Changing a BTEC computing programme of study towards a more inclusive paradigm

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Abstract

The issue with a product curriculum is that it focuses on the ends and lends itself to an outdated and exclusionary mode of teaching: 'educational banking' teacher-led instruction, where educators deposit knowledge into educates, who are passives in this process. This report explains the contemporary meaning of inclusion within education and selects inclusive parameters, based on research findings, that are used, as a measure, to determine the inherent inclusiveness of three dominant curriculum models: (1) product, (2) process and (3) praxis and two learning theories: (1) constructivism and (2) connectivism, which are both innately student-led forms of learning theory.

Furthermore, a focus of this report is to determine whether technology, and which eTools, can be employed to develop and promote an increasingly inclusive, participative and collaborative classroom environment, in other words, a student-led inclusive contemporary classroom supported by technology. To inform, and justify, the selection, embedding and importance of eTools, desk research was conducted and a student survey was carried out to assess learners' expectations and preferences in regards to collaboration and the embedding of technology in classroom activities.

Research findings regarding inclusion in education, curriculum models and learning theories accompanied by an analysis of the student survey results are used to propose a pedagogical approach based on Aristotle's (modified) three disciplines of knowledge that places technology are the heart of student-led collaborative and engaging classroom: a hybrid process-praxis approach to curriculum based on a constructivist-connectivist approach to learning.

Keywords: Inclusive technology; inclusive education; inclusive learning; inclusive teaching; inclusive curriculum; inclusive curricula; inclusion in education; student-led learning; Freire; education banking; technology in education

Introduction

As a Lecturer and Assessor of Computing and Games I have a natural interest in technology and, to be more exact, how technology can be embedded in a traditional (product) curriculum to promote an increasingly inclusive learning environment. Furthermore, I teach BTEC courses, which have recently gone through an overhaul in regards to the rules set by the awarding body, which govern content delivery, assessment, assignment scripting, submission rules and permissible feedback (appendix 7.1); some changes of which, could be deemed exclusionary and present increasingly difficult challenges for both educators and learners.

Key changes include: (1) learners are only allowed one submission, but may be granted a resubmission if strict conditions are met (appendix 7.2); (2) learners are not allowed a draft or to receive feedback from the assessor—no guidance is allowed after the assignment is set and (3) assessors 'must not provide feedback or guidance on how to improve the evidence to achieve higher grades' or meet pass criteria for learners who are granted an opportunity to resubmit (Pearson, 2014, p.32). Therefore, due to the new rules, I seek a pedagogical approach that uses technology (eTools) to promote inclusion and overcome the barriers presented by the BTEC changes and a product curriculum.

The following section (2) will discuss the meaning and importance of inclusion and both a key theme and keywords are determined as indicative inclusive parameters. Additionally, three dominant curriculum models: (1) product, (2) process and (3) praxis and two student-led learning theories: (1) constructivism and (2) connectivism, will be explained, taking into account the research and writings of key educational theorists and commentators. Also, whether each model and theory is characteristically inclusive, in relation to the parameters later proposed in this report, is determined. Furthermore, a survey (appendix 7.3) was conducted among BTEC Computing learners, the results of which are analysed (section 3) to assess their expectations and preferences in regards to collaboration and the embedding of technology.

Section 4 presents a pedagogical approach based on inclusive curriculum models and learning theories and the survey analysis, backed by research findings, which is primarily focussed on the embedding of technology to enhance the learning environment, promote inclusion and collaboration, delivering a course that students both want and expect. This is followed by a conclusion (section 5).

2 Inclusion, Curriculum Models and Learning Theories

2.1 Inclusion

Inclusion is topic relevant to every educator; one that strives to give every person the best possible experience, throughout their education, and opportunities in life (LT Scotland, 2008). Most often, inclusion is associated with learners who have special educational needs (SEN), which is where its origins lie. The Education Act, 1981, abolished legal terms such as 'educationally sub-normal' (Tomlinson, cited in FEFC, 1996, p.2) and set the groundwork for learners with SEN to be integrated into mainstream classrooms (MacBeath et al., 2005). Additionally, SEN covers a wide range of disabilities and learning difficulties; the scope of which, has evolved, over time, in conjunction with medical advances and diagnostic technologies, encompassing more 'contemporary disabilities, such as Autism, ADHD and Dyslexia' (ibid, p.3).

However, inclusion is not only about supporting learners with SEN. Educators will be familiar with phrases such as, 'increasing participation', 'widening participation', 'personalised learning' and 'equal access': inclusion is inclusive of each and every individual learner and supporting them in attaining the best possible outcomes they can achieve, through equal and fair access, enabling them to 'participate fully in… school [all educational institutes]' (DfES, 2004, p.25). Furthermore, Tomlinson (cited in FEFC, 1996, p.4) writes that 'inclusive education… [is] an approach [that] would benefit all'. The same report defined inclusion as 'the greatest degree of match or fit between individual learning requirements and provision' (CSIE, 1996).

