An Exploration of the Potential Therapeutic Applications of the Amazon Echo and Dash Devices in Supporting Students with Autism Spectrum Disorders

BSc (Hons) Computing
Declaration

I certify that this undergraduate dissertation has not been accepted in any degree and is not under the submission for any degree or qualification – other than that of an undergraduate degree in BSc (Hons) Computing studied at Cardiff Metropolitan University (previously known as University of Wales Institute Cardiff). I also declare that this work is the result of my own investigations, except where identified by references and free from plagiarism of the work of others.

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Abstract

Exploring on the social aspects of autism spectrum disorders and exploring the potential therapeutic applications of using assistive technology to soothe social anxieties through the use of this technology. Discussing the challenges which individuals with autism spectrum disorder experience throughout university and how the Amazon Echo and Dash devices could potentially enhance and assist with their university challenges caused by their disorder. This study could show the potential of technologies such as the Amazon Echo and Dash devices being used in universities around the United Kingdom and potentially around the world.

Looking further into the DMV-5 diagnosis of the Autism Spectrum and understanding the need for students to ask repeated questions to gain a better understanding of a project and to understand the reasoning for this. A section will be dedicated to this research throughout the literature review at the beginning of this project to guarantee a fuller understanding of the Autism Spectrum throughout this project. There will be a focus throughout the literature on current challenges faced within university for those of the Autism Spectrum and the current support strategies to deal with those difficulties. Another focus of the literature throughout will be on the current applications of supporting technology within universities which will be used throughout the data collection process. There will be an evaluation of the constraints to the Echo to understand negative values of the device of students with Autism Spectrum Disorders, however there will be a comparison with the pro arguments of this device to understand the benefits this could offer a student with Autism Spectrum Disorders starting university in the first year. Concluding an outcome to whether the Amazon Echo and Dash devices could potentially make an impact on students’ education within the Autism Spectrum.

Through this study there will be proposals for potential therapeutic applications of the Amazon Echo device to support Higher Education students who are on the Autism Spectrum. This will be applications which could potentially have an impact on improving the Amazon Echo or Dash devices for students with Autism Spectrum Disorders throughout higher education. This will increase the effectiveness and be a potential addition to the device which could help propose the device to Student Finance for funding if the device was able to assist more within the educational setting. Also throughout this study recommendations will be made throughout and an investigation carried out into ideas for improvement on the Amazon Echo and Dash devices. This will therefore shine a different light on the possibilities for these devices in the future.
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## Contents

1.0 Introduction ...................................................................................................................... 5

2.0 Literature Review ............................................................................................................... 7

   2.1 Autism Spectrum Disorders ......................................................................................... 7

   2.2 Challenges Faced in University .................................................................................. 8

   2.3 Current Support Strategies ......................................................................................... 9

   2.4 Applications of Supporting Technologies ................................................................. 10

   2.5 Amazon Technologies ............................................................................................... 11

3.0 Methodology ...................................................................................................................... 13

   3.1 Target Participants’ and Research Audience ............................................................ 13

   3.2 Data Collection and Analysis Procedure ..................................................................... 13

   3.3 Ethical Approval ......................................................................................................... 14

4.0 Results ............................................................................................................................... 15

   4.1 Question 1 ................................................................................................................... 15

   4.2 Question 2 ................................................................................................................... 15

   4.3 Question 3 ................................................................................................................... 15

   4.4 Question 4 ................................................................................................................... 16

   4.5 Question 5 ................................................................................................................... 16

   4.6 Question 6 ................................................................................................................... 16

   4.7 Question 7 ................................................................................................................... 17

   4.8 Question 8 ................................................................................................................... 17

   4.9 Question 9 ................................................................................................................... 17

   4.10 Question 10 ............................................................................................................... 18

   4.11 Question 11 ............................................................................................................... 18

5.0 Analysis and Discussion ................................................................................................. 19

   5.1 Positive and Negative Effect on Services .................................................................. 19

   5.2 Effect and Impact ....................................................................................................... 20

   5.3 Current Technologies ............................................................................................... 21

6.0 Conclusion ......................................................................................................................... 23

7.0 References ......................................................................................................................... 25
1.0 Introduction

Many studies report and explore on the social aspects of autism spectrum disorders and exploring the potential therapeutic applications of using assistive technology to soothe social anxieties through the use of this technology. Throughout this report I will be discussing the challenges which individuals with autism spectrum disorder experience throughout university and how the Amazon Echo and Dash devices could potentially enhance and assist with their university challenges caused by their disorder. This study could show the potential of technologies such as the Amazon Echo and Dash devices being used in universities around the United Kingdom and potentially around the world.

The main aim of this study is to explore the potential therapeutic applications of the Amazon Echo and Dash devices in supporting students with Autism Spectrum Disorders within higher education. This is to understand whether it is a possibility for the Amazon Echo device to enhance the quality of university life for students with Autism Spectrum Disorder. This study will investigate into current literature on existing technologies on the market including those used by Student Finance. This will therefore give a clearer understanding of the therapeutic values of the Amazon Echo device and the therapeutic needs of those with Autism Spectrum Disorder.

Another aim of this study is to explore into the current technologies on the market to investigate the potential of adaptations to the Amazon Echo and Dash devices. This aim will allow an overview of current technologies to see if there is a gap in the market and also to see if any of these technologies could potentially be combined with the Amazon Echo or Dash devices. There could be a potential to change the Amazon Echo or Dash devices and incorporate this technology to therefore benefit students with Autism Spectrum Disorder more within higher education.

An additional aim is to critically evaluate the literature on technology in the home and school to support students with Autism Spectrum Disorders in their speech and language skills to see if there is an opportunity to assist students within this area. This will allow for a wider range of research into the Amazon Echo and Dash devices beyond the academic assistance this could potentially offer to students with Autism Spectrum Disorder. This aim allows this study to have a greater understanding of the current support offered within higher education and what is not currently offered which could be of benefit to students with Autism Spectrum Disorder.

There will be another aim to critically evaluate the literature on technology in supporting students on the autism spectrum in managing their emotional wellbeing, with a focus on anxiety. This aim will be investigated and researched in-depth to get a fuller understanding of the role of anxiety in an individual’s daily experience living with Autism Spectrum Disorder. This will allow research to develop further into different triggers of anxiety even down to the diagnosis stage of Autism Spectrum Disorders. Anxiety alongside academic pressures will be compared and investigated to find out if there is a connection or whether there is a trigger with certain aspects of university which can worsen the symptoms of anxiety for an individual with Autism Spectrum Disorder.

An aim of this study is to survey the views of student services and other teaching and support staff on assistive technologies in supporting students in Higher Education who are on the Autism Spectrum. Throughout this study there will be interviews with current members of staff at Cardiff Metropolitan University. This will gain a professional perspective on the abilities of the Amazon Echo or Dash devices understanding whether they will adhere to the struggles of academic pressures which students with Autism Spectrum Disorder have difficulty with. Professional perspectives are a good source of data due to their experience on a daily basis with these students and their understanding of the Autism Spectrum and its difficulties is higher than that gathered in a survey.
Through this study there will be proposals for potential therapeutic applications of the Amazon Echo device to support Higher Education students who are on the Autism Spectrum. This will be applications which could potentially have an impact on improving the Amazon Echo or Dash devices for students with Autism Spectrum Disorders throughout higher education. This will increase the effectiveness and be a potential addition to the device which could help propose the device to Student Finance for funding if the device was able to assist more within the educational setting.

Also throughout this study I will be recommending and investigating into ideas for improvement on the Amazon Echo and Dash devices. This will be through information and data gathered throughout this research and will be backed up through evidence found through the interviews undertaken throughout this study and the current literature evaluated throughout this literature review. Many recommendations could be made for this device as it is a relatively new product only being released in 2015 and therefore the abilities for improvement are high (Amazon UK, 2017).

An aim of this study is to investigate how these improvements and recommendations can improve the lifestyle of people with Autism. This will focus on reducing anxiety and improving the independent living standards in higher education for a student with Autism Spectrum Disorder and understanding whether this will have a positive effect on their academic study. This aim will be met by researching through current literature and understanding how current technologies and support systems within universities assist to these needs and compare them with the abilities of the Amazon Echo and Dash devices.

Throughout this project the understanding of the Autism Spectrum will be looked into considering the academic pressures which they struggle with. Looking further into the DMV-5 diagnosis of the Autism Spectrum and understanding the need for students to ask repeated questions to gain a better understanding of a project and to understand the reasoning for this. A section will be dedicated to this research throughout the literature review at the beginning of this project to guarantee a fuller understanding of the Autism Spectrum throughout this project.

There will be an evaluation of the constraints to the Echo to understand negative values of the device of students with Autism Spectrum Disorders, however there will be a comparison with the pro arguments of this device to understand the benefits this could offer a student with Autism Spectrum Disorders starting university in the first year. This is to investigate if there are specific struggles in the first year of university compared to following years and if they are more apparent to those with an Autism Spectrum Disorder diagnosis. There will then be a conclusion as to this to give the project a clearer understanding after taking data gathered through the sampling technique of interviews which will be used in this project.
2.0 Literature Review
Throughout this research an extensive investigation into literature supporting or relating to the topic in question is required. Most existing research has been conducted by Universities and Colleges in the United States and therefore is relating more to their education system. This research will be an investigation into the different aspects of the Autism Spectrum to gain a greater understanding.

2.1 Autism Spectrum Disorders

Autism spectrum disorders are extremely varied. There are four different known types of autism spectrum disorders, these are; Autistic Disorder, Aspergers Syndrome Disorder, Childhood Disintegrative Disorder, Pervasive Developmental Disorder (Not Otherwise Specified). However in recent years these have been redefined to be called Autism Spectrum Disorders as described in (Benaroch, MD, 2016; Research Autism UK, 2016).

