

## Paper 58 – Full Paper

### Inclusive Education: Enhancing the student experience through simple learning technologies

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#### Abstract

*There is increasing demand and legislative requirement for inclusive forms of teaching and learning that facilitate the needs of a diverse range of students with different backgrounds and abilities (SENDA 2001). As widening participation and the number of students with learning disabilities in Higher Education (HE) increases, approaches toward the teaching of all students must become more inclusive. With larger class numbers, learners with quite minor special needs can often feel singled out by traditional learning methods. Conversely; time pressures on teaching staff often makes it difficult to give additional help to students with special needs. Research suggests that learning technologies can support a more inclusive learning environment that facilitates the learning of all students and can reduce the amount of additional help students require.*

*This paper provides evidence from an action research study, which introduced the use of simple learning technologies (SLTs) into the teaching, learning and assessment of two taught modules in Art and Design at the University of Salford. The study's overall objective was to assess whether HE lecturers can enhance the learning experience and achievements of students with learning disabilities, whilst delivering challenging and inclusive education for all. After interacting with the SLT's introduced, 90 students participants were asked to fill out a semi-structured questionnaire reviewing their learning experience. The results of this quantitative study are analysed and discussed to in response to the aim of the study.*

*Specifically, the paper provides:*

- 1. A review of the issues surrounding learning disabilities in HE*
- 2. Research methodology*
- 3. Preliminary results of the study*
- 4. Analysis & conclusions.*

*For the purpose of this study SLT's are defined as 'existing ICT tools that can be delivered via the virtual learning environment (VLE) at the University of Salford that don't require additional training or additional time to implement into the existing module structure'.*

*Primary evidence from the study illustrates how the SLT tools introduced have enhanced the students' learning experience. All students have achieved improved grades in comparison to the same taught module the year before. In particular, those students with learning disabilities have markedly improved their grades.*

*Keywords: Learn Disabilities, Inclusive Education, Learning Technology*

## **1. Introduction**

There is an increasing demand for Lecturers in Higher Education (HE) to provide teaching and learning that facilitates the needs of a diverse range of students with different and abilities (Lockley 2001).

The focus is education for all; developing an educational environment that supports and nurtures all abilities and provides widening opportunity. (DfES 2004).

This study is toward developing accessible and inclusive curricula, teaching strategies and forms of assessment that include and actively engage all students (Doyle and Robinson 2002). The objective is not only for students to fulfil their potential as a learner, but enhance the student experience. This experience is not just about learning, but about being actively part of the process of that learning. In fact, the student experience is so important that it is one of the nine major categories in the outline checklist for auditors reviewing quality standards at HE Institutions (Haselgrove 1994).

Crucial to the successful implementation of accessible learning and inclusivity in HE is the consideration of learning disabilities, in particular dyslexia, as part of developing and inclusive leaning environment. This paper provides evidence from an action research study, which introduced the use of simple learning technologies (SLTs) into the teaching, learning and assessment of two taught modules in Art and Design at the University of Salford. The study's overall objective was to assess whether HE lecturers can enhance the learning experience and achievements of students with learning disabilities, whilst delivering challenging and inclusive education for all. After interacting with the SLT's introduced, 90 students participants were asked to fill out a semi-structured questionnaire reviewing their learning experience. The results of this quantitative study are analysed and discussed to in response to the aim of the study.

Accessible curricula is becoming highly important, with an increase from around 4304 students identifying themselves as having dyslexia is 1996-97 to around 18,700 in 2003-4 (Brill 2010). The definition of dyslexia from the World Federation of Neurologists is 'a disorder manifested by difficulty in learning to read, *despite conventional instruction*, adequate intelligence and socio-cultural opportunity' (AVKO 2007). Recent legislation in the UK has made fair and inclusive education obligatory by adding the Special Educational Needs and Disability Act 2001 (SENDA). Research suggests that there is now an increasing number of students that embark on degree courses with problems acquiring and employing the range of skills needed in HE that, in the past, would have been essential to study at this level (Mortimorea and Crozierb 2006). Dyslexic students typically have adequate intelligence but simply do not respond to conventional instruction. Is it possible then to create an inclusive education curriculum that supports the notion of education for all that is *unconventional* but just as valid?

Students with learning disabilities often experience low self-esteem that is generated from the difficulties with their studies thus it is linked with lower academic achievement (Gibson and

Kendall 2010). The study will focus primarily, though not exclusively, on dyslexia as a key example of a learning disability. This is because there tends to be a relatively high instance of dyslexic students in Art and Design as dyslexic students often have acute visual intelligence (Anon 2007). They therefore respond more readily to the multi-sensory forms of education that the style of Design teaching & learning provides (Hercules 2001).

The popular image of dyslexia is problems with reading and writing, but it can be much broader, including problems with;

- short term memory
- concentration
- distinguishing right from left
- self organisation
- language acquisition
- maths
- visual perception

The characteristics of dyslexia vary in degree, thus by definition each individual's experience of dyslexia is unique (Lockley 2001). Written work is often perceived to be difficult by Art and Design students in general (Barringer 2009) but dyslexic students often find the work more intimidating and challenging than those without dyslexia (Mortimorea and Crozierb 2006). They often experience a frustrating 'fear' of writing that has been enhanced by allowances made during their education, mainly by previous teachers with low expectations (Gibson and Kendall 2010). This can lead to the student developing the attitude of 'I am dyslexic, therefore I can't write'. Exacerbating this is the fact they are never asked to face their *fear* of writing, they are allowed to avoid it using assistive technologies such as voice-to-text software and spell checkers. This can provide the student with an avenue of escape – they do not learn the skill of writing, they learn how to circumnavigate it, and thus the 'fear' remains. With patient, methodological approaches and support dyslexic students can produce excellent and well-researched academic written work and, more importantly, gain confidence and self-esteem by overcoming a long held fear and obtaining unexpectedly good grades.

