



To What Extent can ‘Bring Your Own Device’ be an Enabler to Widening Participation in Higher Education for the Socially Disadvantaged?

Michael Bass and Siavosh Haghghi Movahed, Sheffield Hallam University

ABSTRACT

Certain elements of higher education are historically regarded as being elitist and steeped in so much history and tradition that many institutions are unwilling to change to cater for the populations that they serve. Despite reams of government legislation and continued pressure from social groups the proportion of university students from socially disadvantaged backgrounds remains stubbornly low. This research aims to look beyond the financial and psychological support given to these groups and instead see what can be done to overcome the barriers to learning they face by utilising a Bring Your Own Device strategy. This research has focused on socially disadvantaged individuals from the UK and the findings have led to the conclusion that BYOD can be an enabler to widening participation. However, it is not an overarching solution for all and there is a distinct need for the technology to be properly integrated into teaching activities as some academic staff remain resolute to delivering in the traditional lecture format that does not facilitate engagement or interaction.

Keywords: BYOD; Higher Education; Personalised Learning; Socially Disadvantaged.

Introduction

This work seeks to examine the extent to which recent technological developments, specifically Bring Your Own Device (BYOD), can be a driver to widen access to university level education. The large swathe of stereotypical 18-year-old college leavers who progress onto higher education have already been thoroughly researched (Burke, 2012; Fuller, Heath, & Johnston, 2011; Mccaig, Molesworth, Nixon, & Scullion, 2010; Miriam & Bathmaker, 2010). Instead this study shall investigate those individuals who are not the stereotypical university entrant. More specifically it shall focus on those individuals who would take alternative routes after leaving compulsory education, either through their own choice or by factors outside of their control.

Even with access to student loans, bursaries and grants the UK Higher Education (HE) sector still remains highly segmented with a disproportionate number of students coming from specific age and socio-economic groups (Observer Editorial, 2013). The aim of this study is to ascertain what role, if any, technology can have in narrowing this gap to encourage a wider breadth of university students. Based on papers published by Beach (2014), Cochrane (2014), and Kong and Song (2015) which show that BYOD will support students into HE the hypothesis of this paper is that BYOD shall positively impact on the number of socially disadvantaged students entering higher education.

This paper shall initially aim to investigate the current use of mobile technology in HE by conducting a detailed literature review around the theory and application of BYOD in both an educational and work setting. Only then will it be possible to ascertain good and bad practice from a range of scenarios that it would not be feasible to assess first-hand. This will be combined with interviews with academic staff who work in HE institutions to determine the level of awareness of BYOD and how this translates into real-world application. A comparison of mobile technology use between a typical and atypical student shall be conducted to rationalise the benefits of BYOD to those socially disadvantaged non-stereotypical students this research is investigating. Thereby current perceptions towards mobile technology and how they perceive it to be of use (or not as the case may be) will be established. Finally, to assess the relative success (or failure) of BYOD within HE for socially disadvantaged students, data must be compared that assesses whether the introduction of these mobile technologies has had an impact on student recruitment and retention for these atypical students. By interviewing non-academic staff from admission and student support teams it will be possible to analyse its impact with greater certainty.

Comparable research

There is already a great deal of literature around the notion of widening participation in higher education. Consecutive governments have implemented a wide-range of policies that seek to ensure universal access to higher education. Most recently the universities minister Jo Johnson has shown concern over the lack of participation from disadvantaged white boys and the lower than average

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outcomes from black and ethnic minority communities (Johnson, 2015). Whilst this is all rather noble it is nothing new as the previous coalition government had already implemented policies to get more people from low income families to go to university. One such policy was specifically aimed at the elite establishments that want to charge the highest tuition fees (between £6,000 and £9,000) then they must have an access agreement approved by the independent director of fair access (Clark, 2012). Here we have the fundamental problem with any analysis of higher education; they are at the whim of government policy.

The purpose of this research is to analyse how an active encouragement of BYOD within institutions can be an enabler to widening participation in HE for the socially disadvantaged. Defining what Bring Your Own Device entails is relatively straightforward; however, distinguishing who are disadvantaged students is far more problematic (Shukla, 2015). Many schemes take the easy option of using postcode data to filter prospective students and use this to analyse what are perceived to be disadvantaged areas. Yet this method is not completely without error. Take the North Yorkshire town of Harrogate or the London borough of Tower Hamlets, both have endemic drug and alcohol misuse amongst large proportions of their populations yet they are surrounded by multi-million pound properties (Stiglitz, 2015).