“*The fifth edition of Diagnostic and Statistical Manual of Mental Disorders, DSM-5, published in May 2013 eliminated the four sub-types listed above by dissolving them into one diagnosis called Autism Spectrum Disorder. According to the APA, this represents an effort to more accurately diagnose all individuals showing the signs of autism.*” (Research Autism UK, 2016) However all individuals with Autism Spectrum Disorders are different, their symptoms differ and are unique to the individual and condition. Mostly symptoms will group together allowing the individual to fall under one of three previously recognised diagnosed conditions listed; Autistic Disorder, Aspergers Syndrome Disorder and Childhood Disintegrative Disorder now all known as Autism Spectrum Disorders. If not then they will be diagnosed with Pervasive Developmental Disorder (Not Otherwise Specified). There are around 700,000 people in the UK living with some form of Autism according to Research Autism UK (2016).

Autistic Disorder is the most developed and known form of autism spectrum disorder. The common symptoms and actions of someone with Autistic Disorder are; communication (not developing speech or having extreme language delay), highly sensitive to noise (hearing is amplified) etc. To diagnose a child or adult with Autistic Disorder they have guidelines to look at; loss of any language or social skills at any age, limited imitation, lack of affective reciprocity or lack of joint attention (sharing a moment with a parent). Adults are usually diagnosed with this at an older age by referring back to their infantile years for diagnosis. Information from Chw.org (2017).

“*People with Asperger syndrome come from all nationalities and cultural, religious and social backgrounds, although it appears to affect more men than women.*” (Autism.org.uk, 2016) Aspergers Syndrome Disorder is a high functioning form of Autism Spectrum Disorder and is very common, with the main characteristics being above average intelligence, withdrawn socially and mostly normal behaviour usually by copying peers (Autism.org.uk, 2016). Aspergers Syndrome Disorder is more noticeable in males than females, it is thought that females hide the signs and symptoms better by copying their peers. Individuals with Aspergers Syndrome Disorder are diagnosed by professionals recognising common characteristics such as; social communication (lack in facial expressions, no tone of voice change, vagueness etc.), social interaction with others, repetitive behaviour such as routines, highly focused interests and sensory sensitivity (Autism.org.uk, 2016).

Childhood Disintegrative Disorder is commonly known as CDD or Heller’s Syndrome and is an extremely rare form of Autism. CDD is a form of Pervasive Development Disorder and is considered a low functioning form of Autism compared to Aspergers Syndrome Disorder which is considered a high functioning form of Autism. This type of autism is closely related to dementia, this is because the individual will have a loss of skills over time as the main symptoms of this disorder (Research
Autism UK, 2015). These losses include; bladder control, play skills, both types of language skills and self-care. The individual may also seem abstract or some may even hallucinate (Lowth, 2017; Kavanagh, 2017).

Pervasive Developmental Disorder (Not Otherwise Specified) is used in Autistic terms to otherwise describe an individual who does not neatly fit into other more understood Autism Spectrum Disorders. Typical signs of an individual with this type of Autism Spectrum Disorder are; an individual showing inappropriate or atypical social behaviour, poor speech or comprehension skills, difficulty dealing with change, repetitive behaviours and increased or decreased sensitivity to light sound etc. (Brain Balance Achievement Centers, 2017).

Autism Spectrum Disorders combined vary with signs and symptoms, the main symptoms of this disorder are; not interacting well with others, copying behaviour of others, shows lack of interest in being affectionate, delayed of advanced speech development, avoidance of eye contact, difficulty dealing with change, repetitive behaviour & scheduling their daily routines (Chw.org, 2017; Brain Balance Achievement Centers, 2017).

2.2 Challenges Faced in University

University comes with many challenges for any student, however for someone with Autism Spectrum Disorders some of these challenges will seem enhanced and become unbearable at times. Challenges such as academic pressures, anxiety, exam stress, loneliness, stress and perfectionism are just some of the ones listed by York.ac.uk, 2016; Nottingham.ac.uk (2016), however these are challenges for all students and are not entirely focused on Autism Spectrum Disorders. According to the University of York academic pressures are increasingly difficult to overcome whilst at university and many students seek help. For an Individual with Autism Spectrum Disorder the struggle of academic pressures and the need for perfectionism can escalate the anxiety which comes with Autism Spectrum Disorders according to (Autism.org.uk, 2017).

“Currently, anxiety is not considered a phenomenological characteristic of ASD. Although it is often assumed that individuals with ASD prefer isolation and low social contact, many people with ASD are intensely aware of their social disconnectedness and appear to wish it could somehow be different (Attwood, 2000).” (White et al., 2010). According to the National Center for Biotechnology, 2016; anxiety is an increasing problem for individuals focusing on young adults. It is also stated that the problems worsen the more problems arise meaning that academic pressures such as in university could aggravate the anxiety experienced by an individual with Autistic Spectrum Disorder (White et al., 2010).

The transition to university from college or sixth form can be increasingly challenging for students with Autism Spectrum Disorders. Throughout the text in Adreon and Durocher (2007) this journal evaluates the transition for US students from high school to college, which in theory is the transition from college to university in the UK. This journal describes the struggles of learning independent living and dealing with change, and also the social aspects of shared living accommodation. The challenges are comparable to what is experienced by a student with Autism Spectrum Disorders in the UK. A student with Autism Spectrum Disorder finds it challenging to deal and cope with change in their everyday life, therefore a move to university from regimented schooling can be extremely challenging for the student which is why a need for the correct specialist support needs to be in place for the transition to be a success (Adreon and Durocher, 2007).

The challenge of living independently for an individual with Autism Spectrum Disorder could potentially be a struggle when also juggling university pressures alongside. In VanBergeijk, Klin and
Volkmar (2008) they found that majority of their participants struggled with the transition into living independently alongside the other academic pressures. However the study also discovered that with subtle change to scheduling and planning this could assist the individuals giving them a great difference in independent living.

Another struggle of living independently for students with Autism Spectrum Disorder is everyday activities such a travel. In Eaves and Ho (2007) they completed a study on everyday activities which individuals with Autism Spectrum Disorders struggle with. Throughout this study they found that only 43% of people with these disorders were able to use public transport without any effect. This could therefore be a struggle for students living independently at university. They also found that 54% of their study found difficulty with everyday life and only 35-45% were able to shop, prepare meals, do housework or laundry independently. This would therefore effect students moving to university in the same way as they would have to learn to live independently whilst also juggling university pressures alongside this.

2.3 Current Support Strategies
In the 1990’s Autism Spectrum Disorder had a surge in diagnoses’ which essentially opened up the possibility of higher education to thousands of those diagnosed with a disorder on the spectrum according to VanBergeijk, Klin and Volkmar (2008). However in this journal it states that the need for support and specific technologies to assist the student is essential in helping them to access and succeed in higher education. There is many current support strategies offered by the Autistic Society 2017 and Student Finance 2017. In VanBergeijk, Klin and Volkmar (2008) they described different support strategies which could help the adjustment to higher education and also specific recommendations regarding the academic, independent living, social, vocational and counselling needs of university students. Also as stated in Taylor (2005) referenced in VanBergeijk, Klin and Volkmar (2008) it recommends the teaching standards required for those with Autism Spectrum Disorders in higher education including evaluating, supporting and teaching students with Autism Spectrum Disorder. Most of these recommendations are supported and offered by Student Finance England through their disabled students’ allowance. The main focus of VanBergeijk, Klin and Volkmar (2008) is on milder forms of Autism Spectrum Disorders as most academic literature is mainly focused on more extreme forms of the disorder which would obviously require more support in an educational environment.

In Eaves and Ho (2007) is it discussed about the current support strategies which autistic students access within education. In this study it was discussed about autistic students having difficulty in an academic environment and therefore having access to support workers at different levels of academia. It is explained that most students throughout this study recall a teacher, classroom aide or support worker who assisted them making their educational experience easier. Support workers and classroom aides are offered to students with autism, throughout university a needs assessment determines how much assistance is needed for the student throughout their high education. In Eaves and Ho (2007) they also discussed the effect of this benefit from not having access to this assistance at all. It was compared whether in Eaves and Ho (2007) the participants found that a personal assistant was better for their education assistance or whether an intense training program had more benefits. It was found throughout this study that most of the participants found a personal assistant was more important to their educational needs than a training program.

In Carinci and Harris (2015) it is outlined of visual support strategies for students with Autism, part of this research was to help teachers implement these strategies into the classroom which closely relates to the idea in this research with showing the therapeutic side of the Amazon Echo and Dash
devices. However in Dettmer et al. (2000) they compared visual assistive technology used both in education and at home to help assist the transition into education easier for an individual with Autism Spectrum Disorder. However this research was predominantly focused on males however as stated in Autism Research UK (2016) DMV-IV Autism Spectrum Disorder affects both sexes and therefore is only somewhat related to the current technologies focused here. In (Dettmer et al., 2000) the visual supports used were related to such problems in scheduling the day in which participant A was given a caregiver’s automobile dashboard device to schedule his car journeys. This is just one visual support aid which is proven to assist an individual with Autism Spectrum Disorder.

As researched in (Dettmer et al., 2000) scheduling is an extremely important aspect to life for an individual with Autism Spectrum Disorder. “Many individuals with autism have difficulty with executive functioning and struggle with organizational and self-management skills.” (Indiana University, 2017). The University of Indiana Bloomington have outlined the fact that applications such as pocket schedules and visual schedule planners assist with organisation and self-management for individuals with Autism Spectrum Disorder. Applications such as ‘Pocket Schedule’ on IOS allows the user to organise their educational routine by organising a timetable for classes, setting assignments with clear deadlines and setting tasks to complete (Appxy Information Technology Co. Ltd, 2017).

Pacifica is a mobile application designed to assist people suffering with anxiety in the United States. This application is designed be using therapeutic technology through a mobile app to soothe the struggles with anxiety. This application incorporates principles of cognitive behavioural therapy, relaxation and wellness to help soothe the struggles with anxiety through a mobile application. This application helps the individual to organise a sleeping pattern and relax in stressful situations. The application is free however there are in app purchases available as seen on Apple IOS (2017). This application can give the user relaxation tips and set goals to achieve. This information was gathered from Forbes.com (2016). As previously mentioned anxiety is increasingly challenging for individuals with Autism Spectrum Disorders, therefore the use of technologies like these would benefit a student struggling with some of the challenges above. Whether this type of technological therapy would prove effective depends on the individual and their difference on the autism spectrum.

