**Inclusive Digital Technology**

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# Contents

Pupils with a Visual Impairment (VI) have many barriers to learning and although the barriers may be generalised, the solutions are individual to each child (Roe, 2008, Douglas, McLinden et al, 2011, Jones, Rudinger et al, 2019). Assistive Technology (AT) for VI pupils has grown exponentially in the latter decades of the twentieth Century and into the current Century and until recently have concentrated mainly on the VI pupil accessing their learning (Presley & D'Andrea, 2008). Whilst this increase in the development and use of AT for VI pupils is welcome, Kelly and Smith, 2011 conclude that much more research has to be carried out on the effectiveness of AT on the educational achievements of VI pupils. Large scale research has been hindered in part because VI is a low incidence condition compared to the general school population and thus it is difficult to replicate or directly compare research. This however, provides an opening for case studies to be used to analyse and inform on specific issues and relationships (Grauer, 2012). It also allows the researcher to use their own prior knowledge and experience to manage change and inform practice (Burton & Bartlett, 2005, pp86).

In this case study, I am investigating a piece of technology which will aid distance viewing for a pupil with a Visual Impairment (VI) in the classroom. The results will then be used decide whether or not to purchase the particular piece of equipment and also draft a decision making procedure to inform and assist in the procurement process of AT in my workplace.

**Background**

In Scotland there are several pieces of legislation from both the Scottish and UK Governments which promote the inclusion of children with Additional Support Needs (ASN) in mainstream settings (The Education (Additional Support for Learning) (Scotland) Act 2004 (as amended)) and prevent discrimination against those children (The Equality Act, 2010). There are also international agreements such as The United Nations Convention on the Rights of a Child (UNCRC) which all Governments in the UK have signed. The threads of these weave together to influence the duties of Local Education Authorities (LEAs) and schools in the universal delivery of Education. Part of these duties are to improve access to the curriculum not just the physical environment (The Education (Disability Strategies and Pupils' Educational Records)

(Scotland) Act 2002) in order to provide equity and equality of opportunity. LEAs may have to purchase items of AT which will provide that equity of access for VI pupils.

For the purpose of this case study and to preserve anonymity, I have changed the name of the pupil to a non-gender specific name; Charlie and neither the school nor the teacher will be named.

Charlie has a condition called Rod-Cone Dystrophy, High Myopia and Nystagmus. In very basic terms for distance viewing, Charlie would need to be approximately one metre away from an object that a normally sighted person would be able to see clearly at around three metres. Charlie attends a local mainstream city school and does not have any other ASN. Charlie has a range of strategies in place but no direct support in class. He has access to enlarged print textbooks and worksheets provided by the VI Specialist team.

One of the strategies that Charlie has been provided with is a Kindle Fire which has Numeracy textbooks stored on it which can be viewed using pinch to enlarge to the preferred size. Charlie also uses the camera on the Kindle to take pictures of the Interactive Display Panel (IDP) and the Whiteboard when the teacher is using these teaching tools. The pictures can then be viewed using pinch to enlarge whatever the teacher has written on the Whiteboard/IDP and it becomes accessible. In the Primary setting Charlie is comfortable getting up out of the chair to take a picture to then work at the desk. However, it is unlikely that this will be the case when the transition to High School is made and Charlie is mixing with a new set of peers and teachers in a new setting. Presley & D'Andrea, 2008 and McLinden at al, 2016, emphasize the importance of planning ahead for AT and the importance of the Qualified Teacher of the Visually Impaired (QTVI) in helping the pupil to develop the skills required to becoming a successful independent learner. The trial of the Connect 12 is part of planning for Charlie's future.

**Method**

Consents to share information were obtained, how anonymity was to be preserved was discussed with Charlie, the parents and the teacher and it was also explained that their consent could be withdrawn at any time.  For the methodology, I have used a combination of observations of the pupil using the Connect 12 and a Kindle Fire, questionnaires and discussions with Charlie, the teacher and the parents.

The Connect 12 is a tablet device that comes with a stand, specifically designed software, an in-built camera that can magnify up to twenty-four times whatever it is pointing at and is capable of text to speech. One of the selling points is that for an extra payment a camera lens, complete with a flexible arm that can be bent or moved and attaches into the stand, connects to the tablet via Bluetooth and so facilitates distance vision for someone with a VI.

Charlie was introduced to the Connect 12 in a one to one session. The purpose of this was familiarisation of the device so that Charlie was comfortable in using it before being introduced into a classroom setting. During this session it was noted that Charlie was not apprehensive in either using or exploring the Connect 12. At the end of this initial session, Charlie was able to turn on, set up the lens on the Connect 12 ready for distance viewing, open stored documents, take pictures using both the camera lens and the in-built camera of materials at distance and close up and save them in a folder for later use. Charlie also discovered the calculator and explored the annotation tools of the tablet.