What is clearly understood is that socially disadvantaged students are not a homogenous group; they have a range of identities, diverse social characteristics and come from a variety of backgrounds. Moore, Sanders, & Higham (2013) and the Office For Fair Access (OFFA, 2015) has identified the following as key target groups that HE institutions should seek to actively engage with:

- People from lower socio-economic groups
- Mature students
- Part-time learners
- Learners from ethnic minority groups
- Vocational and work-based learners
- Disabled learners
- Care leavers

For the purpose of this research these key target groups will be the primary focus of attention. Butler (2010) and Callender, Wilkinson, Gibson, and Perkins (2011) amongst others have recognised the need to engage with these groups early in the process as there is an overly strong focus on admissions from schools/colleges and young people due to the ease of accessing these and providing the necessary support. The Higher Education Funding Council for England (HEFCE) has shown that there is a greater need to work with mature, vocational and part-time learners who are more difficult to access as these learners "face particular challenges with 'fitting in' isolation and no sense of belonging are repeatedly identified as limiting factors" (HEFCE, 2010, p. 14).

Technology is already widely used within HE institutions across the world; a recent study by Kobus et al. discovered that 96% of Dutch university students own a mobile device (smartphone, tablet or laptop) and that mobile technology ownership was relatively income in-elastic, therefore implementing a BYOD policy would not necessarily be to the detriment of those on lower incomes (Kobus, Rietveld, & Ommered, 2013).

The key question though is how will BYOD help widen participation. According to Houston, McCune, & Osbourne (2011) the possibility of flexible teaching pedagogies through the introduction of BYOD will provide greater student choice. This would in turn facilitate the socially disadvantaged students into attending HE. However, according to Cochrane (2014) these new technologies have so far failed to show any evidence of a positive (or negative) impact on widening participation.

What Beach discovered was that the reluctance of many academics is what holds BYOD back, they are not comfortable with the alternative approaches to teaching and various online tools available as they are not "digital natives" like many of their students are (Beach, 2014). This perspective has been echoed by Cochrane who sees smartphones, augmented reality, tablets and social media as rich platforms for lecturers to work with but for the majority they stick with established teaching practices and do not fully embrace the new technology to benefit from its full capabilities "higher education teaching is dominated by a web 1.0 teaching paradigm that focuses on teacher-directed content" (Cochrane, 2014, p. 1). Despite this, Margaryan, Littlejohn, and Vojt (2010) challenged the notion that all students are digital natives; their research concluded that there is no empirical evidence to support either assumption. Consequently it would be prudent to follow the recommendations of Luckin by moving to a student-centred learning experience that utilises the most effective teaching methods based on the actual students needs. This process has been defined as the PAH continuum (Pedagogy-Andragogy-Heutragogy), changing the learning process so that it goes from teacher-directed to student-centred to student-determined (Luckin, 2010).

Empowering students to take control over their learning is a key driver for BYOD in HE according to the OFFA (2015) and Kemmer (2011). From their research, they found that students felt that BYOD empowered them to complete their studies and prompted all learners, including the quiet ones to interact with peers more. Such increased social interaction between teachers and students both inside and outside of the classroom has been replicated with the findings of Gordon, Miller, Dumbleton, & Kelly (2011) and Kelly & Mills (2007). Kelly & Mills specifically noted that the role of technology in flexible learning does not always mean learning in

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isolation. The academics' role in providing teaching and learning support is essential for disadvantaged students; they need to be responsive to the diversity of students that this open access facilitates.

The personalisation of their devices is a big draw for BYOD, particularly so for disadvantaged students who may not be attending university on a full-time basis. Rather than having to continuously configure a different university device each time they use it, wasting valuable time, their own device can be specifically configured to maximise their productivity. Bruder considers the example of single parents who may attend on a part-time basis so have little spare time where they can stop and use the university facilities, they need to be able to begin their work into class on their own device and once the classes have finished take their device with them and continue later in the evening once they have put their children to bed. He found that by "allowing students to use technology they are familiar with encourages participation" (Bruder, 2014, p. 15). Bruder's perspective is shared by Beach who sees BYOD as "the most cost-effective way for the majority of students to work together using personal tools with which they are already comfortable" (Beach, 2014, p. 7).