The introduction of SLTs into the modules was designed to begin to address a more inclusive teaching environment for students and the *conventional* delivery of the modules chosen, which are currently in lecture format. When introducing such SLTs it is important to note that the study also addresses the barriers that lecturers themselves both perceive and experience when attempting to improve the learning of those students with learning disabilities such as dyslexia, which are essentially, that it demands more of their time and that it often requires them to learn new skills.

## **2. Issues for the lecturer or practitioner**

There are a number of issues that prevent lecturers from incorporating new learning technologies into their practice more readily (O'Donoghue 2006). The lecturer perceives that by introducing new technologies there will be increased demand upon their time and day-to-day work in a number of ways:

- New learning – The learning technologies will require 'up-skilling' and training.
- Administration – Introducing the new technologies means they have to be managed.

- Changing the module – There are two elements to this problem, the first being the time and effort needed for module amendments and the perceived difficulties associated with such tasks. The lecturer may initially be sceptical that improved student results will follow.
- Lastly, there is an element of technophobia. Some lecturers already feel that they lack the skills necessary to handle day-to-day ICT issues – There has been a massive increase and reliance on ICT with many inherent problems and complications. ‘Digital immigrants’, those that have had to learn ICT in later life, struggle with such issues (Prensky 2001).

These barriers have been used in the selection of the SLTs that we employed on the modules. We used tools that are readily available on the VLE that can be setup and used by the lecturer with minimal effort and learning. They are also easy to maintain throughout the module. We also selected them based on the idea that the common interfaces on the tools were largely understood by the participating students, so that there was minimal learning for them too.

## **2.1 Learning disabilities – issues of accessible curricula & using technology**

The ‘Accessible Curricula: Good Practice for All’ book (Doyle and Robinson 2002) and the JISC publication ‘Access All Areas: Disability Technology and Learning’ (Phipps, Sutherland et al. 2002) discuss the value of accessible curricula and the need for inclusivity. Both documents detail technologies that can be used to enhance the students learning with both learning and physical disabilities.

The focus of this action research study is on learning disability, specifically dyslexia, so decisions about the learning technologies used were based on the needs of this group of students. These decisions are also based on the barriers perceived by lecturers, investigating simplicity of use and utilising existing tools on the virtual learning environment (VLE) in an effort to minimise time and technophobia issues.

Both documents strongly advocate the recording of lectures. This was introduced in the form of a regular podcast of each lecture with accompanying lecture notes posted in the VLE using the existing ‘podcast’ tool. The implementation of a ‘Wikitool’ on the VLE resulted from research that suggests students with learning disabilities respond well to virtual learning environments; online spaces that can be interacted with and involve multi-sensory approaches that help dyslexic students learning more effectively (Rowcliffe 2002). The Wikitool specifically allowed a group of student’s access to a web-space which they ‘owned’. Providing a virtual environment in which they could post information and media in a variety of formats in response to the project brief. The students were encouraged to use visual information and media just as much as texts to support analysis of the issues. They took responsibility for their own learning, taking experimental and investigative approach. Lastly, audio feedback was introduced as research indicated that students are ten times more likely to listen to audio feedback than are likely to come and collect written feedback. For all students, it is often more explicit than summative feedback, that can pin-point specific issues in the students learning to help them improve. (Lunt and Curran 2010). In-line with institutional and national policy, it is also a technology suggested for speeding up student feedback. (NUS 2010)

### 3. Research methodology

The design of this research study has been structured around the principles of action research described by Kember (2000).

Action research is:

- Concerned with a social practice
- Aimed toward improvement
- A cyclical process
- A reflective process
- Participative
- Determined by practitioners (Kember 2000)

Using these parameters a plan that systematically addresses each element of action research was developed.

Teaching is a social practice that includes direct interaction with groups of people, in this case a group of 90 Art and Design students, spread across 2 modules at 2 different levels. The first group, totalling 61 students was undertaking Dialogues in Design: 3D Practice. This module was populated by level 5 undergraduate students studying Product & Interior Design. The second group totalling 29 was undertaking Business and Communications. This module was populated by HND Graphic Design students. These two modules were specifically chosen to test the SLTs as the students in these groups represent a diverse range of different attitudes, levels of understanding and abilities. (D'Eon, Overgaard et al. 2000). They were also chosen as the primary components of assessment-involved written research work which is the most challenging to students with learning disabilities.

The study does not seek to highlight problems with teaching and learning; it accepts that inclusivity *is* a problem in HE and tests whether introducing the SLTs in a social context that gives the students responsibility for the own learning in a peer to peer environment, improves the student experience for all; making the teaching, learning and assessment in the modules more inclusive. With written work often taking Art and Design students away from their preferred visual learning approaches, these modules provided an excellent opportunity for obtaining preliminary results toward testing the integration of the SLTs.

This approach addresses the next parameter of action research, which is that it should be aimed toward improvement and enhance the quality of teaching and learning in the group. The objective of introducing the SLTs is to enhance the learning of all the participants and improve their grade attainment. The cyclical process is exhibited in the need for continuous personal and professional development of the lecturer, enabling them to be effective in delivering relevant and inspiring design education in HE. By producing this study we can reflect and improve on existing teaching practice. This paper is part of that reflective process.

