



**Abertay  
University**

# **Professional Practice in Higher Education Teaching**

**Volume 5**

**Editor: Dr Martin Watson**





# Professional Practice in Higher Education Teaching

Volume 5

**Editor:**

Dr Martin Watson

**Editorial Board:**

Andrea Cameron, Edward Simpson  
and Martin Watson



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Welcome to *Professional Practice in Higher Education*, the fifth volume of this online journal published by the University of Abertay. The papers presented here were delivered at the Annual Conference of the Postgraduate Certificate in Higher Education Teaching “*Becoming reflective academic practitioners*” in June 2015. The journal was launched in 2010 by June Leishman and Louis Natanson who both retired in 2015. The first four volumes stand as a tribute to their vision of showcasing the thinking and writing of seventy-two early career staff thinking about academic practice, and enhancing teaching and learning in higher education.

Publication in this journal represents an *authentic* enhancement of the traditional assessment tool, the academic essay. It celebrates emerging thinking on pedagogy and the writing of staff new to teaching in higher education. The journal is inclusive and features the work of all staff on the programme. It shares developments in teaching practice across a range of subject disciplines and proudly champions the publication of practitioner writing on teaching in higher education.

In this volume, articles have been grouped by theme as they were delivered at the conference: Transitions, Teaching, Learning, Technology-enhanced Teaching and Learning, Assessment and Feedback. Allocation to one category over another may appear arbitrary in cases where the focus crosses boundaries, such as the papers by Clare Brennan and Jonathan Wilken on technology-enhanced assessment and Nikolai Mouraviev on Assessment *for* Learning, however, the thematic orientation was chosen to highlight shared interests across disciplinary boundaries and reflect the potential for staff to work together in an interdisciplinary way. There are six papers on Transitions, four by colleagues in the Dundee Academy of Sport, the guiding principles of which are outlined by Ian Lowe, and two by staff preparing students for articulation into the final two years of the Abertay undergraduate degrees. There is a balance between nine papers on learning and eight on teaching, including three which focus on blended learning and technologically-enhanced teaching. A dual focus on learning *and* teaching is explicit in Scott Cameron’s discussion of the potential of problem-based learning to re-shape approaches to teaching in biological sciences. Collectively the papers evidence a keen engagement with the pedagogy of teaching and learning and the potential of staff to enhance the student learning experience.

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## Transitions 1



# **Creating communities of learners: supporting and informing those on articulation routes into higher education**

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## **Abstract**

The numbers of students entering higher education via articulation routes has increased in recent years. Articulation involves students studying Higher National (HN) qualifications at college and then using these qualifications to start at university in second or third year. Articulation has become a central issue for higher education institutions, especially with regard to the support in place for those students who move from college to university. This paper explores the development of a pedagogic model in this context by looking at the role of the HN Degree Advisor who supports students studying on articulation routes. Drawing upon the work of Freire and feminist theorists, this paper emphasises the importance of creating a sense of community in order to provide a supportive and positive environment for learners so they feel more confident about starting at university.

**Key words:** articulation, Freire, feminism, learning community, student support

## **Introduction**

When beginning to teach in higher education my initial approach was reflected in the observation by Fry, Ketteridge and Marshall:

many lecturers know how they learnt / learn best, but do not necessarily consider how their students learn and if the way they teach is predicated on enabling learning to happen. (2009, p.8)

Assuming that students learn in the same ways and that their educational experience would be similar to mine meant that my approach to teaching often felt quite limited as, lacking confidence, my teaching was about keeping control and, therefore, avoided student-centred approaches. Engaging with the scholarship of teaching and learning, observing my peers, and experimenting with new techniques have helped to contribute to the development of my pedagogic approach into a more learner-centred one where sessions are now interactive and less about me transferring knowledge to students and more about them discovering ideas for themselves. By critically reflecting upon these teaching experiences, a pedagogic model has been developed which will help me to become a more effective teacher in higher education and in my current role as HN Degree Advisor, supporting students who choose the articulation route from college to university. This model has been informed by Freirean and feminist theories as it aims to create a learning community where participants support one another as they develop skills and strategies for learning in higher education.

## **Articulation and Higher Education**

A major part of my role as HN Degree Advisor is delivering study skills workshops to students studying higher national qualifications at college who are preparing to articulate to university. As Universities Scotland (2014, p.9) has pointed out, articulation is still 'a relatively new and growing area of activity for the sector' and it is becoming an increasingly popular route into higher education with a 26.3% increase in the numbers of students choosing this route from 2006 to 2011. The Scottish Funding Council (2011, p.1) defines articulation as:

A student gaining entry into second year of a degree with a Higher National Certificate (HNC) gained at college, or into third year with a Higher National Diploma (HND) gained at college.

The role of the HN Degree Advisor was created at Abertay University to help to prepare students for the transition from college to university by informing them about what university life is like. This is an important role as illustrated by a recent HEA/NUS (2013) report into learning journeys. It found that students who entered a degree at a later stage, especially in third year, were 'the most likely of all

university students to report that they found settling in to studying at university challenging' (p.4). One recommendation of this report was that students should 'understand the 'how' and 'why' they are learning, in addition to the 'what' (p.6) and through my role students are provided with information about the degree process and the ways in which university life is organised. Indeed, this approach might be useful for all students, not just those who choose the articulation route, as it is evident that there are a number of points of transition within the degree. This is compounded by the fact that the student body is now more diverse due to the expansion of higher education thus making the delivery of student support more complex.

### **The Abertay ASPIRE programme**

The Abertay **A**rticulation **S**upport **P**rogramme and **I**nformation on **R**outes into higher **E**ducation (ASPIRE) aims to provide support to students studying HN qualifications who are thinking about studying at university and to encourage them to take the next step to a degree, thus contributing to the achievement of strategic aims at Abertay University of increasing the diversity of the student body and 'to support student transitions into higher education' (Abertay University 2011, p.5; Teaching and Learning Enhancement 2014, p. 2).

This programme includes a number of orientation and other events, visits to Abertay and the delivery of workshops at local partner colleges. It aims to inform students about studying at university, reassure students that they will be able to move seamlessly from college to university, and encourage students to reflect upon their strengths and weaknesses so they can become more effective learners.

The workshops cover themes like the differences between college and university, how to write at degree level, how to be a successful independent learner and how to think critically. The Dearing Report in 1997, which Race (2001, p.v) has described as 'an important turning point' in higher education, highlighted that one of the roles of higher education was to create responsible citizens who had a number of transferable skills, including critical thinking, problem solving and communication skills, and these workshops contribute to this wider agenda. The workshops do not have any associated assessment and so the first step is to encourage students to attend and to participate. As Gosling (2009, p. 119) has argued:

it can be valuable to introduce some fundamental study skills particularly when students are unfamiliar with the demands of studying at higher education level. It is important the skills are perceived by students to be timely, useful, appropriate and relevant.

The workshops are learner-centred, include a number of activities, are based on the small group model and, therefore, do not involve lectures. This seems to have worked quite well as a way to explore the differences between college and university alongside helping to build confidence amongst the learners in terms of participating in class and learning how to speak in public. It has also led to a more positive experience for me as the facilitator as engagement with learners in this way, rather than transferring knowledge via lectures, makes it more engaging and interesting.

In this context my pedagogic model has developed (see Appendix 1). At the heart of this model is the approach of learner-centred teaching, viewing my role as a facilitator rather than a lecturer or teacher. It is underpinned by the use of reflection, both by learners and by the facilitator, and the context of learning, including the classroom, the dynamics of the group, and the wider learning environment. It aims to build confidence amongst learners, to promote the importance of a range of transferable skills, and to achieve deep learning so learners understand not only *which* specific transferable skills they need to acquire to successfully study for a degree, but *why* they are important and *how* to develop them. Each aspect of my pedagogic model will be discussed in this paper.

## **Learner-centred approach: the influence of Freire and feminism**

The learner-centred approach is central to this model. Approaches to teaching in higher education have changed in recent times and the learner-centred approach is now much more apparent, influenced by constructivist theories of education whereby students are expected to be active in class in order to construct their own knowledge rather than passively receiving it by listening to a perceived 'expert'. Jarvis, Holford and Griffin (2003, p. 9) helpfully described this shift stating that 'learning has changed from remembering 'facts' and 'knowledge' to seeking to understand and be critically aware of the things to be studied' and Biggs and Tang (2011, p. 60) believe that 'good teaching' is about 'giving the student control over their own learning'. My approach has developed within this context, shifting from a teacher-centred to a learner-centred one, and is also informed by theorists like bell hooks and Paulo Freire who were both opposed to the 'banking system of education', with bell hooks (1994, p.13) convincingly describing rote-learning as an 'assembly-line approach'.

Freirean and feminist theorists have contributed a number of important insights to our understanding of teaching and learning and to my pedagogic model. The most valuable insights in the development of my pedagogic model have been the importance of a critical approach, the development of a learning community, and the value of acknowledging the prior experiences of learners. Indeed Ledwith (2005, p. 135) stated that 'feminist and Freirean pedagogies converge in their fundamental assumption...that all people have a basic human right to be valued and active in their world'. Freire (1970) in his adult literacy work with communities in Brazil challenged those working in education to begin to view themselves as students rather than experts or teachers in order to be able to work with learners rather than seeing their role as filling them with knowledge. He also acknowledged that education does not happen in isolation but that the wider context is very important in shaping what is discussed within groups.

Feminists built upon this theory, not only to draw attention to the gender-bias evident in Freire's work, but also to emphasise the importance of emotions within the classroom and the value of creating a 'community of learners' (Shrewsbury 2014, p. 170). Particularly important in this regard is bell hooks (1994, p. 40) who encouraged those in education to build this community by making their classrooms inclusive and a space where everyone felt valued. These insights are particularly important in the context of an HN Degree advisor who is working with students who have come from a range of backgrounds and who often feel nervous about making the move from college to university and thus appreciate feeling part of a group where support and reassurance can be provided.

## **The role of reflection and the learning context in a learner centred model**

These theories have influenced the creation of this pedagogic model and the Abertay ASPIRE programme, leading to a focus on the learners, encouraging them to use their previous experiences of learning and working with them in the development and implementation of Abertay ASPIRE so they feel part of a community in which they have a stake in what happens in the classroom. My approach to teaching aims to capitalise on the diversity of the classroom and to ensure that the learners' experiences are used in a way which creates a productive working environment. In practice this means asking learners to reflect. Each of the workshops which make up the Abertay ASPIRE programme encourage the participants to reflect upon their educational experience so far and what they need to do in order to improve the way they approach learning. For example, thinking of a time when they received good feedback for a piece of assessment and asking them what they did well and how they could apply this to future work or asking them to reflect upon how they felt on their first day of college and what advice they would offer to those starting college based on this experience. The learners are then asked to build upon this and think of strategies they will use during their first few weeks at university. Building upon learners' previous experiences is very important in order to identify any gaps between their college and university experience, but also to help to build confidence and to recognise and encourage them to realise that they often already have many of the skills they need to succeed at university.

It is often difficult to encourage reflection not least because as Fry, Ketteridge and Marshall (2009, p. 15) have recognised it has 'had a worse press than it deserves' and this is often due to the fact that research into how to do reflection and the value of reflection is scant. When teaching at first, it was often difficult to explain what reflection is and how to do it and this often led to learners in my classes feeling confused about what was expected of them. But adopting a feminist perspective clarified the issue of reflection, viewing it as central to the learning process, helping to encourage students to see their 'experiences in different lights' and to relate these experiences 'to other, or new evidence' in order to think about 'experiences in different ways' (Shrewsbury 1993, p. 167). Using students' prior experiences of education in the classroom with the aim of creating a learner-centred pedagogy, however, can only be achieved if both the facilitator and the learners are encouraged to reflect as this creates an environment in which learners feel able and encouraged to share.

The learning context is also important in creating a learner-centred approach. This not only includes the physical space of the classroom, although this is important too, but also the role of emotions. Feminist, bell hooks (1994, pp. 7-8) drew attention to the importance of 'pleasure' and 'excitement' in creating an environment where learners want to learn and this is important when delivering workshops, like those included in Abertay ASPIRE, which are not assessed. Similarly, Mortiboys (2005, p. 30) argued that it was time for educators to recognise the importance of emotions to learning, arguing that 'when the emotional environment is good it leads to learners more likely to risk, explore, make connections and enquire'. Furthermore, it is evident that a 'good' environment also leads to learners feeling part of a wider community. This is important because as one study found students were more likely to leave university early because they did not feel they belonged (Thomas 2005, p. 439). Important techniques in creating this sense of belonging, which are used in the workshops, are remembering people's names and referring to them by their name, maintaining good eye contact, referring to their contributions but also in the use of ice-breakers and the willingness of the facilitator to openly reflect upon their educational experience so as to break down barriers between the facilitator and learners.

Furthermore, treating learners in this way also makes them feel human. bell hooks (1994, p. 15) identified that learners want to be viewed 'as whole human beings with complex lives and experiences rather than simply as seekers after compartmentalized bits of knowledge'. This is especially important within the context of college to university articulation as often learners have returned to education after a break or have lacked the confidence to apply to university from the outset. Acknowledging how learners might be feeling and encouraging them to reflect upon and share their fears helps to create a supportive environment where these fears can hopefully be addressed.

### **Conclusion, Outcomes and Evaluation**

Building upon these aspects of the pedagogic model, Abertay ASPIRE aims to create more confident learners with a range of transferable skills that they can take from college to university and that they understand why these skills are important and need to be continually developed. This approach reflects wider trends in higher education, where there has been a shift from surface to deep learning, where it is now recognised by academics such as Biggs and Tang (2011, p. 28) that good teaching occurs when a deep approach to learning is adopted. This is because learners are able to transfer knowledge and skills beyond their degree, rather than merely learning it so they can pass assessment and gain a qualification.

As articulation is a relatively recent development in higher education and the Abertay ASPIRE programme has only existed for a year, the evaluation of this programme and how far it achieves its aims is based only on the use of approved evaluation feedback sheets, handed out at the end of every session or event. It is evident that attending these sessions can help learners to feel more confident, as this comment from one workshop participant makes clear:

Independent study was making me feel nervous and that I would fail. The workshop helped me understand what is expected and has made it less daunting. Very helpful (Browne 2014, p.17).

Furthermore, other learners have noted that these workshops help them to feel cared for and they appreciated working in a group thus highlighting the importance of creating a sense of community amongst the learners (Browne 2015, p.14). Longer-term evaluations such as the use of focus groups and interviews with learners who chose the articulation route and who are close to graduating at Abertay will be important in order to assess the longer-term impact of this programme and how far it delivers the proposed outcomes as well as contributing to the broader strategic aim at Abertay of delivering 'a continuum of learning provision into and within and between colleges and universities' (Abertay 2011, p. 14). What is apparent is that as articulation becomes an increasingly popular route into higher education and as it becomes a central priority for many higher education institutions in Scotland, the creation of communities of learners, who support each other while also learning from their previous experiences will be important in creating confident learners who can make a seamless transition from college to university.

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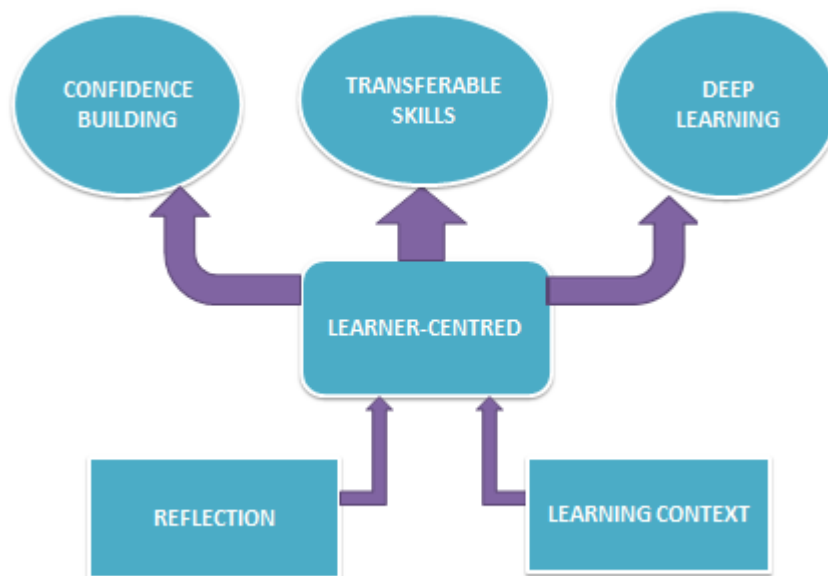
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## Appendix 1: Pedagogy Model



# Supporting the transition from further education to higher education with an e-workbook promoting self-regulated formative assessment

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## Abstract

This paper examines the efficacy of the use of self-assessment and formative feedback within a pedagogical model of self-regulated learning through an e-workbook. This would facilitate the transition for students from a further education background transferring from a Higher National Diploma to degree programme, of which literature notes can be a difficult period for students. Additionally, it will support the development of graduate attributes developing not only knowledge but also the enhancement of lifelong skills and learning. Self-regulated learning has been linked to increased academic performance, increased motivation and confidence. Feedback is an integral part of self-regulated learning, this can be provided through self-diagnostic assessments. It is important that the feedback is concise and corrective, as it shows students how to directly improve academic performance. Therefore it is important to include worked answers into the e-workbook that students can access after the assessment has been taken, allowing the student time for self-correction. The e-workbook will also give the students to access the feedback at different times, due to the contrasting opinions of the literature of when feedback is most effective. In conclusion, the use of an e-workbook can be developed to promote positive graduate attributes and help the transition from further education to higher education through the promotion of self-regulated learning.

**Key words:** Formative feedback, formative assessment, self-regulated learning, self-assessment.

## Introduction

Biomechanics is the application of mechanical principles to the study of biological systems (Hall, 2011). Biomechanics is a core component of the Sport and Exercise science programmes offered at Abertay University, and therefore it is important the transition of students from Further Education (FE) establishments studying Higher National Diplomas (HNDs) make a seamless transition to Higher Education (HE). Biomechanical principles are underpinned by mechanical principles and therefore mathematics. Currently there are no entry requirements for admission to the Sport and Exercise courses Abertay offers (Abertay University, 2014). Additionally, verbal communication from students that made the transition from FE to Abertay have cited a difficulty with the mathematical elements due to a lack of previous exposure. This notion is supported from the literature, with students being reported to have difficulty in grasping basic biomechanical principles (Hsieh & Knudson, 2008; Hsieh, Smith, Bohne & Knudson, 2012). This may be emphasised in FE students that don't have the same mathematical support structure in place like the first and second year Abertay undergraduate students. Other challenges FE students face is the different teaching styles, independent learning, building working relationships with new lecturing staff, confidence and research skills (Ingram & Gallacher, 2013). Improving all these skills is integral allowing the student to be as successful as possible in HE.

One pedagogical strategy that can be implemented in attempt to overcome this difficulty in learning the basic principles is formative feedback through self-assessment (self-regulated learning). The process of self-assessment can be defined as 'the involvement of students in identifying standards and/or criteria to apply their work and making judgements about the extent to which they have met these criteria and standards' (Boud, 1991, p.5). Self-assessment has to refer to either a process or activity coupled with reflection (Boud, 1995). Self-assessment skills need to be developed (Boud, 1995) supporting the efficacy of a framework around students moving from FE to HE. With the proposed e-workbook being a supplementary material it can be considered self-regulated learning, allowing the students to manage part of their own learning experience (Zumbrunn, Tadlock and Roberts, 2011). Self-regulated assessment can be important for the learning process, creating better

learning habits and study skills amongst the students, positively improving student behaviour, discipline and self-belief (Duckworth et al., 2009). With the latter being a common obstacle in biomechanics (Hsieh & Knudson, 2008).

Self-regulated learning feeds into the Abertay University's graduate attribute structure, making students more confident in dealing with tasks with motivation and confidence rounded with the critical evaluation of their own performance and the materials they are learning (Abertay, 2014). This can promote lifelong learning beyond university (Boud & Falchikov, 2006), setting the student up for higher performance throughout life.

It is proposed that the e-workbook will contain a number of resources, including audio lectures with accompanying slides, practical demonstrations and formative assessments, for the student to monitor their progress and understanding. Providing a clear framework of self-regulated learning. Therefore, the aim of this study is to assess the efficacy of self-regulated assessment informing the structure and framework provided within the e-workbook.

### **Challenges facing HND students moving onto a degree course**

A HND is the equivalent of the completion of two years of undergraduate study with both holding weightings of 240 SCQF credits, and taking two years to complete when studying full time (SQA, 2012). Despite this it is clear that students coming from an HND background (entering from the third year of study) have a different skill set to those that joined a Sports Science degree programme from the first year.

It has been documented that students transferring from studying HNDs to HE do experience problems in adjusting to the different approaches in learning, teaching and assessment (Howieson & Croxford 2011; Ingram & Gallacher, 2013). Sixty percent of students ( $N = 155$ ) stated that they perceived the difficulty of changing from an HND to degree study as quite or very difficult (Howieson & Croxford, 2011). Clearly there are some short fallings that can be improved. Along with this the added pressures and expectations on academic performance in comparison to FE establishments (Ingram & Gallacher, 2013) can result in a stressful and undesirable situation for firstly, the student, and secondly the lecturer. Both Howieson & Croxford, (2011) and Ingram and Gallacher, (2013) seem conclude the onus is on the FE establishment to prepare the students better for the transition to HE. However, this does not mean that the HE University cannot assist in this process also.

The themes identified amongst the recommendations given by Howieson & Croxford (2011) and Ingram and Gallacher,(2013) is that FE establishments need to give more advice and support on study skills required on a degree programme such as academic writing and referencing. Additionally, being able to experience the 'university approach' (Howieson & Croxford, 2011) encouraging learners to be more independent and take more responsibility for their learning (Ingram & Gallacher, 2013). In the opinion of the author one of the main conclusions of Ingram & Gallacher (2013) that students transferring from an HND to HE should not feel singled out or isolated and any support schemes developed can be advantageous to all students.

### **Formative Feedback and Assessment enhancing learning applied to an e-workbook**

One difference between FE and HE may be the use of self-regulated formative feedback, due to the independent nature of the learning. Formative feedback can be defined as 'information communicated to the learner that is intended to modify his or her thinking or behaviour for the purpose of improving learning' (Shute, 2008, p.154). Formative feedback is used to increase students' knowledge, skills and understanding within a specific content area (Shute, 2008). In regards to students undertaking self-regulated learning through formative feedback, there are a number of principles that need to be considered, such as the content, complexity, timing and specificity of the feedback.



Brown (2004, p.1) states 'Assessment is probably the most important thing we can do to help our students learn'. It is important that students understand that assessment is a form of learning, not just in FE students but all students. A way this potentially can be delivered is through formative assessment. Formative assessment can be used as a means of feedback, assessment for learning rather than assessment of learning. Formative assessment can be defined as an assessment that is specifically intended to create feedback on academic performance to improve learning (Sadler, 1998). The process of questioning students on lecture content has previously been shown to enhance the retention of physiological (a sister subject to biomechanics) concepts (Dobson, 2012). An e-workbook would contain content of concepts and theories, although different to the lecture format this retention could be replicated. The e-workbook may enhance learning through simply, providing information in a different format, with everyone learning in their own unique way (Drago & Wagner, 2004; Dunn, Beaudry & Klavas, 1989).

The content of the feedback needs to be of a sufficient detail and clear so the student can act on it to improve performance (Nicol & Macfarlane-Dick, 2006). Feedback should also encourage positive motivation and self-esteem in the student, which is integral in learning and assessment (Nicol & Macfarlane-Dick, 2006), without motivation, self-regulated learning is far harder to successfully achieve (Zumbrunn et al. 2011). Students need to see the value in learning tasks and are then more likely to spend time planning strategies to accomplish those tasks (Zumbrunn et al. 2011). Perceptions of learning are equally important; Ramsden (2003) showed that 'how' students learn affects 'what' they learn. With learning being a complex process resulting from interactions between students and learning contexts and environments (Thompson, Pilgrim & Oliver, 2005) despite being self-regulated a clear support structure may be beneficial for FE students starting on a degree programme to reduce the pressures placed upon them. So not to reduce their motivation undermining the purpose of the e-workbook.

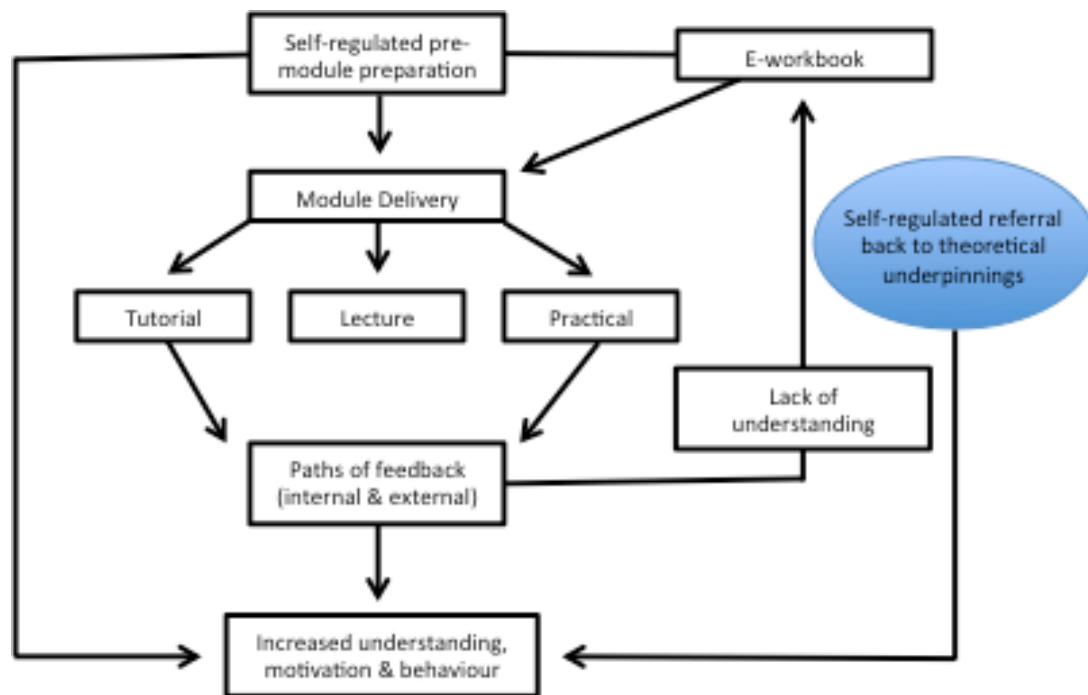
Literature has demonstrated feedback is more effective when it provides corrective or additional advice on how to improve the answer or provides a worked example rather than just indicating whether the answer was right or wrong (Nicol & Macfarlane-Dick, 2006; Shute, 2008). This particularly could be emphasised within the field of Biomechanics considering the mathematical nature, previous work has highlighted barriers in learning theories with mathematical undertones, citing students can suffer from math anxiety (Ashcraft & Krause, 2007; Hoffman, 2010). Providing feedback with worked examples, may demonstrate to the student that the problem was not as hard as they initially thought. Verbal communication with previous students also highlights this problem, with a common theme that they over complicate mathematical problems as they 'think it must be difficult because it involves equations and numbers'. Shute (2008) explains that worked examples before questions can be useful for novice or struggling students as it reduces the cognitive demand on the student who may feel overwhelmed at the task in hand. Worked examples also give the opportunity to make feedback clear and concise, with many learners not paying attention to long or complicated feedback (Shute, 2008). Kelley and McLaughlin (2012) additionally outlined that feedback on incorrect answers result in more learning, particularly in tasks of a high difficulty level.