Throughout many universities in the United Kingdom ‘Academic Study Skills’ is offered and paid for by Disabled Students’ Allowance by Student Finance. Academic Study Skills is an academic form of support for disabled students usually with Dyslexia or Autism Spectrum Disorders however is offered to other disabled students through a needs assessment if deemed necessary. This type of academic support focuses on the academic side of challenges for a disabled students such as time management, adjustment to referencing, the academic ability expected of a university student and help with revision for exams. These sessions are offered on a one-to-one basis to offer the student the best support possible (Cardiff Metropolitan University Academic Study Skills, 2017).

2.4 Applications of Supporting Technologies

Applications of supporting technology used by students at university are usually funded by either the university in question or Student Finance. For disabled student such as those with Autism Spectrum Disorders are usually entitled to Disabled Students Allowance meaning that Student Finance will pay for specialist equipment that the student will require whilst at university due to their disability. This will usually be determined by conducting a needs assessment on the student to determine how much equipment and what kind of equipment they require (Student Finance England, 2017).

Autism Spectrum Disorder is sometimes associated with other disorders such as Dyslexia, Dyspraxia, Attention Deficit Hyper Disorder and Attention Deficit Disorder. These disorders usually hide the
symptoms of Autism Spectrum Disorder and usually effectively be given the wrong support due to the wrong diagnosis. It is important that individuals are diagnosed correctly to offer them the right type of support for their condition. However conditions such as Dyslexia share common academic struggles with someone with an Autism Spectrum Disorder diagnosis, the support needed is very different and therefore applications such as Brain in Hand are not useful for someone with Dyslexia compared to someone with Autism Spectrum Disorders.

Brain in Hand is just one of the applications of support technology which is offered to students through Disabled Students Allowance. Brain in Hand is a mobile application created and published by the University of Exeter. Brain in Hand combines various proven therapies such as cognitive behavioural therapy, solution focussed therapy, and recovery based rehabilitation to create a mobile application of assistive technology to those on the Autism Spectrum to help them function well in everyday life situations (Brain in Hand Ltd, 2017). This application allows the user to create a diary of their daily routines, track their anxiety and stress levels, tracking on a secure website where they can review their use and identify new issues, lastly they have the use of a traffic light system and by using red triggers a support request to the National Autistic Society to request a call of support for the user (Brain in Hand Ltd, 2017; National Autistic Society, 2017).

Brain in Hand is currently used in universities all over England and Wales, it is there to support students and help them cope with current obstacles in their lives through their mobile device. The National Autistic Society has got involved with this application to offer their professional assistance to the users of this application by using the traffic light system on the application offering their support line to autistic users. This feature is set up by selecting their preferred support organisation in the setting along with the user’s mobile number. This feature also allows the application to notify a selected family member of the user’s distress to help in other ways (Brain in Hand Ltd, 2017; National Autistic Society, 2017).

2.5 Amazon Technologies
Amazon have currently created three new pieces of technology to be sold as assistive technology to their users. The Amazon Echo is a hands-free voice controlled personal assistant and is the main piece of technology currently sold at £149.99. There is also the smaller version called the Amazon Echo Dot at £49.99 (Amazon UK, 2017). The features of both these devices have been identified in O’Boyle (2016), this device will play music, provide information (such as news, the weather and sports scores etc), control the user’s smarthome (A home control centre to control the lights, blinds and room temperature) and allow Amazon Prime members to order products online through voice activation (O’Boyle, 2016; Amazon UK, 2017).

Amazon have also created the Amazon Dash button which is an instant order device using the amazon.co.uk website. The Amazon Dash button is usually sold at £4.99 however has been sold on promotion for as low as 50p through the Cyber Monday event in November 2016 (Amazon UK, 2017). The features of this device have been identified in Walker-Smith (2017) where they describe the Amazon Dash device as a small button piece of technology which consumers press to reorder products from Amazon Prime. This device could potentially be adapted to partake different abilities.

Compared to technologies previously described such as the pocket schedule etc, the Amazon Echo and Dash devices offer the user a wider range of abilities and freedom to use multiple applications in one device. The positives and negatives of this device have been compared in Chacksfield (2017). Throughout this review they compared the voice controlled cloud system and labelled it the brainpower behind the device. The Amazon Echo device learns with every word spoken meaning that the technology evolves over time making it a futuristic technology. They describe the benefits of
having smart home technology incorporated with the device allowing individuals to manage multiple technologies through the software in one device. Although the device is exceptional for academic and educational reasons it's also designed for recreational activities, the Jamie Oliver cooking application is included in the purchase of the device. This could be of benefit to students at university as it could make living independently a lot easier, especially for students with Autism Spectrum Disorder who like to be organised, by them having this device this could assist them in the transition to independent living through every day activities such as cooking. The most positive comparable aspect of the Amazon Echo is the ability to take notes via speech recognition as well as multiple other additions to the device compared to Brain in Hand or the Pocket Schedule which only have one main function.

(Image: Amazon Echo Features Description, Mobile Geeks, 2015)
3.0 Methodology

“The goal of Qualitative research is to develop concepts that enhance the understanding of social phenomena in natural settings with due emphasis on the meanings experiences and views of all participants” (Neergaard, 2007)

This research will focus more on gathering qualitative data rather than quantitative data due to the specified information required for this research. After deliberative research I concluded that conducting a qualitative interview of professionals in the Autism Spectrum field would be the best for this type of research by gaining their professional opinion. In Johnson (1994) he states that “qualitative methods are slow” this was one of the deciding factors which led to the decision of only interviewing professionals who are experts in their field as well as offering current support services at university level. This resulted in data being restricted however this resulted in the qualitative interviews being adapted to gain much more in depth information regarding the adaptation of the Amazon Echo and Dash devices to suit being introduced in universities around the United Kingdom to support students with Autism Spectrum Disorder.

The results of this research should clearly show and support the ideas for introducing adapted amazon technologies into universities around the United Kingdom with a focus on Cardiff Metropolitan University. These results should raise new ideas altered after gaining professionals opinions’ and enhancing the research on specific aspects of the Amazon Echo and Dash Devices which could be key to assisting students with Autism Spectrum Disorders.

3.1 Target Participants’ and Research Audience

The target participants’ throughout this study were staff at Cardiff Metropolitan University. These participants’ were specifically selected to gain professional opinions and insight to the use of the Amazon Echo and Dash devices within higher education, also to enhance the quality of professional feedback given. To improve significantly on the feedback given I interviewed two members of staff at Cardiff Metropolitan University who specialise in Autism Spectrum Disorders within the academic study skills department within the university.

This research may be of interest to universities around the United Kingdom as it will potentially show an alternative to current technologies which are used for students with Autism Spectrum Disorders. This could also be of interest to the National Autistic Society who could possibly expand on the research and maybe branch into different aspects of this current study. The target audience for this study is funding bodies such as Student Finance England for this type of supporting technology for students with Autism Spectrum Disorders as well as disability or student services within universities in the United Kingdom as well as the United States. These are the target audiences because these are the most likely to initialise this type of technology into use within universities.

3.2 Data Collection and Analysis Procedure

To collect the correct data needed for this research I requested various members of staff for the study mostly in person to be able to explain the reason of the research more personally. I also emailed a few members of staff with no further response, the staff I approached in person agreed to the interviews, this narrowed down the amount of people being interviewed. However in response to this I revised my interview questions to cover all the information I needed for this research to make them more qualitative interviews rather than focusing on quantity of interviews.

After the participants’ agreement to the interviews I informed the participants of the information of the research via an information sheet and made it clear that they were able to refuse to answer questions or withdraw from the interview at any time.
The reason I have opted to collect the data in the form of interviews is that other methods of collecting would not have enhanced this research. Methods such as online surveys could have gained the wrong type of audience and therefore would have corrupted the data which needed collecting for the Amazon Echo and Dash devices. Collecting data from professionals in the autistic field would generate more valuable and informative data which could be used to create an enhanced conclusion of relating the data to the research.

Throughout my analysis I will use the data gained to compare to current technological support devices of the market and also use this data to verify my argument and investigation into these devices. Having a professional opinion will allow me to compare the results from both participants and allow me to gain different points of view to strengthen my research and analysis. Throughout the results, discussion and analysis I will be reading through picking out similarities and differences and comparing them against each other explaining their professional opinions to result in an overall conclusion relating to literature already existing and how this information could benefit this specific research.

3.3 Ethical Approval
Ethical approval is a crucial part of my methods used and therefore is argued of its importance in project such as these. I therefore found it necessary to gain these ethics for my primary research of interviews before beginning my investigative research into the Amazon Echo and Dash devices. (See Appendix A). As seen in Appendix A ethical approval was gained from Cardiff Metropolitan University, School of Management, Research Degree Committee, the need for this approval was apparently clear due to me involving participants for interviews throughout my project. It is important that participants involved understand the project and why their participation is needed, also they must understand their role in the research making it clear what the interviews are being used for and whether the participants name is being used in the research. Due to this I gave the participants information sheets detailing a brief explanation of the project and why participants were needed (See Appendix C). Also in addition a consent sheet was given to participants for them to sign to show their consent to the project and that they understood their rights (See Appendix D).
4.0 Results
Throughout this results section I will discuss each question in detail highlighting the aims and objectives of the question involved. As well as the answers that were given by the participants involved. Then I will be comparing the two answers to see if the professionals agreed on certain questions and certain aspects of technology which could assist these students.

4.1 Question 1
The first question asked to both staff members throughout the interview was to identify common difficulties for students in general who access academic study skills. There was a focus in this question on difficulties such as time management, workload and attendance. This question was aimed to recognise the difficulties which most students struggle from to then be able to compare against autistic specific difficulties identified by their professional opinion.

The results of this question delivered similarities as well as additional differences, both participants answered this question with time management and organisation being the main factors. Also structuring of assignments was mentioned by both participants as a main struggle for most university students accessing academic study skills. This shows that it is a regular occurrence for students without autistic spectrum disorders to also struggle with these difficulties during university and access academic study skills as a result of that, meaning that it will emphasise the struggles for students with autistic spectrum disorders. This could emphasise the need for organisation devices in universities for students with disabilities to assist them with the transition from school or college to university.

4.2 Question 2
The second question was linked to the first question and was there to find out if there were certain types of struggles which students with Autism Spectrum Disorders suffer from more within higher education such as university. This question was aimed to identify the struggles and compare them to other students without disabilities and to help find a way the amazon echo or dash devices could assist them in university to cope with these difficulties.