Following the increase in the maximum tuition fee in England in 2012, the Independent Commission on Fees (ICOF) identified "some evidence that the differential fee regimes in place across the four home countries are having an impact" (ICOF, 2013, p. 8). The underlying statistics do raise concerns because the fall in acceptances for mature students was far greater than that of the younger age groups. Since 2010, part-time undergraduate entrants have fallen by 105,000 (40%) (HEFCE, 2010). These disadvantaged groups are more likely to have other financial commitments or have a greater sense of risk aversion and likely to be worried about the implications of assuming a higher level of debt (Cabinet Office, 2012). As a result the Higher Education Statistics Agency reports that in 2013 there were 297,870 students who commuted from their home in order to reduce the financial burden of university accommodation (Haidrani, 2013). However there is concern amongst student groups that these 'commuter students' are losing out on the non-academic experiences of university life.

Whilst the financial burden of HE can be a notable barrier for many, taking this aside there still remains an underlying assumption that all potential students (whether standard or disadvantaged in some way) will have the necessary technical skills to take advantage of a BYOD policy. Technical competence may influence potential students' decisions to participate or impact on the quality of their learning experiences (Kelly & Mills, 2007; Hughes, 2007). Institutional factors can help overcome limited technical skills of students, and staff, through ICT instruction and support mechanisms that will enable access to the benefits that BYOD can provide (Moule, Ward, & Lockyer, 2010; Houston, McCune, & Osbourne, 2011).

Despite major technological advances little progress has been made to challenge the domination of full-time, face-to-face teaching in HE (Houston, McCune, & Osbourne, 2011). Their research suggests that HE institutions' notion of flexibility may have been outsourced rather than fully integrated into their educational offerings. They recognise that it is going to take several years for this to change and filter down to students before any noticeable effects are evident. Leonard, Earl, & Sidler (2005) comments that the political whims of many policies within HE are expecting sudden increases in participation from disadvantaged groups but this is highly unlikely and another of the key reasons for institutions reluctance to make long-term commitments without tangible evidence.

Methodology

As a result of the research participants having been a mixture of current HE students and those who do not attend HE due to various socio-economic reasons the methodology and theoretical perspectives utilised have taken these factors into consideration. Consequently, the researchers followed Billing & Waterman's approach to the phenomenological paradigm by using the personal knowledge and experiences of the researchers to interpret the findings by getting past the conventional wisdom and pre-conceived assumptions those without this knowledge would undoubtedly face (Billing & Waterman, 2003).

To gather the primary data over 200 research participants were involved. This involved 160 current HE students, 4 members of HE staff and 70 members of the public who are deemed to be socially disadvantaged. The latter were primarily interviewed on a 1-1 basis or as part of a smaller group interview due to the potentially low confidence and self-esteem of these participants. These interviews took place in familiar surroundings and only those participants who felt confident to participate were involved, no individuals were forced into participating in the research and they were free to leave at any time. From the outset all research participants had informed consent and it was made clear that none of the participants would be referred to by name and all recordings were destroyed once the data had been anonymised and transcripts documented. The questions posed were designed to be sympathetic of the participant's issues and only specifically related to the research objectives.

A non-probability purposive sampling technique was used for the primary research. This means that the researcher's knowledge of the population was used to decide the most suitable participants as the population size was potentially very large and would make it infeasible to assess even a 1% sample. Ultimately this research was constrained by the disadvantaged individuals the researchers had access to from their previous experience of dealing with these groups across North East Derbyshire, South and West Yorkshire. For the current HE students, these were questioned during a lecture session utilising the TurningPoint polling software to gather confidential responses, by using this method it facilitated the collation of larger quantities of quantitative data.

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Findings

A total of 234 research participants were involved in the data gathering process as detailed in Table 1. The group interviews comprised of 5-6 participants and the lecture utilised the TurningPoint software to gather responses.

	1-1 interview	Group interview	Lecture
HE Staff	4	0	0
Current HE students	0	18	142
Non-students	12	58	0

Table 1: Data gathering process

The group and 1-1 interviews had a series of pre-prepared questions to guide the discussions, however, the interviewer merely facilitated the discussion with the participants as the intention was to enable the participants to lead the discussions so that a true representation of their opinions could be gathered. Key points from the interview recordings that were either mentioned on multiple occasions or by multiple participants were made and used to form the basis of the analysis by categorising the research into two distinct sections; those who currently attend HE as either a student or member of staff and those who have never attended HE.