Researching inclusion in education will lead to numerous results; one theme that is consistent, which this report determines a fundamental parameter of inclusion, is that of involving the learner in the teaching and learning process, which is regarded as an essential element of an inclusive learning environment:

'guided by the student's wishes... the process should offer opportunities... to the individual... to make their views and wishes known' (FEFC , 1996, p.15);
'opportunities for students to discuss and manage their own learning' (CSIE, 1996);
'involving children in their own learning' (DfES, 2004, p.52);

'For learners it means being engaged not just with the content of what is being taught but being involved with the learning process' (LLU, 2010, p.20);

'Children and young people feel connected... contributing to their education, to the learning opportunities offered... feel that they contribute to decisions, that their voice is heard... that they can influence it [school], that they are valued within it [school]' (LT Scotland, 2008, p.5)

Additionally, keywords, which also define the parameters when considering inclusive actions and strategies in this report, can also be deduced from research. Keywords include: 'fair', 'accessible', 'transparent' (FEFC , 1996), 'involving', 'enabling' (related to empowering) (DfES, 2004), 'connected', 'contribute' and 'collaborative' (LT Scotland, 2008).

Moreover, a Further Education Funding Council (FEFC) report, 1996, chaired by Professor John Tomlinson determined 'that learning can only be fully effective if it is inclusive' (CSIE, 1996, p.1). As such, promoting an inclusive classroom, where the learner has a voice, is a significant responsibility for educators.

2.2 Curriculum Models

Attempting to define 'curriculum' in a way that satisfies everyone is near impossible (Neary, 2002), partly because any definition is not 'philosophically or politically neutral' (Posner, 2004, p.5). Often, curriculum is defined as a product (Marsh, 1997a), specifying what should be learned and why and how learning will be facilitated (Posner & Rudnitsky, 2008).

Alternatively, it is argued by some that curriculum is about the ends (outcomes)—specifying content and objectives—yet, for others it is about the means—instructions and strategies (Posner, 2004).

However, taking any definition of the term curriculum, though it will not solve problems posed by curriculum, does provide a perspective of how to view curricular problems (Stenhouse, 1975), including through an inclusive lens. Such definitions have formed a basis from which models of curriculum have been developed.

2.2.1 Product

A model intrinsically linked to Franklin Bobbitt (1918) and Ralph Tyler (1949), which focusses on behavioural objectives with a sole emphasis on the ends—product (Tummons, 2009). 'Behavioural objectives' first became a common term in the 1960s (Neary, 2002), used by Tyler who said 'education is a process of changing the behaviour patterns of people' (Tyler, 1971, p.5), where the objective is not to have the teacher perform activities but to produce 'significant changes the students' patterns of behaviour' (Tyler, 1971, p.44).

Presently, product is the dominant curriculum model: objectives are set, followed by plans and then outcomes (Smith, 2000); such as the BTEC curricula. The model has advantages: little vagueness, precise assessment, preselected structure and content (Neary, 2002) and the ability to apply it to almost any level and subject (Marsh, 2009).

However, the model has come across much criticism (appendix 7.4): research shows that during initial planning few teachers use objectives; unintended learnings are not considered; no explicit reasoning exists when selecting one objective over another (ibid); lower levels may not require behavioural objectives; creativity is discouraged; and selecting behavioural objectives at high levels is difficult (Neary, 2002). Furthermore, behavioural engineering is one of the terms linked with social efficiency by Schiro (2008)—an ideology that places an emphasis on designing curriculum to meet to needs of society—who likens students exiting schooling through a social efficiency ideology to steel rail production.

As such, I would argue that this is an exclusionary curriculum model; individual learners and the learning experience are not considered, instead learners are told how and what to learn, leaving them with 'little or no voice', whilst their success or failure is measured solely against predetermined outcomes (Smith, 2000). Therefore, it can be fairly surmised that the product model leans towards a behaviourist or cognitivist learning theory, which both promote a teacher-led learning environment—a system that Paulo Freire (1970) would describe as 'education banking': educators possess all of the power, becoming 'depositors' of knowledge into learners, who 'receive, memorize, and repeat' (Freire, 2000, p.36) deposited knowledge—a concept he argued was 'an instrument of oppression' (ibid, p.5). Furthermore, it is not a model which involves or empowers learners, nor does it promote learner contribution to the educational process or collaboration between all parties.