The results of this question were similar when it comes to time management both participants stated that time management was a particular struggle for student with Autism Spectrum Disorders. One participants also stated that referencing and getting used to the academic writing requirements vital at university. Understanding assignment briefs was highlighted as a commonly brought up issue which academic study skills need to deal with regularly. This could raise the recommendation for an electronic organiser to help assist with the time management and accessing academic study skills appointments through their university.

4.3 Question 3
The third question was asked to gain information to know if students with Autism Spectrum Disorders seek emotional or wellbeing support from academic study skills as well as academic support. This question was aimed to understand more into the role of an academic study skills tutor and if additional support is needed and if so what is the specific support needed. The additional aim of this question was to understand if technology could take a role into assisting students with these concerns and if this could potentially take a role in universities through technology.

The results of this question showed that many students with autistic related disabilities have accessed academic study skills for some kind of emotional or wellbeing support. Most of the students who accessed this apparently were struggling with the transitioning from school or college to university and the social ‘rules’ changed resulting in the needing this type of support. It was also
revealed technology previously mentioned called Brain in Hand is used in Cardiff Metropolitan University as a form of support and is highly recommended to students who struggle with these types of issues. Participant B described Brain in Hand as a piece of software that effectively organises your life which is extremely useful for students struggling with the transition from school or college to university.

4.4 Question 4
The forth question was asked to gain information on software or technologies which are available to students with Autism Spectrum Disorders within higher education. This question was to also discover what technologies these participants at Cardiff Metropolitan University were aware of. The aim of this question was to understand regularly used technologies on the market to discover if any of these technologies could be incorporated into the Amazon Echo or Dash devices.

The results of this question revealed the amount of technologies used within higher education, such as My Mapping Mind View which was mentioned by both participants in their interviews. Technologies such as sensory technologies were also mentioned as some which are used within universities. Software which turned speech into text is also used within universities usually issued through DSA (Disabled Students Allowance) part of Student Finance.

4.5 Question 5
The fifth question was to find out the expenses of the technology which was currently offered to eventually compare them to the Amazon Echo and Dash Devices. Also to understand the roles of funding bodies and how the individual would access these type of technologies through this type of funding at university. The aim of this question was to understand how much current technology is and how they are funded or paid for.

The results of this question showed that DSA (Disabled Students Allowance) through Student Finance was the main funding body of these technologies, and Participant B stated that a piece of software called Dragon Dictate usually costs about £150 - £175. Participant A stated that to be able to get the technologies through Disabled Students Allowance a needs assessment would need to be carried out to determine what the individual was entitled to.

4.6 Question 6
The sixth question was to gather information on what Cardiff Metropolitan Academic Study Skills offer its student with Autism Spectrum Disorder. The aim of this question was to gain a first-hand perspective of what the staff offer the students in terms of academic study skills, this also includes additional support given.

The results of this were very similar in that both participants offered the same academic study skills support. The students are offered 40 hours a week averagely however are assessed on how many hours they would require through a needs assessment by Student Finance. This is currently offered for both Autism Spectrum Disorder students as well as students with Dyslexia. Participant B stated that Student Finance are cutting down so therefore this may not be offered in the near future to students lower down the Autistic Spectrum. Cardiff Metropolitan University offer one to one tuition, help with assessments, diagnostic assessments and needs assessments. Other assistance during the one to one tuition includes research skills, reading strategies, writing skills, building confidence through regular support and guidance and identifying improvements. Participant A stated that they assist students with the use of assistive technologies which they have been given.
4.7 Question 7
The seventh question was a brief question to identify if the participants knew of the Amazon Echo and Dash Devices and if so identify how much they knew about them. The aim of this question was to get a clear understanding of the knowledge they held about the devices and to explain to the participants about the devices if they were unaware of their abilities.

The results of this question identified that most participants were aware of the Amazon Echo device however they were not aware of the Amazon Dash devices. After a brief explanation of both the technologies this gave them a clearer understanding of the products in which I was about to refer to in the next few questions.

4.8 Question 8
The eighth question was to question the participants of their opinion if they feel these technologies could be repurposed to support students with Autism Spectrum Disorder. The aim of this question was to gain a professional opinion on the rebranding of the products and what would or could be added to improve this product in an academic environment.

The results of this showed that both participants had many ideas of improvement after hearing a brief description of the device and what it already does. One participant saw how some of the functions it already offers such as voice communication could be of benefit to students with Autism Spectrum Disorder already. For students with poor communication level this could be very helpful in developing their speech however as the participant stated that communication in high education is usually very good and therefore would not be too much of a problem to assist with. However, the participant also went on to say that in such form of questions this could be very handy to hand as it’s like having a personal assistant there all the time. Participant A also went on to state that the aspect about the device she could find most helpful would be writing lists, organising and checking itinerary would become a lot easier. Even down to travelling the participant stated that even down to checking train or bus times this would be a lot easier because you could just ask the device instead of having to look it up. The amazon echo also can read your timetable which can be handy for new students who don’t know where they are going. Participant A also stated that the reason they find it would be useful to students with Autism Spectrum Disorder is that it would be lots of sources of information in one device.

Participant B spoke about relating a current technology support device and perhaps linking it with the Amazon Echo to enhance the capabilities of the device. The Dash Buttons could be incorporated into the device by having panic buttons around the home to assist with stress in certain aspects of everyday life. It was also mentioned about having buttons around the home could be helpful for those on the Autism Spectrum who have trouble with speech or do not speak at all. Participant A extended on this saying that maybe they could add a visual aspect as a lot of students with Autism Spectrum Disorder learn visually and therefore this could be an adaption to consider. The Amazon Echo device was then compared to the Apple iPad with Siri if it added a visual component. It was also noted that maybe adding Dragon Dictate to the device could enhance its capabilities by allowing the device to write notes through the microphone on the device through speech.

4.9 Question 9
The ninth question was to find out if these participants felt that these were affordable for Cardiff Metropolitan University or similar universities to potentially adopt to their technologies. The aim of this question was to understand how much if any Cardiff Metropolitan University or similar universities would pay for these types of technology compared to technologies already funded within Cardiff Metropolitan University.
The results of this question discovered that the participants both agreed that £149.99 for the full version and £49.99 for the smaller version of the Amazon Echo Devices were affordable for the university. Participant B stated that they were comparable in price and that if they could be adapted to suit the students' needs then these may be very favourable with universities in the United Kingdom.

4.10 Question 10
The tenth question was used to identify any potential funding avenues for the Amazon Echo and Dash devices from current funding used for student support technology. The aim of this question was to find out funding avenues commonly used to support students using assistive technology, and also to find out if they would or could potentially fund the Amazon Echo or Dash devices in support in universities if repurposed.

The results showed some interesting ways of funding these types of technology through universities such as Participant B stated that some projects are funded directly from a university. Exeter University funded the initial project of Brain in Hand, therefore it could well be easy to link this with a project funded by another university. However, due to the high competitive levels to access funding for these types of project this could throw up a few barriers in accessing guaranteed funding for these devices. Participant A stated that Disabled Students Allowance through Student Finance get software recommended to them to fund which could potentially be a route of funding to try, however she was unsure of how to get this recommendation initially. It was also mentioned in this question that the funding could also be accessed through the National Autistic Society as they fund many projects which assist individuals with Autism Spectrum Disorder however this would not then be directly related to student funding, this however could be a route into getting Student Finance to recognise the devices as assistive technology they will provide to students.

4.11 Question 11
The eleventh and final question was used to see if these professionals in the Autistic field and staff at Cardiff Metropolitan University would feel that their university in particular would adopt this type of technology to be assistive technology. The aim for this question is to find out if Cardiff Metropolitan University would be interested in this type of adapted technology as a supportive route and also to see how this would be implemented in.

The results of this showed interest into whether Disabled Students Allowance would fund this type of technology, both participants stated that if this was the case the Cardiff Metropolitan University would gladly incorporate this type of technology into their supportive technology range. Participant B identified that if funding through this channel was reduced then the university would have to fund this type of technology by themselves by supplementing supportive technologies for disabled students. However, they also identified that there is a possibility for new technologies becoming available to students if this were to happen due to less restrictions on types of supportive technologies for disabled students.
5.0 Analysis and Discussion
The aim of this project was to identify whether the Amazon Echo and Dash devices could be used by university students in higher education. Another aim is to then discover whether there is a therapeutic value to students with Autism Spectrum Disorder using these devices in higher education. Another aim of this research was to compare the Amazon Echo against current technologies on the market to see if the Amazon Echo will support the emotional and linguistic development of students with Autism Spectrum Disorder.

Throughout the interviews funding of these technologies were discussed at length with many suggestions put forward by the participants for potential funding for the device. Currently Student Finance fund any disability related equipment through their Disabled Students Allowance sector. Disabled Students Allowance base their criteria through a diagnosis of Autism Spectrum Disorder and then the completion of a needs assessment, which is usually completed by a support worker as mentioned by Participant A throughout the interview. This needs assessment will determine the level of support given, as the Amazon Echo device would be used for multiple different levels of the Autism Spectrum then I feel student finance would be reluctant to fund such an item. However looking at the need for technology they could see the potential to fund an item which will reduce costs elsewhere. Participant B already made the statement that universities may have to cover the costs themselves this could be another potential funding avenue which would need to be considered. The Amazon Echo device offers a lot of advancement to education and independent living, the Dash device however has only two uses within education its current use and an incorporation with Brain in Hand. Universities could see the potential of this application. I think the need for more study within this area before integrating the technology may be useful to get a clearer understanding if it is actually beneficial in action.

5.1 Positive and Negative Effect on Services
There are many positive aspects of adding the Amazon Echo and Dash devices as supportive technologies with Cardiff Metropolitan University towards support services already in place. One of these positive aspects is the reduced strain it would put on support workers, this is evidenced though talking to support workers throughout my interviews and understanding the benefits of having technology such as Brain in Hand within universities. Students could spend less time asking questions to support workers and use the Amazon Echo devices instead, this therefore could free up more time for support workers to help other students which need to be seen on a more personal level. Another positive effect which the Amazon technologies could have on support services is the Amazon Dash Button or similar technology could be created to work alongside the current support workers. In this respect the technology could assist these support workers by setting reminders for university and meetings through the amazon echo device, organise transport remotely and to use the device as a note taker in lessons as seen in O’Boyle (2016). It was discovered in the results of the interview that Student Finance were attempting to make cut backs on the amount of funding they offer this could potentially allow the student to use more of their funding for one to one tuition rather than a note taker they don’t need by having technology.

