggest a frustration that the information they need is there, but that it is somehow lost to them and difficult to find. This reiterates the importance of assessing VLEs on their ease of navigation.

Giving Up

When information was not so readily available or structured in an accessible manner, many students reported simply 'giving up'.

> **J2** –I know it seems quite lazy, but for some people, it can be too, too much to have to try and find that person, so they just put it off. (J2, Telephone Interview)
>
> **L1 -** Because the problem is I found that trying to find the Student Services page, and I'm sort of thinking I'm trying to find something about wellbeing but like, how on earth do I get to that?
>
> **N1** – We still haven't found the Student Services page. Do Student Services have a page (laughs)? (L1 & N1, Focus Group 2)

The students' comments again illustrate frustration at not being able to find the information they need quickly and easily enough.

Interaction

In addition to being able to access information from the VLE, many students also expressed a desire to be able to interact with it. Having a VLE that simply displayed information did not go far enough. Students wanted to be able to manipulate or do something with that information.

Manipulation

> **T1** – Beth, I've just noticed something. The contact us thing, um, the phone numbers aren't clickable (T1, Focus Group 1)
>
> **J2** –… I don't think, you can't sit as comfortably with a laptop, and read something and get into it and concentrate, compared to something else I could… I can touch, if you get what I mean, you can highlight and you can make marks on it and notes you want to, that kind of thing. (J2, Telephone Interview)

The comments above show a desire for the VLE to do more than just display information. There is a need for an almost tactile interaction.

Assistive Technology

Interestingly, many of the participants expressed a desire to have assistive technology integrated into the VLE

> **C1** - I wondered if there was a way for it, for the readings to be read out to me. So I can plug it in and listen to my readings as I do other things. (C1, Focus Group 2)
>
> **B2** – Yeah. What about a text reader, that would be cool.
>
> **Interviewer** - A text reader? That's a nice idea
>
> **B2** – So literally…
>
> **Y** – Maybe some audio. Maybe.
>
> **B2** – Yeah,

These remarks show that students want the VLE to be more than just an information bank.

University Life

In addition, many participants requested interacting functions that would support them to manage their life outside of study. Requests for functions that allowed

purchases of tickets to Student Union events, management of finances and DSA funding were frequent.

> **H1** – Maybe something with, I don't know if it's already on there but with the Student Union you get BOP tickets on there. (H1, Focus Group 1)
>
> **S1**– Also when you get your DSA allowance, you've got like £75 of printing money. It would be great if you had an option with IT where you could pay that money onto your card
>
> **B2** – I think a banking bit… not like a banking but a budgeting sort of thing
>
> **C3** – Oh (interested)
>
> **S2** – that's a good one
>
> **B2** – Just so that you could actually go and …
>
> **Y** – If you could keep track of your money and put how much you spend (B2, C3, S2 & Y, Focus Group 3)

The students are looking upon VLEs as more than just virtual *learning* environments. They are looking to them as a tool that will help them organise and manage *all* aspects of their life at university.

Personalisation

The final theme to emerge was a desire by students to personalise the VLE to suit their individual requirements.

Content

Many students expressed a desire to personalise the content and for the VLE to only include information that is relevant to themselves.

> **T1** –… I don't really mind the blocks. Like if you could hold them and move them around maybe (T1, Focus Group 1)
>
> **S2** – Yeah, there should be like a 'you' section
>
> **C3** – Actually, there should be something like, you know the page… and then you can like add them to your main page.
>
> **B2** – The bits that you use.
>
> **All** – Ah (approval)

C3 – and the ones you actually want so some people wouldn't want say social stuff. Like Windows 8 where you can drag and drop stuff so you only have the things you use. So it would be like 'you' (S2, C3 & B2 Focus Group 3)

This desire to include only relevant information links back to the first theme of wanting easy access to information. It is reasonable to conclude that reducing the content of a VLE to information that is relevant to the individual student, will make navigating it much easier and will not leave students feeling like they are being bombarded with information.