Non-students

This research has challenged the idea that HE is not attractive to those on lower incomes as shown in Figure 1. The findings discovered just 20% of the socially disadvantaged research participants cited financial reasons as the primary reason they had not attended university. Instead work and family commitments were repeatedly mentioned during interviews as why they could not attend a full time course at university. From the literature one of the few published works that concurs with these findings is that of Chowdry, Crawford, Dearden, Goodman, and Vignoles (2010) who concluded that to get more disadvantaged students to attend university then it's not just about throwing money at them. Quite often it is too late by this stage as their greatest barrier will have instead become work and family commitments.

Why haven't you gone to university?

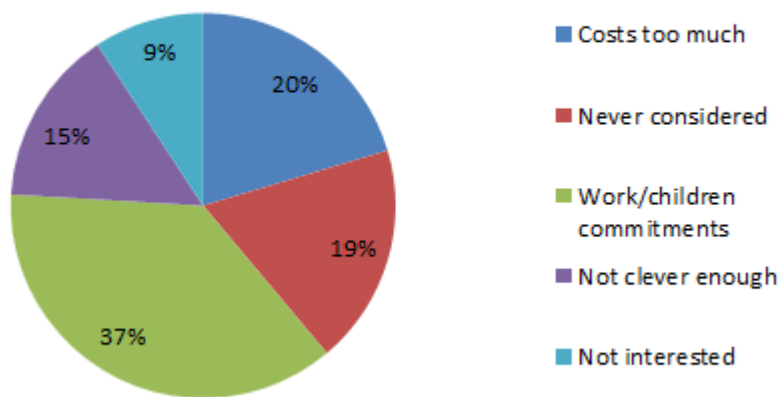


Figure 1: Why haven't you gone to university?

In light of this the relatively new degree apprenticeships may be a means by which to encourage more of this potential student group into attending HE. These can offer the ability to continue working with their current employers and by bringing their own devices they can continue their studies from home, working around any other family commitments. This finding would concur with Figure 2 that showed 46% of non-students would rather undertake practical courses that are linked to their current employment, during a number of the interviews many thought that university was just about sitting in a classroom reading lots of books.

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Would you rather do something else than go to university?

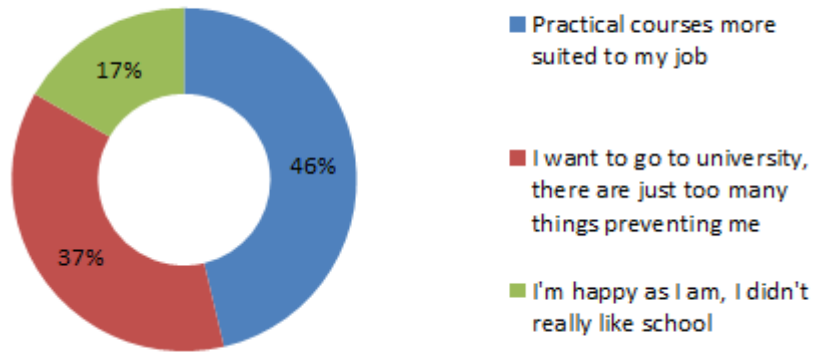


Figure 2: Would you rather do something else than go to university?

Clearly there still remains a pre-conception that higher education is just about lectures with limited interaction. Whilst this may be the case for some courses or institutions there are a growing number of educators bucking the trend by using innovative and engaging teaching pedagogies that embrace the use of technology in their classrooms. The desire for those who have never attended HE to use their mobile device as a tool for learning outside of the home is very much apparent with Figure 3 indicating that 93% of respondents would use their smartphones, tablets or laptops outside of the home for learning activities;

My iPad is always in my bag, it's a great tool to just use when I need to find out something quickly and now that there is free Wi-Fi pretty much everywhere I can always get online. Comment from a single parent.

Would you use your mobile device as a tool for learning outside of the home?