2.2.2 Process

Developed as an alternate model, by Lawrence Stenhouse, who believed it was pointless to criticise a model focussed on behavioural objectives if no alternate solution can be found (Stenhouse, 1975). Stenhouse disagreed with two points made by Tyler: (1) objectives should not be in the form of activities as they could not be judged and justified; (2) content should not be specified as it does not indicate what should be done with the content (ibid).

Fundamentally, a process approach is concerned with the means of education. Stenhouse (1975) wrote that curricula should not be too prescriptive; it should: focus on the journey and activities rather than outcomes; be student-centred and allow for interpretations of the teacher (Tummons, 2009), whilst emphasising activities important to individuals' life skills and have active roles for learners and teachers. Additionally, Tummons (2009) highlights the emphasis on teachers having high expertise and professional qualities as a key advantage.

Naturally disadvantages exist, particularly with the neglect of considered appropriate content and the difficulty of applying this approach to some subject areas (Neary, 2002). Due to this, assessment is also difficult; Stenhouse, commented that the process approach was a 'critical model', not a 'marking model' (Smith, 2000). However, learners are clearly central in the process model, which, when focussed on promoting inclusion, sets the process model apart from the product approach: the educator becomes a facilitator, learners have a voice, interactions are encouraged and learning becomes more individualised (ibid). In turn, this results in a fair, transparent, connected and collaborative learning environment, where learners are empowered and encouraged to contribute.

2.2.3 Praxis

Paulo Freire was one educationalist concerned with praxis in a social and educational context. He believed that coming together to share knowledge (action) is not enough, it is essential that we critically reflect and make a difference (Freire Institute, 2014), writing 'thought has meaning only when generated by action upon the world' (Freire, 1970, p.64). Tummons (2009) uses 'critically-informed practice' as a modern term for praxis. 'Critically-informed' is the reflection, the how and why, to improve and inform practice—future action; 'practice' is the doing, the practical, in other words the action.

Furthermore, Freire contended that we should not act on one another, but instead work with one another, moving away from 'education banking' (Smith, 2002), which 'anesthetizes [sic] and inhibits creative power' (Freire, 1970, p.68). His concern with praxis went beyond education, it was social and political, it was about 'social justice' and 'making a [positive] difference in the world' (Smith, 2002), advocating 'reflection and action upon the world in order to transform it' (Freire, 2000, p.25). He further argued that true knowledge was constructed through continued 'critical inquiry' with others, free, thoughtful and informed action supported by creative reflection: praxis (Birden, 2008).

Therefore, one would argue that praxis is inherently inclusive, naturally lending itself to student-led learning theories: constructivism and connectivism. It promotes social justice, individuals and groups and advocates collaboration to construct knowledge though a process of dialogue and engagement through critical reflection and action upon reflection. Educators are no longer the only one who teaches, instead educators and learners teach one another through open dialogue and experiences, each individual is 'jointly responsible for the [educational] process' (Freire, 1970, p.67). As with the process model, praxis too, empowers learners, involving them in the teaching and learning process; they become key contributors in the construction of knowledge.

2.3 Learning Theories

At this juncture it is worth noting that, as a contemporary theory, connectivism has yet to be wholly recognised as a learning theory. Such arguments are made by Kerr (2007), Kop and Hill (2008), Bell (2011) and, particularly, Verhagen (2006, p.1) who writes that it is a 'pedagogical view, not a learning theory', which belongs at the curriculum level because it is not concerned with how learning takes place; only the 'what is learned and why' (ibid). Siemens responded to Verhagen's criticism; citing, and answering, Schunk's five definitive questions to distinguish a learning theory (1991, cited in Ertmer & Newby, 2013). Summarising, Siemens (2006, p.36) produced the following table (1), which also serves as a general overview of the two learning models this report focuses on.

Behaviourism and cognitivism (appendix 7.5), which also appear in the table are teacher-led theories that have been eliminated from this report due to the inclusive student-led parameter previously determined.

Property	Behaviourism	Cognitivism	Constructivism	Connectivism
How does learning occur?	Black box—observable behaviour main focus	Structured, computational	Social, meaning created by each learner (personal)	Distributed within a network, social, technologically enhanced, recognizing and interpreting patterns
Influencing factors	Nature of reward, punishment, stimuli	Existing schema, previous experiences	Engagement, participation, social, cultural	Diversity of network
What is the role of memory?	Memory is the hardwiring of repeated experiences—where reward and punishment are most influential	Encoding, storage, retrieval	Prior knowledge remixed to current context	Adaptive patterns, representative of current state, existing in networks
How does transfer occur?	Stimulus, response	Duplicating knowledge constructs of "knower"	Socialization	Connecting to (adding) nodes
Types of learning best explained	Task-based learning	Reasoning, clear objectives, problem solving	Social, vague ("ill defined")	Complex learning, rapid changing core, diverse knowledge sources