As seen above there are many positive effects of the Amazon Echo supporting autistic students within university. However, like anything there is always negative aspects of introducing a new technological device into education. One interesting aspect which emerged from the interviews with my participants was the potential negative effect that the Amazon Echo and Dash devices could have on the university’s current support services. One of these negative effects was discovered throughout the interviews carried out with Participant B. Our results confirm that with Student Finance were attempting to make cut backs on their disability funding, our findings then suggest that
this could raise an issue of staff cut backs. If a piece of technology could assist in such a way that was comparable to current staff support workers, as discovered and discussed in the results support workers are regularly used to ask questions which the Amazon Echo device is designed for. Interpersonal staff such as support workers could have the hours they get paid for with students potentially reduced this could have a negative effect on the student especially with the social aspect of Autism Spectrum Disorder. I would suggest that this type of technology could be a great addition to the current support offered through Student Finance however is not sufficient to completely replace the interpersonal support which is already offered.

After comparing the positive effects of the device against the negative I can safely give the conclusion of the implementation into Cardiff Metropolitan University would be a positive outcome. With adaptations made to the device I would recommend this device be implemented into regular use within Cardiff Metropolitan University. This device has shown and proven qualities which have already been identified above this being considered I also feel that the students should remain having support workers as an addition to the device for more interpersonal communication which is clearly a benefit students should remain having at Cardiff Metropolitan University.

It has previously been identified of the support given throughout many universities in the United Kingdom in the form of ‘Academic Study Skills’ which is offered and paid for by Disabled Students’ Allowance by Student Finance. This is the conclusion to the positive and negative effects of the Amazon Echo device is seen as a positive as this could assist the support workers in assisting the student by setting reminders and organising their work for them which they can check at any time. This type of academic support focuses on the academic side of challenges for a disabled student such as time management, adjustment to referencing, the academic ability expected of a university student and help with revision for exams. These sessions are offered on a one-to-one basis to offer the student the best support possible this could potentially assist alongside the abilities of the Amazon Echo device to offer the best support possible to the student at this university, this information was also collected from Cardiff Metropolitan University Academic Study Skills (2017).

5.2 Effect and Impact
As seen in current literature and as confirmed by Participant B in the interview I conducted, Brain in Hand (a current support software used in universities) is extremely useful to support workers as they can keep an eye on their students and what they struggle with throughout the day. This piece of software was highly regarded by both participants who are both support workers. Therefore from this I can state that drawing a conclusion on whether software such as the Amazon technologies would benefit or assist current support workers. Using the evidence and data gathered I would state that this technology could be effective to support workers if the device was installed with the Brain in Hand Software as an addition to the technology to make it more effective.

After deliberating and researching through different types of literature I can conclude that the transition to university from school or college is extremely difficult for many students especially those with Autism Spectrum Disorders. In Adreon and Durocher (2007) it is extensively evaluated of this transition for autistic students and how this can have devastating effects for them especially within the first few weeks. Many students leave university due to the stress and the structured timetable which usually they would be used to according to Adreon and Durocher (2007). Throughout the interview with Participant A it was clearly stated that first years struggle with the transition and they have to give plenty of support throughout this time. The Amazon Echo could assist students in making this time easier throughout the transition by assisting with things like
organisation, stress, note taking and other aspects of the Amazon Echo which could assist students even down to itinerary items such as travelling.

Many students with Autism Spectrum Disorder have difficulty with everyday activities such as travelling by bus and therefore getting a taxi is one of the only options. Taxi rides are funded for some students through Student Finance for students who need this and are given this through a needs assessment according to Student Finance England (2017). The Amazon Echo device connects with the Uber application which could allow students to order Uber cabs to pick them up for university. The Amazon Echo could also takes notes for the student, set deadline reminders, remind them of their class timetable and also allow them the order books and find them easily on Amazon Prime. Therefore by a first year autistic student having access to this device could potentially make their first year a lot more organised by making the transition smoother for the student.

5.3 Current Technologies
Comparing the abilities of the Amazon Echo and Dash devices to that of those on the market currently. After seeing the descriptions of these products and how they can benefit students with Autism Spectrum Disorder I feel the Amazon Echo device could potentially offer more assistance than those more expensive devices which are currently being offered by Student Finance England. The University of Indiana Bloomington have outlined the fact that applications such as pocket schedules and visual schedule planners assist with organisation and self-management for individuals with Autism Spectrum Disorder (Indiana University, 2017).

As mentioned previously Brain in Hand is just one of the applications of support technology which is offered to students through Disabled Students Allowance. Brain in Hand is a mobile application created and published by the University of Exeter. Brain in Hand combines various proven therapies such as cognitive behavioural therapy, solution focussed therapy, and recovery based rehabilitation to create a mobile application of assistive technology to those on the Autism Spectrum to help them function well in everyday life situations (Brain in Hand Ltd, 2017). Therefore this application has proven to be of cognitive assistance to those of the Autism Spectrum. This application allows the user to create a diary of their daily routines just like the Amazon Echo device with the organisation of timetables and task list. Brain in Hand is also designed to track their anxiety and stress levels, tracking on a secure website where they can review their use and identify new issues which is why this would be a fantastic addition to the Amazon Echo device. Lastly they have the use of a traffic light system and by using red triggers a support request to the National Autistic Society to request a call of support for the user (Brain in Hand Ltd, 2017; National Autistic Society, 2017). Brain in Hand were given assistance from the National Autistic Society through their application, if the Amazon Echo device were to join together with the National Autistic Society, having anxiety related questions on the device and trigger questions to access help this could potential make for a very interest adaptation to the device.

Pacifica is another assistive technology through a mobile application designed to assist people suffering with anxiety in the United States. However this technology is not used as an assistive technology within universities this is a mobile application available to everyone. This application is designed be using therapeutic technology through a mobile app to soothe the struggles with anxiety. This application incorporates principles of cognitive behavioural therapy, relaxation and wellness to help soothe the struggles with anxiety through a mobile application. This application helps the individual to organise a sleeping pattern and relax in stressful situations. This application could be extremely useful to a student with Autism Spectrum Disorder whose complete routine has just changed with the move from living at home to living independently. The application is free however
there are in app purchases available as seen on Apple IOS (2017). This application can give the user relaxation tips and set goals to achieve and is recommended as a top application for relaxation and anxiety on Forbes.com (2016). As previously mentioned and seen throughout this study anxiety is increasingly challenging for individuals with Autism Spectrum Disorders, throughout this research the participants regularly mentioned the relation between anxiety and the ability to cope with academic pressures. Therefore the use of technologies like these would benefit a student struggling to cope and therefore would be a great addition application to the Amazon Echo device.

There are many current technologies which could be integrated with the Amazon Echo or Dash devices, many of these technologies have been research through current literature. Throughout Eaves and Ho (2007) it is described about the importance of assistance in education to students with Autism Spectrum Disorder. Many current technologies already adhere to the needs described in Eaves and Ho (2007) however many of these technologies do not assist with more than one struggle at a time. It was also discovered in the results of the interview data that most technologies are only given to students to assist with academic troubles one at a time instead of being incorporated in one device. The Amazon Echo however is a device which already incorporates many applications as add-ons to the device as seen in Chacksfield (2017) where technologies were discussed and the effect of these technologies being in one device was described.

One piece of technology which could potentially be used or incorporated into the Amazon devices is Brain in Hand. After the extensive research and using the data collected from interviews with both participants I have found that the Amazon Dash device could potentially be incorporated with this piece of software. Brain in Hand could potentially become an addition software, the Amazon Dash device currently orders items set up to the device via the customers amazon account. This was already found to be helpful to students with Autism Spectrum Disorder who struggle with everyday activities such as shopping by Eaves and Ho (2007). Amazon could potentially use this research to create a device very similar to the Amazon Dash device which instead of ordering products will connect to the Brain in Hand server. This will be of great assistance to support workers as they will be able to detect certain times of day where the students struggle in particular to assist them more in those areas, whether it is down to organising travel, revising, cooking or other everyday activities.

It was also investigated throughout VanBergeijk, Klin and Volkmar (2008) where they evaluated participants to come to the conclusion that students with Autism Spectrum Disorder struggle with the transition from school or college to university. Compared with the data gathered from the research undertaken in this study it reveals that if students were given a device to manage the social struggles of university alongside the academic pressures which are mostly adhered for already. Aspects such as cooking, arranging travel and organising notes could be covered by the Amazon Echo device. I would make a recommendation for this device especially to be incorporated into university or higher education technologies offered to students with Autism Spectrum Disorder. The students could ask the Amazon Echo questions regarding social aspects of life which could potentially improve their interaction with other students and therefore potentially improve their social aspect of university which could dramatically affect their work with a positive outlook.
6.0 Conclusion

After extensive discussion, research and evaluation of the facts I have come to the conclusion that with adaptations made to the Amazon Echo device and with the correct funding required the Amazon Echo device could make a positive effect of students with Autism Spectrum Disorder. Following the aims and objectives of this study this has brought me to this conclusion. The main aim of this study was to explore the potential therapeutic applications of the Amazon Echo and Dash devices in supporting students with Autism Spectrum Disorders within higher education. Throughout this study it was concluded that the therapeutic applications of this device are drawn from applications which are offered alongside the device. Also the intelligence of this device constantly evolving to improve the communication means that the communication of this device is continually improving to assist students. This allows students to ask questions more freely, this adheres to the therapeutic values of the device. It was discovered throughout the interviews with the participants that students with Autism Spectrum Disorder need to ask repeated questions as it has a therapeutic value as well as relaxing and positive implications on the student.