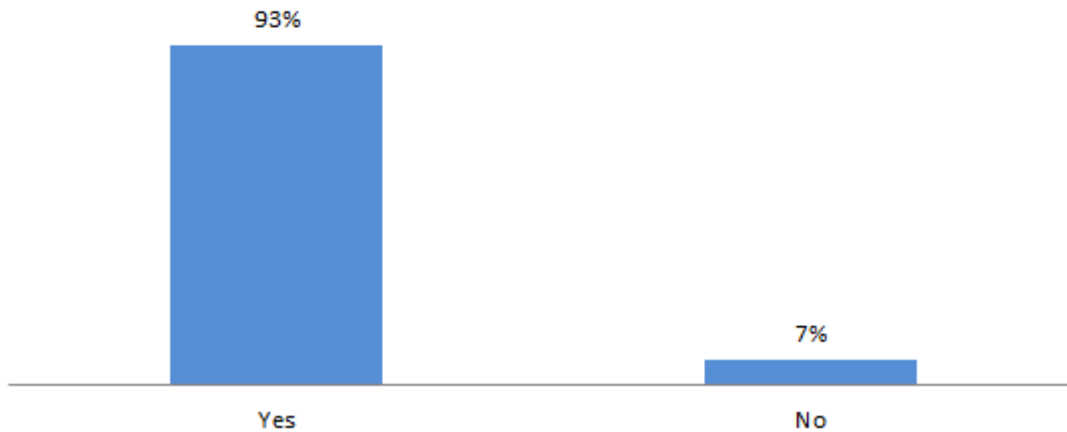


Figure 3: Would you use your mobile device as a tool for learning outside of the home?

A common theme did recur during several of the 1-1 and group interviews and that was the need for flexibility; 37% did not go to university because they were too busy with work or family commitments and 30% want someone who has been through this experience before available to help answer queries outside of normal working hours. It was evident that they do not have 9-5 lives and would be likely to need more help on an evening or weekend when most services are no longer available.

Having the desire to use mobile technology as an integral part of any learning experience is one matter, yet having the actual ability to undertake this is another. The ownership status of these mobile devices for the socially disadvantaged may in fact be that they have to share these devices amongst multiple family members or they may not have the necessary software required for some specialist courses. This is a matter that would need to be considered when deploying a BYOD strategy, ensuring all activities can work on a range of devices with varying technical specifications.

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Current HE students and staff

Current students at Sheffield Hallam University overwhelmingly agreed on their reasons for attending university; 67% agreed that they came to university for enhanced career opportunities. In order to ascertain how these students were supported in their studies they were asked which elements helped them the most with their studies. Unsurprisingly 42% felt that it was the pastoral support from tutors. However, somewhat unexpected was the proportion that found the technology and infrastructure that enabled working everywhere as a key element at 37% of respondents. When probing further during the interviews this technology primarily lies around the extensive Wi-Fi network, short-term laptop loans and online access to specialist software.

The Wi-Fi is really fast, even in the basement of some buildings I get a decent signal so can Skype people when my phone signal cuts out. Comment from a final year student.

Simple factors such as a reliable Wi-Fi network were seen by many as essential for them to succeed at their studies, having access to a wider network of information and resources. Therefore ensuring continuous access to these services and facilities should be seen by university IT teams as a priority.

What students found to be their barriers to learning varied dependent on how long they had been at university. New students felt that not having enough time and the work being too hard were the greatest barriers they faced whilst existing students found it was purely down to a lack of time. Postgraduate students were equally split between not having enough time, having to travel into university every day and the access to help when not in university.

Getting help outside of class is really bad; I wish staff answered emails quicker. Comment from a postgraduate student

The fact that students are seeking help and not being able to access this in a timely manner is concerning. It may be an isolated instance with a few individual academic members of staff but is something that should be investigated further. Within the private sector it is not uncommon to have service level agreements in place for response times to queries, this could be something the HE sector in general may need to look into.

In terms of mobile device usage just 6% of current students do not use their own mobile device whilst at university. Figure 4 shows the primary reason why students use their mobile devices (laptops, tablets and smartphones) whilst at university. They found that the technology integrated well with the universities network and Wi-Fi but found that there was still room for improvement;

I like being able to access my files from home but the web interface can be a bit clunky, once I set my uni drive up as another drive on my system it was a lot better, I guess some people might not know how to do this though. Comment from a second year student.

Why do you BYOD?