Table 1: Learning Theories

2.3.1 Student-led Theories: Constructivism and Connectivism

Constructivism is a theory that suggests humans develop meaning and construct knowledge from their own experiences (The University of Sydney, 2016) and self-reflection on those experiences—studies cited, by Dr. Tesia Marshik, evidence that most of what we learn and retain is 'stored in terms of meaning' (Marshik, 2015, 5:34). That is, as we encounter new experiences we use our past experiences, previous ideas and current knowledge to reconcile, and make decisions regarding, the new information, which may be to discard it, or, alternatively, it may change what we believe or how we perceive current knowledge (Educational Broadcasting Corporation, 2004). As a result, the classroom becomes a place where learners are encouraged to become active participants in a more dynamic and social environment where knowledge is constructed collaboratively through each learner's own experiences (Educational Broadcasting Corporation, 2004, University College Dublin, n.d.).

George Siemens (2005a) and Stephen Downes (2005) are (separately) the key theorists contributing to the connectivism theory, since Siemens first 'coined the term', in 2004 (Downes, 2012, p.9). Siemens (2008) describes connectivism as a 'learning theory for the digital age', that is, it takes into consideration new technologies that impact learning and the way we communicate in the modern world, post behaviourism, cognitivism and constructivism (Siemens, 2005b). It is a theory where knowledge resides on networks that are made up of specialist nodes (information sources, including people) and it views learning as the process of connecting to, and traversing, those networks (Siemens, 2005b; Downes, 2012). That is to say, we store knowledge across a distributed network compromised of multi-format digital information (Kop & Hill, 2008) and that we can learn by plugging into this network, be it through reading blogs, communicating via email, sharing information through social networks, taking part in online communities or searching the web (Connectivism, n.d.).

As previously discussed, involving learners in the process of teaching and learning is key to fostering an inclusive learning environment. Each of the theories discussed in this section are innately student-led and cannot be construed as equivalent to the 'education banking' system so fervently opposed by Freire throughout his life. Freire's conviction was that teaching is not a process of transferring knowledge 'but to create the possibilities for the production or construction of knowledge' (Freire, 2001, p.10); a process inherently enabled by constructivism and connectivism. Each explanation, above, resonates with the inclusive parameters—determined previously—associated with inclusive education. Therefore, it is fair to determine that each student-led theory is, from the perspective of research findings and measured against the set parameters, inclusive and thus provide a strong basis from which to propose an inclusive pedagogical approach.

3 Survey Results

Having informally discussed teaching methods and the use of technology with learners previously, the outcome of which has already informed my practice, I designed a short anonymous survey for the learners to complete in order to more formally document their expectations and preferences regarding the embedding of technology in the classroom. All learners who are enrolled on a BTEC Computing course took part in the survey. Therefore, the survey is fully representative of the targeted learner cohort. 90-percent of participants are male, whilst level 3 learners account for 76-percent of participants; level 2 learners represent the other 24-percent. Additionally, it is evident that all learners, 100-percent, feel that their tutors make appropriate use of the VLE (itslearning).

From experience, despite prompts, very few BTEC learners take notes on a regular basis; resulting in learners struggling with assignment work and questions being asked repeatedly that were answered during lesson activities. Therefore, questions 4-8 were designed with the process of note taking in mind. It was interesting to note that

although 45-percent of learners expect to need pen and paper when studying a computing course, only 28-percent brought pen and paper to lessons; consequently, 72-percent of learners do not have the means to take written notes during lessons. Moreover, 93-percent of learners would prefer to take notes electronically, whilst 100-percent of learners specified that they would find it beneficial if the class shared and collaborated when taking notes and conducting research.

Question 8 showed 76-percent of learners expect technology in every lesson, whilst 24-percent expect technology to be embedded in most lessons. No learner expected some, few or no lessons to have technology embedded. Furthermore, only 10-percent of learners felt that technology was embedded in all lessons, with 59-percent indicating that it was embedded in most and, worryingly, 31-percent feeling that it was only embedded in some lessons. These results highlight a clear discrepancy between the learners' expectations and the current embedding of technology (Figure 1).

Furthermore, learners unanimously confirmed they would like to see more technology used during lessons. Likewise, there was a consensus among all learners confirming that they enjoyed watching videos as a means of learning. Question 12, 'Do you find video recordings of presentations a useful revision/catch up resource?' was asked to see if there was any corroboration between learners enjoying watching videos as a learning tool and whether videos created in Office Mix had the desired impact. If the percentage was lower than that of the learners who enjoyed watching videos as a learning tool, then it would probably be fair to surmise that the created videos did not follow a preferable format that engaged and aided learners. At first glance only 72% of learners found the videos useful, however, the other 28% of learners have not yet needed to watch the videos; no learners stated that the videos were not useful.