Another aim of this study is to explore into the current technologies on the market to investigate the potential of adaptations to the Amazon Echo and Dash devices. This aim has been successfully met as seen throughout the literature review, many technologies were researched and many were mentioned throughout the interviews. Overall this revealed a gap in the market of the current technologies which ultimately was the objective, this meant that the Amazon Echo device could potentially offer an aspect of technology to universities and Student Finance that had not been accessed before. It was seen that current technologies such as Brain in Hand and the Pocket Schedule only have one function per device or software. Whereas the Amazon Echo device offers multiple different functions from the device which could be used in an academic setting. Therefore by meeting this aim I have gathered enough information and data to conclude that the Amazon Echo device would open a whole new market for current technologies which could therefore appeal to universities around the United Kingdom and to Student Finance for funding.

An additional aim is to critically evaluate the literature on technology in the home and school to support students with Autism Spectrum Disorders in their speech and language skills to see if there is an opportunity to assist students within this area. This aim was difficult as there was no practical element to this study, however this could potentially branch out for recommendations for further study into this particular element. Throughout this research it was discovered throughout ... in research into this literature that technologies such as the Amazon Echo device do prove helpful in improving linguistic elements of the disorder. It was seen in Chw.org (2017) that young children who use devices such as these experience an increase in their speech development. As the Amazon Echo device is evolving all the time I therefore would state that it would be better for someone with speech development problems or anxiety related speech delay to talk to a device like the Amazon Echo, as this would dramatically improve their ability to socially interact with others.

There will be another aim to critically evaluate the literature on technology in supporting students on the autism spectrum in managing their emotional wellbeing, with a focus on anxiety. This aim was a main focus throughout the research and therefore was incorporated fully into this research. Throughout the literature review there was much deliberation and discussion of the emotional aspects of the Autism Spectrum and how and what technology could support these aspects and how the Amazon Echo could support these struggles. In conclusion I found that there is not much technology on the market for all of these aspects but only individual aspects. Aspects such as anxiety are ultimately catered for by applications offered on the market however other aspects such as focus and emotional wellbeing are not.
An aim of this study is to survey the views of student services and other teaching and support staff on assistive technologies in supporting students in Higher Education who are on the Autism Spectrum. This was completed by interviewing two participants who agreed to the interview for the purposes of this research. These interviews proved extremely helpful in branching out the research and data collected. This also opened up some potential recommendations which could be made to the device which is discussed throughout this project.

An aim of this study is to investigate how these improvements and recommendations can improve the lifestyle of people with Autism. This was shown in VanBergeijk, Klin and Volkmar (2008) where it was described of the potential to improve independent living with the technological devices that offer the correct support such as the Amazon Echo device. Throughout this study it has been recommended with the research and data collected that the Brain in Hand application would make a good addition to this device to assist with the therapeutic values of the device to students with Autism Spectrum Disorder. This study therefore gives enough data and research to come to the conclusion that the Amazon Echo device would make for a good addition into a university such as Cardiff Metropolitan University with the right adjustments including the addition of the software Brain in Hand.

Throughout every project there is always limitations, throughout this project an extreme limitation I found was the number of participants that I was able to engage in the interviews. However, when I chose to specify the participant requirements this was a decision which was made after overviewing the amount of participants I would be able to gain within a reasonable time limit. Ideally I would have liked to interview students with Autism Spectrum Disorder to get their opinions on the product being used as a supporting technology. Perhaps I could of created an online survey for a wider range of students to fill out which may have gained more data, however this could have opened up a whole new range of information and expanded the project too difficult to complete in the timescale allowed and would be perhaps a better idea for a bigger project.

A recommendation alongside this research would be through the possibility of future studies which could be continued from this research. The potential to stage a practical intervention study with ethical approval would be a possibility as this would gain more valuable data and would be able to be a solid addition to this study. This study could include students with Autism Spectrum Disorder being given the Amazon Echo and Dash devices to use for a certain period of time to see if this had any impact on their living or academic pressures. I would make a recommendation that Cardiff Metropolitan University adopt this device and fund this as a research project alongside Exeter University with the application Brain in Hand. With the expressed permission of Amazon UK I would recommend adapting the device and incorporating Brain in Hand into the Amazon Dash device. I would then recommend creating an intervention study monitoring the academic pressures and using the technology of Brain in Hand to understand if the Amazon Echo and Dash devices are tackling the independent living pressures as well as the academic side of the study. In conclusion to this recommendation for further study this could complete this study and make for a solid proposal to gain potential funding for this project to be incorporated with Brain in Hand and be available on the market.
7.0 References


Amazon UK (2017). Amazon Echo - Alexa Voice Service - Amazon.co.uk. (Online) Amazon.co.uk. Available at: https://www.amazon.co.uk/Amazon-SK705DI-Echo-Black/dp/B01GAGVIE4/ref=sr_1_1?ie=UTF8&qid=1492546606&sr=8-1&keywords=echo (Accessed 18 Apr. 2017).


8.0 Appendices

(Appendix A)

When undertaking a research or enterprise project, Cardiff Met staff and students are obliged to complete this form in order that the ethics implications of that project may be considered.

If the project requires ethics approval from an external agency (e.g., NHS), you will not need to seek additional ethics approval from Cardiff Met. You should however complete Part One of this form and attach a copy of your ethics letter(s) of approval in order that your School has a record of the project.

The document Ethics application guidance notes will help you complete this form. It is available from the Cardiff Met website. The School or Unit in which you are based may also have produced some guidance documents, please consult your supervisor or School Ethics Coordinator.

Once you have completed the form, sign the declaration and forward to the appropriate person(s) in your School or Unit.

PLEASE NOTE:
Participant recruitment or data collection MUST NOT commence until ethics approval has been obtained.

PART ONE

| Name of applicant:                        | Charlotte Hannah Parry |
| Supervisor (if student project):          | Catherine Tryfona       |
| School / Unit:                            | Cardiff Metropolitan University |
| Student number (if applicable):           | ST20059922              |
| Programme enrolled on (if applicable):    | BSc (Hons) Computing    |
| Project Title:                           | An Exploration of the Potential Therapeutic Applications of the Amazon Echo and Dash Devices in Supporting Students with Autism Spectrum Disorders. |
| Expected start date of data collection:   | 28/02/2017              |
| Approximate duration of data collection:  | 1 Month                 |
| Funding Body (if applicable):             | Not Applicable          |
| Other researcher(s) working on the project: | N/A                    |
| Will the study involve NHS patients or staff? | No                     |
| Will the study involve human samples and/or human cell lines? | No |

Does your project fall entirely within one of the following categories:

| Paper based, involving only documents in the public domain | No |
| Laboratory based, not involving human participants or human samples | No |
| Practice based not involving human participants (eg curatorial, practice audit) | No |
| Compulsory projects in professional practice (eg Initial Teacher Education) | No |
| A project for which external approval has been obtained (e.g., NHS) | No |

If you have answered YES to any of these questions, expand on your answer in the non-technical summary. No further information regarding your project is required.

If you have answered NO to all of these questions, you must complete Part 2 of this form

In no more than 150 words, give a non-technical summary of the project

Explore the potential therapeutic applications of the Amazon Echo and Dash devices in supporting students within Higher Education who have Autism Spectrum Disorders (ASDs).

Critically evaluate the literature on technology in the home and school to support students with Autism Spectrum Disorders (ASDs).

Critically evaluate the literature on technology in supporting students on the autism spectrum in managing their emotional wellbeing, with a focus on anxiety.

Survey the views of student services and other teaching and support staff on assistive technologies in supporting students in Higher Education who are on the autism spectrum.

Propose potential therapeutic applications of the Amazon Echo device to support Higher Education students who are on the autism spectrum.

DECLARATION:
I confirm that this project conforms with the Cardiff Met Research Governance Framework

I confirm that I will abide by the Cardiff Met requirements regarding confidentiality and anonymity when conducting this project.

STUDENTS: I confirm that I will not disclose any information about this project without the prior approval of my supervisor.

Signature of the applicant:  
C. Parry  
Date:  
21 February 2017

FOR STUDENT PROJECTS ONLY

Name of supervisor: Catherine Tryfona  
Date:  
21 February 2017

Signature of supervisor:  
C. Tryfona
PART TWO

A RESEARCH DESIGN

A1 Will you be using an approved protocol in your project? No

A2 If yes, please state the name and code of the approved protocol to be used

N/A

A3 Describe the research design to be used in your project

- Sample & Sampling
  - Recruiting and Interviewing Participants after Gaining Consent
  
  I will be recruiting participants’ to take part in my research as interviewees, I will be face to face interviewing. All participants will be over the age 18. Participant’s right to anonymity will be reiteration throughout the research process and they may withdraw their data at any point. The researcher will only record age and gender of the participant. Consent from participants is required from the interviewees by the completion of the consent form before they can take part in the study.
  
  - Possibility for Online Survey

This project will use a primarily deductive approach to the research, in that it will generate a proposal of how existing technology might be repurposed to support ASD students. This proposal will be on the basis of engagement with the literature on supporting technologies and ASD students within higher education and on interviews held with members of staff who support such students.

Interviews will be held with teaching staff within Cardiff School of Management and supporting staff within the Personal Tutoring Unit and also Student Services. It is anticipated that teaching staff will be recruited from a number of departments within the School of Management in order that a wide range of teaching disciplines will be covered. Anticipate sample size will include 3 lecturers, 1 personal tutor and 2 members of staff within Student Services. The interview should take no longer than half an hour.

A4 Will the project involve deceptive or covert research? No

A5 If yes, give a rationale for the use of deceptive or covert research

N/A

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1 An Approved Protocol is one which has been approved by Cardiff Met to be used under supervision of designated members of staff; a list of approved protocols can be found on the Cardiff Met website here
A6 Will the project have security sensitive implications?  No
A7 If yes, please explain what they are and the measures that are proposed to address them
N/A

B PREVIOUS EXPERIENCE
B1 What previous experience of research involving human participants relevant to this project do you have?
None
B2 Student project only
What previous experience of research involving human participants relevant to this project does your supervisor have?
Ten years of experience supervising undergraduate dissertations and final year projects.

C POTENTIAL RISKS
C1 What potential risks do you foresee?

1. Gaining consent for interviews from participants’.
2. Including personal questions about daily habits’ and how technology like the Amazon Echo and Dash could possibly benefit these activities through anxiety.
3. The possible risk of not meeting research deadlines.
4. When arranging interviews a risk could be causing inconvenience to the participants’ during their working day.
5. A risk could be the way the data confidentiality is kept.