Timing of feedback is also important consideration. Currently there is no consensus amongst the literature as to whether immediate or delayed feedback is advantageous. It is theorized that the earlier corrective information is provided (i.e. feedback given) the more likely that the corrective information will be retained (Phye & Andre, 1989; Dihoff, Brosvic, Epstein & Cook, 2003). Schroth (1992) and Corbett and Anderson (2001) findings however contrast this will support that delayed feedback may be superior in promoting learning. Butler, Karpicke and Roediger (2007) concluded this is especially important after a multiple-choice test. Shute (2008) recommends that lecturers need to consider that immediate feedback may result in positive and negative learning effects. The positive effects of which errors can be fixed immediately, a decision can be facilitated or increase motivation to practice, negatives however, may create an over reliance on immediate information which may not always be available (Shute, 2008). Delayed feedback also offers positives and negatives; it may encourage

active cognitive processing and self-esteem but may be detrimental to the knowledge and learning of less motivated students (Shute, 2008). Considering the timing of feedback in regards to an e-workbook may be less of an issue than traditional formative feedback as it is not reliant on the lecturer directly giving the feedback but the students accessing the feedback in their own time. This has the potential to improve students motivation through the self-regulation of their learning (Duckworth et al., 2009; Zumbrunn et al. 2011) with the choice of feedback timing.

### Application of a self-regulated pedagogical model using an e-workbook

Nicol and Macfarlane-Dick (2006) developed a conceptual pedagogical model outlining self-regulated learning and feedback principles. Figure 1 is a simplified model adapted from Nicol and Macfarlane-Dick (2006) outlining where the self-regulated e-workbook will sit within the third year biomechanics module. Some supporting actions not presented in Figure 1 are integral to support and successfully develop learner self-regulation. The lecturer should clarify what good performance is, facilitate self-assessment, deliver high quality feedback information, encourage teacher and peer dialogue, encourage positive motivation and self-esteem, provide opportunities to close the gap and use feedback to improve teaching (Nicol and Macfarlane-Dick, 2006).



**Figure 1:** A model outlining the placement of self-regulated learning within the third year biomechanics module (adapted from Nicol & Macfarlane-Dick, 2006).

All of the aforementioned support structures can be delivered through a correctly developed e-workbook. To clarify what good performance is the Abertay grade boundaries can be used for the tests inbuilt into the e-workbook, this should allow the student to acclimatise themselves to the different standards of work required at degree level. Equally this point can address the process of facilitating self-assessment. High quality feedback can come from the worked examples for the mathematical problems (Nicol & Macfarlane-Dick, 2006; Shute, 2008), with it being very specific, corrective and concise. In regards to non-mathematical questions, the student can be directed to extra-resources such as book chapters, journal articles or the section of the audio lecture where the content was covered. Leaving the student to their own self-regulated discovery, but offering guidance

in where they should go, in attempt to assist them through the transition from FE to HE. Through direct interactions peer to peer dialogue can be encouraged, the author believes this to be an easier process that to build into the e-workbook to keep it as simple to access and work through as possible. Armatas, Holt and Rice (2003) state that difficulty of access to electronic resources can be a barrier to students using them regularly. Positive motivation and development of self-esteem can be embedded through the self-regulated access (Duckworth et al., 2009; Zumbrunn et al. 2011), along with this the promotion of the resource in class making it available to all students, if just to test their understanding and not just the students struggling to adapt. Depending on the position of the student it will allow the students not grasping concepts immediately to close the 'knowledge gap' in a self-regulated manner. Finally, an anonymous survey will be used to improve the teaching through the e-workbook with suggested amendments or possible additions. It is important to have a clear framework in place for the self-regulated e-workbook, giving the students assistance through guidance of topics through the transition, but still motivating them through diagnostic assessment.

With the evolution of technology higher education is no longer limited to the traditional teaching methods of face to face subject delivery and paper based assessments, now computer based provisions can also be used (Biscomb, Devonport & Lane, 2008). The use of computer-based tests is supported within the literature, tests have been found to have a positive effect on students' motivation, concentration and performance within a module (Redecker, Punie & Ferrari, 2012). The timing of the formative feedback is also self-regulated, with the students deciding when they want to access it, potentially important with the lack of consensus when is best within the literature (Shute, 2008). Despite the feedback being potentially less biased than oral delivery (Kluger & DeNisi, 1996). A final support structure of an opportunity to discuss any content or assessments within the e-workbook with the lecturer to identify any areas of difficulty and to check and correct any misunderstandings or mistakes (Nicol & Macfarlane-Dick, 2006).

### **Development of graduate attributes through self-regulated learning**

Since 2007 Abertay University has adopted graduate attributes, a lifelong skill-set that all students foster throughout their undergraduate journey (Abertay, 2014). It has been highlighted that higher education provides a foundation for lifelong learning (Boud & Falchikov, 2006). It is a key role of higher education providing students the skill to learn beyond university into their careers, without the formal infrastructure university provides (Boud & Falchikov, 2006). In regards to HND students moving to a degree programme it may be important to highlight these graduate attributes and the skills they are developing, as previously they may have not been exposed to them.

Abertay University currently uses four dimensions of attributes, intellectual, professional, personal and active citizen (Abertay, 2014). The e-workbook has scope to contribute to the development of all of these dimensions. Nicol and Macfarlane-Dick (2006) state that more effective learners are learners who are more self-regulated. The Abertay attributes aim to create students of a determined, ambitious, motivated and confident critical evaluators of information and their own performance (Abertay, 2014). These are skills that self-regulated learners have been reported to possess more so than students that have no experience of self-regulated learning (Zimmerman and Schunk, 2001; Duckworth et al., 2009). Lecturers may experience greater success in increasing academic achievement and lifelong learning by giving students the opportunity to learn in a self-regulated manner (Zumbrunn et al., 2011). With students moving from studying an HND it is important the correct balance is struck to promote the attributes gained from self-regulated learning but still managing the transition to a degree programme. This can be achieved with a supporting framework, to maintain motivation and ensure the process is made as easy as possible for the students.

### **Conclusion**

It is clear that the transition from an HND at a FE establishment to a degree programme at HE can be a stressful process for the students. Support should not just be placed on the shoulders of the FE

establishment. The University receiving the student should have support structures in place to help the student manage the process, so they can achieve to the highest of their ability from the start of the programme. An e-workbook with suitable supporting framework giving guidance to learning could be used as an innovative tool to support the transition from FE to HE (along with supporting learners throughout the degree programme) promoting self-regulated learning. With self-regulated learning being linked with higher achievements academically and developing desirable graduate attributes it could aid student employability and lifelong learning after university. Formative assessments built into the e-workbook will allow the student to diagnostically assess their learning and understanding of materials, improving confidence and motivation. Along with concise corrective feedback accompanying the self-regulated formative assessments it will allow the learner to utilise the feedback to improve performance. In conclusion, evidence within the literature suggests the use of formative assessments and feedback via an e-workbook (with suitable framework in place to help the transition from FE to HE) will facilitate the promotion of self-regulated learning improving characteristics highlighted in Abertay graduate attributes.

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## Curriculum for Excellence and the transition to Abertay attributes: the contribution of sport

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### Abstract

Scotland's Curriculum for Excellence (CfE) in schools has been acknowledged as the most significant change in teaching practice in many years (Reeves 2008). At the heart of the CfE lies the desire to develop four capacities within pupils to give individuals the necessary skills for work, life and learning. Abertay University's curriculum is undergoing change designed to develop "Abertay attributes" in their graduates. Central to both strategies is interdisciplinary learning alongside the contextualisation of lessons to increase levels of engagement, attainment and success. This paper will consider the parallels between CfE and the Abertay Teaching and Learning Strategy, the Scottish Government's policy on attainment and draw conclusions on the role and potential of contextualised learning through the Dundee Academy of Sport project.

**Key Words:** Attainment, Curriculum for Excellence, Contextualised Learning, Abertay Attributes

### Introduction

The Scottish Funding Council has aspirations to increase attainment levels amongst students within Higher and Further Education. Aligned with this is their desire for institutions to "*improve access for people from the widest range of backgrounds*" (Scottish Funding Council, 2014, p.1). The desired output of this result in improved life chances for all (Scottish Funding Council, 2014).

Higher education institutions are taking various methods to achieve this through reviewing admissions processes, developing curriculum to include more links to industry and through developing stronger links with partners and pedagogy in schools and colleges. For many pupils the lack of attainment is due to the thinking that their learning is irrelevant to their own life experiences (Education Scotland 2012). This is mirrored within school education through the development of the Curriculum for Excellence and the Skills for Work, Life and Learning campaign. Therefore the challenge of raising attainment is not limited to teachers at school level but should stretch to include teacher practitioners and strategists throughout the learning continuum.

The result of the attainment drive in schools is a more diverse student body in higher education institutions with varying degrees of experience suitable for higher or further education. This wider cohort of student brings with it a wider expectation of the teaching and learning expected at University. Wharton, Goodwin & Cameron reinforces this notion, "*From the perspective of education professionals we would contend that the experience of students in the 21st century can be limited where HE institutions fail to review and adapt. The last decade has been characterised by rising numbers and an increasingly diverse student population. In our HEI contexts there are increasing numbers of first generation students as well as adults returning to education through widening access opportunities*" (2014, p.72). Lifelong learning is also a facet that institutions need to consider, the increased intake of mature students with prior life and work experience entering higher education places stress on teaching staff to ensure that their needs and expectations are met. Mature students prior experience of learning will differ greatly due to the current approach to teaching pedagogy.

This development of widening access to higher education has coincided with the development of the Curriculum for Excellence in Schools where pupils engage in a broad general education before specialising in subjects later in their school career. Students moving through the CfE have long established experience of teachers using contexts and problem based teaching to stimulate learning. Therefore teaching pedagogy within universities needs to reflect this. Wharton, Goodwin & Cameron explain that "*the onus is on every tutor to combine imaginative assessment with dynamic and relational experiences in order to provide a strong foundation for flexible, reflective and creative graduates*" (2014, p, 72).

This movement towards a more learner centred approach to teaching and learning reflects the instructor – learner paradigm as explained by Barr and Tagg. They conclude that learning institutions should facilitate a culture where learning is not a means to an end but rather an ethos that learning is a journey of experiences, concepts and collaborations that contribute to the learner's life and not just his classification of degree (1995). In addition to this Harreveld and Singh explore the notion that

institutions should harness the potential of real life learning to ensure that learners have the skill sets required to lead worthwhile lives in the future. They argue that contextualised learning focussing on the needs and the interests of students is key to achieve attainment and a culture of learning rather than retention (2009).

Barr & Tagg further explain that institutions striving for excellence in teaching should ensure that learning doesn't happen in isolation and that real life, problem based learning and solutions should be central to their learning culture. Knowledge should not be instructed or transferred from teacher to student but shared and developed between the two partners (1995).

Co-operative learning where teachers and student work together to achieve shared outcomes is another method of addressing the widening access targets as prescribed by government. Group work within the classroom at school and undergraduate level can prevent and treat many barriers to education such as diversity, self-efficacy, self-esteem and motivation (Johnson, Johnson & Stanne 2000). Co-operative learning also provides a wide range of options with regard to classroom management, the layering of lessons and development of philosophies. In addition to this they explain that working co-operatively is a greater motivation for learners than working against fellow classmates (2000).

The increased use of co-operative learning alongside the shift within institutions to move from instruction to learning is a direct result of the development of government policies and university teaching and learning strategies.

### **Curriculum for Excellence**

Through developments with the Scottish schools system the Curriculum for Excellence (CfE) has been designed. At the core of the curriculum is the aim to develop four learning capacities within each pupil. The four capacities the CfE look to create in pupils are: Successful Learners, Confident Individuals, Responsible Citizens and Effective Contributors (Education Scotland, 2014).

Underlying these capacities is a series of experiences and outcomes set against curricular areas that "*signpost progression in learning and set challenging standards that will equip young people to meet the challenges of the 21st century*" (Education Scotland 2014).

The curriculum aims to ensure that all school pupils in Scotland develop the knowledge, skills and attributes they will need if they are to flourish in life, learning and work, now and in the future. The CfE aims to give a more holistic approach to learning and allow teachers as professionals to shape the teaching and learning in the classroom to reflect the cohort of pupils, their community and changes in technology. The emphasis within the CfE is the development of skills, competencies and the application of knowledge rather than the regurgitation of facts (Minty & Priestley, 2012), with teachers trusted to develop themes and contexts within the paradigms of core curricular subjects. Furthermore Minty & Priestley describe teachers "*as agents for change and professional developers of the curriculum*" (2012, p, 1). This empowers teachers to use imagination, creativity and the development of concepts within the classroom. A core theme of the CfE is to ensure that learning and assessment should be in-extrinsically linked (Hayward 2007).

Within the CfE the importance on contextualised learning across disciplines is highlighted. Revisiting theories from different viewpoints deepens understanding, makes learning more meaningful and joins the curriculum up. Outside agencies such as University's can enhance the CfE experience (Priestley & Humes, 2010). Central to this is the use of contextualised learning as a method of engaging and inspiring learners through providing real life experience and the application of school curricular subjects.

### **Abertay Attributes**

The curriculum at Abertay University is undergoing change which reflects the development of the CfE and the wider government agenda for widening access to higher education. Alongside this the Teaching and Learning Strategy of the university acknowledges the challenges that institutions face with regard to funding, student diversity and expectations with regard to teaching and choice alongside the need to ensure a flexible approach to the learner journey. Despite the link to CfE not being at the forefront or a driver of these changes the Abertay TL Enhancement Strategy (Abertay

2014) highlights the need for interdisciplinary study, contextualised project work and the development of Abertay attributes and in many ways mirrors the development of CfE but in a Higher Education context - the Abertay attributes can closely be aligned to the four capacities within the CfE. Central to the focus of the strategy is ensuring that graduates have the skills to make them capable of making an impact on the community. The development of communities of learning both for staff and students support the strategy through increasing inter discipline teaching, learning and projects.

These attributes are demonstrated in four dimensions: Intellectual, Individual, Professional and Active Citizen. These terms closely mirror the four capacities used as benchmarks within CfE and are seen as a medium to the development of learning rather than output which in turn should enhance the student experience of all including articulating and mature students (Abertay 2014). This mirrors the work of Barr and Tagg alluded to earlier through the development of a culture of learning rather than a culture of assessment and standalone knowledge (1995). Reference to this is made within the university's yearly outcome agreement with SFC.

As a result interdisciplinary teaching and learning is common place and teachers are encouraged to draw paradigms between subjects to such an extent that from session 15/16 students are to be given choices and options throughout their undergraduate program alongside inter disciplinary elective modules that focus on skill and competencies rather than focussing on particular subjects.

### **Dundee Academy of Sport**

The Dundee Academy of Sport is a project that uses sport as a means to engage and inspire sporting and educational attainment contributing to the pupil's level of achievement towards the four capacities with CfE. As a consequence the project prepares students for study at Abertay after school level study and their subsequent attempt to demonstrate Abertay Attributes.

Contextualised learning is at the heart of the projects values and as such the project can act as a bridging programme between school and university study. The project works in areas of multiple deprivation to encourage young people to recognise their potential to continue in education. Links between sport and a wide range of academic subjects are exploited - from maths to history, chemistry to sociology, and nutrition to literature resulting in a perceived increase in attainment levels within partner schools. One focus of the work with senior pupils is supporting and encouraging them to study in a higher education context. The project also works with students in further education to support their articulation onto higher education. Within this area of work key skills are developed such as critical thinking, independent learning and research skill to ensure that students develop a range of skills appropriate for higher education but also to ensure that the notion of lifelong learning is apparent and reflective in their practice. Again contextualised teaching is used to inspire and motivate – key and current issues in sport as used as the context to stimulate discussion, rationale and opinions with the students.

This approach to teaching places the pupil and student at the heart of the lesson. It inspires and motivates the student by placing their interests as the focal point of the learning. Scull & Cuthill explain that the perceived unimportance of pedagogy to the life experience of students is a determining factor regarding the success of the student (2009). They conclude by explaining that engage outreach coupled with real life teaching in primary and secondary schools can lay a basis for lifelong learning and reflection (2009) thus developing key skills required for life, learning and work. A key outcome of the academy of sport project is to see a spike in applications to study sport – clearly the tactic of using sport as a context to learn is an approach to achieve this and motivate pupils to have a career in sport.

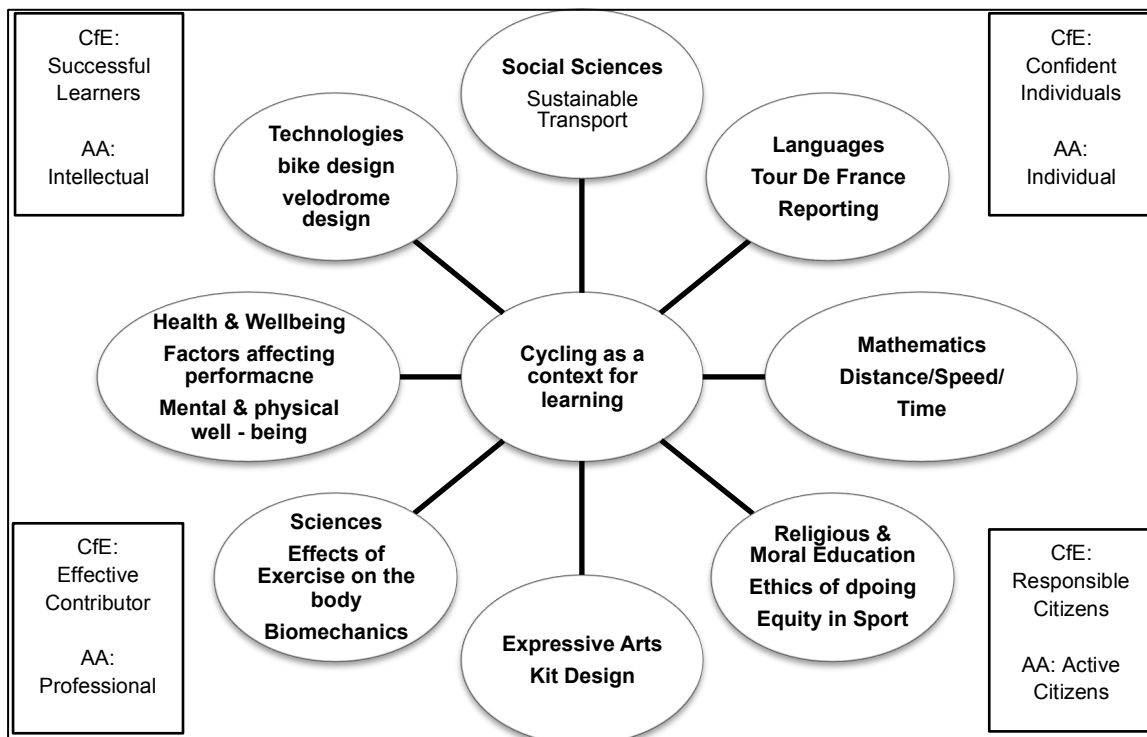
However such is the extent of using sport as a context for learning it can also be used to inspire the study of other subjects. Paracharissis, Danis & Theofanidis (2007) argue that the combination of the outcome of sporting participation coupled with the experience could be vital for the development skills and attributes required for daily life. They argue that these attributes are not limited to the obvious physical benefits of sport but can also include cognitive and behavioural skills (2007). Skills such as decision making, communication skills, team working and problem solving can be developed through using sport as a context for learning.

Within the academy of sport project, sport is used as the conduit for learning other subjects and disciplines; it harnesses the interest of sport and uses it to develop academic and life skills to attempt to contribute to the development of the four capacities in the CfE and the four Abertay Attributes



described earlier. Paracharissis, Danis & Theofanidis state that such a method can help create, “young athletes with knowledge and skills that are necessary for successfully coping with the complex realities of life...(2007, p, 68) ” and that these skills ultimately result in “better students, better athletes and more concerned and productive community members” (2007, p, 69).

The table below illustrates how the Dundee Academy of Sport uses sport as a context for learning and how the teaching within the programme links to both the CfE and Abertay Attributes.



**Table 1:** Example of using sport as a context for learning within the Dundee Academy of Sport linked to Abertay Attributes

## Conclusion

To ensure that Abertay University develop the attributes they wish to see in their students the university needs to play a wider role in the community. This should be in the form of greater outreach work in to the schools and communities that the University serves. This outreach work should not only support schools in their delivery of capacities within CfE but act as a stepping stone to achieving Abertay attributes.

Abertay University prides itself on being a global university for the people of Dundee and as such the majority of students at the institution reside locally (Abertay, 2014). The institution needs to work with partners within education to help shape, develop and prepare school pupils for study at Abertay or for contributing to the community. Church, Zimmermann, Bagerstock & Kenny reinforce this by explaining that outreach work should be a core principal of university's'. They describe outreach as “a reciprocal learning/teaching situation that increases both the external partner's capacity to address issues and the academic staffs capacity to produce scholarships that better reflect the realities outside the laboratory (2003, p, 142). Therefore greater emphasis on outreach work would see a win-win situation that supports the teaching and learning in communities alongside the intrinsic benefits of developing and refreshing of academics staffs skills set and understanding of contemporary issues within partner classrooms in the community. The expertise of academic staff couple with the vocational nature of the

courses on offer at Abertay would act as an inspiration to school pupils and other members of the community and ensure that the learning in the classroom is applied to the life of the learner.

Lynton further enforces the notion that outreach is central to the success of institutions by stating explaining that if universities are truly striving for academic excellence then outreach work with communities is essential (1996).

Therefore if Abertay wish to create graduates with the attributes to become active citizens it's clear that greater levels of interactions with local communities through outreach programmes to schools would support this desire and in turn support the race for the capacities with the CfE. Projects such as the Dundee Academy of Sport should be expanded upon with links to its work made across the spectrum of undergraduate degree programmes on offer within the institution. In turn the degrees on offer should impact purposefully on the communities that Abertay serves.

Furthermore Franz (2007) explains that outreach and engagement in communities should be rooted in the business of universities. Not as a method for promotion or to raise student numbers but more so for a method to raise wider engagement in education and to support the holistic development of learner centred communities in line with Barr & Tagg's learning paradigm (1995). It is the responsibility of university's to lead and create the learning environments that create a culture of intrigue, learning and attainment. To compliment this Franz explains that the learners involved in outreach programmes should feel part of the host institution and the wider community of learners (2007). To conclude, outreach work that engages learners should be core university business, expertise within institutions should be harnessed to support outreach work, this work should be considered just as valuable as other academic pursuits of the institution. The interests and lives of learners should be the starting point for the delivery of courses and lessons and the university should play a central role in the locality's community of learners.

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## Learning 1

## **Mathematics for Non-Mathematicians: Relating Mathematics to Subject Area through Practical Applications**

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### **Abstract**

A pedagogic model is presented in which practical coursework is introduced to first and second year mathematics modules within a non-mathematics degree. The aims of the proposed coursework are to demonstrate the relevance of mathematics to the subject area; assist students in understanding complex concepts both by presenting them from a different angle and giving them a 'hands-on' experience; increase the opportunities for feedback; and align the modules with Abertay University's Teaching and Learning Strategy by developing Graduate Attributes within the students. Each of these aims is justified with reference to literature, and a discussion of further ideas is presented.

**Keywords:** Mathematics, Assessment, Experiential Learning, Feedback, Graduate Attributes

### **Introduction**

"Too many students arrive in higher education without a realistic understanding...of the relevance of Mathematics and Statistics to their discipline." This is one of the findings of a recent report published by the Higher Education Academy (HEA), which considered the mathematical and statistical skills required in a range of non-mathematics degree programmes (Hodgen, McAlinden and Tomei 2014, p.19). The main recommendations of the report suggest that prospective undergraduates should be better informed of the mathematical knowledge and skills that will be required of them when applying to higher education, however I believe that it is also important for tertiary educators in non-mathematics programmes to ensure student understanding of the relevance of mathematics to their subject area.

Students studying Computer Games Technology (CGT) at Abertay University are required to undertake modules in mathematics throughout their degree, but as the HEA report suggests, do not always appreciate the relevance of the mathematics they are taught. The purpose of this paper is to put forward a pedagogic model that introduces experiential learning in mathematics in an attempt to bridge the gap between theory and practice. Although this is presented in the context of a degree in CGT, the theories discussed are applicable to mathematics teaching in other areas. The model is aligned to Abertay's Teaching and Learning Strategic Plan 2011-2015 by considering how it fosters the University's Graduate Attributes within the students (University of Abertay Dundee, 2011).

### **Pedagogic Model**

Currently, first and second year mathematics for CGT is delivered through traditional lectures, followed by tutorials in which the students can work through problems associated with the lecture and ask any questions of the module tutor. The assessment for both modules is via two end of semester exams. Two issues with the present format of the module are: 1) feedback from students indicates that they cannot always see the direct relevance to their degree of the mathematics taught; and 2) assessment via an exam is almost purely summative, testing the students' knowledge and assigning a grade, but providing little or no feedback. The main aim of this paper is to address the first of these issues, but the suggested practice also goes some way towards addressing the second issue.

One reason for students failing to see the relevance of mathematics is that often it can be presented in too theoretical a manner, especially when a degree programme like CGT is very practical in nature. Therefore I propose the introduction of tasks that demonstrate practical applications of mathematics. In particular, as a starting point, a practical piece of coursework with relevance to computer games, for the first and second year CGT mathematics modules. The first and second years of an Honours degree are a critical time in developing a basic understanding of the knowledge and skills required to excel in the subject area, so it is important that the students recognise the relevance of mathematics at this stage. The pedagogic aims of the practical coursework are 1) to directly demonstrate the relevance of mathematical concepts learned in class; 2) to present concepts raised in class in a different light and give a concrete experience of those concepts in a practical setting; 3) to provide a

form of assessment that will give constructive feedback to the students; and 4) to develop the Abertay Graduate Attributes within the students.

The following sections describe the proposed coursework and discuss how it will address each of these aims.

### **Practical Coursework**

The coursework will consist of a practical project where the student will use their programming skills developed in other modules to code up a mathematical problem relevant to computer games. This will be accompanied by a written report in which the student will be encouraged to reflect on the project.

The students will be given a certain amount of freedom with the project. They can choose any programming language they like to code it up, choose how they visualise the results, and choose from a small selection of mathematical problems to investigate. Depending on the success of the project, I would like to offer the students the option of proposing their own problem for investigation, subject to a discussion with the module tutor to agree suitability. It is hoped that this freedom will encourage ambitious enquiry within the students, while at the same time giving enough suggestions and guidelines to be of comfort to those yet to develop their confidence.

The mathematical problems suggested will draw on concepts from the lectures and be simple in essence, but with scope for extension. For example, a basic problem could be that of modelling a bouncing ball. The students will have to consider the equations of kinematics and projectile motion describing the motion of the ball, and the equations for collision between the ball and the ground. There are many ways in which the problem could be extended for the more ambitious student. The ball could initially be fired from a catapult, requiring the students to consider the elasticity of the catapult and the resulting acceleration imparted. Other, more complex extensions could be the inclusion of velocity-dependent air resistance or rigid body collisions. For a project like this, parallels can easily be drawn with computer games.

A clear description of what is required of the students in terms of the practical and the report will be provided. The success of this project description will be judged by how well the students have followed the instructions, based on their written reports. Feedback will also be collected from the students on a variety of aspects of the project, including how clear they found the guidelines to be.