A systematic approach to this research was applied to the planning of the module delivery. The following stages were completed:

1. Literature review and assessment of existing practice
2. Highlighting needs and requirements of students toward inclusive practice
3. Investigating useful and simple-to-use technologies

4. Building such technologies into existing modules through delivery and assessment of learning in a participatory manor.
5. Launching projects and allow them to run as normal.
6. Using research, planning reflective questionnaires for initial quantitative study.
7. Approaching and briefing participants.
8. Analysing and evaluating results
9. Considering further research.

Action research facilitates straightforward and practical approaches to solving problems and issues of substance (Kember 2000). The methodology is not complex but it does rely on strong data and analytical skill which is why a structured quantitative questionnaire (Oppenheim 1992) is used to explore the issues the learning technologies tackled. In order to gain as impartial an opinion as possible, the quantitative questionnaire was introduced to the students after the assignment had been completed in full and feedback had been received. The research by its nature is participatory, and the outcomes analysed and evaluated in this project are determined by practitioners.

#### **4. Preliminary results of the action research study**

Participants in the study were asked to fill out a reflective questionnaire based on their experiences with the SLTs during their teaching learning and assessment. It asked them to agree or disagree with statements using the Likert methodology of attitude measurement (Likert 1932) in regard to the SLTs introduced and how they affected their learning experience on the module. The results were split into three categories:

1. Level 5 learners on Dialogues in Design 3D: Practice – BA Interior and Product Design (37 respondents out of 61)
2. Level 2 learners in Business and Communications – HND Graphic Design (15 respondents out of 29)
3. Participants from both groups having a learning disability (LD) (14 students).

It should be noted that the overall response rate from the students was 57% as the questionnaire.

For clarity, the comparative results shown in the report are based on calculating percentage responses depending on group size. This was desirable given the different number of correspondents in each category.

##### **4.1 Results analysis section 1: Using Wikitools on Blackboard to facilitate better learning and organisation**

The first section of the questionnaire asked participants in the study to agree or disagree with statements regarding their use of the Wikitool to facilitate peer to peer learning for a collaborative team presentation assignment in the module. The graphs show the responses to the statements from each of the categories. Each of the graph's results are analysed and discussed.

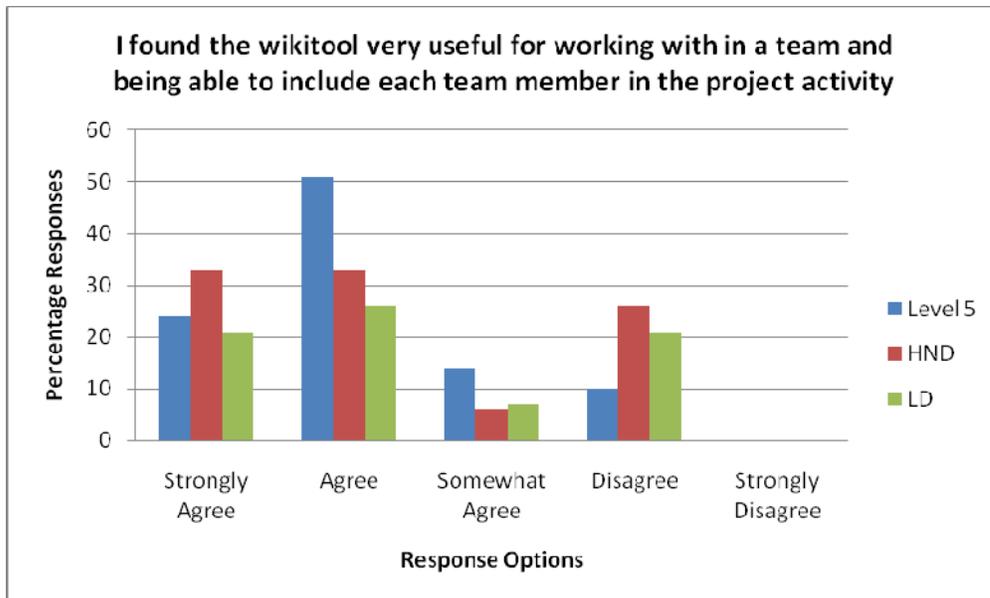


Fig 2.

The results in Fig 2. show that, primarily, the students found the Wikitoool a useful device for including each team member, with 78% of participants in each of the groups either agreeing or strongly agreeing that the Wikitoool helped to include each team member in the project activity. However it is interesting to see that when the results from the students with learning disabilities are examined, though the majority found the Wikitoool useful (47%), 21% of the learning disability students disagreed that it helped inclusion. When this was investigated it was found that the students with learning disabilities had commented that they felt they wanted more training in the use of the Wikitoool software. Their comments indicated that explicitly discussing the functions and setup of the Wikitoool would be useful to developing its use as a collaborative tool in future.

Also to be addressed should be the limitations of the Wikitoool on the University of Salford's VLE, Blackboard. Some students commented on its poorly designed interface. One such group in the HND group actually asked permission to create a blog that was outside of Blackboard. This was allowed as part of the research and the results showed a great deal more creativity due to the improved interface the external blog provided. This should be investigated and evaluated as to its usefulness in further facilitating collaboration.