C2 How will you deal with the potential risks?

1. Consent for the interviews will be gained via a participant consent form which will be signed before the interview. Interviews times will be arranged in advance at a time and place convenient for the interviewees to not inconvenience them. The researchers’ whereabouts will be known to a third person, probably the supervisor to ensure safety. Email/s confirming that people have agreed will be kept to prove consent to participation.
2. The questionnaires will state terms of participation and confidentiality on the header. Completion of the questionnaire is taken as consent and will be stated on the header. If participants do not wish to contribute then they need not complete the questionnaire and will therefore not be taking part in the research.
3. A timetable will be kept to keep track and an allowance will be made in case the research overruns.
4. The interviews will not contain any questions that reveal the identity of the participant and will insure anonymity throughout. If participants feel uncomfortable during any part of the research gathering process withdrawal from the process can be immediate to allow the participant to feel comfortable. Arrangements will be made when participants’ are available.

5. All raw data will be held on a secure password protected external hard drive and paper copies will be kept in a locked cupboard. Access to the raw data will only be available to the researcher and therefore restricted.

When submitting your application you MUST attach a copy of the following:

- All information sheets
- Consent/assent form(s)

An exemplar information sheet and participant consent form are available from the Research section of the Cardiff Met website.
(Appendix B)

**DEVOLVED ETHICS APPROVAL APPLICATION SUMMARY**

Student Name: Charlotte Hannah Parry  
Student Number: ST20059922

Module Name: BSc (Hons) Computing Dissertation Project  
Module Number: BCO6022

Programme Name: BSc (Hons) Computing  
Supervisor Name: Catherine Tryfona

<table>
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<tr>
<th>To be completed by student and supervisor before submission to Ethics Approval Panel</th>
<th>Student Signature;</th>
<th>Supervisor Signature;</th>
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<td>Application for ethics approval</td>
<td>[X]</td>
<td>Yes</td>
</tr>
<tr>
<td>Participant information sheet</td>
<td>[X]</td>
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<td>Confirmation of interviewee participation</td>
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First Submission [ ]  
Resubmission [X]

Date: ______________

**For use by the devolved ethics approval panel:**

Panel Members  
Name  
Signature

Module leader: Dr. Jason Williams  
Supervisor: Catherine Tryfona  
CSM Ethics Committee Representative: Dr. Hilary Berger
Outcome:

Project Approved [ ] Reference number: __________
Application not ready/ incomplete [ ] (Decision deferred)

Comments for projects not fully approved:

The original to be retained by the module leader and a copy given to the student
An Exploration of the Potential Therapeutic Applications of the Amazon Echo and Dash Devices in Supporting Students with Autism Spectrum Disorders

Cardiff Metropolitan University Protocol Number: 2016D0459

Project summary
The purpose of this research project is to explore the potential therapeutic applications of the Amazon Echo and Dash devices in supporting students with Autism Spectrum Disorders. Your participation will enable the collection of data which will form part of an undergraduate dissertation project being undertaken at Cardiff Metropolitan University.

Why have you been asked to participate?
You have been asked to participate because you fit the profile of the professionals being selected for study; that is that you work directly and have professional experience either studying or working with students with Autism Spectrum Disorder within a study environment.

Your participation is entirely voluntary and you may withdraw at any time.

Project risks
The research involves the completion of an interview which will be recorded for later analysis. We are not seeking to collect any sensitive data on you; this study is only concerned with your knowledge, understanding and experience with students with Autism Spectrum Disorders. We do not think that there are any significant risks associated with this study. However, if you do feel that any of the questions are inappropriate then you can stop at any time. Furthermore, you can change your mind and withdraw from the study at any time – we will completely respect your decision.

How we protect your privacy
All the information you provide will be held in confidence. We have taken careful steps to make sure that you cannot be directly identified from the Interview. When we have finished the study and analysed all the information, all the documentation used to gather the data will be destroyed. The recordings of the interview will also be held in a secure and confidential environment during the study and destroyed when it is complete.

YOU WILL BE OFFERED A COPY OF THIS INFORMATION SHEET TO KEEP

If you require any further information about this project then please contact:

Charlotte Hannah Parry, Cardiff Metropolitan University, CMU email: ST20059922@cardiffmet.ac.uk
CONSENT FORM

Reference Number: 2016D0459
Participant name or Study ID Number:
Title of Project: An Exploration of the Potential Therapeutic Applications of the Amazon Echo and Dash Devices in Supporting Students with Autism Spectrum Disorders.
Name of Researcher: Charlotte Hannah Parry

Participant to complete this section: Please initial each box.

1. I confirm that I have read and understand the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason.

1. I agree to take part in the above study.

The following statements could also be included on the consent form if appropriate:

2. I agree to the interview being audio recorded

3. I agree to the use of anonymised quotes in publications

________________________  ____________________
Signature of Participant    Date

________________________  ____________________
Name of person taking consent    Date

________________________
Signature of person taking consent

* When completed, 1 copy for participant & 1 copy for researcher site file
Interview Questions

In relation to managing academic studies, what do you feel are the most commonly presented issues or challenges that students come to see you with? (Time Management, Workload, Attendance etc.)

Are there any issues you feel are perhaps more particular to students who have a diagnosis of autism spectrum disorder and, if so, what are they?

With regards to wellbeing, emotional or otherwise, do you feel that students with autism face any specific challenges?

Are you aware of assistive technologies for students with ASD within the context of Higher Education?

Are these expensive and how are they funded?

What support do you currently offer to students with ASD?

Are you aware of the Amazon Echo and Dash devices?

Do you see potential for these to be repurposed to support students on the autism spectrum?

Would you say these the amazon echo and dash devices are affordable compared to other assistive technologies used in universities such as Cardiff Metropolitan University?

Can you identify potential funding avenues that may be applicable?

Could you see Cardiff Metropolitan University potentially adopting the use of these technologies to assist students with autism spectrum disorders?
Interview with Participant A

In relation to managing academic studies, what do you feel are the most commonly presented issues or challenges that students come to see you with? (Time Management, Workload, Attendance etc.)

Is that all students or specifically to do with students with ASD?

Both.

I would say generally it was Time Management and Organisation that’s probably the biggest one. It’s managing the pressures of working independently which a lot of students especially the first years although you get a lot of third years as well but especially first years find it really difficult after school or college which doesn’t always prepare students for working independently and having to manage their own time, deadlines, workloads and finding information out for themselves about deadlines so as using Moodle that sort of thing. So Time Management and Organisation because of that is probably the biggest one. I think then it’s probably Academic Writing and Referencing, lots and lots of Referencing. Academic Writing style like knowing how to write clearly and concisely.

Do you find spelling a problem?

Spelling, grammar, punctuation but actually lots of times I fear that with Academic Writing the vocabulary has to be of a very high standard where actually a lot of students use simians a lot and it’s very confusing because it changes the meaning subtly so it’s better to write clearly and simply if you have to as long as you are using the right technical language so I think there is a bit of a misunderstanding of what Academic Writing is so a lot of students come to see us about that. The students with ASD I think it is Time Management and Organisation definitely but I would say it’s also understand Assignment Briefs as well so use of language in Assignment Briefs can be quite confusing and I think Reading Strategies as well so knowing that if you are given a reading list for example being able to choose which parts of which reading to read and not feel that you have to read everything. So it’s knowing those subtle rules about studying that aren’t specially stated anywhere.

Are there any issues you feel are perhaps more particular to students who have a diagnosis of autism spectrum disorder and, if so, what are they?

Answered above.
With regards to wellbeing, emotional or otherwise, do you feel that students with autism face any specific challenges?

Yes, I do think because of what I’ve just mentioned about independent working in University, I think that can be daunting for students with ASD. There is so much implied understanding and implied meaning which is not specifically stated anywhere. It’s very very subtle and if you do not read between the lines or if you are just relying on people just sharing a common understanding of something is written in a certain way or the guidance is written in a certain way then I think it can be very confusing. I think I mentioned earlier Assignment Briefs for example some of them are written very clearly with specific guidance others are just a confusing statement and that can be really difficult. I think that the social side of things again communication and understanding expectations, everybody is terrified in University in the first year. The first weeks are really scary, I think knowing how to behave, fit in is difficult but we see some students with ASD who find it more difficult just because it’s a new set of rules. It might be transferring learning behaviour from home or a different situation and then transferring it into a whole new situation which can be really difficult and quite frightening.

Are you aware of assistive technologies for students with ASD within the context of Higher Education?

It tends to be fairly standard I would say, through the DSA what is given tends to be fairly standard because it tends to help students across the board so My Mapping software for breaking down assignments or managing time, or adding to an essay or to visually see a picture of an essay plan or actually anything where words are quite difficult if you can represent it visually that can be really helpful. So Mind Mapping software is used quite a lot, Text it Speech again might allow some students to capture immediate thoughts without having to translating them into the written word. Some of our students have Brain in Hand as well. That’s an App where you record feelings, emotions and experiences on and there is a team behind it that will identify patterns and behaviour. I think there is a linked support network with it. So some students have Brain in Hand which is specifically for Autism but I have seen it used for students with ADHD as well actually. But no I think in the context of High Education I am not hugely aware of any others but I am aware of them outside of them like things that answer questions. I know some students have their own sensory equipment which can be quite interactive or just fiddle toys, something like that but some of them can be quite interactive with lights and sensors and things.

Are these expensive and how are they funded?

I don’t know if I am honest, funding would be through the DSA. So a student would go through a needs assessment process where they will see a Needs Assessor where they would look at their specific needs and recommend assistive technology based on that.
**What about students that are not eligible for DSA?**

With Autism you would be eligible because it does come under the DSA criteria. So if you are diagnosed with Autism you would be eligible for DSA.

**How about international students?**

International students, No it would be different.

**So that would be the criteria?**

Yes.

**What support do you currently offer to students with ASD?**

I offer study skills support so it’s one to one tuition based on again students individual needs, working with the assessment or diagnostic assessment they have and their needs assessment. So it would depend on what has been identified as their learning needs and also an ongoing discussion with that student. The type of support I provide varies completely. I have several students with ASD at the moment and everybody’s needs are completely different. So it can be anything from what I have already mentioned so research skills, reading strategies, writing skills, building confidence through regular support and guidance and identifying improvements. It would also be use of assistive technology as well and how to use it in general academic work. It is also useful beyond that as well.