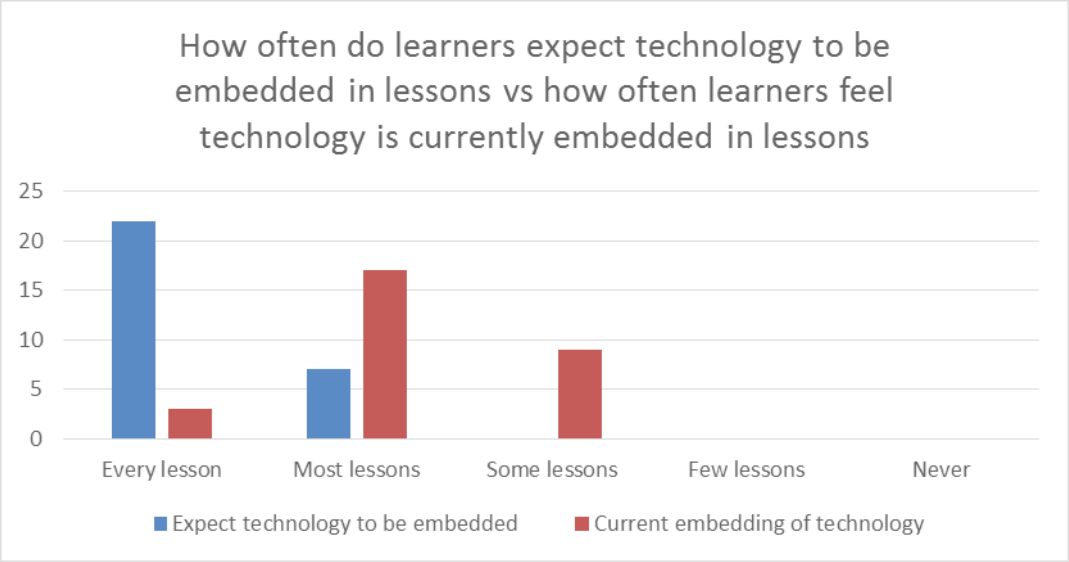

Figure 1: Survey results--question 8 vs question 9

As an educator I have found the college's VLE, itslearning, limited and dated in its user interface design. As a result, the VLE is non-linear, highly compartmentalised and very 'clicky', that is to say you spend a lot of time clicking back and forth between screens to access resources. For example, for a learner to open a PowerPoint, they must login and click through nine, or more, screens. Many staff and students have voiced their frustrations over this.

Therefore, I have searched for alternative means to deliver resources to learners in a more contemporary, linear and seamless fashion. However, alternate solutions had to be free, easily accessible and not conflict with college policies. As a result, I recently demonstrated to learners a proposal that was developed using, Microsoft product, Sway. Learners were shown how course resources would be accessed, presented and shared, through one link, from any device with web access and without logging in. Question 13 asked learners whether they preferred Sway to the itslearning. The response was emphatic, 100-percent of learners preferred Sway.

Finally, learners were asked the reasons why they preferred Sway. Their response is shown in Figure 2. All learners preferred the ability to both navigate and access resources faster whilst also being able to view files without the need to download them. Additionally, 83-percent preferred the linear layout, 76-percent like the idea that the format was easily accessible on mobile devices and 66-percent were impressed by the ability to view multiple resources at the same time on the same page.