Colour and Style

An interesting discourse developed around the idea of colour preferences. Many of the participants were passionate about the choice of colour but there was no unifying decision as to which colour was best. This further highlights the need for a VLE that allows for individual adaptations.

H – I hate the colour.

Interviewer – That's interesting

H – Boring, …

T - They seem to have budgeted for only three colours. Blue, black and white. (H1 & T1, Focus Group 1)

A1 - Yeah, I like that it's blue as well, not on a white background. (A1, Telephone Interview)

C3 – Maybe grey

S2 – Grey's already been used

H2 – But like, I mean like…

B2 – A softer colour (C3, S2, H2 & B2, Focus Group 3)

H2 – It's very blue (laughter)

Y – Yeah, it is very blue

Interviewer – is that a positive or negative?

H2 – I don't know

S2 – It's easier to look at than white and black I would say. Much easier to look at

(H2, Y1 & S2, Focus Group 3)

This participant sums up the importance of personalisation.

> **S2** – Maybe it would be great if each person who downloads the app could basically, if they want to, design their own little labels for each field so they have a connection to the… Cause obviously as there are so many different perceptions of what works for them, … they could design their own little labels. (S2 Focus Group 3)

Her comments show that not only would personalisation allow students to access the information more easily but it would also create a 'connection' to the VLE, a feeling that it belongs to them.

Discussion

The three themes that emerged from the interviews provide insight into the design characteristics of VLEs required to provide an inclusive learning platform for students with dyslexia.

Accessing Information

The data revealed a need for students to be able to access information quickly and in as few steps as possible. The explanation for this could be twofold. It could be viewed as a reflection of contemporary social expectations. The advent of mobile technologies, giving instant access to shops, entertainment and social networks has fuelled our need for quick and instant gratification (Fuller & Joynes, 2014). However, to justify this as the sole explanation would overlook many of the nuances of dyslexia. A weak working memory can make recalling a series of processes challenging (Snowling, 2000; Beneventi, 2010). Having to click through various pages and folders to find information would be a frustrating task, putting added strain on working memory. Add to this, a difficulty with visual tracking (Kim et al 2014; Jones et al, 2008) and processing speed (Kunert, & Scheepers, 2014) and it is reasonable to see how this process can be an exhausting experience for students with dyslexia.

In addition to the problems caused by having to navigate through vast amounts of information, inadequate search bars were also implicated. Despite them being designed as a tool to make navigation of VLEs easier, many of them caused further frustration due to their failure to include spell checkers. Habib et al (2012) also discovered this finding in their previous study. Difficulty finding information such as help and support pages could lead to an even greater feeling of isolation and social anxiety often experienced by students with dyslexia (McKissock, 2001; Pollak, 2010). It is also worth remembering that for individuals with dyslexia, their cognitive and neurological differences can result in many tasks taking longer than they would for

their neurotypical peers. Shaywitz reminds us that 'dyslexia robs a person of time' (2003: 314). Hence, we need to be mindful that students with dyslexia will often feel that time is so scarce that they do not have much of it left to waste.

The students themselves were able to provide possible solutions to these challenges. They repeatedly suggest having direct links to the essential information, negating the need to navigate through long sequences and suggest incorporating a spell checker into the VLE. Specialist tutors could also provide strategies to offset these challenges. For example, supporting students to set up shortcuts to specific information pages will lessen the challenges of navigation. In addition, utilising spellcheckers from other applications (such as Texthelp™ Read & Write or Grammarly®) could aid the student if a spell checker is not already integrated.

Interaction

The theme of interaction was common among the participants' comments. It was often cited as a means by which information could be accessed quicker and with more ease. This desire for a more interactive and tactile VLE is indicative of a multi-sensory approach to learning. Individuals with dyslexia can often favour an approach to learning that allows for manipulation of information in order to aid retention and comprehension (Fidler, 2012) as well as provide compensation for certain cognitive deficits (Malpas, 2012). It was evident that the lack of interaction with the VLE, was obstructing potential learning.