The trial was over a period of four weeks where Charlie was able to choose when it would be used. During this time I carried out observations of Charlie using the device and had discussions with Charlie and the teacher. In my discussion with parents, it transpired that Charlie had not mentioned the use of the Connect 12 at all. At the end of the trial, the teacher and Charlie were given a questionnaire to complete (Appendix A & B). Unfortunately, the teacher filled out the incorrect questionnaire.

**Discussion**

The Connect 12 was stored in a cupboard and Charlie had to get up and bring it over to the desk to set it up. It took time for Charlie to do this when the rest of the class had started the work. This did not bother Charlie and work was always completed in line with the rest of the class. It took time for Charlie to learn how to adjust the flexible arm and focus the lens but as the trial progressed, so too did Charlie's abilities. The clarity of the pictures was superior to those taken by the Kindle.

The company sales representative visited during the trial and was able to demonstrate more features that Charlie could use. This was useful but it also drew attention to my lack of in-depth knowledge about the Connect 12 and the fact that many of its features would not be required or used. Hendrick & MacPherson, 2017 and Jones, Rudinger et al, 2019 emphasise the importance of teacher knowledge in the successful implementation of AT.

Charlie mainly used the Connect 12 for Numeracy lessons when the teacher used the IDP or Whiteboard most frequently. It was observed that during the first week, Charlie spent some time zooming the camera lens in at for example, the teacher's face not the work. I considered it may be because Charlie had not been able to view the teacher's facial features from a distance but it was just Charlie exploring how much the camera could magnify. An unintended consequence arose out of this exploration as others at the group surmised that the camera could be used for "spying" on people. An animated discussion followed but with the help of the class teacher this inappropriate diversion was quickly dealt with.

The Connect 12 cannot at this time be networked in my LEA which is a significant but not insurmountable problem. In Primary when it is just one or two teachers involved with a VI pupil, it is much easier to organise work, ensure it is prepared and put onto the device. In High School where all pupils have more than a dozen teachers and each teacher has significantly more than twenty or thirty pupils per day, these tasks become more complicated. Furthermore, when work is completed and to be marked, it is neither easy to print out nor drop in a computer folder if the device is not networked or where the school has poor Wi-Fi.

This is a consideration as ultimately introducing the Connect 12 in Primary would be the foundation for Charlie using it at High School; if it cannot be networked there may be no point in buying it as niggles at Primary may become huge issues at High School.

The cost of the Connect 12 complete with camera lens is £2450 excluding VAT compared to the price of a Kindle Fire 10" for £149 is significant. The Equality Act, 2010 requires LEAs to make reasonable adjustments in order that a pupil is not at a "substantial disadvantage". There is however, a caveat whereby if the reasonable adjustment is regarded as too expensive by the LEA, it does not have to purchase the item. The cost of the Connect 12 is not insignificant when the average spending per pupil in Primary Schools in 2016-17 was £4804 (National Benchmarking Overview Report 2016/17, pp26). Pupil Equity Funding paid directly to schools in deprived area has given Head Teachers latitude to allocate funds. Whether any of this funding has been used for AT for individual pupils remains to be seen.

In feedback given by the class teacher, he felt that the Connect 12 drew more attention to Charlie's VI and he considered it to be less inclusive as he felt it accentuated difference between Charlie and the rest of the class. The size of the Connect 12 although considerably less than CCTV Video Magnifiers is still seen as a social and physical barrier. Charlie liked the Connect 12 because there was no need to get up from the seat once it was set up. The observation of the "spying" discussion suggests a lack of maturity in Charlie and the class. It is possible that I introduced the Connect 12 too early and Charlie could not understand fully its purpose or educational benefits. It is also possible that Charlie does not consider the level of vision as a disability. There is not the space here to discuss fully the definitions surrounding Disability and Inclusion as they are contested issues (Allan, 2013., Barnes & Mercer, 2004., Imray & Hinchcliffe, 2012) but pupil perceptions of their abilities or disabilities are something that I should take into account when planning in the future as well as anticipating changes in classroom dynamics.

Universal Design for Learning (UDL) seems to be the next step in the development of inclusive pedagogy that when coupled with AT would address barriers that all children face in their learning (Jones et al, 2019, Novak, 2016, Rose & Hasselbring, 2005). Philosophically, it aligns with Getting it Right for Every Child in Scotland. However as Florian & Black-Hawkins, 2011 point out, making learning accessible to all is a

"complex pedagogical endeavour" (pp814) and would require significant structural change in school systems (Florian, 2008, pp207). As a peripatetic teacher I am not responsible for designing the teaching and learning of classes. However, if I can demonstrate how AT can help a VI pupil access their learning and achieve in class this may in some way lead to small steps towards UDL.

I have concluded the Connect 12 whilst it had some benefits, the level of Charlie's VI meant that not all of the features of the Connect 12 such as text to speech and Diamond Edge were needed. This begs the question of why spend so much on AT when it will not be used to its optimum potential? Undoubtedly there are some features that Charlie would use in the future but at present I do not consider that the Connect 12 would bring more significant educational benefits than the Kindle. As Charlie matures, I will revisit his distance viewing needs for High School. Technology will move on too; there may other devices becoming available and other pupils may use AT making AT equipment in the classroom normal rather than novelty.