### **Constructive Alignment and Kolb's Experiential Learning Cycle**

Constructive alignment is a system in which students “construct meaning through relevant learning activities” to achieve a deeper understanding of the discipline (Biggs, 2003, p.2). Biggs (2003) raises the issue that students in higher education are often required only to ‘declare’ their knowledge, whereas it is more desirable for students to “perform their understanding, not just tell us about it” (Biggs 2003, p.3). The latter is certainly true in general for the CGT degree: students undertake many modules in which they are expected to demonstrate their skills and knowledge in a practical situation, for example in Programming in C++.

Biggs (2003, p.4) identifies four levels of understanding:

*Minimal understanding*, sufficient to deal with terminology, basic facts: Memorize, identify, recognize.

*Descriptive understanding*, knowing about several topics: Classify, describe, list.

*Integrative understanding*, relating facts together and understanding basic theory: apply to known contexts, integrate, analyse, explain the aetiology.

*Extended understanding*, being able to go beyond what has been taught, deal creatively with new situations: Apply to novel contexts, hypothesize, reflect, generate.

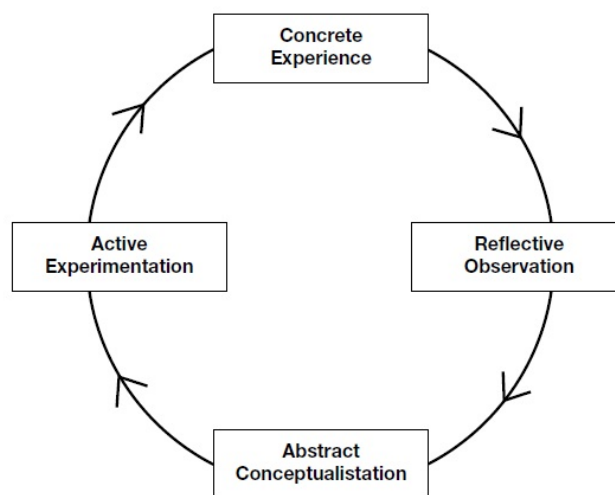
I believe that the current delivery, extensive tutorial examples and assessment of the modules in question already allows most students to achieve an integrative understanding. The introduction of the practical coursework should enable more students to achieve an extended understanding: going beyond what has been taught to them in class to apply the concepts creatively to a practical problem, and reflecting upon the experience through the report.

The aims stated in the module descriptors for the two mathematics modules discussed are to provide students with “basic ideas and techniques” (first year) and “an appreciation of advanced mathematical techniques” (second year) required for CGT. The practical coursework aligns with the stated aims by having the students demonstrate their understanding in practice, and in turn directly demonstrating to them the relevance of the material in the context of CGT.

Supporting the claim that the proposed practical coursework will result in deeper learning in the students, it represents an implementation of Kolb’s Experiential Learning Theory (Kolb 1984). Kolb proposed that “Learning is the process whereby knowledge is created through the transformation of experience” (Kolb 1984, p.38, quoted in Healey and Jenkins 2000, p.185). The theory describes a four-stage learning cycle, illustrated by Figure 1. The cycle can be entered at any stage and, ideally, the learner would follow the cycle several times, to reinforce the learning.

The cycle will be experienced by students as follows

*Abstract Conceptualism:* New mathematical methods and concepts will be introduced in lectures. The student will have to consider which techniques and concepts in particular are relevant to their practical project.



**Figure 1:** Kolb’s Experiential Learning Cycle (from Burrill et al. [No date])

*Active Experimentation:* To an extent, through solving mathematical tutorial problems. On the more practical side, students undertake a variety of programming tasks as part of their other modules. The students will be encouraged to experiment with the mathematical project, e.g. by varying parameters, to gain a deeper understanding of the equations they are modelling.

*Concrete Experience:* Actually undertaking the practical side of the coursework.

*Reflective Observation:* The students will be actively encouraged to reflect on the project, through carefully constructed guidelines accompanying the coursework.

From experience, it is the Reflective Observation part of the cycle that students have the most difficulty with, but this is also one of the most important parts of the cycle. The Active Experimentation and Concrete Experience will help students to make the connections between the mathematical theory and practical applications that they may otherwise have been missing. Effective reflection, however, will help to reinforce these connections and make further connections between the mathematics employed and its relevance to their wider subject area.

### **Threshold Concepts and Troublesome Knowledge**

Students failing to understand the relevance of mathematics to their subject area can lead to frustration in both the learner and the educator. In particular, if the student views mathematics as irrelevant to them, this may result in reduced motivation, reduced attendance and poorer performance (both in their mathematics modules and their other modules they mistakenly viewed as unrelated to

mathematics!). Mathematics is a subject that is seen to contain many 'threshold concepts', which provide "a transformed way of understanding, or interpreting, or viewing something without which the learner cannot progress" (Meyer and Land 2003, p.1). According to Meyer and Land (2003), often 'troublesome knowledge' must be surmounted in order to achieve a threshold concept. Troublesome knowledge is knowledge that can appear conceptually difficult or counter-intuitive to the student (Perkins 1999).

A good example of troublesome knowledge in mathematics given by Meyer and Land (2003) is that of complex numbers. These are numbers of the form  $x + iy$ , where  $x$  and  $y$  are real numbers and  $i$  is the square root of  $\sqrt{-1}$ , a purely imaginary number. When first encountered, complex numbers can seem completely abstract and even "absurd". Once understood, however, they open up a huge range of fields of mathematics and have applications in areas as diverse as biology, economics and engineering. Therefore, they also represent a threshold concept. Of particular relevance to CGT are quaternions, which are extensions of complex numbers from two to four dimensions, and are often used to perform rotations in computer graphics (e.g. Unity 2015). If a student does not understand the relevance of complex numbers, they may not fully apply themselves to understanding the concept, then struggle when later encountering the more apparently relevant quaternions.

The proposed coursework will encourage the students to consider mathematical concepts introduced in lectures in a new light, from a practical as opposed to a theoretical point of view. Gibbs (1988, cited in Healey and Jenkins 2000) highlighted that different learners have different preferred learning styles, and students should be made aware of different learning approaches. Concepts that might previously have been considered abstract and/or irrelevant will be demonstrated in a setting more directly relevant to the students' subject area, and it is hoped that these alternative viewpoints will solidify the student's understanding of the underlying mathematics. Sometimes just explaining a difficult concept in a different way will help make understanding 'click'.

## **Feedback**

Whilst not the primary aim of this model, good feedback can be highly beneficial to students' learning and performance (e.g. see review of studies on feedback by Black and William, 1998). In the current set-up, the first and second year CGT students don't receive much feedback in mathematics, other than their grades from their exams. This is in part due to time constraints and sheer number of students. According to Biggs (2003, p.1) "Academics are more stressed than ever", as a result of larger class sizes with more diverse abilities, motivations and needs, as well as greater demands on teaching quality. The introduction of this coursework will increase the teaching workload, but it is hoped that the overall benefits to the students in terms of motivation and understanding will outweigh this negative point.

The introduction of this feedback to the students' mathematics modules should have a positive effect on their performance, provided care is taken over the quality of that feedback. Some important points to consider are that the feedback should be clear, constructive and encouraging. The topic of what constitutes good feedback is worthy of a study in its own right. It is not the main focus of this paper, but the interested reader is directed to Nicol and MacFarlane-Dick (2006) who discuss seven principles of good feedback practice.

## **Graduate Attributes**

Part of Abertay University's Strategic Plan 2011-2015 focuses on the development of Graduate Attributes within its students; a set of knowledge, skills and values they aim for all of their graduates to possess. The attributes are Confident Thinkers, Determined Creators, Flexible Collaborators and Ambitious Enquirers (University of Abertay Dundee, 2011, p.8). The fostering of these attributes should be kept in mind during curriculum design.

The proposed practical coursework satisfies each of the Graduate Attributes in the following manner:

*Confident Thinkers*: The project encourages independence within the students and requires them to demonstrate their understanding of their field, combining their knowledge of mathematical methods and programming. They have a degree of freedom in their approach to the project, to foster confidence in their decisions.



*Determined Creators:* The freedom allowed in the approach to the project allows for creativity and innovation. Determined students can push the project beyond the outlined goals to create a more ambitious simulation.

*Flexible Collaborators:* Although the project itself is an individual endeavour, the students are always encouraged to discuss ideas with one another. This is particularly true within the classroom environment – a student may be able to explain a tricky concept to a peer in a way that is more understandable to them. Having just learned the concept themselves, they will have a good idea of where the difficulties lie.

*Ambitious Enquirers:* Enquiry is required throughout the project, and there is scope for students to be creative and ambitious. The report encourages the students to create, analyse, evaluate and reflect.

## Conclusion

This paper has proposed the introduction of a practical computer games related project to the first and second year CGT mathematics modules. The project aims to 1) demonstrate to the students the relevance of mathematics to CGT; 2) facilitate the students' understanding of complex concepts both by presenting them in a new light and giving them a 'hands-on' experience; 3) provide more constructive feedback; and 4) align with Abertay University's Teaching and Learning Strategy by developing Graduate Attributes within the students. Evidence from literature was provided to justify each of these aims.

The new coursework will increase the teaching workload, both during the design and marking. This should reduce in subsequent years, however, once inevitable issues have been ironed out and the project becomes more familiar. If successful, there is scope for extending the ideas of the project to increase the benefits. The introduction of additional, small programming tasks as formative problems outside the classroom would further establish the relevance of the mathematics modules to rest of the CGT programme and provide the students with further opportunities to explore mathematical concepts in a practical setting. It would also give the students more experience of this type of practical application, preparing them for the more involved coursework. If the students could be given feedback on even one to two of these formative programming tasks, this would make the overall feedback process more effective: "The only way to tell if learning results from feedback is for students to make some kind of response to complete the feedback loop" (Sadler 1989, cited in Boud 2000). Having multiple similar tasks would allow the students to act on the feedback given, and allow the tutor to gauge whether the feedback has had the desired effect. Kolb's Experiential Learning Theory also indicates that for maximum effect, the student should go through the four-stage cycle multiple times (Healey and Jenkins 2000).

Several years of data will be required to comprehensively determine the effects of this pedagogical model. I am confident though that it has the potential to benefit students in a variety of meaningful ways.

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## **Nurturing reflective art & design practitioners**

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### **Abstract**

This paper proposes a pedagogic model for teaching art and design practice that is learner centric and based on reflective and experiential models of learning and teaching. This is a model that has creative “making” processes at its heart. It is informed by three main areas of debate in the teaching of art and design in Higher Education: changes in technology; blended teaching of practice and theory; and defining practice-based/ -led research. The paper reflects upon how understanding these current debates impact the learner’s journey. The model is contextualized within Abertay University’s Strategic Plan and examines how key academic objectives can be met.

**Keywords:** Art, Design, Higher Education, pedagogy, research, Kolb,

### **Introduction**

The teaching of art and design in Higher Education involves developing the creative skills of practitioners, whilst enabling them to underpin these with knowledge of critical theory, which facilitates informed decisions in the creative process. By understanding the debates and contexts in which their work sits, students in art and design are able to build upon these and push boundaries with experimentation, perceptive questions and the contextualising of their work within relevant critical frameworks. Contemporary discourse in art and design Higher Education is dominated a number of areas that need to be considered, and how this affects the teaching of art and design students.

#### **I. Changes in technology**

Changes in technology affect art and design teaching in two ways. Firstly the tools with which artists and designers can create works are both diversifying and demanding high levels of technological literacy. This means that those teaching these students need to keep abreast of new technologies, be able to challenge the latitude of what they can do, and see ways in which artists may apply them to their work. Even in these contexts, much of traditional art and design knowledge is still relevant to students today, and challenges lie in applying this to ever changing contexts in ways that students can understand the linkages. Loretta Staples highlights this strand of discourse with:

Students struggle to stay current, motivated by market opportunities (“how can I get a job”) and are seduced by the powerful allure of the tools themselves. The digital has exploded our expectations, blurred our boundaries, and rendered obsolete what we thought we cared dearly about. What are now “the basics” in teaching and learning design? (Staples, 2001, p6)

With new technologies, new “basics” have had to be introduced, such as learning software such as Photoshop and Illustrator, but this should not be at the cost of core knowledge which underpins all art and design practices such as colour theory and composition.

The other way in which technological change is affecting art and design teaching is with the shift towards electronic submission of assessment, there is the risk of losing some of these universal skills, and students miss out on understanding the value of qualities, such as texture, tactility and physicality. Where some institutions are pushing towards all assessment submissions to be electronic, there is no longer a space or place for students to make “things” and this is problematic. Although, it could be argued that artefacts can still be made, and the documentation submitted for assessment, this can lead to issues of copyright and plagiarism. This is because these students have been taught in class how to doctor images as part of their coursework, so how will the assessor know that the documentation is a true representation of the student’s work? At the time of writing, there is still the great need in some areas of art and design for there to be physical submission of work.

## II. Teaching theory and practice as a blended model

Historically art and design courses have focused on the practical aspects of the creative process, giving students the practical skills necessary to make works. However, with interdisciplinary approaches and the realization that the ways in which artists and designers can contribute greatly in areas of research and innovation, there is a need for these students to understand the critical contexts in which their work sits. This is especially pertinent as media/ mediums converge and the boundaries between artistic practice, research and design become blurred. However, there are still those lecturing in art and design who do not agree with the idea that theory and practice should be taught in a blended way. This is best explained by Anne Bush:

The fact that many design students misunderstand the role of discourse in visual communication is partially a factor of the history of design education, which has, for the most part, traditionally clung to two seemingly opposite definitions of its activity: one grounded vague notions of self expression and creativity, the other in in scientific method. (Bush, 2001, p 78)

The scientific method that Bush refers to is the idea that design is about communicating facts and data, yet despite the need for designers to understand *how to* communicate ideas, quite often they are unable to reflect on or contextualize the design work that they have made. The teaching of theory in a blended manner and relating it back to student practice is integral to overcoming these hurdles.

## III. Practice-based and Practice-led research

In the HE sector there is a shift towards actively engaging students in research projects as part of their learning process. This is an experiential model approach, which challenges traditional notions of classroom/ lecture theatre based learning, and aims to make learning more relevant to students. McClellan and Hyle investigate engaging students in real-life research situations in detail, with a study conducted in their Doctoral programme. The findings highlight how both researchers and students benefitted: “Most importantly, students spoke about their reflection and self-discovery, of insight gained from the dissolving of the classroom borders and stepping into the world of researchers” (McClellan and Hyle, 2012, p 251).

Defining practice-based and led research is important is because students now are expected to engage in this at honours level and above, so clarity is needed. With art and design, research is a little more complex than other more traditional research methodologies, because there is now a differentiation between research into art history and theory, and research which is embedded in the making of artefacts. Art practice-based and led research methods have are relatively “new” – since the 1970’s (Sullivan, 2005) - in the context of academic research, and as such there are many debates on what exactly this entails, and how practice-based/ -le research differs from the actual making of artworks. In essence, the differences between practice based research and the practice of art are based on the way that knowledge is made and viewed, where research outcomes are steeped in the generation of new knowledge (Sullivan, 2005).

Linda Candy breaks this down further, in the book *Interacting: Art, Research and the Creative Practitioner* and provides a definition of practice-based versus practice-led research, saying: “If the research process is primarily based around making an artefact, the research could be said to be practice-based. If the research leads primarily to new understandings about practice, it is practice-led” (Candy, 2011) She then goes on to say:

In practice-based research, any claims of originality and contribution to knowledge may be demonstrated through artefacts created during the research process, such as artworks, musical compositions, performances and interactive new media installations. A full understanding of the significance of the research can only be obtained with direct reference to the artefacts in whatever form they take... In this form of practitioner research, the artefact becomes a basis for exploring ideas through making. Thus, the research is dependent upon the creation of an artefact and it is also difficult,

if not impossible to understand its significance without direct experience of the artefact itself. (Candy, 2011, p. 36)

Candy explains how practice-led research is not necessarily dependent on the making process and is not artefact driven. Practice could take any form, not necessarily that of artistic practice and she uses the example of a teacher-researcher to illustrate her point. In the teaching of art and design students it is important that they are aware of these debates and understand what their own art practice is about, in order to apply it in the right contexts, and develop their skills and thinking as innovation practitioners.

### **A Pedagogic model for Art & Design**

At Abertay University, The Strategic Plan documentation (2011 - 2015) has identified that key academic objectives in learning and teaching aim to:

1. Develop innovative learning environments that reflect real-world challenges and approaches to work
2. Use active enquiry and project-based activity to ensure our students can purposefully access and evaluate information
3. Develop graduates who, through exhibiting the Abertay Graduate Attributes, can contribute to, and shape, future economies and society.

The pedagogic model being proposed addresses these key objectives through a reflective, iterative approach which is modeled on the ways in which artists and designer work in the studio, in an environment that addresses all three of the above academic objectives, and provides students with critical thinking skills and self-discipline, but also encourages risk taking and innovation.

It starts with the idea of teaching students established “rules” (for example, sans serif fonts are best for reading on screen) explicitly so that, should they need to, later they can then go ahead and break them for the right reasons. This approach underpins knowledge in early HE years, but as students mature and gain confidence, boundaries and strict briefs are taken away and students are given the freedom to break rules and challenge conventions to push practical and critical boundaries that make them successful artists, designers and researchers. This taking away of boundaries, for many students is actually quite an intimidating situation, but necessary for them to understand themselves as creative practitioners and to set their own boundaries.

Teaching artists and designers is about forcing students out of the complacency of their comfort zones, about sometimes playing devil’s advocate, and about sometimes deliberately provoking students with outrageous ideas, so preposterous that they have no choice but to actively respond to what is being presented to them. It is also about being an active creative practitioner oneself, so that not only do the students have a positive role model, and know that the person leading them is an expert in their field, but also so an empathetic learning environment is created. Often, and particularly at higher levels, the relationship is more one of mentorship. In this way, the pedagogy is learner-centric with a focus on how students are responding to the stimuli in their learning environment, and the artworks and designs they are creating to reflect on these experiences.

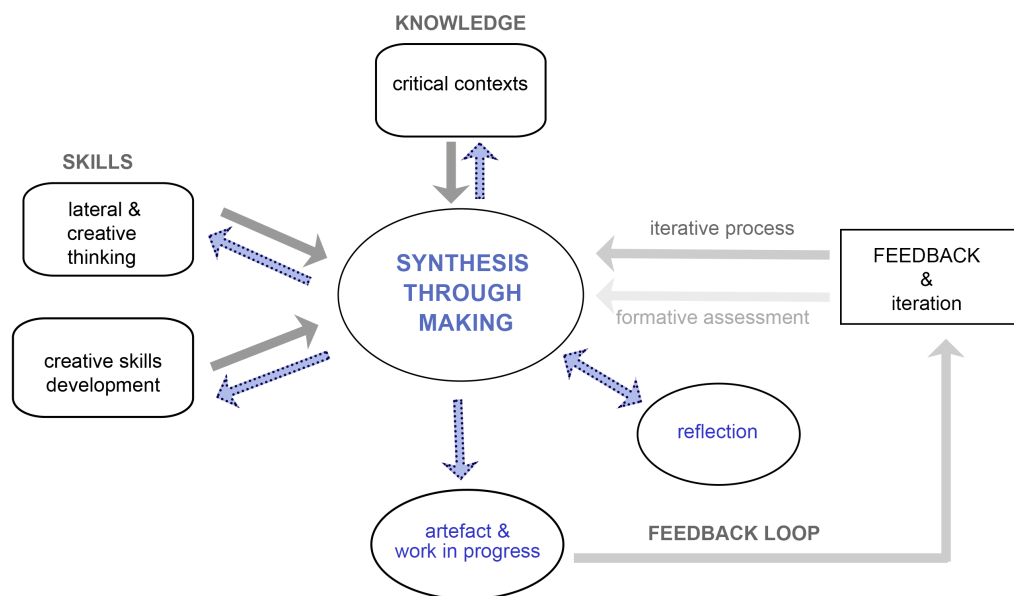
This approach is similar to that identified by Paulo Friere in *The Pedagogy of the Oppressed* (1993). It challenges traditional pedagogic models that are teacher centric where emphasis is placed on the teacher’s unquestionable infallibility and superior knowledge. In contrast, Friere presents “problem-posing education” (Kolb & Kolb, 2009) where student and teacher are on equal footing as individuals whose life experiences are important in the learning process, and encourages students to be critical of their learning experiences.

Because the actual making process is so integral to developing as an art or design practitioner, the

role of the learner is an active one, with experiential learning at its heart. In art and design, learning emphasis is placed on process, rather than final outcome because making a piece of art is a reflective, iterative process and it is through this cycle that the student learns. Based on work by Rogers and Friere examining learner self-identity, Kolb’s Experiential Learning Theory (ELT), also has an emphasis on process where:

In ELT people who see themselves as learners are those who trust their direct personal experiences and their ability to learn from them. Their primary focus is not on immediate performance or goal achievements but on the ongoing process of learning from these experiences. Instead of desiring some fixed goal, they prefer the excitement of being in the process of potentialities being born. (Kolb & Kolb 2009).

Artists and designers fit particularity well with this model for often it is the “excitement of being in the process of potentialities being born” that drives their creative energy, and figure 1 illustrates how this pedagogic model works, where knowledge and skills are given to the learner to synthesize through making and reflect upon through iterative processes.



**Figure 1:** A pedagogic model for art and design

In this illustration, the arrows outlined in dotted lines indicate the activity that learner undertakes, showing that in some cases the processes of developing skills and knowledge generates more skills and knowledge where the learner acts upon what their teacher has provided them, indicated in grey. The critical contexts that a student is given are from a range of areas such as belief systems, cultural contexts, critical theory and technologies and their impact. Thinking skills focus on critical reading, discussion and reflection, whilst creative skills focus on mastering the tools pertinent to the artist or designer’s chosen media, as well as developing abilities in core creative skills, such as drawing.

This reflective and iterative model is similar to Gibb’s Reflective Cycle in that the learner’s journey is one that takes feelings into consideration and actively encourages students to write about their learning experiences. In this case, the learner is also a maker and synthesizes their knowledge through the process of making, reflecting upon what they have made and through gaining formative feedback from their teacher in order to iterate on their work. When an artifact is created, this then becomes part of a feedback loop where the teacher can provide feedback to the learner either to feed

an iterative process, or to enable learning for future projects. This also allows for the reduction of boundaries at higher levels of learning so that the focus becomes art and design process led, rather than being driven by showing key facts have been learned.

The “synthesis through making” phase at the heart of this model is based on the idea that the making process is a means of enabling practitioners to turn tacit knowledge into that which is explicit (Gray and Malins, 2004), and is key to both learning in art and design as well as practice-based. The briefs and learning outcomes given to the student by the teacher are an opportunity to implement the first of Abertay’s University’s academic objectives in the strategic plan, by providing briefs that reflect real life situations to which the students can respond. The making process means that work tends to be project based, aligning with the second of the Abertay University’s academic objectives in the strategic plan. By facilitating and encouraging risk taking, reflection and innovation in the creation of work, the third of Abertay’s academic objectives can be achieved, to nurture art and design graduates who contribute to, and shape, future economies and society.

## Conclusion

The education of artists and designers is an iterative process, where making is integral to becoming a successful innovative practitioner. This means that a pedagogic model in this field needs to reflect the iterative nature of the making process. Based on experiential learning this pedagogic model is a flexible cyclic process which enables the synthesis of knowledge and creative and practical skills in order to push boundaries to challenge and nurture new generations of confident, innovative and reflective creative practitioners.

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## Teaching 1



# Integration of problem-based learning into 1<sup>st</sup> year biology teaching at Abertay University

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## Abstract

Transformational changes in science education and practice mean the traditional didactic methods used in teaching and learning are not sufficient for the skills our graduates need in employment or in postgraduate education. Step changes in technology and the vast amount of information now available across the science disciplines, including biology mean as well as core knowledge, science programmes need to develop the skills to deal with novel complex problems and challenges graduates will be expected and required to deal with. To promote development of these skills, a new pedagogical model has been proposed in this paper to integrate problem-based learning into first-year biology modules. The rationale and benefits are discussed in this paper, with a new model for delivery within the biology modules at level 7 at Abertay University.

**Keywords:** Problem-based learning, biology, constructionism, laboratory skills, group-work, feedback.

## Introduction

Biology is a core component of teaching on numerous degree programmes at Abertay University, and the biology team in the School of Science, Engineering and Technology co-teach numerous modules at SCQF level 7 and 8 on the Biomedical Science, Forensic Sciences and Forensic Psychobiology (School of Health Sciences) degree programmes. The teaching of science goes back centuries, and has traditionally been delivered in a very didactic way where the lecturer is central and the students are there to absorb and recite information. This has mostly been delivered via lectures, with increasing use of tutorials to back up the lectures over the last few decades. Laboratory skills, essential in science practice, are also part of the delivery, however from a student's point of view are often separate to the more theoretical parts of the course. Life sciences themselves have undergone transformational changes over the last few decades and the skills and abilities required in the workplace are no longer the same as they traditionally were (Coward and Grey, 2014). The development of the internet, computer technologies, and the easy access of the vast and exponentially increasing amount of biological information make the traditional modes of teaching for 'rote learning' no longer suitable for graduates in today's workplace. Increasingly our graduates not only need the basic understanding of biology and biological chemistry, but the skills which allow them to work on novel or unknown subjects and deal with the increasing complexity we are faced with working in science.

The purpose of this paper is therefore to outline a pedagogical model to integrate and enhance the teaching of biology to 1<sup>st</sup> year undergraduates at Abertay University, leveraging the benefits to the students of the new academic timetable and introduction of problem-based learning (student-centered) from the start of their degree programme to make them more skilled for employment or further study/research in science.

## Current delivery of biology teaching

Basic biology teaching is essential to the development of students in the programmes covered to give them the knowledge, skills and academic attributes required to succeed in the latter parts of their degree. Core biology at level 7 is currently taught within 3 modules, two in semester one (BI0701A and BI0703A) and one in semester two (BI0702A). Both Biomedical Science and Forensic Science students are required to take all three, and Forensic Psychobiology students undertake the core theory modules (BI0701A and BI0702A), one in each semester. BI0701A and BI0702A cover the basic theory parts of biology, which in some part revise and expand material, delivered at Higher level

or equivalent at school. Integrated into BI0702A is a practical component, where laboratory exercises where some basic biological principles are tested. BI0703A is a 'skills' module totally composed of weekly laboratory practicals to develop laboratory skills, an essential ability of graduates in science disciplines. Scientific numeracy and basic statistics is also covered in BI0703A, using Blackboard VLE for online instruction and practice tests, together with tutorials and is included throughout the practicals to ensure these essential skills are embedded from the start of the degree programmes. Currently there is no problem-based or student-led learning in the biology provision at level 7, and beyond the numeracy skills where the students set their own pace (with guidance) and guide their own learning with tests where they can measure their own performance before summative assessment.

### **Rationale for developing a different pedagogic model for biology teaching**

Major changes have been taking place in education at all levels over the last decade, with the widespread use of modern technology, developments in pedagogical theory and much more emphasis on continual learning. The Scottish government is also implementing its Curriculum for Excellence (CfE), which will have an obvious impact on new university entrants. The CfE aims to achieve 'personal fulfilment and enterprise, employability and adaptability, active citizenship and social inclusion' (Learning and Teaching Scotland, 2011). Other strategic documents from the Scottish government, which may impact upon university science teaching, include an advisory report on 'Supporting Scotland's STEM Education and Culture' (2012) as key drivers for economic growth. These aim to create quality learning provision to train people with skills in these areas, making them more employable and expand this area of excellence in the Scottish economy. There is therefore a pressing need and opportunity to develop undergraduate science training to meet the strategic policies of the government and help develop people with the skills and knowledge to grow the local economy and help improve the social impact of the university in the local community, which is an important component of Abertay University's (formally University of Abertay Dundee) strategic plan 2011-15.