One suggestion made by the participants to enable better interaction, is the incorporation of assistive technology (AT). Until the recent changes to DSA provision, most students with dyslexia would be provided with a laptop containing AT, to aid their studies (Pollak, 2012). However, there is some evidence to suggest that students are shunning specialist equipment and software in favour of more generic mobile technologies (Nguyen, 2013). With this in mind, it is reasonable to conclude that a VLE containing functions such as text to speech software would provide the accessible, non-stigmatising and inclusive platform that Reid et al (2013) advocate. To further this goal, specialist tutors could also provide students with suggestions of applications that can be used in conjunction with existing VLEs. It is worth noting that both NaturallySpeaking® and ClaroRead® provide cheaper, mobile friendly apps.

Furthermore, many of the participants made comments about wanting to use the VLE to enable them to manage their social lives. It is evident from this that the participants are seeing the VLE as more than just a study apparatus but also as an organisational tool that will help them manage all aspects of life at university. It may be controversial to consider a VLE as a tool to help students plan their social life and it is hardly in keeping with the definition of it as a *learning* environment. However, if

we consider that dyslexia can impact on organisational skills and time management (Crombie & Crombie 2001; Henderson, 2001; Cooper, 2009; McLoughlin & Leather, 2013) as well as "robbing" an individual of the time that they have to accomplish tasks (Shaywitz, 2003), then it is reasonable to conclude that a students' social life and free time would also be reduced. Perhaps we should be looking upon VLEs as a more holistic tool to aid students in all aspects of their life at university. After all, a students' social and study life at university are not mutually exclusive.

Personalisation

Many students expressed a desire to personalise the information and functions within the VLE in order to simplify navigation.

There was a strong preference for specific colour schemes, exemplifying studies on the interaction between colour, dyslexia and reading (Stein 2001; Singleton & Trotter, 2005; Northway et al, 2009; Wilkins & Evans, 2010). If we can create VLEs that allow information and colour to be personalised then we can further improve inclusivity. This theme also reminds us of the individual nature of dyslexia. Varying "spikey" profiles of cognitive strengths and weaknesses characterises the assessment process (Zoubrinetzky et al., 2014; Grant, 2009; Thomson, 2009); while differences in life experiences, along with the individual personalities of every student (Carter & Sellman, 2013), results in an array of individual needs and approaches to learning.

It is apparent that by allowing personalisation of the app, difficulties with navigation and accessing information would also be reduced. It would allow for differences in approaches to learning, enabling students to take greater control over the methods they use (Price, 2012) and permitting them to apply strategies they have learnt from specialist tutors. Reid et al (2013:180) remind us of the individual nature of dyslexia when he states, 'there is no 'off-the-shelf' answer to dyslexia'.

Conclusion

In conclusion, the study found that in order for VLEs to be an accessible and beneficial learning tool for students with dyslexia, certain design characteristics need to be considered. Students need to be able to access the information within VLEs quickly and simply without having to trawl through a multitude of data. Ensuring that relevant information is not hidden within layers of folders and multiple pages will vastly improve the accessibility. In addition, incorporating functions such as search bars, which also take into account spelling mistakes, will support navigation.

Allowing the individual to personalise and interact with the VLE would also improve access to information. Allowing for personalisation of content, to ensure individuals

are only confronted with information that is relevant to them and their course, would reduce information overload. Including an ability to adjust colour and images would enable students to access the information with greater ease. Finally, integration of functions that allow students to tactilely interact with the VLE would support different approaches to learning.

VLEs have the potential to support inclusive learning. As specialist tutors, we need to encourage their use and continued development, in order to ensure that our students are fully able to utilise this essential aid to learning. With a few considered adjustments, VLEs can be an accessible, non-stigmatising learning environment for all learners.

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