**Do you find you get a lot of questions from students with ASD?**

Again it depends, it’s so individual, there is a famous quote that says “if you have met one person with Autism you have met one person with Autism. It does not mean it is representative of all Autism it’s so individual. In fact all the learning support I do with students with Dyslexia, everybody’s Dyslexia is individual to them, everybody’s Dyspraxia, everybody’s Mental Health issues are all individual. There might be some common things we talked about in the beginning but it is very individual. And it changes what a student may have needed in the first year definitely changes over the three years. By the time they leave their needs might of changed completely.

**So it adapts over time?**

It does yes, definitely and of course there is so much improvement along the way and then the University throws different problems at them. They get to their third year and have to do their dissertation which throws a new set of problems and so it goes on. You cannot cover everything in the first year even though you improve the work gets more difficult.

**Are you aware of the Amazon Echo and Dash devices?**

I have become so recently, yes. I wasn’t until a few weeks ago.
**Do you see potential for these to be repurposed to support students on the autism spectrum?**

Oh repurposed? OK I can see how as they are currently they would have some use. I can see they are for communication skills, they could be useful depending on your level of communication so I am not sure about the students we see as their level is already really high. But maybe again for tone of voice and expression things like that, maybe they would be good for practicing those sorts of skills. We can keep using Organisation and from what I have seen and it has only been really brief they could be really helpful for writing lists and organising and actually maybe checking, I think I am right in saying because it is open you could have things like train timetables so they could ask train times and things like that. So maybe it would be useful for just things like that actually. Being able to have one single source of lots of different bits of information.

**Could you see anything added to the Amazon Echo that would assist?**

Because my background isn’t in that area it’s difficult.

**Perhaps maybe a projector involved to project a Mind Map?**

Yes, because it isn’t visual at all it’s just spoken at the moment.

**So adding a visual component would that help?**

Yes so something like a projector would be a good idea otherwise it effective turns into an I-pad doesn’t it. Because you have got sometime like Siri then that you could talk to. The idea is that you have this box that sits there and I know the microphone system that it has is very good isn’t it for picking up voices from wherever you are and so actually some sort of visual addition would be good. So something like trains times, maps or locations that you can visually see. Mind Maps, yes maybe something in the future I suppose like Dragon where you could talk to it and it could transcribe to somewhere what you have said to it. So I suppose with Notes it does do that, so maybe having the software available where you could extend that.

**It does connect to your phone so you do have some visual component.**

So yes some sort of visual component would be good.

**Would you say these the amazon echo and dash devices are affordable compared to other assistive technologies used in universities such as Cardiff Metropolitan University?**

Remind me the Echo is about £150.00 isn’t is?
Yes the Amazon Echo is £149.00 and the Amazon Dot which is a smaller version of the Echo is £49.99 but it doesn’t have a speaker inbuilt it uses your phone.

I am not sure of the exact prices of the assistive technology. If this is a ‘One Shop’ for a lot of assistive technology then yes it is a relatively good price.

*And the Dash devices are £5.00 per button but they sometimes do sales which take them down to £1.00.*

I think that it is all in one place makes it quite useful as well because some of the assistive technology that is given out is all on it’s own fantastic but it uses lots of different Apps or programs. For example this is just generally not necessarily just for Autism you may be given Audio Note Taker which is a good way of recording and organising notes. You might be given a voice recorder, life scribe pen which it also records to you end up with lots of duplication. I think that the thing with Amazon Echo at the moment it is just one thing and has lots of different functions.

*Can you identify potential funding avenues that may be applicable?*

Well I suppose if it was proven to be assistive to students then I not sure how it works or how software becomes recommended through the DSA. But the DSA would be a potential funding avenue if it was proven that it was effective and assistive in some way. But what that step is I do not know but it would be a potential avenue. I suppose other ways would be through sponsorship or private. I don’t know if the Autistic Society would potentially fund anything like that. But the DSA is the most obvious one.

*Could you see Cardiff Metropolitan University potentially adopting the use of these technologies to assist students with autism spectrum disorders?*

I am not sure at this stage, I think funding and finance is such a tricky subject at the moment. I think because Cardiff Met does not decide what assistive technology is given out to students beyond a needs assessment but that can only be recommending approved software so yes if it was approved technology and helpful then Cardiff Met would use it.
Interview with Participant B

In relation to managing academic studies, what do you feel are the most commonly presented issues or challenges that students come to see you with? (Time Management, Workload, Attendance etc.)

The biggest one is Time Management then Understanding Questions and then the next one is Structure (how do I structure the assignment). Sometimes it’s in the assignment brief it’s sort of structured to a certain extent but it’s for them getting that logical sequence from signposting all the way down. With Structure if you are putting in headings and sub-headings if you have to take them out take them out but them into start with so you have that Structure.

Are there any issues you feel are perhaps more particular to students who have a diagnosis of autism spectrum disorder and, if so, what are they?

To me I would say it was Time Management it’s keeping them on track, I won’t say bitesize but parcelling it up so that they can see from one step to another.

With regards to wellbeing, emotional or otherwise, do you feel that students with autism face any specific challenges?

Yes it really depends on the level of the Autistic Spectrum and where they are on it but sometimes on the low end it’s not too much of a problem it just making sure that for them they stay on track. And to the extreme end it’s down to even having a plan of “if I am in this situation what do I need to do?” So have you heard of the software Brain in Hand?

No.

It’s a bit of software well it’s an App so if I am going out what is likely to happen? You ask yourselves these questions and then give yourself responses so if somethings happens for instance ‘I miss the bus what do I do?’ And it may have a number of responses like ‘don’t panic wait for the next bus.’

Oh OK.

We have a student in the School of Art on the Autistic Spectrum who uses Brain in Hand and they went off to Amsterdam on a field trip so they did a lot of preparatory work beforehand about what issues or events that might happen or occur on that trip and then have a series of responses to ease the panic.

So it sort of organises their life?

Yes that’s right it’s a really good piece of software actually.
Are you aware of assistive technologies for students with ASD within the context of Higher Education?

Yes.

What are they?
Brain in Hand is one of them it’s most like having a friend

Is that the main one?
Yes also software like My Mapping Mind View, My Mapping Tools Inspiration, Mind View, Mind Manager there are lots but it’s even down to good old pen and paper sometimes. Then you have your speech detect software again that can ease if it the information is being read back to you that sort of thing. And there are various about 3 or 4 good ones there is Clearer Read, Text Help and there is also a freebie one called Babble Boker so that’s quite good. There is a lot out there to give help.

Are these expensive and how are they funded?

They can be funded through the Disabled Students Allowance. A lot of them are reasonably cheap to buy. The most expensive one would be Dragon or Dragon Dictate if you are using the Mac. I haven’t looked at the cost recently but a lot of them are about £150-£175 that sort of thing.

What support do you currently offer to students with ASD?

We offer one-to-one if they are receiving DSA, they are offered at least 40 hours a week on that score. And this is where it gets a little bit difficult now. Student Finance Wales is still giving students with ASD study skills. Student Finance England only giving study skills to those students with Dyslexia and ASD. I’ll take that back but they are cutting down all the time and it wouldn’t surprise me in the future if you are the low end of the Spectrum both Dyslexia and ASD it could be that you won’t get it. It depends really on that level it’s a very difficult one and being debated a lot within the profession.

Are you aware of the Amazon Echo and Dash devices?

I am aware of Amazon Echo but not the Dash device I don’t think if I am honest.

The Dash device is a button where there are a lot of little buttons that you can stick lots of devices around your home.

Ok.

They have one for coffee so if you are running low on coffee you can push the button and it will order another batch of coffee for you that you usually order.

Ok that’s freaky.

It’s quite handy if you are around your home you notice you are running low on something you don’t have to get your phone out to order it.

I go down the shop.

It’s for Prime Members.

So it’s under the Amazon Prime is it?
Yes it is.
That’s really quite fascinating.

Do you see potential for these to be repurposed to support students on the autism spectrum?

Yes but in a way like Brain in the Hand they could if you had buttons like that around the home, I’m not talking about specific food or anything like that but there could be a way of like the App gives you the ability to have answers to situations or scenario’s then they could do the same sort of thing. It’s almost like having panic buttons around the house. So yes at the moment it is all in one App but that could almost be an extension of the App.

The Amazon Echo is more voice controlled.
That’s right.
But the Dash is more button controlled. For people on the Autism Spectrum that do not speak.
Those button would work.
Yes.
That’s a nice extension actually I wonder if they have thought about it.

Would you say these the amazon echo and dash devices are affordable compared to other assistive technologies used in universities such as Cardiff Metropolitan University?

What does the Echo retail at?
The large Echo is £149.99 and you can get the Amazon Echo Dot which is the smaller version which uses your phone speaker to use it is £49.00.
OK
The Dash devices are £5 each.
Yes they are comparable in price it depends if you can adapt the technology a little bit better I think. I have only seen the advert on TV for the Echo but I haven’t seen one in action yet.

Can you identify potential funding avenues that may be applicable?

I think the way a lot of the software started off like Brain in Hand and also Global Autocorrect. For instance Global Autocorrect started off at Cardiff University as a small business opportunity. Not too far from the Woodville Pub there is a centre that has small units in there so they have a lot of start up business in there. They have preferential rates for so many years that sort of thing. I think Brain in Hand started off at Exeter University so a lot of them are spin offs from Universities. So they get support that way. It’s a long time since I have looked. There are funding opportunities but like everything at the moment they are pretty competitive. You probably have to jump through many hoops to get anything. But to be honest I couldn’t honestly say. If you want to speak with someone about it I could I could certainly put you in touch with someone who could probably tell you more.

Could you see Cardiff Metropolitan University potentially adopting the use of these technologies to assist students with autism spectrum disorders?
Again it’s an interesting one because it really depends on how the DSA funding is going. So it could be in the future then yes but as the DSA funding is withdrawn so to speak then the University is going to have to step in and supplement that. So there is a possibility of new technologies coming on tap for students.