The second statement examined whether the multi-sensory approach and combinations of visual and written media the Wikitoool facilitate improved the students' learning by introducing more constructive meaning and promoting deeper learning. (Talay-Ongan 2000)

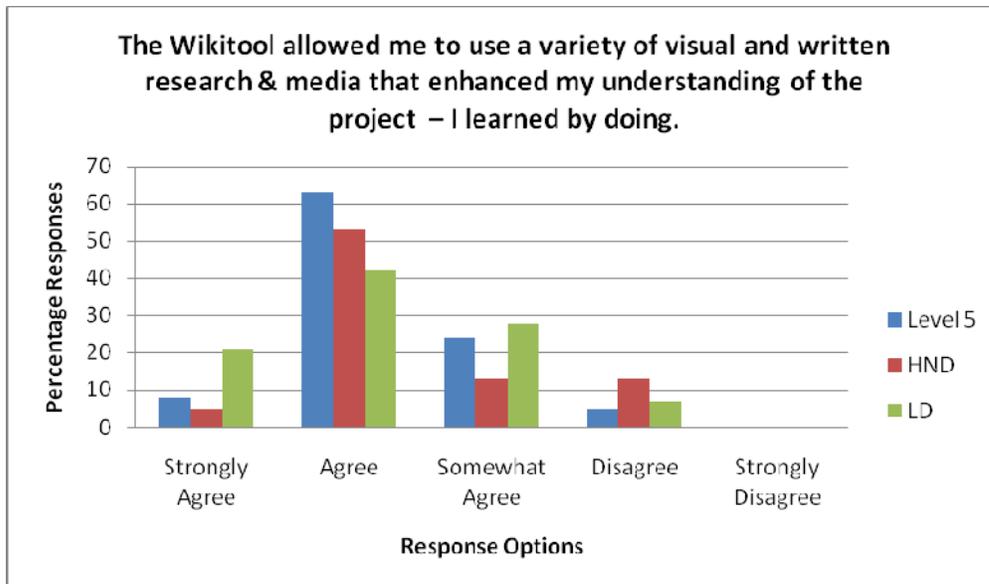


Fig 3.

It is pleasing to see that 70% of the level 5 students agreed or strongly agreed with the statement in Fig 3. Similarly, 73% of the HND students agreed and strongly agreed that their learning was improved. Only 7 % of all the students disagreed with the statement. The students with learning disabilities showed slightly different results with 64% agreeing it improved their learning. This is perhaps related to the above result where they comment upon a more detailed training session for using the Wikitool.

When the students were asked if they felt they could organise and research their work more effectively using the Wikitool there was a slightly more varied result, though still largely positive. The results from this statement shown in Fig 4. show that while most of the level 5 and HND students agreed that the Wikitool helped them at least to improve ‘somewhat’ their organisation (with 90% of all respondents agreeing or somewhat agreeing) it is the students with learning disabilities who feel that the Wikitool really assisted their organisational approach to the project, with 100% of them agreeing or somewhat agreeing that it aided them. 20% strongly agreed or agreed which is shown as a noticeable difference from the results graph in Fig 4.

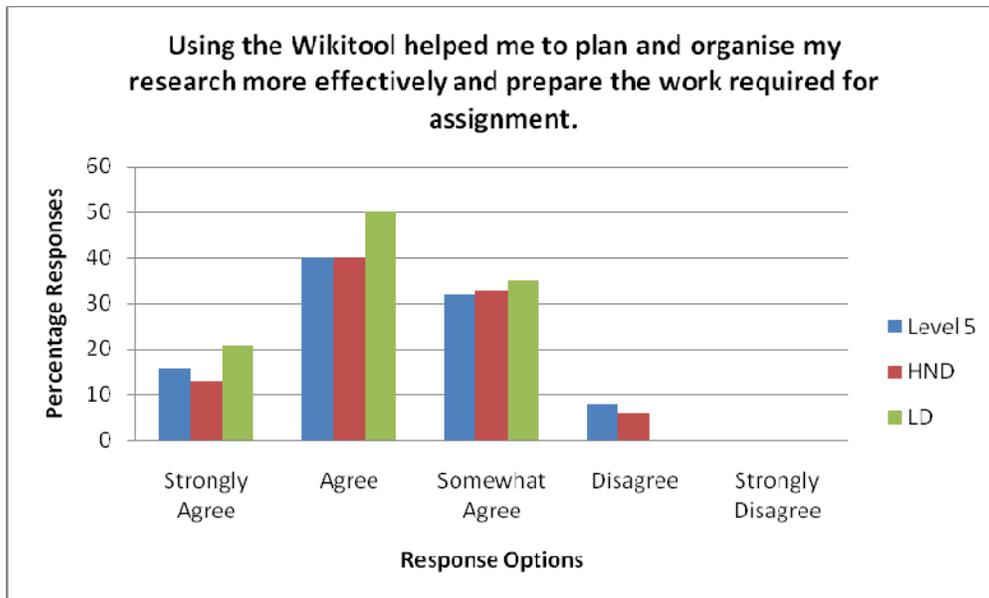


Fig 4.

These findings correlate with research that suggests students with learning disabilities such as dyslexia respond to methodological and multi-sensory forms of learning that are visual, auditory and kinaesthetic-tactile. (The International Dyslexia Association: Cited in (Rowcliffe 2002). For example, the Wikitool allows them to link words with images and video which can be explored on the page all at once. The action of developing the Wikitool contributes to the kinaesthetic-tactile approach where a combination of multi-sensory tasks in creating the page itself helps overcome some of the learning difficulties associated with interpretation of the written word (Price 2006).

#### 4.2 Results analysis section 2: Using podcasting for lectures

In the second section of the results, the use of 'podcasting' for each lecture was reviewed by the students. The podcasting entailed the recording of each lecture via a Dictaphone which records the discussion in the lecture and creates an MP3 compressed audio file compatible with virtually all computer systems & personal audio devices, including players on mobile phones. Again, the students were asked to agree with statements about the value of the technology to their learning experience.

The results of the podcasting, perhaps the simplest technology to implement in terms of time efficiency and ease of introduction for the lecturer, can be seen to be highly effective from the results shown in Fig 5. It is evident that agreement that podcasting aids learning was consistent in all three of the groups of students participating in the research. In fact, it is pleasing to see that 46% of all the respondents strongly agreed and a further 38% agree that it was useful toward their learning. These results clearly show that all students on the modules, regardless of ability and level of education, felt their learning had benefitted from the podcasting.