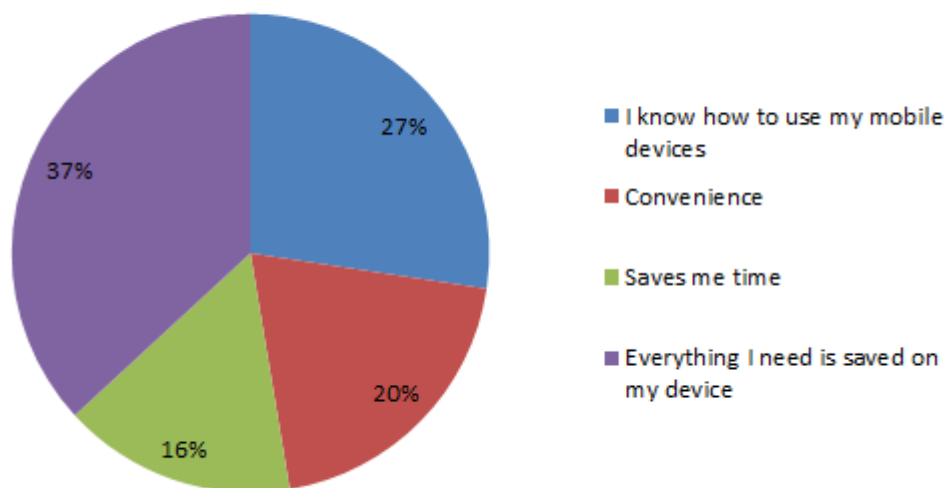


Figure 4: Why do you BYOD?

Notable areas for improvement documented by 32% of new and existing students were the desire for subsidised laptops available to buy whilst 45% of postgraduate students want more places to sit in groups with easily accessible power sockets:

Some of the new buildings are good with lots of easy to reach plug sockets on tables but the older buildings are rubbish, I always keep an extension cable in my laptop bag so I do not have to sit on the floor. Comment from postgraduate student.

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Having to carry around their own extension lead so that they don't have to sit on the floor should send a chilling message to any university staff involved in student experience or building design. This should not be happening in modern universities where students are paying thousands of pounds a year in tuition fees.

BYOD can broadly be split into two categories, those using their own devices for student-led activities to make notes and complete their work and those using them for teacher-led activities during taught sessions. Course leaders were unanimous in their agreement that BYOD should be used more during teacher-led activities. However, they felt that:

Some staff are better at integrating it into classes than others are, some staff think that students will just be accessing social media and not doing any work.

Staff that did use the technology to good effect found the transition between class work and self-directed learning was much better. They also commented how BYOD helped their part-time students who preferred to work at home on evenings to create their own communities on blackboard and collaborate virtually thereby supporting one another.

A common concern by many over the adoption of a BYOD policy is that it will be yet another barrier for those on lower incomes who are unable to afford devices of sufficient quality or specification to actively participate. Nevertheless after speaking with admissions staff they confirmed there are funds provided for disadvantaged students to loan equipment or use the facilities at local colleges and other universities so that they do not miss out on this opportunity through a lack of equipment. To overcome some of the common problems students face then technical services staff creates YouTube clips and online guides for how to access the universities Wi-Fi, remote access of network drives and use of specialist software. Although they were slow with the roll-out of the necessary infrastructure to support BYOD at the start:

BYOD was hampered initially by a need to ensure that the devices connected securely to the network. We have a lot of sensitive data and could not risk a data breach.

Given the ever increasing number of devices connecting to the university network, smart watches, tablets and mobile phones in addition to the traditional laptop:

Additional Wi-Fi access points are being installed to bolster coverage in some high density areas like lecture theatres and social spaces.

Due to the cost implications and lack of justifiable evidence to support a scheme of providing subsidised laptops to all students it has been decided instead to implement several laptop loan facilities, these are being rolled-out across the campus and will be expanded where demand exceeds supply.

This investment in the infrastructure at Sheffield Hallam University to support BYOD has clearly had a positive impact on the student-led activities as evidenced by the feedback and positive comments documented during this research. More work now needs to be made on the tutor-led activities that incorporate BYOD into a greater range of teaching activities that can engage and inspire all students not just the socially disadvantaged.