### **Main Pedagogical Theories in Higher Education**

The most common learning theories applied in Higher Education are behaviorist, cognitive and constructionist (Sawkat *et al.*, 2010). Behaviourist theory evolved from John Watson, 1913 who believed that students learn best through conditioning, basically to memorise facts. This was largely the model employed by traditional universities in the first half of the 20<sup>th</sup> century. The problem with this is that the student is not encouraged to question or explore the subject and gain a deeper understanding of the subject matter. It also does not help with the expected attributes of a graduate who can do a lot more than memorise and recite information.

Tamez and Surles (2004) more appropriately describe learning as a relationship between the learner and the environment, their present and past experience, curiosity to know and the social interaction between each of us. Cognitive theory states that we learn by sequential building of knowledge in a structured way, developing the capacity for recollection, analysis, reflection, application, creation, understanding, and evaluation (Bruner 1960). Together these capabilities map very well to Bloom's taxonomy, which shows the hierarchical nature of lower to higher order learning and abilities (Bloom, 1994). It should also be noted that the foundation of cognitive learning is based upon behavioural theory where the student does need lecture-led or directed learning to gain some basic understanding of the subject matter, including the explanation of technical terminology employed in science. This quickly goes beyond that to allow and encourage students to undertake deeper analysis and reflection, and hopefully lead to the evaluative and creative abilities in Bloom's taxonomy.

Appropriate, lecturer-led scaffolding needs to be embedded in the curriculum and models of teaching employed in every course, to allow for this learning to develop. Constructionism theory builds upon cognitivism and states that new knowledge and abilities are constructed from existing knowledge.

Jean Piaget (1926) and Jerome Bruner (1960) were early proponents of constructivist theory in learning, and developed methods to engage students in activities to build upon existing knowledge. Kolb (1984) takes this further to encourage the use of reflecting on experience to improve learning, and by iteratively using these experiences develop the skills and knowledge which can then be applied in new situations. In this model of learning, the students are at the center- and are highly involved and directing their own learning. In this model the lecturer acts as a facilitator of learning, helping guide rather than directly dictate what the students should be learning.

Understanding how individuals learn is becoming an increasingly important area of research and should be used to help develop our teaching practices. It is also generally accepted that students have different learning styles, and it is vital for engagement that our curriculum design is done in such a way to allow for all these learning styles and promote engagement of as many students as possible. Indeed evidence suggests that engagement is one of the most important issues for achievement and learning in higher education (Pascarella & Terenzini, 2005 and Kahu, 2013). Abertay University has developed a Learning and Teaching Enhancement Strategy (Abertay University, 2013), a major component of which states 'The first year will form an important foundation, critically engaging students in university education, offering a combination of breadth and depth of knowledge and experiences that will provide wider inspiration developed further during programmes' following stages'. Indeed evidence from Felder and Spurlin, 2005 suggests that when learning styles are seriously mismatched to individual student learning styles, the students are likely to be inattentive and bored, leading to poor performance. Student engagement is therefore essential for learning, as observed by Blended learning approaches at level 7 are therefore paramount to improving student engagement, and the model for biology teaching explained below has taken this approach, blending the use of styles to include lectures, tutorials and practical instruction classes in the more traditional behaviorist vein, but taking a much more constructionist, student-led approach through problem based learning (both theoretical and laboratory skills) in the latter half of the modules.

### **Problem-based learning**

Problem-based learning (PBL) is a specific type of enquiry based or active learning where students create and solve a problem. This is almost always done in small groups where students start with 'brainstorming'- working out what the question is, what they already know and what they need to research or learn about to solve the problem. Lecturers in these activities act as facilitators helping where necessary, but the students themselves direct the project to solve the problem (Savery and Duffy 1995 and Hmelo-Silver *et al.* 2007). A summary flow diagram of a typical PBL is shown in figure 1 below, and shows the iterative steps to follow during a PBL assignment, with the cycle repeated as many times as necessary until a solution to the problem is generated.

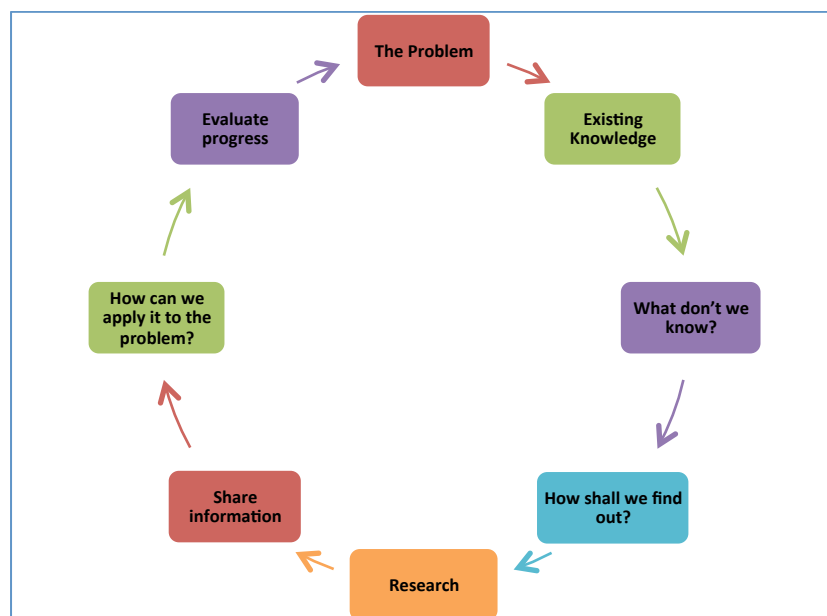
Enthusiastic practitioners of PBL suggest it develops critical thinking and more advanced understanding (Kilroy 2004) and general ability to problem-solve. Indeed Dolmans *et al.*, 2005 go so far as to say students who partake in regular PBL exercises are more 'adept at transferring knowledge', a skill we all want from our students, but find it difficult to achieve. Problem-Based Learning has the potential to allow students to develop skills for the workplace, fitting in with both government and university policies to produce graduates with high employability skills, as previously described. One potential issue with PBL in science teaching is the need for knowledge and language to begin to solve problems, so it is essential any teaching using this method is scaffolded to support the students, and facilitation is there to help them access the information they need.

There are many examples of PBL introduced into courses, but there is little definitive evidence of the benefits. One example where PBL was used and analysed in a science course is from Williams *et al.*, 2010, who successfully introduced PBL to a 1<sup>st</sup> year introductory inorganic/physical chemistry. They state that this led to grades in class tests and exams as good as before the introduction of PBL, but also 'students appeared to show an improvement in, and recognition of the acquisition of transferable skills and that group work on immediate arrival at university (representing an opportunity to use social

skills within an academic exercise) led to high student retention within the PBL cohort'. These are important skills as previously discussed, and retention is always an issue in universities (Kahu, 2013), which are not easily addressed, and PBL may play an important role in engagement.

When examining feedback and performance indicators (PIs) from the current modules, it is clear that students do better in the practical based summative assessments, however often comment that there is no time to understand why they are doing the practical's they do. Although the students are given the lab protocols in advance, there is no opportunity to critically evaluate or gain a deeper understanding of what they undertake. In addition, assessment of these labs is done, via submission of lab sheets with results and answers to questions at the end of a lab session, giving no time for reflection and deeper understand of what they have done, and how it could be improved. These are all skills which students need, and it could be argued that they develop in later years- but, in the author's opinion, these processes and analyses should be started as early as possible, in a structured way so that our graduates are much more comfortable and able to partake in the higher levels of Bloom's taxonomy when moving onto new studies or jobs.

The major driver for enhancing the pedagogical model for biology teaching is therefore to embed problem-based learning to allow student to plan experiments or topics of study to answer a biological question they set, undertake the experiments or research, reflect upon results and have a chance to improve the experiment in a repeat session, together with proper analysis and conclusions from the data they collect. This should give much more ownership, and hopefully a deeper understanding of the subjects, and skills we want our students to have with regard to the learning outcomes and beyond.



**Figure 1:** Diagram of PBL process cycle beginning at the problem, and the iterative steps until the problem is solved.

## Feedback

Feedback is a continual issue for most higher education institutions, where students give a much lower rating for the feedback they are given compared to other metrics, consistently highlighted by the annual National Student Surveys (NSS) and analysed by Williams & Kane, 2008 for the 2007 NSS. The new academic calendar with a 'structured feedback' week breaking the semester will give an ideal opportunity to give high quality, direct individual feedback to all students at this important time at the beginning of their programme. It must be designed to help the student improve their work, and

many studies, including Price *et al.* 2010, demonstrate that students benefit from constructive feedback to allow them to improve their performance for a summative assessment

### **Pedagogic model for contemporary biology teaching at Abertay University**

The major driver for the pedagogical model chosen is the introduction of problem-based learning, and student centered learning to complement and integrate biology theory and practical skills, including planning, analyzing, decision making and working in groups, as discussed above. Additional value of this teaching model is related to Abertay attributes (Abertay University, 2014) where students should have the following attributes: 1) Intellectual- understanding how their topic interacts with other subjects, understand how to collect, process and disseminate information, critical evaluation, 2) Professional- solving problems, making decisions, tackling complexity, using judgment, working independently and collectively, 3) Personal- be responsive and responsible, articulate and adaptable, honesty and integrity.

The new structure would be to merge BI0701A and BI0703A into one 30 credit module combining the early theory and practical skills in biology. A second module in semester 2 would remain, but utilize more problem-based learning for the practical portion of existing module. The new biology module (BI0707A) would have a reduced amount of lecturing hours (24 instead of 36), with 2 x 1 hour per week each with the same lecturer throughout. In order to accommodate this, some of the theory will be updated, given that the majority of students in this module have a qualification in Higher Biology or Human Biology. Support will also be offered to any students who have not studied biology through extra reading and optional tutorials if required. Some of the material traditionally delivered via lectures will be covered in tutorial based, problem-based learning exercises. One will cover physiology and the other genetics (which was previously mostly a repeat of higher biology/human biology). During these students will work in groups of 4-5 to formulate a relevant question, research it and report back as a group.

The laboratory practical's will be reduced in number from 12 to 7, taking out some of the repeat and unnecessary components of a historical nature. All of these 'core' labs will take place in Teaching weeks 1-6, and a checklist of 'skills' will be signed off by the lecturer as they are demonstrated in class. After feedback week, where students will be given 1:1 feedback on their lab-book from the first 7 labs, to help them improve in the summative part thereafter. The latter section of the semester will move to a PBL lab, the subject of which is milk analysis. Several tutorial sessions will be timetabled to allow the same groups of 4-5 students to formulate a question regarding 'which is in milk, or the differences between different milks'. They will then do some research and plan experiments to carry out to answer the question. The experiments will be carried out, data analysed and improvements made for a repeat of the experiment. This will give the students ownership of their work, hopefully engaging them and allowing them experience beyond the basic lab skills as listed above.

The numeracy and statistics component of the module will remain as is, because it works very well, allows unlimited formative assessment using online tests- with support in the form of weekly tutorial sessions in weeks 1-6, and a general feedback session during feedback week for each tutorial group.

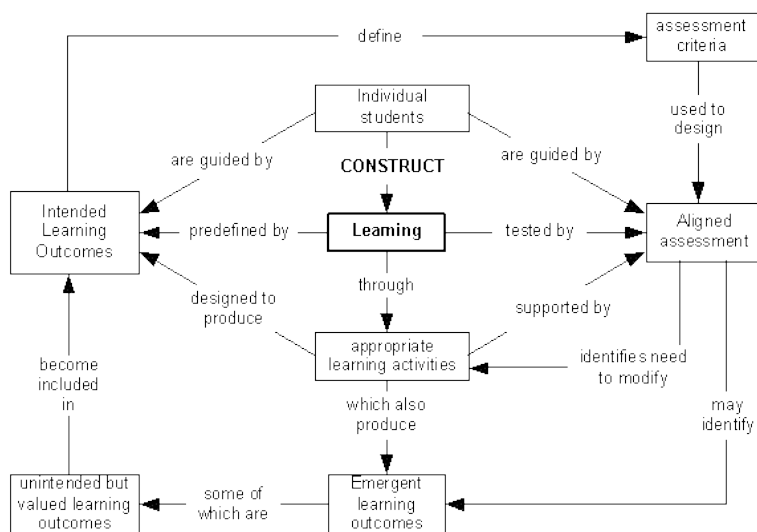
BI0702A will remain similar to its current form for this first year, but if the changes to the first semester biology is successful, this should be implemented in that module too. This will mean that the major changes are focused on one semester- and give time for proper evaluation.

### **Assessment in the new biology teaching model**

There are no major changes to the learning outcomes for these modules, however Abertay's learning and teaching strategy, particularly reducing summative assessment, means there should be a maximum of 3 units of assessment. The Numeracy section will be given a 10% weighting and given as a class test in week 9. Laboratory skills will be assessed via the 'skills checklist' together with the

laboratory-notebook against criteria clearly laid out for the students at the beginning of the module, and have a 60% weighting. The final assessment will be an electronic MCQ exam during exam week covering all the theory, and material from the tutorials. This will have a 30% weighting.

All these assessments have been designed with curriculum alignment in mind, to ensure we are assessing against the learning outcomes of the new module. Biggs (2003) states that his theory of curriculum alignment 'is an approach to curriculum design that optimizes the conditions for quality learning'. Figure 2 below (taken from Haughton and Warren, 2004) shows how learning is center to all the outcomes, assessment criteria and teaching methods used. This is always an iterative process, and should be examined upon module review/enhancement.



**Figure 2:** Concept map of the curriculum design process

### Evaluation of Proposed Model

The proposed model above is a major change from the previous delivery of core biology at Abertay. Evaluation of how it works is obviously essential. Common metrics, such as PIs as well as feedback from both students and staff must be collected and analysed to improve the modules in an iterative manner.

Abertay is also undertaking a total curriculum review, and moving to a 20 credit based module system. The design of this module (30 credits) has also taken into account this future move, where the core changes to PBL, if successful, will be maintained and a large portion of the lecture and tutorial material regarding human body systems will be moved to a physiology based module.

### Conclusion

The proposed pedagogical model discussed above is designed to meet the skills that will be required of all our future graduates. It leverages modes of teaching which are shown to be successful in current Higher Education Teaching and aligns to the changes in learning and teaching within Abertay as well as the Scottish Government policy where science provision is of paramount importance both socially and economically. If successful, the use of PBL will be improved, and promoted in more modules across all levels in our programmes.

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# Teaching Statistics to Biology students at Abertay: would an integrative teaching approach help or hinder their learning?

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## Abstract

Statistical skills are becoming more important for graduates in the STEM sector. However, in many courses in these fields, statistics is not integrated in the rest of the curriculum, even though such an approach can be very beneficial for acquiring such skills. Integrating statistics in the rest of the curriculum can facilitate so called deep learning to enhance a relational and abstract understanding of statistics with the rest of their learning. This paper discusses some of the few available studies that tested the effect of integrating statistics in biology undergraduate classes. It consequently discusses how such an approach would align with the Abertay Graduate attributes and the Abertay Employability Strategy.

**Key words:** statistics, math anxiety, employability skills, integrated learning, graduate attributes

## Introduction

*“Statistical thinking will one day be as necessary for efficient citizenship as the ability to read or write”-*  
H.G. Wells.

Being proficient with statistics is regarded as an important mathematical skill by employers in the [science](#), [technology](#), [engineering](#), and [mathematics](#) (STEM) sector. In a recent report from the Royal Society about mathematics in the workplace and higher education, serious concerns were expressed by employers at the NHS about the lack about the statistical sophistication of many decision makers in the health sector (Advisory Committee on Mathematics Education- The Royal Society, 2011). The Lords' Committee on Science and Technology concluded similarly that the UK needs not only more students in the STEM fields, but also that their math skills need to improve before starting these studies (House of Lords, 2012). Particularly the pharmaceutical industry needs biology graduates with good statistical skills, according to Sir Wakeham from this committee (BBC, 2012). Not only committees point towards such a need in the STEM fields. International advertisements looking for graduated biologists (ranging from conservation biology to bioinformatics) showed that the most frequently requested skills by employers were analytical and statistical skills (Blickley et al., 2012, Hill et al 2010). Overall, analytical and statistical skills are highly desired skills for graduates from the STEM fields, including the fields of biology and medical biology.

It is therefore surprising, or at least a contrast, that students themselves do not see statistical proficiency as a skill that will make them more employable. In a workshop at the Teaching and Learning Enhancement conference at Abertay University in 2014, a student survey regarding students' ideas about their own employability was presented. One of the results showed that Abertay students regarded statistical skills as not important for their future employability at all (ATLEF, 2014). Likewise, when I taught statistics to Biomedical Science students in stage 2, 3 and 4 during the first and second semester of 2014-2015, I have been surprised by students repeatedly asking me the relevance for statistical analyses, and how this skill could actually benefit them.

Next to not viewing it as an important (employability) skill, students tend to find statistics a difficult topic to study (Garfield, 1995, Garfield and Ben-Zvi, 2007). For example, a questionnaire amongst post-graduate students in Lancaster showed that at least 50% of these students (strongly) agreed that they find it hard to work independently on a statistics project. Furthermore, 43% percent of this group agreed with the statement *‘I do not feel able to use statistical analyses’* and 85% of respondents agreed or strongly agreed with the statement *‘I feel that my statistics knowledge needs to be improved’* (Allen et al. 2010). Overall, many students view a required statistics course mostly as an obstacle to overcome: the statistics course is something to successfully complete in order to fulfil the necessary requirements of their major, rather than something that will help them in the rest of their degree or in their career (Dunn, 2000, Laher, et al., 2007). The observations in these studies are again similar to what I have heard some of my own students say. For example, from the 'Food and Nutrition' students in stage 3 in my statistics classes in 2014, I estimate about 20% vocalised their concerns to me about being able to do statistics by claiming they are 'not good at math' or 'not good with computers and numbers', while in addition asking me questions about the use of the course.



The student attitudes toward learning statistics are important because they are related to their learning process and how well the intended learning outcomes are achieved. In the field of statistics teaching, attitudes towards the topic have been related to the development of statistical thinking skills, the degree to which statistics will be used outside of the classroom, the likelihood of enrolling in future statistics related courses, persistence in the courses, and the eventual achievements (Gal et al., 1997; Hilton et al., 2004). In fact, there is research supporting the notion that negative attitudes toward statistics are related to worse performance in class (e.g. Waters et al., 1988). Some statistics teachers have suggested that in order to improve statistics learning, this topic should be integrated more in the other topics of the curriculum (Moore, 1997). In this essay, I will review some theory behind the observations above and reasons for integrating statistics teaching in the general biology curriculum. I will consequently review some practical studies that have attempted to do this. Finally, I will discuss how this acquired knowledge can be of use in designing integrated statistics teaching at Abertay University.

### **Integrative teaching, constructive alignment and deep learning**

For teaching statistics, Moore (1997) suggested that “the most effective learning takes place when content (what we want students to learn), pedagogy (what we do to help them learn) and technology reinforce each other in a balanced manner”. This resonates with what Biggs and Tang (2007) have put forward regarding ‘constructive alignment’. In short, constructive alignment is a form of outcome based learning activities that aligns teaching and assessment to the intended learning outcomes. How then would an integrative approach to teaching statistics (the pedagogy) better align the learning outcomes, content, and assessment in our case?

Intended learning outcomes in statistics teaching generally encompass the students being able to i) explore data, ii) select appropriate tests for an analysis, iii) perform the selected statistical test, and iv) explain the results. In order to achieve these learning outcomes in a meaningful way, it is important that students achieve a deep understanding of the material, rather than just being able to superficially restate facts about statistical tests. Biggs and Tang (2007) identified five different levels of understanding, ranging from pre-structural (*i.e.* students failing to understand) to uni-structural, multi-structural, relational and eventually to an extended abstract understanding. For performing statistical tests, only a uni- or multi-structural level of understanding of statistics and the statistical software is needed. However, for other desired learning outcomes, such as selecting the appropriate tests and explaining the test results, students will need higher levels of understanding. At least a relational level of understanding of statistics, and preferably an extended abstract level would be necessary for this. Especially the extended abstract level of understanding will enable students to apply what they learned in newly encountered circumstances as well. In the end, this is what is envisioned with teaching students how to do statistical analyses.

In order to reach this higher level of understanding, it is important that students engage in so called deep learning, rather than surface learning. Marton and Säljö (1976) were the first to show with their research that a deep learning approach leads to a higher level of understanding of the studied topic. By selecting certain learning activities over others, the students that normally only engage in surface learning will need to engage in deeper learning (Biggs and Tang, 2007). When integrating statistics in the rest of the biology curriculum, this could be achieved by making the test choice (e.g. knowing when to select a t-test) and performing the analyses a part of the course work for the other biology classes. Colon-Berlingeri and Burrowes (2011) did such a thing in their genetics and zoology classes. This kind of learning can also be achieved by including inquiry based statistical learning, as was done by Metz (2008) in the first introductory classes of an undergraduate biology courses. By presenting the students with a biology problem to solve with statistics, or by letting them analyse data they collected, the students are forced to develop a good understanding of the available statistical tests before they can solve the biological problem or question.

### **Attitudes towards learning and ‘math anxiety’**

Deep learning of statistics, however, may not always come easy. Leamson (2002) noted that in general deep learning ‘demands both understanding and remembering of relationships, causes, effects and implications for new or different situations simply cannot be made easy. Such learning depends on students actually restructuring their brains and that demands effort.’ Learning statistics

might even be harder for students, given the negative attitudes some of them hold regarding the topic. As mentioned earlier, attitudes toward statistics are thought to influence the success rate in the class, which will influence how engaged students are, and how successfully they will be able to achieve the learning outcomes (e.g. Gal et al., 1997, Hilton et al., 2004, Waters et al., 1988). So far I identified:

- 1) Negative attitudes towards the usefulness of statistical skills (*i.e.* students do not see it as something that will increase their employability, or something of direct use to them).
- 2) Negative attitudes towards the topic itself and the capacity of students to perform well.

According to Race (2014), the firstly listed negative attitude can be overcome by showing students the usefulness of learning something. He argues that when there is no particular desire in students to learn something new, we can at least try to show them the need to learn it, which will then motivate students to engage more in the topic. Indeed, integrating statistics in the topical courses of the biology curriculum will likely show student the usefulness of statistical analysis better than teaching it separately. However, the latter attitude, concerning the students' worries if they are actually capable enough to do statistical analyses, is not necessarily be challenged by this. On the contrary, the idea that a skill is very important, combined with the conviction that you are inherently bad at it might just enhance, rather than reduce the performance.

Much has been written about a phenomenon called 'math anxiety': the perception of and worry about not being able to do mathematical tasks, independent of the person's actual skill (e.g. Ashcraft and Krause, 2007, Hoffmann 2010). Math anxiety is thought to affect about a quarter of the population, although cultural and gender differences in the percentage of people that are affected have been identified (Hembree 1990). Empirical studies have shown that the levels at which students worry about their mathematical capabilities influences how well they perform in such tasks (e.g. Ashcraft and Kirk 2001, leFevre et al 2005). In general, people that experience high levels of math anxiety demonstrate smaller working memory spans, especially (but not exclusively) when assessed with tasks that involve calculations. Furthermore, students with high levels of math anxiety tend to sacrifice accuracy for speed (Ashcraft and Krause, 2007), which the researchers have interpreted as an avoidance strategy to get the assignments over with. As a consequence, you could question whether integrating statistical learning in other biology courses could actually have some negative consequences; either because students would not engage with the tasks enough through avoiding it as much as possible, or because the math anxiety directly influences the working memory tasks so the learning of the other topics are not optimised.

Even though there has been interest in integrating more mathematics and statistics in other topics such as biology (e.g. Moore 1997), very few studies have been performed that study such potential negative effects of such practices (as opposed to testing the beneficial effects of this kind of integration for the students' mathematical and statistical skills). Madlung et al. (2011) showed that for first year undergraduates, integrating a statistical component into biological coursework (*i.e.* introducing independent t-tests, *p*-values and the analysis of microarrays) had no influence (not positive, nor negative) on student performances in testing for their understanding of the biological interpretation of the biological coursework. They also found that in an advanced plant molecular biology course, adding a quantitative component to the coursework actually increased students' performance. As for students' attitudes towards maths, Arnett and Van Horn (1999) showed that integrating biology and mathematics has as an additional advantage that it makes students more appreciative of mathematics. This could henceforth reduce their anxiety for this topic as part of their biology undergraduate degree.

Overall, not many studies have specifically addressed the effects of integrating statistics in biology undergraduate teaching on student performance for either topic, so there is room for extending research in this domain. It would be of particular interest to monitor students' performance with statistical tests and analyses after their graduation, although such studies might be practically difficult to execute. Nevertheless, the available studies show either positive or neutral effects on student performance in either field. Furthermore, it may even be used as a tool to reduce 'math anxiety' or worries about using statistics in students, which encourages, rather than discourages such practice.

## Integrating statistical teaching at Abertay University

The current curriculum reform at Abertay University offers a unique opportunity to integrate statistics teachings in the other topics of the Biomedical Science undergraduate programme. According to Anne Savage (personal communication), practical sessions that support the classes will become the forum where statistical techniques are introduced and implemented. At the moment, however, the exact form of how this will take place is still being discussed. Nonetheless, implementing the statistical teaching in the rest of the curriculum will align with both the Abertay Graduate attributes and the Abertay Employability Strategies. Graduate attributes are skills, qualities and understandings a university agrees their students should develop during their time with the institution (Bowden et al., 2000). These skills are generic for all the graduates from a university, regardless of the course they have enrolled in. Abertay University has employed Graduate Attributes since 2007 and is currently developing a new set (Director of Teaching and Learning Enhancement, 2014). The graduate attributes are divided in three sub-categories (intellectual, professional, personal) that are all encompassed by a fourth one: active citizen attributes. For the 'intellectual attributes' Abertay will foster individuals to:

Master their subject, understand how it is evolving and how it interacts with other subjects;  
Know how knowledge is generated, processed and disseminated, and how problems are defined and solved;  
Be able to critically evaluate information, and tackle uncertainty and information gaps with confidence and self-awareness.

Through the integration of statistics teaching with other modules (and the consequently improved learning of statistical skills), especially the latter two attributes listed here would benefit. In addition, the Employability Strategies at the Abertay University (Head of Student Services, 2014) ambitions to increase the employability of its graduates. The Higher Education Academy (HEA) identifies employability as:

*a set of achievements, - skills, understandings and personal attributes – that make graduates more likely to gain employment and be successful in their chosen occupations, which benefits themselves, the workforce, the community and the economy (Peg et al., 2012).*

As mentioned in the introduction, several reports about the STEM fields, as well as advertisements for biology graduates have indicated the need for graduates with good and statistical skills. Making the Abertay students more proficient in statistics will therefore increase their employability, and most likely make them more confident in their statistical capacities (*i.e.* reduce their 'math/statistics' anxiety) at the same time.