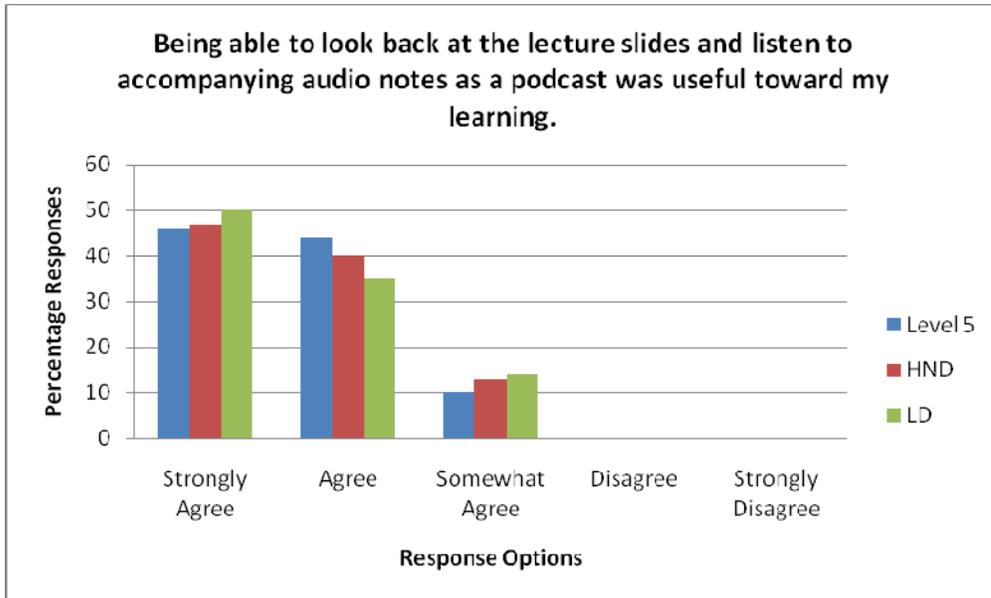


Fig 5.

In the ‘Disability, Technology and Learning Guide’ (Phipps, Sutherland et al. 2002), there is key discussion about the benefits of recording lectures that concurs with these results in support of facilitating learning for dyslexic students. It also suggests that it is important to facilitate the listening and concentration skills of such a student during lectures and that audio recording can help this. On this rationale, the next statement investigated this.

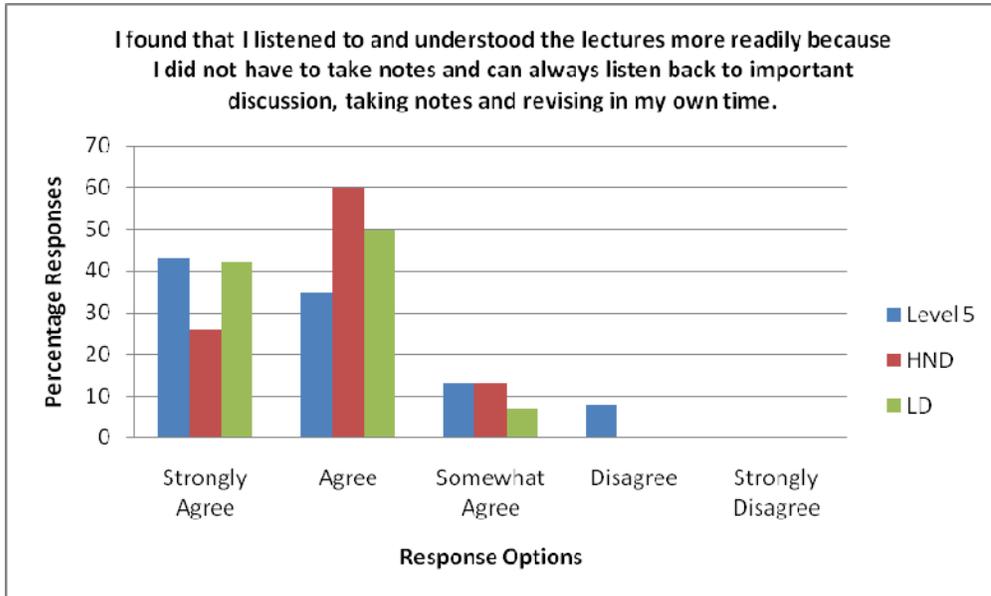


Fig 6.

The results in Fig 6. again indicate a high level of agreement with this statement. It can be seen that the response to this statement supports the research discussed. 92% of the students with a learning disability either agree or strongly agree that they engaged with the lectures more readily. This is a very pleasing statistic, when focusing on inclusive learning.

Lastly, in this section of research, a key issue commonly voiced by educators as a reason for not recording lectures or providing notes beforehand is concern about the regular attendance of students. The questionnaire given to the students was anonymous to increase the probability of honest responses to this statement.