## Model

In my workplace there is no model or framework to guide QTVIs in their decision to purchase AT. Purchases rely on the knowledge and experience of the QTVI who knows the child. One of the reasons for participating in this course has been to develop a better method of making and justifying decisions. The Scottish Government has stated in the National Improvement Framework and Improvement Plan that it wants evidence from research data to be the basis of improving teaching and learning (2017). If we can show that we have been diligent in our decision making process and can back it up with research it will provide a stronger argument to purchase items of AT which are often but not always expensive. It is part of our duty as teachers to lobby for social justice for our pupils (GTCS Standards, 2012) especially in these financial times.

Lenker and Paquet's (2003) review of models of AT commented on the need for a reliable model to aid decision making. They reviewed six models but they were not all relevant to an educational setting. Of the two that were, The Human Activity-Assistive Technology (HAAT) Model and the Student, Environments, Tasks and Tools (SETT)

Framework; they take a holistic view of the use of AT but the HAAT model seems to start from a task orientated issue or problem whereas the SETT Framework starts with the pupil which we are encouraged to do in educational settings furthermore, it was designed for educational use. Therefore, I propose using the SETT Scaffold for Consideration of AT Needs designed by Zabala, (2005) as the starting point for a workplace decision making tool. It will formalise the decision making process and help to ensure that all areas have been considered and it encourages collaboration of everyone involved with the pupil and the wider VI specialist team. It will also provide a record of what has been tried and tested. Using the framework alone will not be enough though as it will still require some knowledge of existing technology or where to source this knowledge. The QTVI will still have to keep abreast of current AT developments which can be time-consuming but is nevertheless essential.

## Conclusion

Before this course I was unaware of the lack of research into the educational impact that technology has on pupils with a VI. As Kelly and Derrick (2011) point out most AT can be considered to be;

> "effective...merely because they have practical application" (pp74).

Therefore it is up to us as practitioners to fill that gap with case studies and use our knowledge and experience to help build up a bigger picture rather than waiting to be told as one solution will not suit everyone. The constant changes and updates to AT are without doubt daunting but if we and the pupils with whom we work are to be listened to then we need to take a professional approach.

# Review of Connect 12

Now that you have had the Connect 12 I'd like you to think about how you used it and what you thought about it.

1.  **What did you like about the Connect 12?**

    _____

    _____

    _____

2.  **What was easy/easier? Why?**

    _____

    _____

    _____

3.  **What did you find tricky? Why?**

    _____

    _____

    _____

**4.    What didn't you like? Why?**

_____

_____

_____

**5.    Which do you prefer; the Kindle Fire or the Connect 12?**

_____

**Why?**

_____

_____

_____

**6.    Is there anything else that you would like to say about the Connect 12?**

_____

_____

_____

**Thank you**

APPENDIX A Cont'd

# **Review of Connect 12**

1. **When did Charlie use the Connect 12?**

   _____

   _____

2. **What did Charlie use the Connect 12 for?**

   _____

   _____

3. **In your opinion, did Charlie find the Connect 12 easy to operate himself? Did you have to support? If so, in what way?**

   _____

   _____

   _____

   _____

4. **How did the other children in the class react?**

   _____

   _____

5. **Were there any differences between what Charlie used the Connect 12 and the Kindle Fire for? If so, what were the differences?**

_____

_____

_____

6. **Do you have any other comments/feedback?**

_____

_____

**Thank you.**

## Review of Connect 12

Now that you have had the Connect 12 I'd like you to think about how you used it and what you thought about it.

1. What did you like about the Connect 12?

   there was a camera on it.

2. What was easy/easier? Why?

   i did not have to mave to take picture

3. What did you find tricky? Why?

   Aiming the camera it droped down sometimes

4. What didn't you like? Why?

   it was very heavy

5. Which do you prefer; the Kindle Fire or the Connect 12?

_i Like rhem both_

Why?

_the tabler was Lignter to cary but the conect meant i did not have to leave my seat_

6. Is there anything else that you would like to say about the Connect 12?

_i Like that i could magnify the pictures when i use the tabler it takes a wnile to get in focus_

# <u>Review of Connect 12</u>

Now that you have had the Connect 12 I'd like you to think about how you used it and what you thought about it.

1.      **What did you like about the Connect 12?**
       **I liked how good it was for Charlie to see the class and move it about. The quality of the picture on it was excellent.**

2.      **What was easy/easier? Why?**
       **To start with no as it took some setting up but after that it went well.**

3.      **What did you find tricky? Why?**
       **Only the initial set up but after a few uses that became easier**

4.      **What didn't you like? Why?**

I found the size of it quite off putting and perhaps obtrusive.

5.      Which do you prefer; the Kindle Fire or the Connect 12?
Kindle Fire
Why?
I just think for the purpose of Charlie this was working but on the other hand I think the Connect 12 is very good.

6.      Is there anything else that you would like to say about the Connect 12?

A great piece of kit that enhance the learning experience for Charlie. As said before my only concern was the size it.

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