## Conclusion

Modern biology requires an increasing set of statistical and mathematical skills, and more statistical sophistication of graduates in the STEM sector is desirable. Integrating the teaching of statistical skills more broadly in the undergraduate curriculum of the natural and life sciences can help towards this goal. The studies reported here show that integrating statistics teaching courses can contribute to the enhancement of statistical understanding, and that this most likely will not come at the expense of other learning (although it has to be noted that more studies on this topic are desired). Therefore, the integrated teaching of statistics at Abertay University contributes to both the envisioned Graduate Attributes and the Employability Strategies of this university.

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# **An Investigation of Psychological Investigations**

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## **Abstract**

Successful psychology students are required to understand and apply skills and concepts from research methodology from the outset of their undergraduate career. These transferrable skills are central to accredited psychology courses, and are also highly desirable to future employers. Psychology is a science which attracts a diverse cohort of students from arts and science backgrounds, however, which can present difficulties to students and challenges to educators. To help students to master research methodology, I propose a module with a new, applied approach, Psychological Investigations. This would provide a bridge between the current first year undergraduate psychology modules: Introductory Psychology and Research Methods. In so doing, students would be encouraged to link their learning from across their curriculum. I describe how the module is supported by pedagogical theory, primarily through research-based teaching and contextualised learning which are thought to encourage a deeper learning approach.

**Keywords:** Research Methods, Research-based Learning, Contextualised Learning, Psychology, Pedagogy

## **Introduction**

### ***Teaching Research Methodology to Psychology Undergraduates***

Research is at the very core of the discipline of Psychological Science. Successful practitioners within the teaching of psychology, therefore, must incorporate recent, research findings into their teaching to provide a theoretical basis for knowledge learning, and also must ensure that students develop a sound understanding of research methodology in practical terms. In combination, students of psychology at higher education institutions therefore must be able to understand and critically analyse previous research and to be able to conduct their own, independent research. Indeed, in this way, research and teaching in psychology are interdependent, as was recently emphasised by the regulating body, the British Psychological Society (BPS, 2007, p. 10):

The Society believes that teaching and research are symbiotic, and recognises the value of both activities for the other. Teaching is research led; and excellent research depends upon high quality teaching.

More specifically, both the theory-based and practical skills required of a good researcher are diverse and many. For instance, in terms of theory and conceptual knowledge, psychology undergraduates must develop a thorough understanding of the methodological issues concerning ethics, experimental design and technique, and statistical analysis. This learning of this core knowledge will require scaffolding (Vygotsky, 1978), - appropriate teaching support, to reduce students' zone of proximal development (Vygotsky, 1978). The wider aim of this scaffolding (Vygotsky, 1978) of knowledge, however, is to empower students to be able to critically evaluate the work of other researchers, and also to design and conduct independent research in later years. In practical terms, psychology undergraduates need to be able to analyse both quantitative and qualitative data, and to gain experience on a range of experimental paradigms and technologies. Further, to successfully carry out research, psychology undergraduates at Abertay University and all BPS-accredited institutional programs, must develop skills in project management, organisation, time-keeping, working collaboratively, and report writing (BPS, 2007). The aim of these requirements is to produce a rigorous education of scientific, experimental approaches (BPS, 2007).

Indeed, for a student graduating from a BPS-accredited psychology degree, such as those offered at Abertay University, to be eligible to apply for Chartered Membership of the BPS, the institution conferring the degree must have evidenced a range of stipulated, subject-specific skills. This accreditation is thought to be ultimately beneficial for students as it enhances graduate employability through the development of specified transferrable skills (BPS, 2007). The first of these required skills, as noted by the Quality Assurance Agency's Subject Benchmark Statement for Psychology (2007), involves the ability to identify and evaluate a range of research methods, theories and evidence in psychology from a range of perspectives. Students must also be able to demonstrate an

ability to conduct independent research, analyse the results, and evaluate the research findings of others (BSP, 2007). Across UK higher education establishments, this is formatively demonstrated primarily through a dissertation based on a novel research project which takes place during the final (Honours) year of the undergraduate degree. For students to be able to successfully undertake this substantial piece of work, skills in research methodology should therefore be introduced and developed from the outset of undergraduate study, to foster confidence and competence in research methodology. Indeed, as everyone will be a consumer of data in some form in their lives (Holmes & Beins, 2009), being able to understand, use and evaluate data is of clear importance to individuals and also to wider society.

Happily, these transferrable skills are highly desired by future employers (Quality Assurance Agency, 2000–2002; Quality Assurance Agency, 2007). Indeed, the Dearing Report (NCIHE, 1997; in Fry, Ketteridge & Marshall, 2008; Association of Graduate Recruiters, 2006) indicated that the four most desirable skills, according to future employers, which indicate the success of graduates, are: communication skills, the use of information technology, numeracy, and metacognition (learning how to learn). All of these skills are well-suited to a research-focused teaching environment, where active learning and problem solving are essential to the ultimate goal of conducting independent research. This fits well within the Abertay University context, which places a high importance on learning outcomes which relate to transferable skills and future employability. Indeed, Abertay University's Strategic Plan (2011-2015) clearly states the objective that teaching and learning should reflecting real-world, applied challenges, including through active learning.

### **Challenges**

This learning journey, however, is not without its hurdles. In psychology, teaching of research methodology can present a particular challenge, since psychology students typically comprise a highly varied cohort (e.g., in terms of personality, Zachar & Leong, 1992). Unlike most other higher education disciplines, psychology cohorts typically come from diverse academic backgrounds, - with some coming from arts and humanities backgrounds, whilst others specialised in the natural sciences. This can present particular difficulties, for instance with arts-based students struggling with statistical analysis, and with science-based students doing more poorly on essay writing exercises (e.g. North, 2005). Another significant proportion may not have taken mathematics past a basic level, or may not have encountered it in a long time, since most higher education institutions do not stipulate mathematics as an entry requirement for psychology. The expectation of conducting, analysing and critically evaluating research can therefore be a daunting and unexpected prospect for many students. This anxiety can then relate to a barrier to learning and engagement (e.g., Zimkiewicz et al., 2003). For this reason, engaging students in research skills training, in a research-led teaching environment, from a very early stage of their undergraduate degree is essential to producing successful psychological researchers. Early initiation in research skills aims to 'level the playing field' of this varied group.

At Abertay University, undergraduate psychology students are fortunate in receiving training in research methods from the beginning of their studies. This is largely provided in the form of laboratory-based, practical sessions which focus on the learning of statistical analysis and the use of statistical software packages. These classes focus on equipping students with core, practical knowledge of research analysis which will be required of them throughout their degree. Such core knowledge could be argued to represent threshold concepts (Meyer & Land, 2003; 2005). That is, students must gain understanding of these tests and theories to be able to later apply them flexibly. This approach in isolation, however, may encourage students to take a purely surface approach to learning (Marton, 1975). Students may simply learn the names of the statistical tests, and how they are carried out, rather than thinking more deeply about the relative advantages and disadvantages of certain experimental designs, or the contexts in which their application would be particularly relevant. These abilities are clearly required for students to be able to master the skill of critically evaluating research.

Indeed, it is typically only later that undergraduate psychology students gain real experience and training in a variety of actual research methodologies. Across higher education institutions, it is still convention that undergraduate psychology students do not engage in active research (either as a participant or an experimenter) until they conduct their own dissertation project in the final year of their studies. The common exception to this is undergraduates being required to participate in ongoing,

departmental studies to gain mandatory course credits. The learning merits associated with this system are debatable, as they may also encourage a surface learning approach (i.e., simply attending the experiment to gain the credits rather than gaining learning from the experience, as are the ethical implications (i.e., whether it is appropriate to use students as participants when the gain may be largely on the part of the researcher). Another exception is students who volunteer as research assistants to lecturing staff, however, these activities are considered extra-curricular and these students are in the minority. Thus, it remains apparent that psychology students, particularly early in their undergraduate study, may not be given adequate opportunities to actively engage in practical research in a learning context. This is surprising, since having active engagement in research embedded in the curriculum for first year psychology students would be likely to highly benefit learning of research methods in a wider context.

### **Psychological Investigations**

At Abertay University, however, this is set to change, with the introduction of a new first year psychology module in the coming academic year which I am currently designing. Conceptually, this module can be considered as a bridge between the current two first year psychology modules which are mandatory, - Introductory Psychology, - which introduces pivotal theory and research from various domains of psychology (e.g., social, cognitive, biological, and so on) and Research Methods, - which focuses on research analysis. First year students will learn about famous research in Introductory Psychology, they will gain hands-on experience of similar research in Psychological Investigations, and finally they will learn how to analyse such research in Research Methods. A goal of this module is thus to contextualise learning, as students engage with research in terms of theory, practice and analysis.

Pragmatically, it is currently thought that Psychological Investigations classes will primarily consist of practical sessions, with groups of approximately thirty students attending on alternate weeks for sessions lasting one and a half hours. Before each session, students will have been asked to read an agreed research paper which relates to the practical demonstration and answer some brief questions on it. Such pre-practical exercises (Carnduff and Reid, 2003) could be provided via a Virtual Learning Environment such as Pebble Pad. Upon arriving, I will first spend a short time recapping the paper, to ensure that all students gained an understanding its theoretical and practical relevance. This will allow for scaffolding (Vygotsky, 1978) of knowledge, so that all students have the understanding to then engage fully with the practical exercise. Discussion points will also be raised, which will be returned to at the end of the session. During the body of the practical session, students will act either as participants or experimenters in the practical demonstration. Over the year, these demonstrations will aim to involve a range of experimental techniques and will be pertinent to a range of psychological theories. Ideally, the theories encountered in Psychological Investigations will coincide with those being taught in Introductory Psychology, so that the links between modules can be clearly made. This linking aims to encourage a deep approach to learning (Marton, 1975). Finally, at the end of the session, students will be engaged in critical discussions pertaining to the research demonstration, such as ethical considerations and potential sources of experimental bias or error. Students will also be encouraged to extend these considerations to the wider research context, such as whether similar issues may have applied to the original research paper.

Psychological Investigations therefore aims to engage students in active learning exercises, where students gain practical experience of research which is then applied to a wider theoretical context. This aims to encourage insights and critical thinking through deep learning. Finally, an objective of this module is to make research 'real' to students, and to emphasise the scientific nature of the discipline, along with the relative advantages and disadvantages of a scientific approach. The design of Psychological Investigations was founded on two core pedagogical principles: research-based teaching and contextualised learning, which will be elaborated on next.

### **Research-based Teaching**

The fundamental significance of the synergy between research and teaching has been highlighted as essential to the successful production of learning in psychology (e.g., BPS, 2007), and in higher education in general. For instance, Jenkins, Healey and Zetter (2007) emphasise that embedding research (taken as 'scholarship,' Boyer, 1990; Glassick et al., 1996) in the student learning experience is an essential part of all tertiary education subjects, and it is important to remember that



learning is the outcome of both teaching and research (Brew & Boud, 1995). Careful course design, including constructive alignment (Biggs, 1999) of learning outcomes and assessment criteria will also aim to strengthen the link between teaching and research. Jenkins and colleagues (2007) also make a number of suggestions as to make research-teaching links more explicit, including by expanding students' understanding of the role of research in their own subject and by developing students' specific research-method abilities.

Importantly, Jenkins and colleagues' (2007) research-teaching nexus distinguishes between teaching which is research-led (which involves the transmission of research findings primarily through knowledge transfer), research-oriented (where students learn about the research process such as how knowledge is actually produced), research-based (where students actively learn as researchers, such as analysing data in interactive sessions) and research-tutored (involving small group based discussions concerning research findings) (Jenkins et al., 2007; Griffith, 2004; Healey, 2005a). Each of these learning types can be considered as appearing along a continuum, from students being treated as passive, audience members to active participants in research, and from the stress being on research content to problem-based learning (Jenkins et al., 2007).

In regards to the new Psychological Investigations module, this module aims to involve students as active participants in learning and thus, it will employ research-tutored and primarily research-based styles. Research-based teaching has been demonstrated to aid learning in scientific disciplines. Jenkins and colleagues (2007) note, however, that other UK academics have reported problems with students and colleagues who question the learning value of research-based classes (Booth & Harrington, 2003; Murtonen, 2005; in Jenkins et al., 2007). It will be necessary, therefore, to also emphasise to students the application of research-based skills and methodology to their undergraduate and professional careers (Jenkins et al., 2003; Healey & Jenkins, 2006).

For example, practical, research-based laboratory classes are vital to learning, particularly in scientific subjects (Overton, 2003), such as psychology, where students partake in and learn to carry out scientific research. Learning of these transferrable, research skills are more important now than ever, when employers are explicitly stating the appeal of abilities in graduates (NCIHE, 1997), and when concurrently, many graduates are protesting that they are not properly equipped to carry out such practical skills in their early employment (Brown et al., 2005; in Fry et al., 2008). Explaining these benefits to students, therefore, should help them to engage with the learning material (e.g., Knowles, 1984). Finally, research-based teaching should also benefit the active development of teaching practitioners. Kane, Sandretto and Heath (2004) conducted an empirical study into what makes an excellent tertiary educator by investigating a group of outstanding teachers and their teaching practice. Interestingly, they found that excellent teachers emphasized the link between teaching and research (as well as interpersonal relationships). This was achieved through active and ongoing reflection on their teaching practises.

### **Contextualised Learning for Deeper Understanding**

The conceptual foundation of the Psychological Investigations module is also based on the pedagogical premise that students will benefit from learning in context. By actively taking part in research and relating their experience to theory and methodological issues, the goal is that students will be encouraged to learn through context-based discovery. This relates to a modified social theory of learning (Bandura, 1977), coined 'situated learning' by Lave and Wenger (1991). Situated learning emphasises the importance of learning occurring in context, and also that the learner should work collaboratively with others to form a collective understanding of a topic as part of a community of practice (Wenger, 1998). According to this view, learning should occur between individuals and in appropriate, social and contextualised environments. This notion fits well with the principles underlying the Psychological Investigations module, - it is hoped that learning will occur during interactive and social practical demonstrations of experiments, and also during group discussion which will relate the demonstration to theory. In this setting, the community of practice is taken as the class cohort or research group.

It is also thought that contextualised learning, such as that which will be provided in Psychological Investigations, can encourage deep learning. Research initiated by Marton (1975) has suggested that learners' intentions toward a task or topic are related to their subsequent engagement and outcomes. On the one hand, 'deep approaches' to learning are characterised by an intention not only to know but

to understand (e.g., to critically compare and contrast findings within a knowledge framework). On the other hand, 'surface approaches' to learning are typified by rote learning and an intention to complete the task at hand (e.g., Marton, 1975; Prosser & Trigwell, 1999; Biggs, 1987; Ramsden, 1988). Crucially, evidence has suggested that when learning takes place in context, this encourages deeper learning approaches (Trigwell & Prossner, 1991). Indeed, Ramsden (1988) pointed out that a deep learning approach is not inherent or fixed within the individual, but rather is made up of an interaction between the student and the teaching environment.

Another approach which is thought to encourage deep learning is problem-based learning (PBL), where the acquisition of knowledge takes place entirely through student-centred, self-directed learning (Boud & Feletti, 1998; Savery, 2006). Indeed, one aim of PBL which is described by Savery (2006) is to "empower learners to conduct research, integrate theory and... apply knowledge," – which clearly fits within the remit of Psychological Investigations. First year undergraduates, however, may not be ready for a wholly PBL approach. As many undergraduates are new to the study of psychology, some scaffolding of knowledge will be necessary. Problem solving exercises, however, will be involved in the running of experimental paradigms and the extending of this knowledge to appropriate theory. The aim is that appropriate core knowledge will be provided, whilst taking care to avoid the 'spoon feeding' of information.

Finally, another benefit of learning in context aside from the promotion of deep learning is that the information which is learned in context is often better recalled in context. For example, evidence from cognitive psychology has consistently demonstrated a phenomena termed 'context-dependent memory' (for a meta-analysis, see Smith & Vela, 2001). This was famously demonstrated by Godden and Baddeley (1975), who asked members of a university diving club to memorise a list of words. Half of the participants learned the list on land, and half learned the list whilst underwater. Participants who learned the list on land recalled the words better on land (i.e., in context), whilst participants who learned the words underwater recalled more words underwater. This effect has now been demonstrated across a range of stimuli, including educational settings (e.g., Anderson, Reder & Simon, 1996). It would appear, therefore, that learning how experiments by doing experiments, will aid the recall of students when they come to carry out studies themselves, later on in their degrees.

## Conclusion

Research-based learning, and learning in context have the potential to greatly enhance learning of research methodology in undergraduate psychology students. By framing learning in this way, students will be encouraged to approach psychology as a research-based science, to engage in deep learning approaches and to make cognitive links between all their first year psychology modules. This contextualised learning should also aid their recall of practical information in later years. It is thought that by immersing students in research practice from the outset of their degree (i.e., through research-led and research-tutored teaching), that this should ultimately help to produce confident and capable graduates and to provide transferrable skills which will serve students throughout their university career and beyond. This project will be take place in the coming academic year, and could potentially also be applied to other academic disciplines within the social sciences.

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## Transitions 2

## **The changing landscape of higher education, the Dundee Academy of Sport project and teaching and learning in higher education**

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### **Abstract**

Over the past decade there have been many changes to the Scottish education system. Such changes are relevant for life and work in the 21st century and beyond. The Dundee Academy of Sport project uses the context of sport and exercise within a number of subject areas to support teaching and learning across the field of education. This paper critically reflects on the teaching practices and learning theories used within the project and proposes a pedagogical model that is compatible within all education sectors, highlighting the need for a joined up approach to learning. The model aims to build on learners' prior knowledge and develop skills and attributes for life beyond education.

**Keywords:** reflective practice, educator development, education practices, curriculum for excellence, graduate attributes

### **Introduction**

The demands and expectations of higher education (HE) to provide world class graduates, meet the needs and ambitions of students, society and the economy (Scottish National Committee, 1997), in a commercial market, is ever increasing. In response to these demands there have been many changes within HE. These changes are designed to make education more relevant for life and work in the modern world. Perhaps the most relevant are, the developments in the HE curriculum, the increased choice and flexibility of the learner journey and the development of graduate attributes.

However there have also been great changes within other parts of the Scottish education system. Changes have happened at the grassroots level with a major reform of the curriculum for young people, aged 3-18 through the introduction of the Curriculum for Excellence (CfE). The developments in HE and the aim of the CfE are to make learning more relevant to the modern world (Education Scotland, 2010a). It has been suggested that the CfE is a pedagogical innovation (Priestley and Minty, 2012) that brings primary and secondary education more in line with the learning and teaching approaches and desired student attributes (through CfE capacities), with those in or being developed in universities (Universities Scotland, 2012). However it is worth noting that it may also bring a number of challenges to HE institutions with regard to student admissions, student knowledge and skill sets (Doyle, 2013; Moir, 2014).

While acknowledging such challenges, Moir (2014) suggested that the CfE offers great opportunity for all educational sectors to collaborate with one another. From a learning and teaching perspective this would allow those who teach at university to better understand the CfE, enable the students to have contact with universities through out their education, provide opportunities for student work experience and deliver continued personal development opportunities for teachers and academic staff alike (Moir, 2014). Collaborative work would also give educators the opportunity work together to embed the development of the CfE capacities into graduate attributes (Moir, 2014) and ensure a seamless transition between institutions regardless of the students chosen learner journey.

Abertay University has seized this opportunity, through the work undertaken at Dundee Academy of sport project. The Dundee Academy of Sport project is an innovative partnership project between Abertay University and Dundee and Angus College (funded by the Scottish funding council). The project supports learning and teaching across the field of education, using the context of sport and exercise within a number of subject areas. The unique position of the project team allows us as educators to reflect upon teaching and learning within schools, further and higher education. Therefore the aim of this paper is to critically reflect on the teaching practices within the project, highlighting the changing landscape of education and outlining a pedagogical model developed through our work.

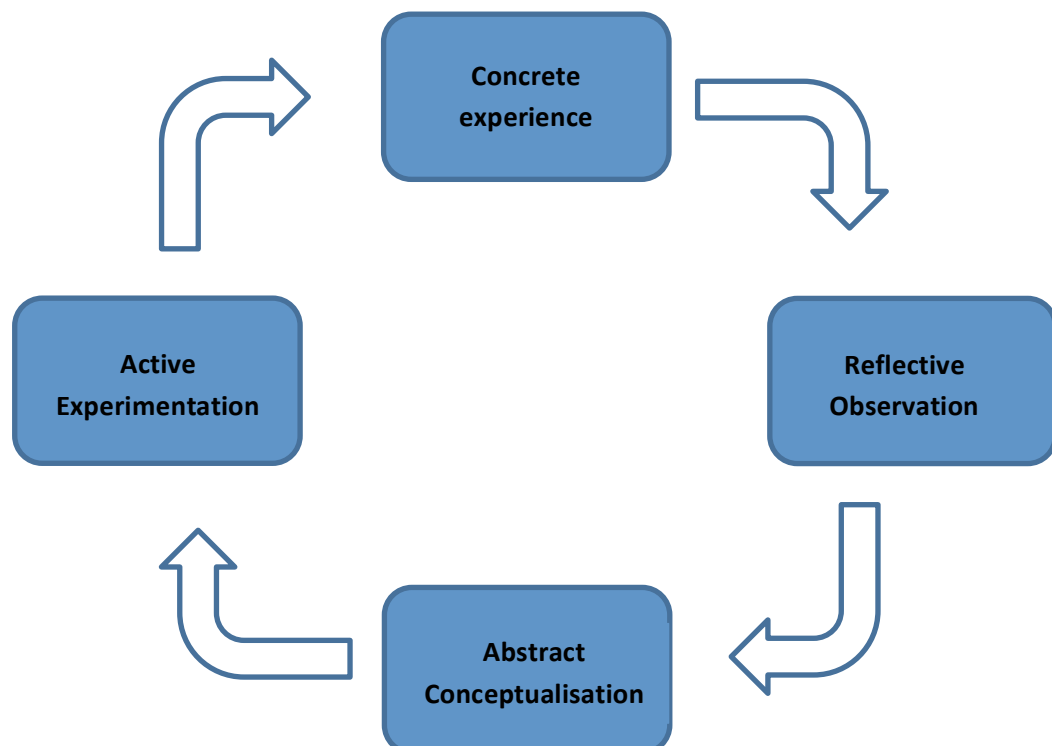
## Using Sport and Exercise as a vehicle for learning, the teaching and learning theories adopted.

The practical, vocational and academic nature of sport and exercise lends itself to education, life and work. Therefore it can be used as a vehicle for learning, capturing the imagination, inspiring and engaging people of all ages.

In using sport and exercise as a vehicle for learning, the teaching practices adopted by the Dundee Academy of Sport project are influenced by experiential learning theory. The work of a number of educational theorists and psychologists such as John Dewey, Kurt Lewin, Jean Piaget, David Kolb and Carl Rodgers have highlighted that experiences have a central role in theories of learning and human development (Kolb and Kolb, 2005).

Arguably the most notable is the work of Kolb (1984), who built on the earlier works of Dewey, Lewin and Piaget. Kolb (1984) describes experiential learning as 'the process whereby knowledge is created through the transformation of experience' (p.38). His work illustrates a theoretical perspective on the individual learning process, applicable to all situations and areas of life (Kolb, 2014). His holistic process of learning is designed to provide a systematic framework that can address the problems of learning and education in the 21<sup>st</sup> century (Kolb, 2014) and may therefore be significant in guiding teaching and learning within the changing landscape of the present education system.

Kolb's Experiential Learning Theory (ELT) is presented as a cyclical model of learning, consisting of four stages: concrete experience (active involvement within a situation); reflective observation (observing or reviewing the experience); abstract conceptualization (distilling perceptions into abstract concepts) and active experimentation (testing new ideas) (Kolb, 1984) (see Figure 1). Kolb (2014) states that all stages of the model are part of the learning process, knowledge results from the combination of grasping (concrete experience and abstract conceptualization) and transforming (reflective observation and active experimentation) experience in the context of the situation.



**Figure 1:** Experiential learning model. Source: Kolb, D.A., (1984)

Kolb (2014) also stated that the term 'experiential' learning is often referred as exercises or games used to engage students in a practical way with the learning process. However, it can also engage students vocationally through what some may argue are 'traditional' forms of experiential learning such as internships; apprenticeships; laboratory studies; field work and academically within a classroom or lecture. Within the project experiential learning is applied practically, vocationally and academically, for example a practical application may involve practical activities which measure aspects of fitness or involve a treasure hunt which is designed to improve academic skills. Student placements, work experience, laboratory session and residential opportunities provide the vocational element. Interactive lectures involving theory and tailored activities designed to reinforce the theory are examples of academic involvement.

In addition to using experiential learning to guide the teaching practices within the project, co-operative learning and peer education approaches are often employed to enhance the learning experience. Co-operative learning is influenced by Vygotsky's (1978) concept of learning as a social process and provides opportunities to learn with and from others. Peer education is designed to provide educators, peer educators and peer learners with an equal role in informing, shaping and passing on information, through peer assessment and evaluation. This has a strong emphasis on personal development (Education Scotland, 2010b) and is therefore a key to lifelong learning. The benefits of this approach to the student are highlighted by Fast Forward a national voluntary organisation promoting health and wellbeing (cited in Education Scotland 2010b); they suggest that peer education empowers young people to work with other young people and they become active players in the educational process rather than passive recipients of a set message. However fundamental to this approach is collaboration between young people and adults. Further, reflection (although a stage in the ELT model) is also employed to help students link and build on learning from previous lessons or experiences.

### **Development of a Pedagogical model**

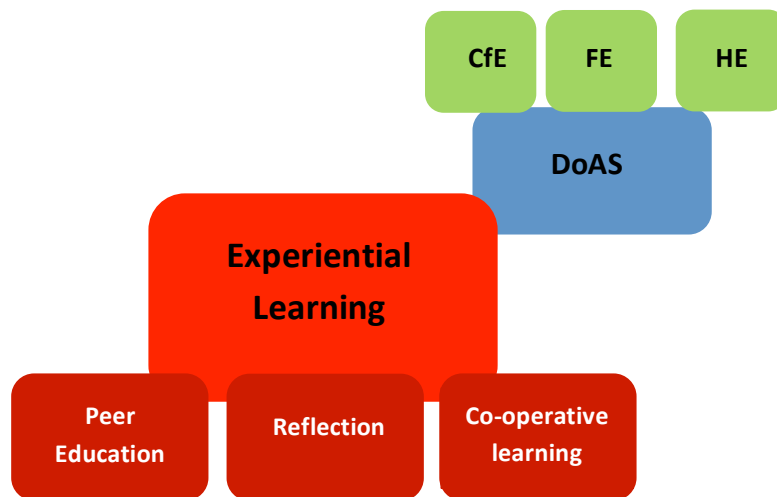
The proposed pedagogical model is relevant across the education system and designed to provide education for life and work in the 21<sup>st</sup> century and beyond. The context in which it is applied is described below.

Within primary and secondary education, sport and exercise is used by the projects, teaching staff across the 8 curricular areas of the CfE (expressive arts; health and wellbeing; languages; mathematics, religious and moral education; sciences; social studies and technologies). Our work is guided by experiences (what has to be learnt) and outcomes (what is achieved through the experience) (Education Scotland, 2010c) and works towards the four capacities (successful learner, confident individual, responsible citizen and effective contributors). The project not only provides a HE presence within the schools, it allows the student to experience learning within the context of sport and exercise, often engaging them in collaborative and cross curricular activities.