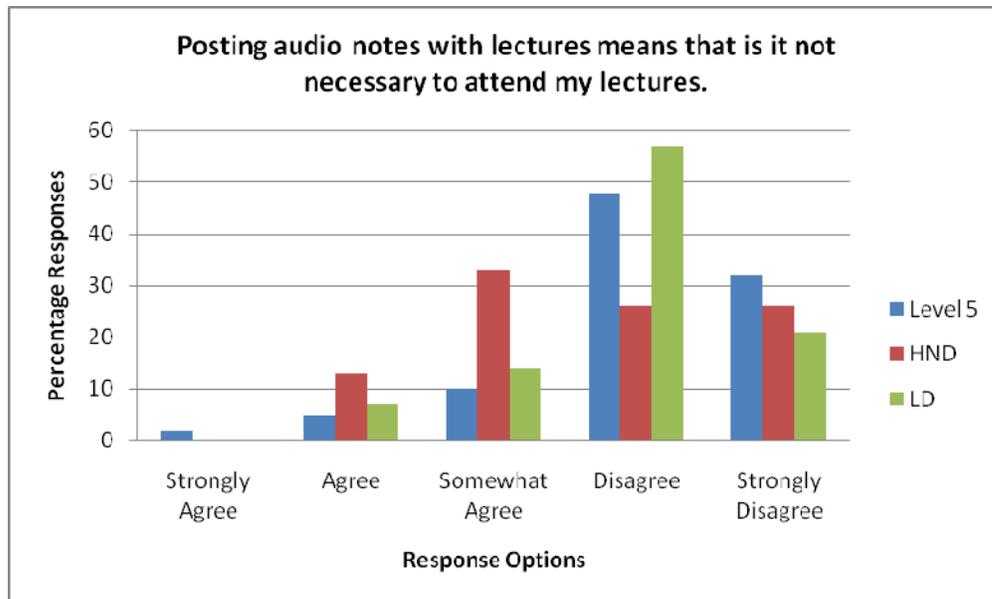


Fig 7.

The results in Fig 7. seem to show honest opinion, indicated by the fact that 73% of respondents disagreed with the statement, leaving 27% of all the respondents either somewhat agreeing or agreeing. In order to validate these findings a comparison of attendance records both for this academic year and the previous year was performed, and an improvement in attendance this year was noted. A longitudinal study of attendance would be required to take into consideration other attendance factors. The indications are positive, however.

### 4.3 Results analysis section 3: Using audio feedback

Research discusses the importance of quality feedback to students; in fact, the National Student Survey (NSS) indicates that, in general, students are unhappy with the quality, detail and timing of feedback (NUS 2009). Indeed, the NSS results are now a strong indicator of the student experience and, as a result, inform much emerging policy within HE institutions. Salford is no exception and much of the recent strategic planning can be attributed to the consideration of these results (Anon 2009).

There is research that suggests that audio feedback can address many of the feedback issues described by the results (Lunt and Curran 2010). This research found that implementing audio feedback was not only straightforward, but allowed more explicit and detailed feedback to be given to the student. It was also found to be timely; students involved in the modules (totalling 104) were given feedback within one week of their assessment. The difficulties were found to be in delivering the feedback via the VLE and its interface. If delivery were to be improved, this process would be made very straightforward.

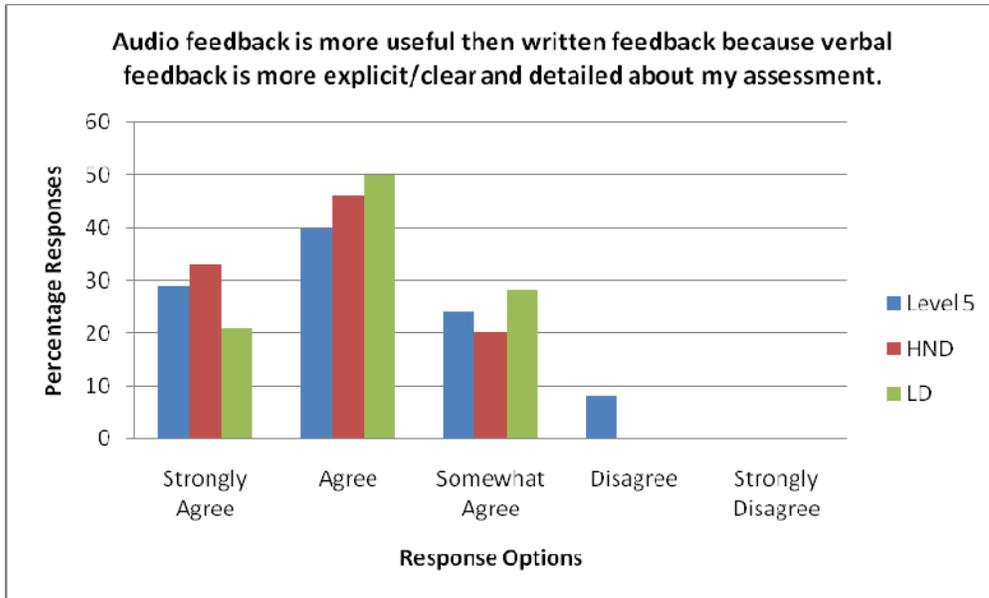


Fig 8.

The results in Fig 8. indicate that the students with learning disabilities in particular find audio feedback valuable. However, it demonstrates inclusive value, with very similar results from students without learning difficulties. It appears to enhance students' learning but they overwhelmingly still want written feedback too.