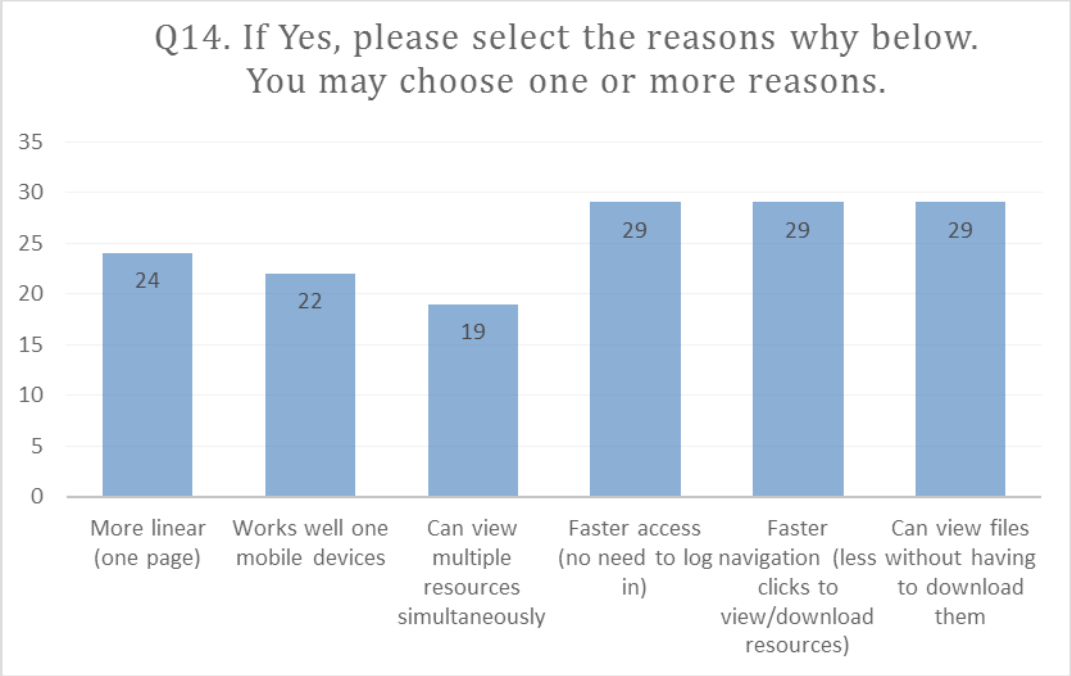

Figure 2: Reasons why students preferred Sway to itslearning

4 Pedagogical Approach

BTEC is a product driven curriculum, which lends itself to a teacher-led transferring of knowledge; there is clearly defined criteria which form the basis of tasks to be carried out in order to achieve the ends. However, this does not have to shape our classrooms. As such, I propose to shape curriculum and resources around Aristotle's (modified) three disciplines of knowledge (Figure 3), which places process and praxis between the syllabus (BTEC criteria) and the product (achieve criteria).

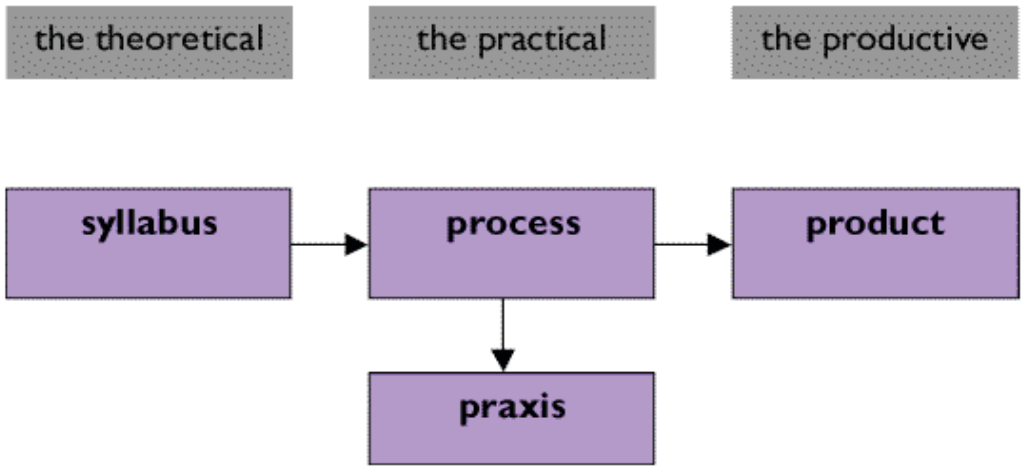

Figure 3: Aristotle's (modified) three disciplines of knowledge

As previously established, process and praxis approaches to curriculum are inherently inclusive, but they only form a model of curriculum and should be supported by learning theory to further inform practice. Therefore, my focus is to foster a classroom environment that fuses constructivism and connectivism, that is to plan lesson activities that promote active participation, collaboration and student-led construction of knowledge with the aid of appropriately selected technology that meet the needs and expectations of my learners and do not treat learners as 'empty vessels' to be filled by a transfer of knowledge (Freire, 1970). In turn, this approach supports a hybrid process-praxis curriculum focussed on the means of education and critical action upon reflection.

The proposed approach could be considered a 'transformational curriculum', one in which technology influences what we know and how and when we know it, meaning that the planning of teaching and learning and the curriculum need to change also, to reflect the influence of technology (Attwell & Hughes, 2010). Therefore, at this point I will evidence the importance of technology to this inclusive pedagogical approach, from which it should be readily apparent how the embedding of technology syncs with a process-praxis curriculum model, can work alongside constructivism, echoes the inclusive parameters that were previously identified and reflects the preferences of learners.

Many studies: 'Wang et al., 2012; Roblyer et al., 2010; Selwyn, 2009; Bosch, 2009; Barnes, Marateo and Ferrisare, 2007; Tsai, 2003; Garrison, 1999' (Ratneswary & Rasiah, 2014, p.377), indicate that online (social) networks, in general, impact positively on learning: promoting student engagement; fostering collaboration; increasing motivation; and transforming students into active learners (Dron & Anderson, 2014; Ratneswary & Rasiah, 2014). Online networks also allow us to create vast networks with each connection providing the opportunity to learn, directly or indirectly (Dron & Anderson, 2014).