Compared with our work in primary and secondary education, our role within further and higher education concentrates more specifically on the sport and exercise related courses offered at each institution. Key aspects of our work within these institutions are to support student learning, build the students subject knowledge, develop employability skills and graduate attributes.

The experiential learning approach adopted by the Dundee Academy of Sport is the educational philosophy used to create the learning environment. Peer education, reflection and co-operative learning are the techniques used to link all the aspects of the learning experience and develop the skills needed to achieve and build on the desired learner attributes (see figure 2).





**Figure 2:** Pedagogical model developed through the work at the Dundee Academy of Sport (DoAS), across teaching and learning in CfE, FE and HE. Experiential learning represents the educational philosophy of the pedagogy and peer education, reflection and co-operative learning are the techniques used to link all aspects of the learning experience.

### Developing the four capacities into graduate attributes

In September 2015 the first group of school leavers who have experienced the CfE throughout their secondary education will enter university system (Education Scotland, 2015a). These students will have had different experiences of learning and teaching and will have followed different qualification pathways to previous student intakes (Education Scotland, 2013). These students should display the capacity to be successful learners, confident individuals, responsible citizens and effective contributors (Education Scotland, 2010d).

However, to ensure these students are able to build upon their previous learning experiences and attributes they have developed through the four capacities of the CfE, a joined up approach between each educational sector will be required. This should not only ensure a seamless transition from school or college but prepare the students for future learning (Education Scotland, 2013; Moir 2014) and develop the CfE capacities into graduate attributes through teaching and learning at university.

Abertay University's Teaching, Learning and Enhancement (TLE) strategy outlines the importance of developing graduate attributes as a set of principles, which are intended to guide the review and development of the curriculum, promote student learning and enhance employability. These are seen to be essential in the promotion of transformational change.

Students who graduate from Abertay University are expected to leave as individuals who are intellectual, individual, professional and active citizens. Abertay graduates will be masters of their subject, ambitious, articulate, adaptable, responsible, critical thinkers, effective collaborators and seek further opportunities to develop their knowledge (Abertay University, 2014). The Abertay attributes described above, are compatible with the four CfE capacities (Successful learner, confident individual, responsible citizen and effective contributor). Therefore the student intake who have experienced the CfE throughout their primary and secondary education will have the opportunity to build on previous learning within the university environment.

While this is a positive step towards developing a joined up approach to learning, it also highlights the need for the continued personal development of teaching staff and collaborative projects like the Dundee Academy of Sport, to continue to increase awareness of the knowledge and skill sets that students will have when they enter higher education (Moir, 2014). As educators we must create a learning environment that fosters and develops a platform for learners to gain knowledge within real-life situations and develop essential skills for potential future employment, ultimately preparing them for life and working in the modern world. Within the Dundee Academy of Sport project this is guided by the proposed pedagogical model described above.

## Conclusion

Contemporary education has evolved from a number of past teaching and learning theories. The teaching and learning approaches of the Dundee Academy of Sport project have been greatly influenced by experiential learning theory as it can be created within the learning environment, practically, vocational and academically and therefore lends itself to the area of sport and exercise. Experiential learning theory has been used as the educational philosophy within the pedagogical model developed through the work of the project. Co-operative learning, peer education and reflection are also demonstrated to be key parts of the pedagogical model and are used within it to link and promote the skills needed to achieve and build on the desired learner attributes. Further, the project's potential to develop the CfE, FE and HE interface highlights the potential of partnership and collaborative work. Furthermore the Dundee Academy of Sport project gives us the opportunity to have a positive influence on the development of learners across the education system and beyond, helping each individual to reach their optimal potential within education, life and work.

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## Primary to Higher Education: Cultivating a pedagogical approach fit for all levels of education

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### Abstract

The aims of the paper are to reflect personally on the pedagogical model cultivated to meet the needs of a demanding and innovative educator role as part of the Dundee Academy of Sport, delivering across all levels of education. This is set in the current national and institutional context with Scottish and European Union students paying no tuition fees, whilst English, Welsh, Northern Irish students and non-EU international students pay fees. The Scottish college infrastructure has undergone a major programme of mergers, with students having their institutional identity changed mid-course. At a secondary and primary school level, where the Dundee Academy of Sport (DAoS) delivers much of its work, we are seeing the eventual full implementation of the flagship Scottish Government initiative the Curriculum for Excellence (CfE). The paper will also look at the updated institutional policies and practices (such as the Abertay Graduate Attributes) that aim to foster a culture that allows a high quality student experience to flourish, bearing in mind the different skill set of this new generation of 'home' undergraduates who are coming through the CfE. I have found my dual approach of utilising both Progressive and Behaviourist teaching principles within sessions or learner programmes has led to me to successfully move from differing education levels in short periods of times, essential in the role I am delivering for DAoS.

**Key words:** Progressive teaching, Behaviourist theory, Tuition Fees, Curriculum for Excellence

### Introduction

It has been a welcome experience to have the opportunity to reflect on one's personal journey as an educator. The last opportunity was during my Post Graduate Diploma in Teaching Adults at the University of Glasgow in 2011/12. I am always looking to enhance and evolve my capabilities and beliefs as an educator. My current academic practice, as part of the fledgling and exciting Dundee Academy of Sport project, sees me deliver mainly in primary and secondary schools and occasionally in Dundee & Angus College and at Abertay University. The delivery in schools is shaped within the parameters of the 'Curriculum for Excellence'. The Curriculum for Excellence has eight curriculum areas. All our lessons we deliver must hit the 'Experiences & Outcomes' (E&O's), as set out by the class teacher. The university teaching I have been involved in is set in a context of it being free to Scottish and European Union (EU) students and costing English, Wales and Northern Ireland students or Rest of UK. The Scottish Government having gone in a different direction to the Westminster administration which took on board the recommendations of Lord Browne's 2010 report the '*Independent Review of Higher Education Funding and Student Finance*'. There is further research to be carried out in the sector to analyse if there is a difference in student engagement and attainment between fee and non-fee paying undergraduates, although having paid a four figure sum to study a post graduate qualification at Glasgow University, I know this increased my commitment to the course compared to when I was an undergraduate. I will also look at my pedagogy model in relation to the current Abertay landscape. It is an exciting phase in the development of this post-1992 *Further and Higher Education Act (Scotland)* institution as we have 20 credit modules, electives and excitingly, the accelerated degree programme, which is shaped by the new Abertay Teaching and Learning Enhancement Strategy and the updated Abertay Graduate Attributes. Both of these documents compliment the new draft strategic plan up to 2020. I will explain my pedagogical approach in the context of a unique and varied educator delivery role, within the background as detailed above.

## Personal Pedagogy Model

The pedagogy model I have fostered could be summed up as a combination of Behaviourist and Progressive approaches. This combination approach is required in order to deliver within the Curriculum for Excellence and Abertay context in which the Academy of Sport operates. I am keen to apply Progressive approaches as much as possible in my practice, as I seek to facilitate learning and put the student at the 'centre' of their learner journey. Progressive education can be traced back as far as John Locke in the 17<sup>th</sup> century (Hayes, 2006) however it is Dewey who is more widely known as his development of the theory had a real impact over American and Western education from the late 19<sup>th</sup> century (Sharma, 2002).

### *Progressive approach*

It is worth stating at the outset that it has been said that those attempting to identify a 'capsule definition' would be 'disappointed' as the Progressive approach means 'different things to different people' (Cremin 1961). However, I am content with my understanding of a Progressive approach and will seek to utilise this approach as often as appropriate and effective.

The teacher finds a new function. He is no longer the 'oracle' who speaks from the platform of authority, but rather the guide, the pointer-out ...

(Lindeman 1956, cited Elias & Merriam, 2005, p.160)

With this approach in school, college or university, I find that I too learn. The students are empowered to direct learning and feed in their own experiences and knowledge. The set-up of the classroom is important to create a conducive learning and sharing environment. With tables pushed to the side and chairs in a circle, the educator is not seen as the all-knowing '*oracle*' stood at a lectern at the front of a lecture hall. Instead they become a facilitator that encourages self-reflection and most of all, students to have a voice. This approach to encouraging learners to have a 'voice' and an opinion is not new in Higher Education but with Curriculum for Excellence it does mean that more students will reach university having already harnessed some of the skills required to make a confident personal judgement based on fact. Having not taught any university lectures since I did at Glasgow Caledonian University back in 2012/13 and only delivered tutorials so far in my time at Abertay. I have been heavily involved at Dundee & Angus College devising the content and leading delivery of the new Sports Union clubs CPD programme, this means I am never usually working with more than 25 to 30 people currently.

My approach to room set up will become less feasible when larger numbers attend in lecture theatres, however is easily achieved in 'lectorials' or tutorials/seminars if the room dynamics allow. As Lindeman states, the teacher finds a '*new function*', and I like to have the front of the class in the traditional seating style and then move to small group work at the back of the class, sometimes with or without tables and occasionally even stood up if I feel a lethargic class need energised. A circular approach is preferable for seating. Moving from the traditional setting empowers the students and halts any delusions of the lecturer as an all knowing '*oracle*'. I do seek to use the Progressive, student centred approach as much as possible to be the best educator I can be and to meet the objectives of the Abertay Attributes and Curriculum for Excellence, the two overarching approaches I teach under the auspices of. However, there are times when another approach is required to teach part or all of a session and I shall now go on to examine this.

## Behaviourist Approach

Watson (1913) in the first half of the 20th century brought the theory to the fore. The theory was later developed by Skinner (1972) which ensured its status was raised within the Adult Education community. Within the sphere of teaching adults the Behaviourism approach emphasizes such

concepts as control, behavioural, modification, learning *through reinforcement, and management by objectives*. (Elias & Merriam, 2005). This definition offered by Elias & Merriam concisely details the main themes of the approach as 'control' is key in delivering in a behaviourist approach and is required for some of my teaching duties in my role.

I utilise a Behaviourist approach at times in my delivery even though I look to build upon prior learning as much as possible. Having worked with first term undergraduates at two universities I have seen the low levels of expertise in particular areas of the sports coaching and development industry. In this scenario there is a need as the 'expert in the room' to go into detail, and define any non-negotiable facts. An example would be in a Coaching Process module, it must be made clear that coaches need to have the pre-requisite qualifications before being allowed entry to schools. The Behaviourist approach allows the lecturer to make the message clear about how non-compliance will affect the graduate's employability, with no room for ambiguity.

Behaviourism may seem contrary to Progressive education and in many ways it is, however they can be successfully utilised within the same session or programme delivery. Learners learn in varying ways and a varied approach is required to teach and facilitate learning as appropriate.

### **'The combination'**

A combination approach is required in the Dundee Academy of Sport Teaching Fellow role as we have a heavy teaching workload in comparison to university specific lecturers and have to be so versatile being as we can go from a Primary 7 class in the morning to a university tutorial in the afternoon. Within the one session I am used to moving from a Behaviourist approach to Progressive approach later in a class. Empowering students is key so once I am content that key points have been taken on board we can move rapidly towards much more progressive, student centred learning with students having animated discussions. There are advocates of this combination of Progressive and traditional approaches:

If experiential teaching works well in some cases, and not in others, it seems plausible that any curriculum should utilize aspects of both. Since every class is different, ultimately the decision rests with the teacher, who alone knows the character of his or her classroom and the potential for experiential learning to work. (Virginia.edu)

### **Current Abertay strategies and Government policies in Education**

The new Teaching and Learning Enhancement Strategy (TLE) at Abertay University has impetus given to it by the well-attended monthly TLE Seminars which staff know are always the first Wednesday lunchtime of the month. The strategic objectives are as follows:

1. Reforming our curriculum
2. Incentivising students' performance
3. Raising the status of teaching

The strategy followed a consultation process in the autumn of 2013. The consultation was timely given that the Curriculum for Excellence has been becoming fully established in schools in recent times and the future graduates at this and other universities will have different experiences than in the past. The inter-disciplinary nature of much of Curriculum for Excellence gives us realistic hope that future students will not at all be phased by the prospect of electives in different areas of study and indeed will relish the opportunity to follow a particular study and career path while maintain a broad approach to their learner journey. The TLE objectives are set with a longer term goal of producing higher quality graduates with the employability skills that industry desires and that stand them out as from our institution. The attributes of an Abertay graduate have been summarised in the Abertay Attributes and are defined under four 'dimensions':

Intellectual, Individual, Professional and Active Citizen,

The Curriculum for Excellence attributes are also four fold and determined as

Successful learners Confident individuals  
Responsible citizens Effective contributors

I shall return to reflect further on the four Abertay and CfE 'dimensions as the similarities are apparent on comparison.

### **Draft Abertay Strategic Plan 2015-20**

It is worth noting that the university strategic plan is in a draft stage and yet to be fully ratified by Senate; however on inspection it does use both contemporary and dynamic language to espouse the university's loft ambition and vision. This is heartening for any pro-active teaching staff like myself and shows an emphasis on the quality of the student experience rather than placing research and staff personal progress ahead of the students which we are all here to educate and to the best of our abilities.

#### **OUR PURPOSE**

To offer transformational opportunities to everyone who has the ability to benefit from Abertay's approach to university education.

To inspire and enable our students, staff and graduates to achieve their full potential.

To use our knowledge and expertise to have a positive impact on the world around us.

Strategic plans can gather dust on office shelves and computer hard drives, however with such concise and clear objectives it must be hoped that the collectively the scholarly community at Abertay can aspire to raise their standards in order to meet these student centre targets by 2020.

### **Free education for Scottish students**

Scotland, Wales and England each have their own funding councils, something which has led to very different approaches in funding practices across the 'home' nations. The widening access agenda is followed across the United Kingdom, though the means to which it is supported differs.

Since the 1970s, UK higher education has moved beyond an elite system to one that is more accessible and inclusive.....widened its offer with respect to the diversity of subjects offered at degree level. (Fry, et al, 2008)

Unlike in America or over the border in England, Scottish undergraduates do not pay for their degree fees. The Scottish National Party have been in power at Scotland's devolved parliament at Holyrood, Edinburgh since 2007 and look set to be in power for the next term of the parliament. The then First Minister and ex-SNP party leader Alex Salmond famously stated: "...the rocks will melt with the sun before I allow tuition fees to be imposed on Scottish students – upfront or backdoor." (STV.tv, 2011)

Scotland has had a great tradition of free education, going back to the Scottish Enlightenment of the 1500s and the centre left leaning nature of the overwhelming majority of the Scottish electorate means this policy plays out well in election campaigns. The Scottish Labour leader, Jim Murphy MP has, after at one time appearing to support some sort of fees on undergraduates, publicly committed any future Scottish Labour led Holyrood government to matching the SNPs commitment to maintain the centuries old tradition of free education for Scots.

The stereotype of an undergraduate is that they often having a reputation for enjoying their social life more than their studies. Some would argue that by paying for all or some of your tuition fees you are, literally and figuratively, more invested in their education and are more likely to attend classes and strive to attain higher grades. However, since tuition fees came in over the border many students have declared the courses '*not value for money*' (Guardian, 2014). In England tuition fees have been a political 'football' in the current parliament as the Liberal Democrats reneged on their manifesto

commitment to not raise tuition fees after accepting the blandishments on offer from the Conservatives to form a coalition government. Current opinion polls suggest the Liberal Democrats are on course for a disastrous loss of seats with a projected tally of just 26. (Ipsos-Mori, 2015) This shows how important an issue tuition fees are across the UK.

### **Further Education – the landscape post-mergers**

I currently oversee and deliver on a monthly CPD programme for FE student sports clubs at our partner, Dundee & Angus College. As part of the merging of 43 colleges into just 13 regional colleges, (Scotland.gov.uk, 2012) Dundee College and Angus College were brought together in 2013. In the Dundee Academy of Sport provides support to HN students and colleagues from our team go in weekly for an hour to work on developing the skills they will require for successfully articulating into the third year of our degree programme at Abertay. A staggering 27% REF of students at Abertay articulate from colleges so it is a new initiative to support these students before they articulate and this is followed up with DAoS Direct Entry support sessions every week in term time. The biggest differences between HNC/D years and the university first and second year experience is that the college students are getting assessed much more often and do more practical activity compared to the more academic approach of the sports degree programme with the work placement module being the only obligatory practical outlet. Therefore the DAoS Direct Entry support once the students articulate to Abertay are pivotal to ensuring students gain the skill they need to match up to the Abertay Attributes by the time they have graduated and seek employment in their chosen field.

Through the Scottish Funding Council funding our project, we are trying to help various agencies increase attainment for FE students in articulating to university and achieving a degree once they reach their. College students also benefit from free education. For many this is a big step forward in life, particularly if they did not enjoy their school experience. The funding DAoS has from the Scottish Funding Council has been granted with the hope and expectation that the articulation from college into university is made much more straight forward so that the students have the self-efficacy levels to pass their degree in four years, which the government agency, the Student Awards Agency for Scotland (SAAS), budget for funding for a student. If we deliver our project effectively then this objective will be met in the eyes of the Scottish Funding Council and the university will benefit from students articulating in that are already on the path to meeting some of the Abertay attributes. When teaching in college I am eager to use a Progressive approach and be as interactive as possible, however, with many students not long out of the school system I have actually found that the traditional set up for a class room is more comfortable for them than any cabaret or small group station type set up. Once a relationship has been built, one can start to utilise more innovative learning approaches.

### **Curriculum for Excellence**

The vast majority of my teaching is currently in primary and secondary schools and falls under the auspices of the Scottish Governments 'Curriculum for Excellence'. It is defined by Education Scotland as: "Curriculum for Excellence aims to achieve a transformation in education in Scotland by providing a coherent, more flexible and enriched curriculum from 3- 18." The '*flexible*' curriculum has much more of an emphasis on inter-disciplinary learning than ever before. The 'old' curriculum saw most learning taught and learned in 'silos' with teachers rarely teaching out with their subject area. The local schools fill in a pro forma with what 'Experiences and Outcomes' they wish us to hit and we come up with original material. Although some grammar and spelling issues are deemed by some observers, as more prevalent now after a generation used to '*text speak*' (Cingel, 2012) there is a greater sense of the pupils having a 'voice' and they are encouraged to have opinions much more than when I was going through the Scottish state school system. The seven curriculum areas are perhaps not surprising but the approach to teaching them is much more progressive and innovative than before. At the Academy of Sport we find ourselves in demand to deliver maths via the medium of footballer contracts or

Modern Studies by looking at how sport and politics do or do not mix. However, it is heartening to see some of the excellent examples of inter-disciplinary innovative learning environments created because Curriculum for Excellence facilitates it. A local school runs a sports event and has some pupils as participants, organisers, match officials and news reporters to mention just a few. This approach is much more engaging and memorable for a pupil than being sat behind a desk listening to a supposed expert speaking 'at' them. Confucius (Cited in Hattie et al, 2014) perhaps summed this up most concisely: *What I hear, I forgot; What I see, I remember; What I do, I understand*. Universities Scotland, the representative body for Scotland's 19 Higher Education Institutions drew up an '*Overarching Statement on Curriculum for Excellence (2013)*' and have followed this up with '*Implications of Curriculum for Excellence (CfE) in Scottish schools on admissions for universities in England, Wales and Northern Ireland (2014)*'. This shows that the HE sector is awakening to the realisation that the Scottish school pupils coming into the HE sector are coming in with differing skill sets to their predecessors. Abertay has made strides to address this with the *Abertay Graduate Attributes* which one can see a reflection of the values of the Curriculum for Excellence. Both wish to see our society have 'Active' and 'Responsible' citizens however, the most notable synergy is the understanding within both models that an overlap exists in the balance between the learner journey, personal development that produces the strong employability skills that benefit the individual, their family, community and wider society.

## Conclusion

The pedagogic approach I have, and will continue, to develop is to enable effective delivery across all levels of Scottish education. This paper has detailed how I have utilised two theoretical approaches in my pedagogy even though they may appear to be the antithesis of one and other. However, even the great advocate of experiential learning Dewey (Sharma, 2002) did not fully disregard the benefits and necessity of 'traditional' teaching approaches in some situations, despite some of his followers exaggerating his stand point on learning through experiences. A Progressive approach is where I feel most effective as an educator and allows deeper learning to occur, although a foundation may have been laid by utilising a Behaviourist approach utilised. Given the current climate of some undergraduates in HE and further education students paying no fees, Scots and non-rest of UK EU citizens, then there are rest of UK and non-EU citizens paying thousands of pounds in fees before any living expenses are taken into account, a versatile approach is required. Student engagement levels vary so greatly and perhaps tied in to whether they are getting a free or paid for education the need to deliver of a variety of students with different motivators is greater than ever before. With the Abertay context shifting towards electives it would be realistic to say the school leavers coming into Abertay degree programmes will be better equipped to take advantage of such opportunities than those who came through the 'old' curriculum. College students coming into a university with a Grade Point Average (GPA) marking scheme from day one of their third year will require the Dundee Academy of Sport's Direct Entry support classes, particularly in term one, however they will be comfortable with electives having only been two years out of the CfE system. It is an exciting time to be working at my Alma Mater. The accelerated degree programme is another forward thinking initiative that will position Abertay as one of the leading modern universities in Scotland. I will always seek to be learning and developing my scholarship and teaching approaches, however this exercise in reflection has me content, for now, that I am delivering for the pupils and students across all levels of the Scottish education system.

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# Enhancing the Student Experience of Transition from College to University

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## Abstract

Advanced entry to university degree programmes through transition having successfully completed and HN qualification at college is a widely accepted progression route. The learner experience of this pathway however, may fall short of excellence as differences in teaching, in learning styles and in assessment are not generally addressed prior to the arrival of articulating students at university. This paper considers current government policies and contemporary developments in the HE/FE sectors that indicate increased uptake of this pathway is likely. To assist this transition an alternative model of practice is proposed in this paper that will support learners more fully prior to arriving at university and offer excellent cpd opportunities for both university and college lecturing staff.

**Key words:** Transition, advanced entry, teaching and learning, Continuing Professional Development

## Introduction

The Scottish Government recognise that in the past higher education, further education and skills development have been looked at separately. However, in order to effectively deliver their post -16 reform objectives, they will need to ensure each sector contributes fully and work to strengthen their interconnectedness.

The Scottish Government (2011)

As a means of achieving this they have produced various papers including Building a Smarter Future, specifically aimed at Higher Education, Putting Learners at the Centre: Delivering our Ambitions for Post 16 Education and Opportunities for All.

The paper, Putting Learners at the Centre: Delivering our Ambitions for Post 16 Education outlines the need for

efficient, flexible learner journeys that meeting the needs of learners and employers; results in positive outcomes at all stages of the learner journey and uses public funding to deliver courses, qualifications and degrees as efficiently as possible.

The Scottish Government (2011)

Building a Smarter Future, another Government paper, refers to the four year degree course as remaining the core offer of universities but demands great flexibility while continuing to deliver high quality learning. It also cites Curriculum for Excellence being offered in all Scottish secondary schools as "being a milestone in reform of the learning journey." The Scottish Government (2010) The impact of Curriculum for Excellence on university and college delivery is likely to be felt in the medium term as it brings forward "a new generation of students" who will have a different skills and different opportunities when compared to students entering tertiary education prior to its introduction.

Following extensive consultation the Scottish Government introduced new legislation in the form of the Post 16 Education (Scotland) Bill 2013. Collectively this has resulted in the creation of 13 regional colleges and, for the Higher Education sector, the expectation of seeing greater collaboration between institutions. Alongside this is the requirement for universities to do more to widen access to ensure people from areas of deprivation have the opportunity to access higher education. A key driver for increased collaboration and widening access is the Scottish Funding Outcome agreement for Universities, 2014 which expects access to be more evenly spread; articulation to be increased and retention to be better. SFC Abertay University Outcome Agreement 2014-2015 (Jan. 2014)

## **Abertay University**

Abertay University is committed to an Outcome Agreement that sees the university working towards 7 key aims, closely linked to the government's planned national outcomes as stated by the Scottish Funding Council. Abertay Strategic Plan (2011-2015) The aim to improve access to higher education for people from the widest possible range of backgrounds is fully supported in the Strategic Plan of Abertay University which promotes "equality of opportunities for all who can benefit from or contribute to the Abertay Experience." This can be seen by the higher proportions of students recruited from the most deprived areas than the average Scottish Universities, SFC Abertay University Outcome Agreement 2014-2015 (Jan2014) and through the introduction of the university's new admissions policy which includes a commitment to wider access and social inclusion along with selection guidance should academic qualifications held be insufficient. Abertay University Admissions Policy (2013 v2.1) In addition to this almost a quarter of undergraduate entrants to Abertay enter with advanced standing following articulation from college. In the current academic year part of Abertay's contribution to the outcome agreement is the commitment to continue to increase the proportion of Scottish-domiciled undergraduate entrants from the 20% and 40% most deprived postcodes and to increase the proportion of Scottish- domiciled learners articulating with advanced standing from college to degree level courses. SFC Abertay University Outcome Agreement 2014-2015 (Jan. 2014).

## **Dundee Academy of Sport**

Dundee Academy of Sport is a partnership project between Abertay University and Dundee & Angus College funded by Scottish Funding Council with three main aims that support the Outcome Agreements of both University and College. These aims are:

- Delivering widening access to various academic subjects through the unified Academy of Sport
- Establishing a single provider of sport education in Tayside, providing training and education from Access level to Phd, simplifying the learner journey, allowing seamless transition and enhancing retention and progression
- Developing the workforce through CPD opportunities

Dundee Academy of Sport Interim Report (2014)

The political context described above is instrumental in driving forward curriculum reform in both HE and FE where there is greater emphasis on employability and graduate attributes that will enhance the workforce and in turn help impact on Scotland's place in a global economy.

## **Teaching and Learning**

Students from diverse backgrounds bring different expectations to learning and these expectations need to be managed through innovative teaching and learning. According to Fry, Ketteridge and Marshall (2004)

experiential learning and the use of reflection are based on Constructivism. Constructivism outlines a style of learning that fits new understanding and knowledge into existing structures or schemata of understanding and knowledge.

According to Mezirow (1991) learning is often considered only to add more knowledge when, as lecturers it is necessary to think about how to enhance the knowledge held by the learner at that point in time. This fits with the concept of experiential learning which is based on the premise that understanding is neither a fixed or unchangeable element of thought but can be influenced and reconstructed from experience (Fry, Ketteridge and Marshall 2004). When transformational learning

takes place it is a continuous and cyclical process. The Kolb learning cycle outlines the stages of the process as concrete experience, reflective observation, abstract conceptualisation and active experimentation (Fry, Ketteridge and Marshall 2004)

Teachers planning a lesson therefore need to consider the most appropriate means of enabling this change to existing knowledge to come about. They need to plan an activity that involves learners in undertaking activity, allow time for them to think about what they have just done and why. This can be followed by discussion with the learning group to suggest where else this principle might be used. The final stage of the cyclical process as described by Kolb is then to provide the opportunity to try out some of the learners' own ideas. This will help the transformation needed to consolidate learning.

Lecturing is a widely used delivery method within HE teaching and yet, in its traditional form, does not allow for the student to participate in an active manner, engaging with the subject matter and challenging the concepts outlined. It is also acknowledged that attention levels drop as the lecture progresses unless the students are actively engaged in their learning. Horgan (2004) According to Horgan adding variety into a lecture through appropriate use of questions and providing the opportunity to work with people near them, to share their ideas that can then be fed back to the wider audience better support transformational learning.