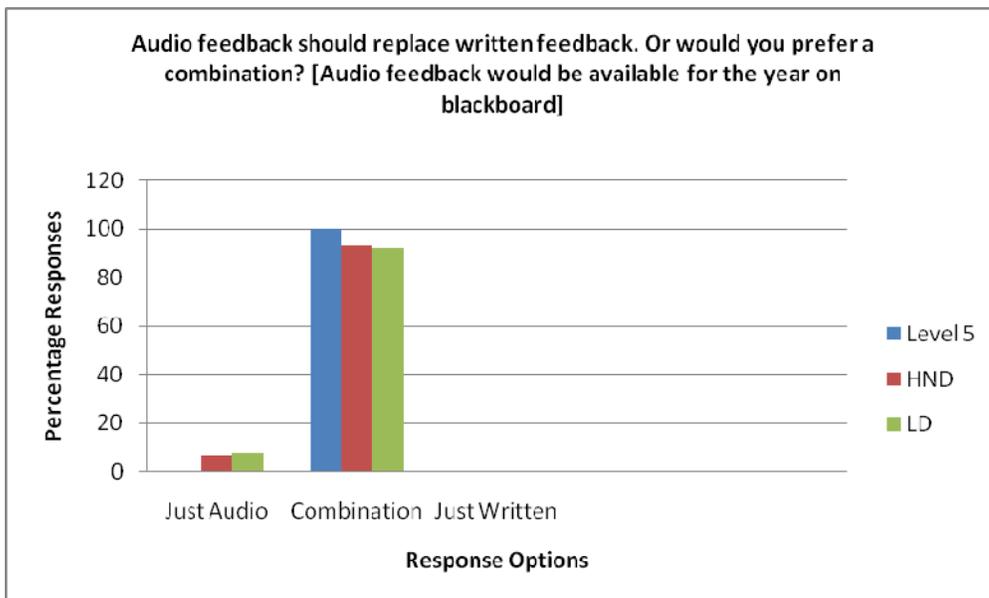


Fig 9.

The results shown here in Fig 9. very clearly show the preference of students, that audio feedback is useful as part of a combination of feedback types to aid their learning. Through investigation it was established that recording and writing feedback at the same time was, again, straightforward, but this did constitute additional work. This does indicate that there is an issue here, when we consider that the most important perceived barrier by lecturers is time. However, anecdotal evidence found that as a result of the audio feedback and podcasts

more time was generated in other areas. For example, fewer student tutorials were given in support of learners with different abilities because they felt confident and informed and were able to listen again to lectures. The Wikitool also made assessment of the research the students had conducted for the presentation element of the modules easier and quicker to examine and assess.

Finally, students were questioned about how they felt about the speed of response using audio feedback.

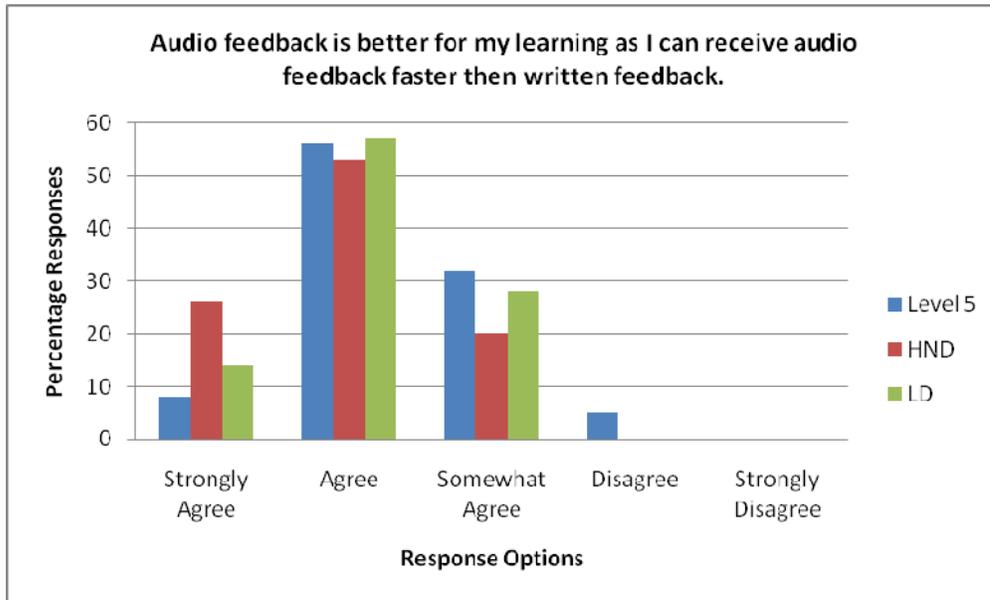
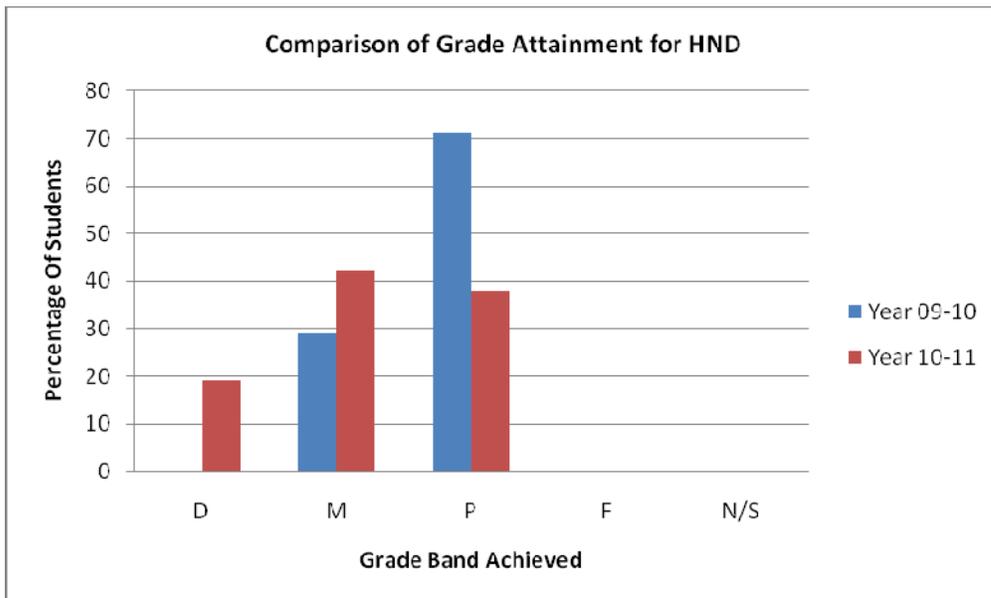
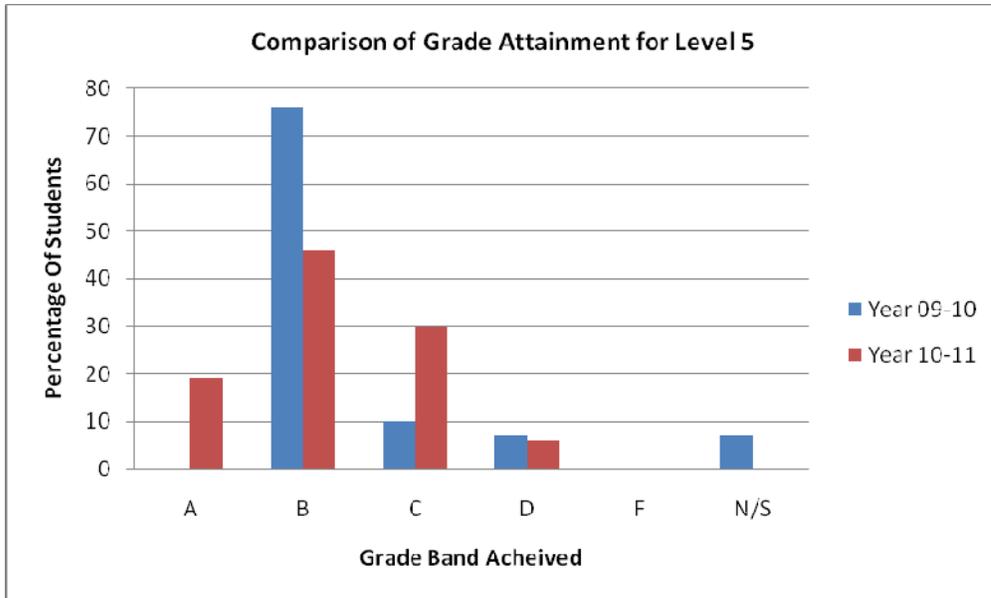