Moreover, many educationalists identify three types of learning: formal , non-formal and informal (non-formal and informal being features of process and praxis models) (García-Peñalvo et al., 2015). Technology, characteristically, allows all three, which is important in today's educational environment where formal and non-formal learning no longer dominate; informal learning compromises a significant aspect of our learning through communities and personal networks (Siemens, 2005b).

Additionally, several papers and case studies have shown that there are benefits of using technology as part of a constructivist approach (The University of Sydney, 2016) and that technology can promote inclusion, enhance the experience of learners (Kop & Hill, 2008; Hobgood & Ormsby, 2011), promote benefits 'such as cognitive processing, independent learning, critical thinking and teamwork and… enhances a student centred learning approach' (European Agency, n.d.).

Furthermore, D'Alessio et al (2010, cited in European Agency, n.d., p.24) argues that technology can facilitate and enhance each key factor (appendix 7.6), proposed by Meijer (2003), in transforming classroom practice to support inclusion. Moreover, using technology allows educators to increase accessibility and extend learning time away from the classroom (Hobgood & Ormsby, 2011). Technology also enhances 'access to information [which] is [viewed as] a fundamental right of every learner' (European Agency, n.d., p.18) and we must also consider learners who 'want and prefer to learn differently' (Ertmer & Newby, 2013, p.66), as the survey results suggest— Figure 1 shows my learners expect technology to be embedded in lessons more that it currently is.

Formal learning: explicit, organised and structure learning that usually leads to certification (García-Peñalvo et al., 2015).

Non-formal learning: non-explicit but embedded in organised learning activities (García-Peñalvo et al., 2015).

Informal learning: not explicit or organised and has no formal objectives. It is typically the result of everyday activities, which may be linked to leisure, work or family (García-Peñalvo et al., 2015).

Taking into account the survey results and the prominent role technology can have in enhancing inclusion and promoting active participation, I propose the newly embedding, or continued use, of four technologies (eTools): (1) Delicious and (2) Wikispaces in response to 45-percent of learners expecting to need pen and paper yet, only 28-percent actually bringing pen and paper to class; 93-percent of learners preferring to take notes electronically; and all learners agreeing that they would find it beneficial if the class shared and collaborated when taking notes and conducting research. (3) Office Mix because there was a consensus among all learners confirming that they enjoyed watching videos as a means of learning and all the learners who had viewed videos created in Office Mix found them useful. (4) Sway as learners were unanimous in their preference for the presented prototype over the VLE used by the college.

Additionally, each eTool is free and requires no specialist equipment and are therefore readily accessible to learners outside the classroom.

4.1 Delicious and Wlkispaces

Delicious is a social bookmarking tool and its potential as a learning, research and collaboration tool is immediately apparent. It allows users to bookmark websites and assign multiple tags to each bookmark, which can be searched by anyone in the world. From a classroom perspective, a network can be created that each learner joins; subsequently any bookmark or tag any learner adds will be viewable to network members (Queen's University, 2009). Therefore, social bookmarking allows for easier, and encourages greater, collaboration between learners, enhancing the scope of research and resources available to the learning network (Ruffini, 2011). Furthermore, studies have shown that social bookmarking has a positive impact on the learner experience, with many learners preferring social bookmarks over VLEs and printed material (Farwell & Waters, 2010). Also, Delicious allows for private or public bookmarking, allowing learners to have control over what they do and do not share with others.

In many ways Wikispaces is similar to using a blog, in regards to the content learners can create, such as embedding images, videos and rich-text information. However, Wikispaces has a feature named 'Wikispaces Classroom' that provides a secure social network environment where learners can communicate and where educators can measure student engagement and contribution, all in real-time (WikiSpaces, n.d.). Additionally, whilst learners can work in private spaces for individual work, educators have the ability to create learner groups, allowing simultaneous collaboration on a project, whilst also providing an excellent platform for peer assessment and feedback. Furthermore, these groups are not fixed, a tutor can simply drag and drop learners between groups, allowing for dynamic and engaging group activities. Moreover, because Wikispaces is online, students have the opportunity to interact in a social environment as much or as little as they choose, whilst participating in topics and tasks that they are most interested in and at a time of their own choosing, since synchronous and asynchronous communication options exist. Finally, online participation often encourages learners who are normally shy, quiet or that prefer not to speak out or have attention thrust upon them, to actively participate, and perhaps gain confidence.