### **Widening Access**

Widening access may in some instances allow people to access to university education with fewer entry qualifications than traditionally would be sought. Newcastle University offers a Partners programme involving partner schools and colleges. Applicants from a Partner institutions may be offered places at Newcastle University with lower grades than demanded from others from non-partner institutions. Briggs, Clark and Hall (2012) This can also be evidenced in the case of the government's additional funded places scheme. The scheme is designed to enable applicants of certain degree courses to be enrolled as a student at university but undertake the first two years of their programme of study at a partner college. The criteria is for the student to have shown potential in their application but either they do not quite hold the entry qualifications demanded or through their application have given rise to the thought that college may offer a preferred route to higher education. Abertay has forty such places in the disciplines of Computer Arts, Computing, Science and Sport. As more students may enter HE through different routes to that of traditional applicants, university staff will need to reflect on their style of delivery and consider whether it meets the needs of the future university student body. This need is supported by Abertay's new Teaching and Learning Enhancement Strategy as according to Robertson (2014) there is "*a shift in emphasis of curriculum development from subject knowledge taught to students critically analysing, applying and extending newly gained knowledge, skills through experiential problem based learning.*" Robertson (2014) also considers, "*both staff and students to be learners in the context of the Abertay community.*" Brown, Fry, and Marshall (2004) argue that "as teachers we should be seeking to become active, purposeful, reflective practitioners".

The study undertaken by Kane, Sandretto, and Heath. (2004) offers a five- dimensional model of tertiary teaching citing these as reflecting the attributes of excellent science teachers within a university setting. The five dimensions are seen as inter-related and are subject knowledge, skill, interpersonal relationships, teaching/research nexus and personality. These dimensions are all connected to reflective practice. Based on the evidence gathered by their study, the authors propose that the participants engaged "in purposeful reflective practices to better understand and improve their own teaching practice." The authors also outline four types of reflection - technical, descriptive, dialogic and critical. The areas most often reflected upon were subject knowledge and skills. The proposed model of practice in this paper will give rise to opportunities for staff at both university and

college to reflect on the areas within the 5 dimensional model including subject knowledge and skills while delivering in an alternative teaching environment.

### **Working towards seamless transition**

In order to move towards seamless transition and to enhance retention and progression as outlined in the project aims of Dundee Academy of Sport, it is necessary to consider what barriers, if any, currently exist for students moving from college to university with advanced entry into third year of a recognised degree pathway for sport. As project partners, the college and university considered are Dundee & Angus College and Abertay University however, in principle the same model can be applied to other similar institutions.

Prior to the project being awarded funding from the Scottish Funding Council, mapping of the units currently offered within HND Coaching and Developing Sport against the modules offered within the Sport and Exercise Degree for first and second year study at Abertay University was undertaken. This was essential before the funding council would agree to offer the 40 additional funded places, referred to earlier in this paper, to Abertay University. While it would appear that the unit mapping indicated the content of HND Coaching and Developing of Sport was suitable in content at both SCQF level 7 and level 8 to enable advanced entry to third year of the degree programmes in Sport, students who chose to undertake this route moved from a different style of teaching environment. Gosling (2004) refers to this in his text relating to Supporting student learning. He states:

In recent times the sector has seen significant change in emphasis from understanding teaching as a process in which academic staff simply lecture, to one in which students are supported in their learning.

At an early point in the DAoS project, lecturers within the university's academic department for sport were consulted to establish what, in their opinion, were the gaps in learning for students gaining advanced entry to third year having successfully completed their HND level qualification in a relevant discipline. It was established that the students from college had not undertaken research skills in the same way as was undertaken by university students in years one and two, nor had they any knowledge of social studies in relation to a sporting context. While it was acknowledged that advanced entry students would still be able to undertake their degree studies effectively, some exposure to social studies would support their wider learning. Research skills, on the other hand, were deemed fundamental to what students would undertake in year 3 of their degree studies and while those from college would have undertaken some research related to their HND, referencing styles in particular were an issue. In addition, the more supportive environment of college teaching meant that not all students moving via advanced entry were self-directed learners and often struggled to undertake the type of study required of them at university.

To understand how the students themselves found the experience of transition, direct entrants were invited to participate in focus group sessions, The challenges from the student view point were slightly different to those mentioned by staff. They perceived that staff seemed to expect them to know how university worked in the same way as students who had been there for first and second year of the degree programme and did not seem to appreciate how different the environment was for them. They also cited it as being difficult to integrate with the students who had studied year one and two at university. Other issues included how timetables worked, the difficulties associated with units being referred to by unit number rather than name and how to get booked onto some classes proved challenging missed. Writing style and referencing also caused them difficulties initially.

To add to the information now available to the project team, an advisor from the Partnership Office within university was asked to outline their role in supporting transition across the whole curriculum between college and university. The information provided was embedded in the final design of the model of practice. Course leaders at college were also consulted as to what currently happened to support students who applied through UCAS to gain advanced entry to third year of a sport degree

pathway. At this time there were no formal arrangements between college and university to support transition within sport. Some student visits were arranged but these were ad hoc rather than a planned, regular occurrence.

This very limited, informal information gathering shows similar issues around transition as information gathered in a number of studies linked to transition. It is suggested that key to successful transition is that the learner is able to feel “part of” the institution through learning to act as university student. Fazey& Fazey (2001). In addition, according to Dweck (1999) “*Peer interaction is an important factor in developing concepts of self that are associated with learning and achievement.*” This peer interaction seems to be missing in the initial weeks of transition to advanced entry of a sports degree programme at Abertay University. It is possible that either or both of these situations could have a negative impact on retention. Examining all findings and with a view to meeting the target of seamless transition as outlined in the project bid of Dundee Academy of Sport, a plan of intervention was drawn up for discussion.

### **Proposed model of practice**

Dundee Academy of Sport is intended to be an entity that encompasses all delivery of sport programmes of study within Dundee and Angus College and Abertay University. The expectation is that over time staff from both university and college will support delivery of the curriculum within the others’ institution. To enable this movement between institutions, the expertise of the staff team within Dundee Academy of Sport can be used to support delivery where appropriate, freeing up staff from either institution to enable them to work with the other organisation or indeed co-deliver in some subject areas. The movement of staff for guest lecturing opportunities will not only benefit the students in both college and university but also provide cpd opportunities for staff giving them experience of different teaching methodologies.

While it is understood that students within college do not need to indicate an interest in applying to continue their studies at university until semester one of their second year of study at HN level, in order to be as inclusive as possible, it is proposed that a planned scheme offering additionality to college students’ timetable begins the start of semester two of year 1 HND.

Course leaders from college and the divisional leader from university will work together on timetabling to ensure units and modules mirror the sequence of the other institution as far as is possible. A timetabled slot of one hour per week will be included in the timetable for first and second year HND college students adjoining the hour for personal development and planning already in their timetable. A programme of study to enhance students’ learning at college through additionality is currently being reviewed. (appendix 1)

Over and above, through aligning the HN and degree timetables, there can be planned co-delivery where college students join university students in lectures at university but are assessed in the manner as required by either qualification. This will enable college students to experience the learning environment at university while still at college and have the opportunity to meet both staff and students from university prior to applying for advanced entry. It is intended that this familiarity will help support retention and achievement of students moving from college to university as an advanced entry applicant.

University staff will be invited to deliver guest lectures within their area of specialism in a college environment to reinforce what is taught in college and to extend the learning for students, again supporting seamless transition. College staff will be invited to deliver practical applications in their area of specialism, in a university setting thereby enabling university students to gain practical experience that will complement their learning for the module Contexts in Sport and translate into employability skills as recognised through Abertay’s Graduate Attributes.

This plan of intervention mirrors the three types of preparation activities as outlined in the findings of The Bridging the Gap project (Briggs, Clark & Hall. 2009) These are generic activities, focused activities and pedagogical activities. These are activities are designed to inspire young people and encourage self- belief that university is a realistic option for them; to help inform decisions and to introduce subject specific studies thereby giving the students an early taste of university teaching.

## Conclusion

This paper proposes a planned intervention linked to university study within college timetables that will enhance student learning and support seamless transition to advance entry of the relevant university degree programme. This intervention will familiarise college students with university staff and with expectations of university teaching and learning styles in advance of applying for a place on a degree pathway. As a result of this proposal, opportunities for CPD for both university and college staff will be provided and while meeting the aims of the joint Dundee Academy of Sport project. It also aims to assist in addressing political drivers including HE and FE institutions working more closely together, widening access and improved retention and achievement.

## Appendix 1

Example of topics that could form part of the delivery to HN students at D&A College as part of a joint delivery enhancing their learning with a view to seamless transition.

Week	Topic
1	Introductions and Articulation with Abertay University – the benefits of doing a degree/volunteering
2	Introduction to Sociology in Sport
3	Introduction to Sport Psychology
4	Ethnicity and Sport
5	Health beliefs and health behaviours
6	All by myself? How to be a successful independent learner
7	Finding research articles
8	Evidence based arguments/ Critical Reading
9	Politics and Sport
10	Morality in Sport
11	Research in Sport
12	Overview of Research Strategies
13	Evaluation of support for articulation

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## Learning 2

## Applying theory into practice: A model for developing students' managerial skills

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### Abstract

Students' difficulty to deal effectively with real-life business problems, questions the effectiveness of current practice and requires the adoption of a different teaching approach. To address this problem at undergraduate level, this paper proposes a pedagogical model that promotes intentional learning, action learning and cooperative learning and suggests a switch from passive to active learning environment. The model aims to help students develop all necessary managerial skills by collaboratively and actively participating in the learning process through the use of printed and real-time business case studies, as well as simulations, games & role-play (SGRP).

**Key words:** Management, Intentional learning, Action learning, Problem-solving, Decision-making, Real-time learning, Simulations, Games & role-play (SGRP)

### Introduction

Understanding key management theories and concepts is imperative for business students, as these are the starting point for solving a business problem. Nevertheless, the application of theory to practice and to real-world business problems seems to be problematic. The recent financial crisis that has shaken the global economy not only did it reveal the weaknesses of the global financial system but also it revealed educational weaknesses. Being in the eye of the storm, business schools have been blamed for producing ineffectual managers. As such, an ongoing discussion has been launched both in academia and the Media on whether business schools strengthen students' critical thinking, problem-solving, and decision-making skills, and thus whether they properly prepare students to deal with real-life business problems. However, the financial crisis should be seen by business schools as an opportunity for self-reflection: What do our students really learn? Do they develop the skills required for a business student? Therefore, it seems that this is the right time for a paradigm shift and for ensuring that business students do learn, acquire and develop all necessary skills that will prepare them to efficiently and effectively deal with real-life business challenges.

According to Socrates, one of the greatest classical Greek philosophers and fathers of Western philosophy, students acquire knowledge when they follow the steps of reasoning by themselves and not by collecting pieces of information didactically conveyed to them. Based on this view and by considering the challenges that are currently inherent in applying theory to real-world business problems, this paper proposes a new pedagogical model that incorporates the use of printed and real-time business case studies, as well as simulations, games & role-play (SGRP) that will take place in the tutorial classes. Aiming to move from a passive to an active learning environment that enhances adult learning experience, it is suggested that the solution offered will be a valuable tool in assisting students develop all necessary skills and meet Abertay's graduate attributes.

### Theoretical basis of the proposed model

#### Adult education/Andragogy

Given that the model proposed in this paper is placed within the higher education context, it would be an omission not to briefly discuss the concept of Andragogy. Based on Plato's educational theory, in 1833 Kapp introduced that term, whilst in 1921 Rosenstock revived it. Contrary to the notion of Pedagogy (in Greek "παιδαγωγία"-*paidagogia*, meaning child-leading) which concerns the theory and practice of children education, Andragogy (in Greek "ανδραγωγία"-*andragogia*, meaning man-leading) refers to the different approach that is required to be adopted in adult education. According to Knowles (1984), who is considered the most influential theorist in the field of andragogy, the five key assumptions that underpin adult learning are as follows (See Appendix 1):

1. Self-concept: "As a person matures his self-concept moves from one of being a dependent personality toward one of being a self-directed human being
2. Experience: "As a person matures he accumulates a growing reservoir of experience that becomes an increasing resource for learning
3. Readiness to learn: "As a person matures his readiness to learn becomes oriented increasingly to the developmental tasks of his social roles
4. Orientation to learning: "As a person matures his time perspective changes from one of postponed application of knowledge to immediacy of application, and accordingly his orientation toward learning shifts from one of subject-centeredness to one of problem centeredness
5. Motivation to learn: "As a person matures the motivation to learn is internal

(Knowles 1984, p. 12).

In this context, and after having conducted a thorough literature review, it is suggested that the three educational approaches that will formulate the theoretical basis of the proposed model are Intentional learning, Action learning and Cooperative learning. Intentional learning refers to the learning that is persistent, goal directed and driven by the learner (Sinatra, 2000). Therefore, "intentional learners act not only as investigators of particular domains, but as reflexive epistemologists who subject their own knowledge to continuing scrutiny" (Cholbi 2007, p.55). The value of this approach lies in the fact that the knowledge obtained is deeper, available for application and valued by the learner (Marton and Säljö, 1976). Action learning is a constant process of learning, reflection and development, in which the group supports the individual in learning from experience (Beaty, 2003). By working on real-life problems, individuals learn from each other and learn from their actions and others' actions, reflect on their own experiences (McGill and Beaty, 2001), and consider how to act in the future (Weinstein, 1995). Cooperative learning refers to the process that involves students working together in groups towards the accomplishment of a common goal (Johnson, Johnson and Smith, 1998). The benefit of this approach is that knowledge is constructed and transformed by learners (Dooly, 2008). By promoting a positive interdependence, it aims to maximise both their own and each other's learning (Kagan, 1990).

### **Linkage of Intentional, Action and Cooperative learning to Adult Learning**

Adult education is distinct from children's education, and thus a different pedagogical approach is required (Rosenstock, 1921). The reason is that there are key differences in terms of the learner, the role of the learner's experience, the readiness to learn, the orientation to learning and the motivation for learning (Knowles, 1970). Consequently, what lecture theatre classes seek to offer is different from what school classrooms aim to offer. Leading and Managing Change (MT0903) is an undergraduate-level optional module undertaken by 3rd year students coming from different schools. Therefore, prior exposure to the principles and philosophy of management is not prerequisite. There are also many mature students who have been granted direct admission from college. Thus, every student has a different educational background, work experience, attitude to learning, and of course learning needs. All these make the quest of a pedagogical model that embraces students' different needs difficult, unless this model caters for these differences. By taking into account all these issues, the learning outcomes of the module, and the attributes that students should develop, the adoption of Intentional learning, Action learning and Cooperative learning is considered suitable because it gives the opportunity to design an environment which is appropriate to adults and assists students' develop their managerial skills.

### **Identifying the problem: Current practice**

The Managing and Leading Change (MT0903) module is delivered yearly in the second semester over a 14 week period consisting of one hour lecture and one hour tutorial. In the lectures the fundamentals (such as the key theories, models and principles of management) are presented to the students; and in the tutorials they have to complete certain tasks (sometimes students are provided with printed cases studies and other times they have to answer some questions). However, it seems that the current practice leads to "barren knowledge", as the tutorial classes just test students' knowledge in terms of whether they have memorised the theories and models presented in the lecture. This does not promote students' critical thinking who, in such an environment, seem to be passive learners. This means that when students in their career as managers or supervisors will be confronted with various challenges/problems that must be overcome, it is likely that they will not either be or feel ready to effectively solve a problem or make the right decision. Therefore, the aim of this paper is to propose a model that addresses all these issues and helps students develop their decision-making and problem solving skills.

After conducting a thorough review of the literature on the strategies/tactics that promote critical thinking and action learning, and having considered the requirements and outcomes of the chosen module, it is suggested that the combination of printed and real-time case studies, as well as simulations, games & role-play (SGRP) can serve as useful tools to promote effective learning (see e.g. Karia, Bathula and Abbott 2015; Kreber 2001; McDade 1995; McEwen 1994; Mitchell 2004; Popil 2011; Sivan et al. 2000; Steadma et al. 2006; Swanson and Fouad 2014).

### **Identification and Operationalization of the solution: The Proposed model**

Before presenting the proposed model, the rationale behind the selection of the tools (case studies and simulations, games & role-play (SGRP) that will foster action learning, intentional learning and cooperative learning will be set out by briefly discussing and justifying their choice.

#### **Printed Case studies**

Case study is the narrative description of a real-life situation which involves an issue such as a problem, a challenge or a decision that an individual or a group have to make; and without giving simple or explicit answers it requires a possible solution (Leenders, Mauffette-Leenders and Erskine 2001). Therefore, by allowing students to deal with real-world problems, case studies engage the learners, develop their analytical skills, foster their critical thinking, train them in managerial skills such as problem solving and decision-making skills, negotiation, show them how to think in a professional way and encourage them to apply theory into practice (Dowd and Davidhizar, 1999). Moreover, by promoting thinking, brainstorming and listening, case studies strengthen students' cooperative learning skills (Grupe and Jay, 2000).

According to Velenchik (1995), the four pedagogical issues addressed by the use of case studies are motivation to learn, theory application of theory, use of evidence and limitation of theory. All these seem to be applicable in the Managing and Leading Change (MT0903) module:

- *Motivation to learn theory:* Experience of delivering business and management classes at Abertay has shown that a common method when teaching business courses is that students are first exposed to theory, and then the use of examples illustrate the application of a particular concept. This automatically implies that the emphasis is on the theory itself, and not on its application. Lack of understanding the purpose of the theory makes the learning process difficult and for some students meaningless. The use of case studies helps students realise that they do not have the tools they need in order to address a particular problem. Thus, they start looking for these tools; in other words, they want to learn the theory.
- *Application of theory:* Presenting the theory and then providing students with an example to see its practical implication has another limitation. The chosen example clearly illustrates the particular theoretical concept. This does not help students to understand which theories are appropriate and can be applied to different business problems. Hence, the usefulness of case studies lies in the fact that they require students to identify the theory that is most appropriate for the problem that needs to be addressed.
- *Use of evidence:* Providing students with an example does not require them to select, employ, present and comment on data/evidence. Case studies are supported by accompanying data that students need to manipulate, analyse and interpret in order to address a problem.
- *Limitation of theory:* One of the lessons learnt from the recent financial crisis is that managers and decision-makers need to realise and consider the impact of their decisions in the broader "politico-socio-economic" context. Therefore, given that some of the students at some point in the career are going to work as managers and thus make important decisions, it is imperative that they understand this impact. Contrary to examples that are usually abstracted from their context, case studies make students to consider and come across with the wider implications of their decisions.

#### **Simulations, games & role-play (SGRP)**

Experience of teaching at Abertay has shown that students find it difficult to deal with the abstraction that permeates management theories. Providing them with specific examples assists them overcome this abstraction and to relate to the examples given. However, not all students have the same experiences, and thus the usage of examples is not always effective. Simulations, games and role-play (SGRP) can fill this gap as their use "ensures that all students have at least some level of common experience upon which to base their understanding of the relevant theory, [and second] it

actively involves the student in the learning process” (Neral and Ray 1995, p. 170). Similarly to case studies, simulations, games and role-play (SGRP) help students develop their decision-making and problem solving skills in realistic situations. Being confronted with real-life business problems and ethical dilemmas, students are given the opportunity to understand, recognise and appreciate the impact of poor judgment, and thus learn both from the good and bad decisions they make (Rossett, 2004).

Also, adopting this approach has much to offer to the learning process. Not only does it encourage students to reflect on their understanding of theoretical business concepts (Alden, 1999; Oberhofer, 1999), but also enables them to gain a deeper understanding of both their own and others' feelings and views and thus to recognise the importance of role and responsibility. Another benefit of the use of simulations, games and role-play (SGRP) is their significant positive impact on class dynamics, as learners have to work collaboratively in a group in order to reach consensus. This removes barriers among students and stimulates interactivity (Francis and Byrne, 1999). Students' full involvement in the learning process (Feinstein, Mann and Corsun, 2002), as well as the spiritual nourishment and support that the group supplies its members whilst they try to make sound decisions and come to an agreement are priceless, as they provide them with a precious learning opportunity that cannot be offered by textbooks (Gremmen and Potters, 1997).

After considering a number of benefits that the use of simulations, games and role-play (SGRP) such as decision-making, problem solving and analytical thinking skills, retention of knowledge, motivation, transfer of knowledge etc. (see more in Clarke 2009), it would be an omission to ignore an extra one. Case studies expose students to real-life scenarios but because of the static nature of the data/information provided, the range of decisional possibilities is not boundless (Mitchell, 2004). On the contrary, business simulations and role playing give learners the opportunity to observe others' behaviours, and thus during the decision-making process to take these behaviours into account in (Curry & Moutinho, 1992). Therefore, simulations, games and role-play (SGRP) can overcome case studies' deficiencies.

### **The proposed model**

It is in the tutorials that students will demonstrate a comprehensive understanding of the fundamentals (in other words the key theories and models that will be presented to them in the lectures) by applying them to real-world business problems. However, printed case studies have some shortcomings. For instance, according to Theroux and Kilbane (2004) by devoting 10 to 15 pages documenting a business problem, printed case studies cannot provide in a detail all the necessary information that are imperative for a well-informed decision-making. Moreover, it usually takes 1 year to 1,5 year to produce a business case study. Businesses nowadays operate in a globalised, hypercompetitive and an ever-changing environment, thus some case studies when are finally released on the press are outdated. Moreover, most students have work experience and expect a practical, real-life curriculum. Finally, the Internet era we live in today enables them to be “connected with the world” in many aspects of their lives; so excluding their business education would not probably be a good idea. Therefore, the suggestion is that the business cases will be a mixture of printed cases, and real-time cases. As far as real-time business cases is concerned, after being provided with some suggested websites and a short video and by having access to the Internet and thus to unlimited data and information, students will be asked to investigate and solve a business problem. The solution of the problem will be ‘live’ and in ‘real-time’. This is an element of innovation in the delivery of the module, as students will need to master the same challenges that managers face when, for instance, they gather and analyse information, develop/weight alternatives and make managerial decisions.

From the above it is evident that simulations, games & role-play (SGRP) can be used as a complementary tool along with business case studies, and the combination of them can serve as an efficient and effective pedagogical model that addresses existing deficiencies in the Managing and Leading Change (MT0903) module. Therefore, by taking into consideration all the above, it is suggested that for the module Managing and Leading (MT0903), the following model embraces important contemporary discourses in Higher Education, and addresses critical issues related to the Abertay's Teaching and Learning Strategic Plan 2011-2015 (See Figure 2).

## SIMULATIONS, GAMES & ROLE-PLAY (SGRP)

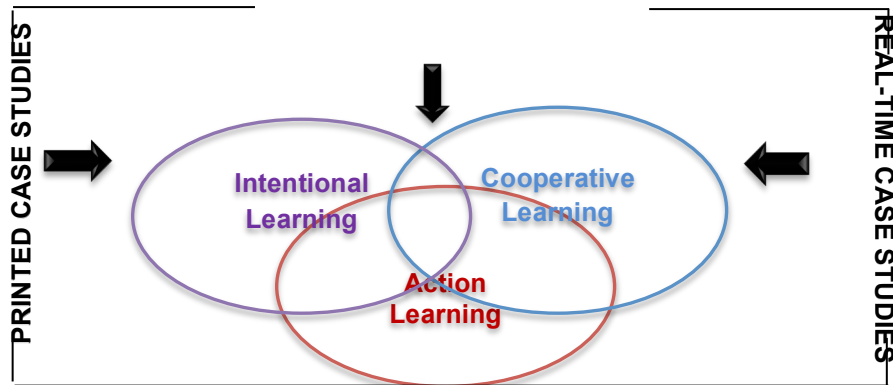


Figure 2: The proposed model

But what such tutorial classes can do for meeting and promoting Abertays' graduate attributes? In other words, how does the proposed model fit in Abertay's context?

### Relationship to Abertay's Graduate Attributes

When students complete their studies and graduate from Abertay, they should have developed their intellectual and social capacity to contribute to society, find practical and innovative solutions to real-world problems, and work in complex contexts (Abertay's Strategic Plan 2011-2015, p.8). As such, they should be confident thinkers, determined creators, flexible collaborators and ambitious enquirers. The use of printed and real-time business case studies, as well as simulations, games & role-play (SGRP) in the Managing and Leading Change class, can significantly allow students to meet these objectives and develop Abertay's attitudes in the following ways:

#### Confident Thinkers

Students will develop an in depth knowledge and understanding of the main strategic themes in developing and managing people and organisations in the context of organisational change management. The analytical, evidence-based approach to solving a real-life business problem requires students to engage in critical thinking, creativity and collaboration.

#### Determined Creators

Students will develop the ability to critically evaluate and analyse, issues associated with change management using evidence from both theory and practice in an innovative and creative way. Business case studies encompass a wide variety of topics of different levels of detail and complexity.

#### Flexible Collaborators

Through the use of group work and discussion based on the use of case studies as well as simulation exercises, students will be able to identify and evaluate the ideas of other groups or individuals. This will allow them to develop their understanding of change management and develop their ability to respond appropriately and make a contribution that promotes group working and supports the contribution of individuals.

#### Ambitious Enquirers

Students will be able to analyse case study situations involving the use of information technologies and make logical, informed recommendations. The application of decision-making and problem-solving skills on real-life problems requires students to identify sources of information and thus engage with issues that cover all areas of library services and facilities.

Finally, it is noteworthy that the proposed model and the use of printed and real-time case studies, as well as simulations, games & role-play (SGRP) totally fits in Abertay's Strategic Plan (2011-2015) as it meets its key three strategic objectives that are as follows:

1. Developed innovative learning environments that reflect real-world challenges and approaches to work;
2. Used active enquiry and project-based activity to ensure our students can purposefully access and evaluate information;
3. Developed graduates who, through exhibiting the Abertay Graduate Attributes, can contribute to, and shape, future economies and society”

Abertay's Strategic Plan 2011-2015, p. 10

## Conclusion

This paper identified and addressed a certain problem that underpin management classes. Experience of teaching management courses at Abertay has shown that in the lectures students are presented with key management theories and models which try to memorise in order to apply them in the real-life problems that have to deal with in the tutorial classes. This clearly does not promote their critical thinking and does not create an active learning environment. Thus, a pedagogical model was proposed in this paper as a drastic way to address this problem which involves the use of printed and real time business case studies, as well as simulations, games & role-play (SGRP). The adoption of these teaching strategies is aligned with the characteristics and the outcomes that are required from adult education. Students not only will better retain, understand and apply theory into praxis by assessing real-life problems and understanding the complexities involved in problem solving and decision-making, but also they will develop the desired Abertay's graduate attributes.

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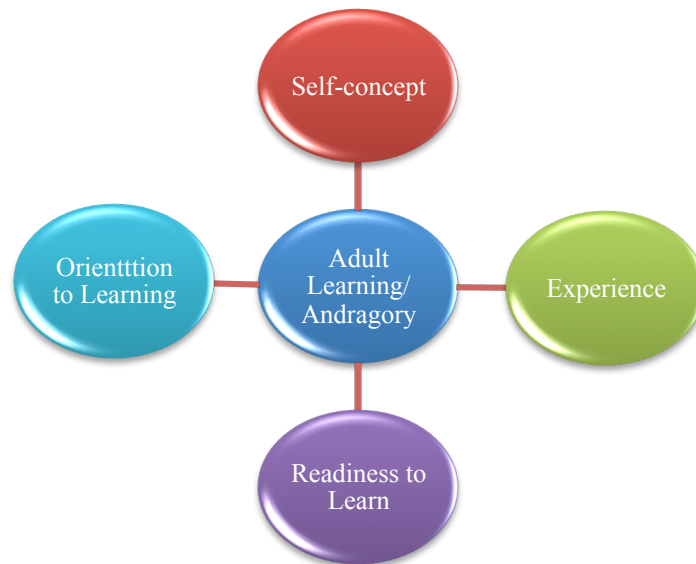
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Appendix 1: Adult Learning/Andragogy (Knowles, 1984).