Fig 10.

The results in Fig 10. again show that audio feedback is useful because of its speed and informative nature as the previous results show. However it must be considered, as we have seen, as a complement to what students see as the ‘final’ written or summative feedback.

#### 4.4 Student attainment analysis

In conclusion, the previous year’s results for the modules were compared to this year’s in order to ascertain if the introduction of the SLTs had not only positively impacted on the inclusivity and learning experience of the students, but also positively impacted on their achievement in terms of grade attainment. The level 5 Students are shown first (Dialogues in Design: 3D Practice) and HND Graphics Level 2 (Business and Communications) students are shown second.



It can be clearly seen that both cohorts of students have improved their overall grade attainment significantly. Analysing the figures indicated that the Level 5 students have made a 28% improvement in grade attainment. Most notably, 20% of the students have moved from a 'B' band, to and 'A' band with 10% of students moving away from the lower bands or even non-submission.

In the HND cohort, the results show an even more encouraging 33% improvement on grade attainment from the previous year with a 13% movement of students moving from a pass level to a merit level, and a 19% movement from merit to distinction.

It should be noted that these results must be analysed in much more detail. There are many other contributing factors to grade attainment that should be input into this scenario, for example, issues of gender, number of students on the module in comparison to the previous

year, the design of the module assessment which is different due to the implementation of the learning technologies. The number of students with learning disabilities is also an issue.

However, it cannot be ignored that there is a significant improvement shown in this research toward the students' learning experience, inclusivity and, finally, their achievement. The point of this research is to illustrate that by implementing new teaching practices such as SLTs, lecturers can innovate in teaching. The process of being innovative, at least in this instance, does not require radical change, long-winded training or a significant amount of time.

## **5. Longitudinal study**

In order to improve the reliability of the results it is acknowledged that the research questionnaire may need development in certain areas, for example the manner in which certain questions may be interpreted differently by different students and the lack of ability of students to select an entirely neutral answer to the questions. It is also acknowledged that to add weight to the study a much larger number of modules would need to be tested following the methodology for introducing SLTs into the existing module structures and there is much planning involved in constructing and testing the SLTs introduced across multiple modules. A longitudinal study over a period of academic years would provide much more stringent evidence that such technologies can tackle the factors discussed which affect students engaged in the HE experience.

## **6. Conclusion**

This paper has sought to investigate if by introducing SLT's HE lecturers can enhance the learning experience and achievements of students with learning disabilities, whilst delivering innovative and challenging education for all.

The results of the research process and its participant generated results have strongly suggested that the overall student experience and grade attainment can be markedly improved by introducing SLTs that include all students, especially those with learning disabilities such as dyslexia. There are further considerations and factors that could have affected the results from the students to be researched and considered; which could be explored by the longitudinal study proposed. This study also considered the position of the lecturer in delivering the SLT's proposed - learning new technologies, time pressures and the rigor of the university system; such as the importance of quality standards. It is hoped this is an example of simple effective and innovative teaching practice that could enhance a University's teaching reputation in HE as providers move toward a high level competition in the sector due to increased student fees (Browne 2010). The demand from high fee-paying students will be excellence in teaching and enhanced learning that produces highly skilled graduates. At the same time we will need to cater for larger cohorts of students with multiple abilities and consider institutional drivers such as requirements for digital submission. In short – simple, technologically enhanced and inclusive teaching practices become essential.

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