4.2 Office Mix

Office Mix is a free plugin, from Microsoft, for PowerPoint, which adds valuable teaching and learning tools to the PowerPoint toolbar (appendix 7.7). Office Mix will allow learners to write and annotate, or speak and discuss orally, or record video using a webcam. Therefore, it allows learners to participate in multi-format ways, meaning that learners can choose their preferred method. It also means that where a learner cannot physically participate in one method, they can choose another to present their information. Within my own practice there is a learner who demonstrates comfort when discussing and presenting information orally, but due to Dyslexia and Dyspraxia, often struggles and can become demotivated during written tasks. However, Office Mix provides this learner with alternate ways to present their information depending on how they feel at a particular moment in time.

Additionally, the opportunity to present information in different ways has also benefitted learners whose first language is not English. Furthermore, I use Office Mix to record presentations so that learners can review them when they wish, which certainly helps learners when I am unable to give them guidance due to the new BTEC rules (appendix 7.7).

4.3 Sway

Sway has a very simple design interface that has many built-in design and layout features, making it very simple to use (Thorp, 2014, PCMag, 2015). Some will view Sway as a PowerPoint replacement, but Sway is not designed to replace PowerPoint; Dave Paradi (2015) writes an excellent in-depth comparison of the two applications. PowerPoint provides users with more control over individual elements, design and layout, whereas Sway is simple, providing fewer options, yet, creating a potentially more powerful and dynamic interactive document in less time (Thorp, 2014; PCMag, 2015; Paridi, 2015). For example, a simple remix button will automatically change the design of the whole Sway in one click (Microsoft, 2016). Sway currently has three navigation options: (1) a click through presentation style format, (2) horizontal scrolling (imagine an eBook) or (3) vertical scrolling (similar to a website) and is focussed on providing a user with a quick way to produce interactive newsletters, presentations, reports, stories, photo albums and more (ibid). Examples can be viewed here (If this document is not electronic see appendix 7.8).

The potential I see in Sway resides in its linear navigation features and the ability to easily embed content. My learners enjoy watching videos as a learning tool and whether they are videos that exist online, such as YouTube, or are created by me, I can embed them into a Sway with ease. Furthermore, I, and I encourage the learners to, use cloud storage; Sway can link and embed files directly from a OneDrive account, meaning that they are live files; if I edit a file the learner will see this when they next view the Sway. The survey evidences that learners want and prefer information to be presented in this way. The prototype presented to learners can be viewed here (appendix 7.8).

Additionally, a Sway can be set as view-only or editable, meaning that multiple users can collaborate on a Sway at any the same time, a good tool for promoting group work, sharing ideas, note taking and generating evidence for tasks. Moreover, Sway will automatically adjust content for the device that a person is using to access to content, be that a mobile phone, tablet or desktop; hugely important as all of my learners have smartphones and, globally, more people are using mobile phones and tablets to access information online. Lastly, moving forward, I view Sway as a tool that learners can use to generate and present content in a way they are most conformable; a multi-format mode of assessment where the learner chooses how they generate and present information.

5 Conclusion

The issue with a product curriculum (BTEC) is that it focuses on the ends and lends itself to an outdated and exclusionary mode of teaching: 'educational banking' teach-led instruction. As educators, we have a duty to the help learners reach the ends (criteria), but we can determine how those ends are achieved. As such, we must be progressive and focus our curriculum and lesson design on inclusive student-led classrooms, concentrating on the means of education and higher order critical thinking skills: student-led construction of knowledge and action and reflection upon that knowledge to develop new knowledge. The hallmark of a process-praxis curriculum supported by constructivist learning theory.

Moreover, technology is an ever increasing part of our lives, we live in a 'digital age' and there is an expectation among learners to be engaged, learn, research, communicate and collaborate via technological means; we, educators, are duty-bound to meet their needs. Furthermore, technology, used correctly, can further promote inclusive practice, increasing active participation, accessibility, collaboration and engagement. Connectivism, irrelevant as to whether it is a learning or curriculum theory, provides the pedagogical framework from which to view and plan the embedding of technology into curriculum to reap its inclusive (and other) benefits.

That said, all eTools will not be suitable for all learners, curricula or classroom environments and should not be forced into planning without the learners having a voice. We must engage our learners to determine their needs and select appropriate inclusive eTools for them, as was done with the student survey. This approach provides the grounds from which to develop a student-led inclusive contemporary classroom supported by technology that matches our learners' needs and preferences.

'When I enter a classroom I should be someone who is open to new ideas, open to questions, and open to the curiosities of the students as well as their inhibitions. In other words, I ought to be aware of being a critical and inquiring subject in regard to the task entrusted to me, the task of teaching and not that of transferring knowledge' (Freire, 2001, p.28).

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