Conclusion

Mobile technology use between standard students and the socially disadvantaged is on a par within one another. The research found no notable discrepancies between their desire or intent to use mobile devices as a medium for enhancing their learning. If anything the research discovered that the socially disadvantaged feel they are not getting the most out of their devices and want to use them to their full extent. The main sticking point from the research appears to be the lack of opportunities to use their mobile devices within a learning environment due to the academic staff not having properly integrated them into their courses.

Ultimately this research can conclude that whilst BYOD can help widen participation for the socially disadvantaged it is not the only answer, rather it is a combination of collaborative technologies and teaching approaches that are actively advertised to these potential student groups that will help widen participation. Mobile technology is a support mechanism that when amalgamated with childcare, financial support and the provision of time to complete their studies will enable the socially disadvantaged to be able to participate in HE on an even keel.

Atypical students interviewed as part of this research demonstrated a good understanding for how they could use technology as part of any further education. Almost all were sufficiently proficient in the use of mobile devices to gather data, collaborate on documents and any other such activities they may be required to participate in as part of their studies. The desire to use mobile technology to further their careers or open up new opportunities for them was clearly evident; however, there was concern over whether the systems and processes would be in place to enable them to take advantage of this. Many had the perception that HE was for 18 year old, full-time students who had just left college and there was little or no scope for anyone outside of this field who may want to study on a part-time or distance learning basis due to their other personal commitments. A lack of flexibility in HE institutions was an overriding perception portrayed by the socially disadvantaged research participants.

The overarching purpose of using BYOD to help widen participation within higher education is all about self-efficacy, giving all students the self-confidence and belief that they can achieve their goals. BYOD is just one means by which to support students into

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moving away from a perceived anti-intellectualism; that is individuals going out of their way to not contribute and engage with learning because they do not want to give that information out to the non-contributors. Instead if BYOD can give all students a level playing field to start from it will enable greater participation from all.

Despite a lack of any quantifiable statistics there is sufficient qualitative data that suggests BYOD is an enabler to widening participation for all students, not just the socially disadvantaged. This premise has been ascertained from a combination of the comments made by current students and how the socially disadvantaged research participants responded to the questions posed to them. Current students felt that having the option of bringing their own device improved their flexibility and integration within the classrooms, enabling them to participate more and find information that corresponds to the task at hand quicker. Not having to move location or find alternative equipment to continue with their work was considered additional benefits but they did still find themselves somewhat constrained by the lack of available plug sockets to power their devices did hamper them at times. The atypical students have a desire to further themselves by attending university but their lower self-esteem and confidence, combined with their other commitments (work, children and caring for elderly relatives being commonplace) were preventing them from attending university in a traditional mode. Having the possibility to attend classes on a part-time basis and then collaborate with their peers on an evening was singled out as a game changing evolution in education.

Proposed recommendations

There are two main areas where improvements can be made in HE to help BYOD be a driving force for widening participation for the socially disadvantaged. These are to ensure academic staff are made acutely aware of the need to utilise the available technology to its full potential and to actively inform and promote HE to these particular student groups, showing them how they can participate in HE by using their own devices at a time and location that suits their other commitments.

Given the changing times within higher education, many of the long-standing academics that are less willing to change their teaching practices for unproven new teaching pedagogies are gradually being replaced as they retire by new staff with more recent industry experience. It is this experience of the private sector where mobile and home working is far more widely adopted and integrated within the working environment that will be a catalyst for bringing these working practices to HE. Should this research be conducted again in 5 years' time then the outcome could be notably different in terms of the student's experience with academic desire to integrate new technology. As has already been identified, there is a clear desire by all the research participants to use their own devices in order to access HE at a time and place to suit their individual requirements but the underlying issue remains as to whether or not there are the systems and processes in place that will support this.

Biographies

Michael Bass is a lecturer in business systems and data analytics at Sheffield Hallam University. He runs his own successful consultancy service for new business enterprises and worked for several years in the private healthcare sector across Europe and Asia.

Siavosh Haghghi Movahed is a senior lecturer in Computer Networks and the course leader for MSc Advanced Computer Networks at Sheffield Hallam University. Working in industry for more than a decade both as a senior network engineer and a network manager in mission critical networks, has given him the ability to draw on previous experiences to design innovative practical teaching and learning environments. He is extremely passionate about innovative ways of learning and teaching computer networking in higher education.

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