## Visualising the mapping of intended learning outcomes on Abertay Attributes at module level

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### Abstract

Despite the importance of graduate attributes, their embedment within modules and how the teaching and learning activities foster the development of the capabilities are not always clear. This paper describes the development of a model to visualise the mapping of intended learning outcomes on Abertay Attributes at module level. The module is built upon Bloom's taxonomy and consists of five learning outcome components: *Information, Application, Reflection, Skills* and *Social*, capturing the three different domains of learning activities i.e. cognitive, psychomotor and affective, with an emphasis on the cognitive domain. Mapping exercises using the model will allow teaching staff to visualise the embedment status of Abertay Attributes within a module, identify gaps and make alignments to increase the likelihood of achieving the desired capabilities.

**Keywords:** Abertay Attributes, contextualisation, intended learning outcomes, graduate attributes, mapping, visualisation

### Introduction

There has been an increasing focus by universities around the world on the development of various sets of transferable skills, personal qualities and values among their graduates in addition to the knowledge and skills typically associated with a particular discipline. These context-free learning outcomes are known as graduate attributes which essentially represent the nature of the education a university offers to its students:

Graduate attributes are the qualities, skills and understandings a university community agrees its students should develop during their time with the institution. These attributes include but go beyond the disciplinary expertise or technical knowledge that has traditionally formed the core of most university courses. They are qualities that also prepare graduates as agents of social good in an unknown future.

(Bowden et al. 2000, cited in The University of Edinburgh, 2011)

An important driver for the emergence of graduate attributes in higher education is employability (Bridgstock 2009). With the looming of knowledge economy, it is no longer sufficient for university graduates to only possess disciplinary knowledge and skills because they are expected to be able to function efficiently and adaptable in a more challenging world (Bridgstock 2009). They must be able to think critically, solve problem efficiently and work in teams. They need to be flexible, creative, open to new ideas and lifelong learners. They should also act ethically and are expected to contribute to the society in meaningful ways (Litchfield et al. 2010). By fostering the development of these generic capabilities among students, the university not only will better prepare its students to function efficiently in their chosen profession, but also will allow the university to demonstrate its commitment to meet the interest of government, professional societies, accreditation bodies and employers in producing a competent workforce (University of Tasmania, 2015).

To materialise graduate attributes, they must be grounded in the programmes and/or modules on offer. Curriculum design, teaching and learning strategies and assessment activities should reflect the pledge of the university in supporting students to achieve the generic skills and capabilities. The students should have a clear understanding of the graduate attributes will be developed in the programme and across different modules, allowing them to select relevant modules, engage in appropriate learning activities and effectively monitor their progress (Berrie 2004; Bath et al. 2004). However, despite much emphasis on the literature the importance of graduate attributes, the implementation, both within and between universities, has been patchy (Barrie 2006; Jones et al. 2007) due to a number of barriers. Firstly, in most cases graduate attributes are very broadly defined and have little meaning unless they are elaborated within the context of a discipline (Jones et al. 2007). The lack of conceptual clarity or contextualisation could make their embedment in the curricula difficult, ineffective and superficial. Secondly, some academic staff may see the initiative of

implementing generic attributes by the university as a burden imposed on them, especially when there is a lack of ownership of the implementation plan by a wider academic community (Jones et al 2007; Fleming et al. 2013). Indeed, Green et al. (2009) stressed that a whole institution involvement is important to successfully develop graduate attributes. Thirdly, the fact that graduate attributes are embedded in general teaching across different modules rather than being taught in a standalone module, they are less visible, may not be directly assessed or even being missed out altogether in the modules (Biggs and Tang 2007). Graduate attributes are competencies that develop over time and they are unlikely to be achieved if they are only addressed in one or few modules. Therefore, it is important to continually review, reflect and renew implementation practices based on evidence gathered from students and academic staff, in order to make sure that the graduate attributes are fostered effectively in teaching and learning across the programme.

In order to better embed graduate attributes in different disciplinary contexts and to ensure that students are able to develop relevant capabilities in a structured and coherent manner, some universities have taken systematic approaches, such as mapping exercises, to identify strengths and weaknesses in their teaching and assessment of graduate capabilities (Bath et al. 2004; Jones et al. 2007; Fleming et al. 2013; University of Tasmania, 2015). Graduate attribute mapping can take place at two different levels: module level mapping and programme level mapping. Module level mapping focuses on identifying intended learning outcomes and/or teaching and learning strategies of a module that will contribute towards the development of contextualised attributes (University of Tasmania, 2015). Not all graduate attributes are expected to be addressed in one single module, but at least a few elements of the graduate attributes should be embedded. Programme level mapping, on the other hand, examines how the learning outcomes of all modules holistically contribute to the attainment of graduate attributes. Graduate attribute mapping allows academic staff to identify gaps, overlaps or omissions in attribute development and takes appropriate actions to rectify the embedment (University of Tasmania, 2015).

### **The aim of this study**

This paper aims to develop a model for visualising the mapping of intended learning outcomes on Abertay Attributes at module level. The model will provide a snapshot of the state of embedment of the graduate attributes within a module (i.e which dimension(s) of Abertay Attributes is/are addressed and to what extent). The paper does not argue that the model is the best approach to align learning outcomes with Abertay Attributes, nor the model is perfect, but it is hope that by revealing the link of module intended learning outcomes with Abertay Attributes, the model allows academic staff to evaluate and reflect on their current practice in relation to embedment of Abertay Attributes.

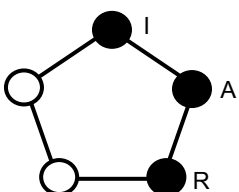
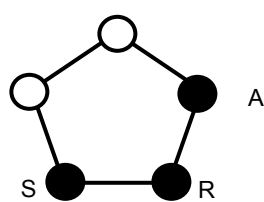
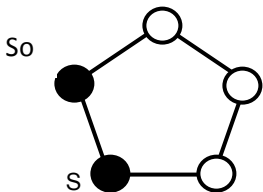
### **Contextualisation of Abertay Attributes**

Abertay Attributes were first set in 2007 but evolved into a new set of four dimensions, i.e. Intellectual, Professional, Personal and Active Citizen in 2013 with three generic exemplars for each dimension (Abertay University 2015). The aim is “to support all young people to be successful learner, a confident individual, a responsible citizen and an effective contributor” and “cope and thrive in the modern complex society” (Abertay University 2015, p.1-2). Like most other graduate attributes, Abertay Attributes are generic statements of institutional learning outcomes and they need to be contextualised according to discipline. In a real scenario, development of discipline-specific Abertay Attributes would expect to involve a great deal of debates from all teaching staff. But this has not been done for Food programmes (Food programmes are used as example for discussion in this paper) so for the purpose of this paper, several discipline-specific exemplars which may be relevant to Food programmes are created and listed in Table 1. The learning outcomes deemed to foster the respective attributes are also presented in Table 1.

Development of discipline-specific exemplars is an important first step to map module learning outcomes on Abertay Attributes because it allows us to address the attributes more effectively when designing curriculum, teaching and learning activities and assessment (Bath et al. 2004). For example, one of the generic exemplars under Intellectual dimension of Abertay Attributes is “master their subject, understand how it is evolving and how it interacts with other subjects” (Abertay University, 2015, p.2). For Food programmes, this could mean the university will foster the students to acquire a sound knowledge of different areas related to food and nutrition, and develop an ability to make meaningful connections among these different areas in order to have a holistic understanding

on the discipline. To achieve this, the students are expected to learn professional knowledge and develop abilities to analyse and reflect upon information and experience within the modules. Other Food Programme-specific exemplars are also created and shown in Table 1.

**Table 1: Some Food programme-specific exemplars of Abertay Attributes and their related learning outcomes**

Abertay Attributes (Abertay University, 2015, p.2) and Exemplars for Food programmes	Learning outcomes or capabilities that foster development of the attributes
<p><b>Intellectual</b></p> <ul style="list-style-type: none"> <li>• “Master their subject, understand how it is evolving and how it interacts with other subjects” <i>Exemplar for Food programmes:</i> Gain a sound knowledge of food and nutrition and make connections in different contexts</li> <li>• “Know how knowledge is generated, processed and disseminated...” <i>Exemplar for food programmes: ...</i></li> <li>• “Be able to critically evaluate information...”  <i>Exemplar for Food programmes: ...</i></li> </ul>	<ul style="list-style-type: none"> <li>• Professional knowledge and skills</li> <li>• Analyse, apply and reflect upon information and experience</li> </ul> 
<p><b>Professional</b></p> <ul style="list-style-type: none"> <li>• “Be decision-maker and problem-solvers, tackling complex issues using creativity and considered judgement” <i>Exemplar for Food programmes:</i> Apply professional knowledge and skills of food and nutrition to solve problems in real life situations</li> <li>• “Be equipped and motivated to continue learning...” <i>Exemplar for Food programmes: ...</i></li> <li>• “Be able to work independently and collectively, [...] leadership and a team-member role...”  <i>Exemplar for Food programmes: ...</i></li> </ul>	<ul style="list-style-type: none"> <li>• Problem-solving skills</li> <li>• Critical thinking, reflective listening and effective reasoning skills</li> <li>• Management skills</li> </ul> 
<p><b>Personal</b></p> <ul style="list-style-type: none"> <li>• “Be responsive and responsible in personal, cultural and social contexts” <i>Exemplar for Food programmes:</i> Relate and recognise personal, cultural and belief issues with food choice and nutrition, and act responsibly on it</li> <li>• “Be determined, ambitious, articulate and adaptable”  <i>So Exemplar for Food programmes: ...</i></li> <li>• “Understand and embody self-awareness,</li> </ul>	<ul style="list-style-type: none"> <li>• Ability to organise and evaluate short and long term processes by taking into consideration multiple perspectives and points of view</li> </ul> 

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honesty and integrity ...”

*Exemplar for Food programmes: ...*

### Active citizen

- “Maintain and continuously develop awareness of their civic, ethical and environmental responsibilities”

*Exemplar for Food programmes:*

Develop well-informed, multi-faceted awareness of occupational health and safety, ethics, food laws and regulation, and current issues related to food, nutrition and health

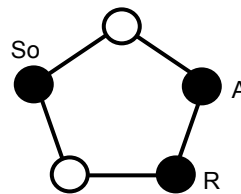
- “Deploy their skills and learning to make a real contribution to society ...”

*Exemplar for Food programmes: ...*

- “Be inclusive, globally conscientious, socially respectful...”

*Exemplar for Food programmes: ...*

- Ability to apply professional knowledge such as food laws and regulations, and code of ethics on local, national and international issues



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\* I, A, R, S and So are the five learning outcome components of the model, i.e. *Information, Application, Reflection, Skills* and *Social*, respectively.

### Development of the model

Comparing the intended learning outcomes of a module with the contextualised programme-specific exemplars allows us to examine where the module sits within the Abertay Attributes. To visualise this relationship, a pedagogical model is proposed as shown in Figure 1. The model is built upon Bloom’s taxonomy (Bloom et al. 1956; Anderson et al. 2001) of education objectives and it consists of five learning outcome components:

- *Information*: learning outcomes that focus on the acquisition and interpretation of declarative knowledge. Learning outcome verbs under this component include identify, define, describe, explain, discuss and compare.
- *Application*: learning outcomes that focus on the ability to analyse and apply knowledge. Examples of learning outcome verbs under this component are: apply, demonstrate, conduct, analyse, differentiate, calculate and relate.
- *Reflection*: learning outcomes that focus on the ability to evaluate and reflect on new information or experience, and make connections of different information to create and assess the value and relevance of the information within the discipline. Examples of learning outcome verbs are develop, create, justify, investigate, argue and reflect.
- *Skills*: learning outcomes that focus on the development of transferable skills such as writing, presentation, management (leadership and team player) and problem-solving and professional skills such as knife handling, cooking, laboratory and research techniques, etc. Examples of learning outcome verbs are demonstrate, construct, mend and conduct.
- *Social*: learning outcomes that emphasize on awareness and response to professional ethics, governance policies and current issues, as well as the ability to prioritise values and act on them accordingly. Examples of learning outcome verbs are compare, appreciate, assist, perform, justify, respect and demonstrate.

One would notice that the model captures the three different domains of learning activities – cognitive, psychomotor and affective – with an emphasis on cognitive domain which reflects the nature of university as an academic rather than vocational institution.

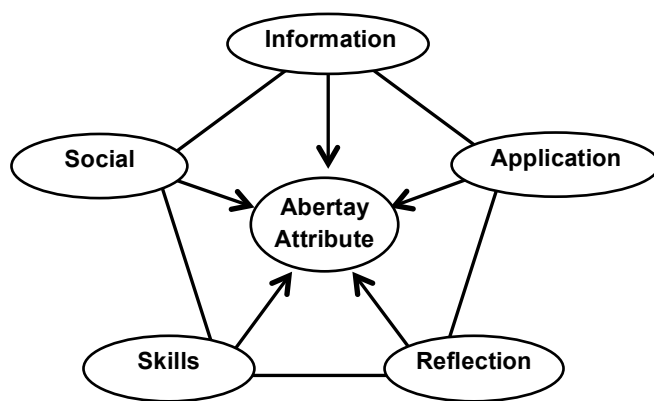


Figure 1: Pentagon representation of the model which maps learning outcomes on Abertay Attributes

### Applications of the model

Different set of intended learning outcomes addresses different dimension of Abertay Attributes, so when the intended learning outcomes are clustered into the five different components, the model visualises which dimension of Abertay Attributes is these learning outcomes more likely to foster (see simplified diagrams of the model in Table 1). For example, intended learning outcomes that emphasize on the acquisition of disciplinary knowledge, the ability to apply the knowledge and reflect upon it (learning outcome components of *Information*, *Application* and *Reflection*, respectively, as indicated by the black dots on the model in Table 1) would be more likely to foster the development of the dimension Intellectual rather than Active Citizen which has a strong focus on social awareness. It is important to note that the set of learning outcome components is not fixed for any particular attribute dimensions, rather they can be mixed-and-matched freely so long as they are deemed relevant for development of a graduate attribute.

Since there is a significant overlap in the four dimensions of Abertay Attributes (Abertay University, 2015), the same learning outcome component of the model can appear more than once in the mapping. For example, *Reflection* is highlighted in fostering the development of the dimensions Intellectual and Professional (Table 1) because reflective and critical thinking is important for evaluating information (Intellectual) and solving problems (Professional).

The model is also useful in the process of identifying, locating and profiling the intended learning outcomes of a module, allowing teaching staff to review and evaluate the aim of the module, in a bid to make more explicit their teaching approaches to achieve the intended learning outcomes that fostering the development of Abertay Attributes. To demonstrate this, a Level 7 module in Food programmes is chosen as an example:

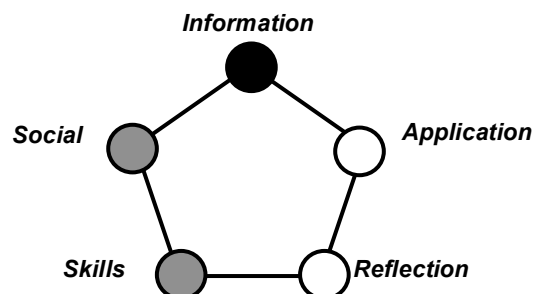
The aim of this module is to develop student understanding on the nature and functionality of food ingredients in conjunction with consideration of nutritional implications. The learning outcomes of the module are:

1. Explain the physical structure and chemical nature of food components, their interaction in food and relevance to food processing;
2. Describe the relationship between the structure and composition of food commodities and the preparation, processing and food preservation methods used to maintain optimum quality;
3. Relate the range and quality of food products available (both raw material and processed product) within each commodity category;
4. Describe the general principles of nutritional requirements, nutrition policy, dietary assessment methods and current healthy eating guidelines;
5. Demonstrate safe, competent food handling skills.

(ACME FC0702A 2014, p.1)

The first three learning outcomes of this module focus on the acquisition of declarative knowledge but there is no emphasis on the application of the knowledge as indicated by the learning outcome verbs *explain*, *describe* and *relate*. The forth learning outcome also stresses on the attainment of declarative knowledge but with a societal element to it because the knowledge is related to public health and

organisational policies and guidelines; while the last learning outcome is about gaining a professional skill. From this analysis, one can map the intended learning outcomes of this module into the model as represented in Figure 2. Under the framework of the model, the main component of the learning outcomes is *Information* (represented with the black dot) and to a lesser extent the secondary components are *Social* and *Skills* (represented with grey dots).



**Figure 2:** Pentagon representation of learning outcome analysis of a Food module using the model. Black dot and grey dots respectively represent the primary and secondary components of the learning outcomes of the module.

So in what way and to what extent the learning outcomes of this module foster the development of Abertay Attributes? Since *Information* is the main learning outcome component, it suggests that the module helps students to develop the Intellectual dimension within Abertay Attributes, particularly in the aspect of “master their subject, understand how it is evolving and how it interacts with other subjects” (Abertay University, 2015, p.2). The module, however, does not fully embrace this dimension which otherwise would have included higher learning outcome verbs that involve critical thinking, evaluation, etc. Hence, the components of *Application* and *Reflection* in the model are missing (Figure 2). The module, to a less extent, may help prepare students to be an Active Citizen by “develop awareness of their civic, ethical and environmental responsibilities” (Abertay University, 2015, p.2), but again, this dimension is not fully addressed and this is represented as grey dot in the model in Figure 2. By using the model in this analysis, it is clear that if Abertay Attributes were to be better embedded within this module, the intended learning outcomes of this module needed to be ‘geared up’; and this could be done in a number of ways. Perhaps one could revisit the aim of this module so that it better enables students to develop the graduate capabilities, or the learning outcome verbs are revised to fill the gaps in attribute development.

## Conclusion and outlook

This paper has presented the mapping of intended learning outcomes on Abertay Attributes at module level in order to help identify the attributes that are being fostered within the module. The proposed model, however, does not describe to what level of attainment, eg. elementary, proficient or advanced, of a particular attribute is embedded within the module, or how the actual learning activities and assessments of the module are designed for encouraging the development of the attribute. Indeed, a much more comprehensive mapping tool is needed to better capture the breadth and depth of Abertay Attributes, as what have been practised in many Australian universities (Jones et al. 2007; University of Tasmania, 2015).

To ensure students develop Abertay Attributes in a coherent and structured manner, the mapping exercise should be extended to programme level or university level. Higher level mapping allows a holistic review of the curriculum, and hence, help build a more complete picture of how the attributes have been embedded (or the lack of) within the programmes. Mapping of Abertay Attributes should be seen as an examination process of intended learning outcomes against the attributes rather than an audit (Barrie 2004), and the model described in this paper visualises the examination outcome. Such visualisation provides a starting point for teaching staff to reflect their practice so they can better incorporate Abertay Attributes within the curriculum.

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## Information literacy for distance graduate programmes: an andragogic-constructivist approach

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### Abstract

With Abertay moving towards distance delivery for some postgraduate courses this paper explores current research in information skills delivery for adult distance learners and will suggest a hybrid pedagogical model which embraces the needs of this diverse student body while aligning delivery with the on-campus provision.

**Keywords:** Distance learning; Information literacy; postgraduate, andragogy, constructivism

### Introduction

Abertay was the first university in Scotland to develop and implement an information literacy framework. Launched in 2004 the framework embeds key IT and information skills into all on-campus degree programmes and is based on SCONUL's 7 pillars model. The embedded information skills form part of the overall support programme offered by the library which includes sign up workshops, library drop in sessions and one-to-one support.

In 2014-2015 Abertay introduced two distance learning modules to their postgraduate nursing course. The first entirely distance learning programme will be the LLM in *EU security and transitional criminal justice* which launches in 2015-2016. Offering distance courses enables Abertay to attract more fee-paying students using an efficient and attractive mode of delivery (in line with Abertay's current *Efficiency and Effectiveness* programme) while avoiding the complications of student visa restrictions. Online delivery also aligns with Abertay's current *Teaching and Learning Strategy*, aims of which include revolutionising delivery and facilitating different modes of learner journey. The move to distance learning is also in line with national trends which show an increase in distance learners from 49,020 in 2012/13 to 51,870 in 2013/14 (Higher Education Statistics Agency 2015). Alignment with institutional priorities and buy-in from academics has been key to the success of the current on-campus information literacy programme and will be key to off campus delivery as well (Secker and Coonan 2013, Kenton, Blummer and Song 2010).

While the library has extensive experience of delivering information skills in person previous experience of supporting distance learners is limited to one-off site visits or video-conferencing sessions. This type of self-contained instruction lacks active learning opportunities and is not sufficient to develop the higher level skills required by postgraduate students to excel (Martin 2013). It is often assumed that by the time students reach postgraduate study they will have already acquired the research skills necessary for this level of study (Francis 2014). However the leap from undergraduate to postgraduate study often exposes a lack of skills (Miller and Hensley 2010, Barrett 2005, Catalano 2010). This can be compounded by the varied abilities and prior knowledge of adult learners.

### Information Literacy- definition; drivers; underpinning frameworks

"Information literacy is knowing when and why you need information, where to find it, and how to evaluate, use and communicate it in an ethical manner" (Chartered Institute of Library and Information Professionals 2013). Enabling students to acquire and master these skills has long been part of the librarian role (Barrett 2005). While this paper focuses on higher education it's worthwhile considering the wider application of information literacy skills. For example Scotland's current programme of government based on "participation, prosperity and fairness" (The Scottish Government 2013) relies on citizens having the skills and technology to access services. There is a recognised skills gap



created by this drive to 'digital by default'. The *Curriculum for Excellence* in primary and secondary education as well as community based initiatives such as *Let's get on* (Digital Scotland 2015) are examples of attempts to bridge this gap. Mastering information and digital skills is key to personal and professional advancement:

Information literacy is a prerequisite for participating effectively in the Information Society and is part of the basic human right of lifelong learning. It encompasses everything we do and our approach must therefore be holistic. (The Right Information 2013)

At Abertay information literacy is at the heart of the curriculum. The new graduate attributes launched in 2014-15 conceptualise four main dimensions: intellectual, professional, personal and active citizen. Information literacy skills are most apparent in the Intellectual dimension (see figure 1 in appendices). The graduate attributes are mapped against the module learning outcomes embedding them, and thus information skills, in the curriculum. The outcomes-based learning at Abertay can be compared with Biggs' theory of Constructive alignment (Biggs and Tang 2011). Constructive alignment is an outcomes based method of curriculum design which encourages deep student learning. It's based on constructivism (developed by Dewey, Piaget and Vygotsky), the idea that students 'construct' their own learning through engagement in appropriate learning activities. Teachers 'align' the learning activities and assessments with the learning outcomes to create an environment where deep learning can occur (Biggs and Tang 2011). Current information literacy provision at Abertay is delivered by the academic librarians and the digital skills tutor. The embedded, in-class teaching is negotiated with the module tutors and aligned with the overall learning outcomes of the module to ensure maximum relevance. Information skills delivery necessarily has an element of procedural knowledge for example how to use databases. However, inquiry based learning forms the backbone of information skills classes.

### **The conceptual frameworks underpinning Information Literacy**

Information literacy is subjective, multidimensional and highly contextual changing according to the perspective of the learner and the teacher (Hepworth and Walton 2009) . In their seminal paper *Six frames for Information literacy* Bruce, Edwards and Lupton argue that "Information literacy is not a theory of learning"(Bruce, Edwards and Lupton 2006 p.1). Rather learning theories underpin and inform approaches to the teaching information literacy (see figure 1 in appendices). Traditional library instruction is content and competency based, for example instructor-centred database demonstrations (Francis 2014). However, as access to information (particularly on the Internet) has increased, the focus has moved from basic skills to developing higher level skills including critical thinking and evaluation (Hepworth and Walton 2009, Black and Holford 2002) . As such the theoretical basis of information literacy has moved from behaviourist to a constructivist model which promotes independent learning with students as active participants and teachers as facilitators (Hepworth and Walton 2009) .

The main conceptual framework that underpins information skills delivery in the UK, including Abertay, is the SCONUL 7 pillars model. Each pillar is described by a set of statements which relate to a series of skills, competencies, attitudes and behaviours, including both procedural skills and higher thinking (see figure 2 in appendices). Developed in 1999 this competency based model has been criticised for the passive role of the learner (Hepworth and Walton 2009) and the emphasis on functional skills over deep learning (Hepworth and Walton 2009, Markless and Streatfield 2007) . One approach is to divide information literacy into two: procedural, functional use of information and critical/ analytical use (Bruce, Hughes and Somerville 2012). This is supported by Black and Holford's assertion that knowledge should be sub-divided into "information, understanding and intellectual skills" (2002 p.191) . Thus any information literacy framework needs to take a holistic approach to include both types of knowledge and both cognitive and behavioural skills (Hepworth and Walton 2009) .

## Current information literacy frameworks

Recent updates to information literacy frameworks have embraced the holistic and flexible approach advocated by Hepworth and Walton (2009) . Both SCONUL's 7 pillars model and the equivalent American framework have been updated to reflect changes in technology and the information landscape. As well as these revised frameworks *A New Curriculum for Information Literacy* (ANCIL), based on Biggs' constructive alignment theory (Biggs and Tang 2011) , has also been developed (Secker and Coonan 2011). In her analysis of the four main frameworks currently in use in the UK (SCONUL 7 pillars, ANCIL and the Welsh and Scottish national frameworks), Martin ( 2013) highlighted the following key qualities of effective models:

- Holistic
- Flexible
- Contextual
- Multidimensional
- Reflective
- Active participation: students as both users and creators of knowledge
- Recognition of impact of technology

These qualities, in particular the active participation and the emphasis on reflection and context, indicate the constructivist basis of current information literacy practice. How does a constructivist model align with the needs of adult distance learners?

## Information needs of adult distance learners

The information needs of taught post graduate distance learners is a neglected area of research (Francis 2014, Barrett 2005, Shaffer 2011) . As a small sub-set of the student population and they are "easily over-looked" and are often unaware of the support available to them. Most distance learners in the UK are adult learners so much of the research on distance learning could also apply to adult learners (2012 p.71) . Adult learners have specific needs which must be considered if information literacy training is to be successful. Rapchak and Behary go on to argue that "Andragogy should be understood by librarians and all those who work with information skills in adult learners" ( 2013 p.350). Andragogy, the theory of adult learning, was popularised by Malcolm Knowles in his 1970 book *The Modern Practice of Adult Education*. Originally devised as the opposite of pedagogy in subsequent texts (*From Pedagogy to Andragogy* in 1980 and *Andragogy in Action* in 1984) Knowles refined his model to incorporate pedagogy (Knowles 1984) . Knowles was uncertain if andragogy was a theory of learning preferring to describe it as a "system of concepts" (1984 p.8) . The main concepts can be summarised thus:

- Adult learners need to be ready to learn (Knowles 1984 p.11)
- Adults learners are self-directed learners (Knowles 1984 p.9)
- Their prior knowledge and experience should be recognised and used as a source of learning (Knowles 1984 p.10, Patterson 2009)
- The relevancy and applicability of their learning to their current situation is important (Rapchak and Behary 2013 p.354). Thus problem-based learning is particularly suited to adult learners (Knowles 1984 p.12)
- Adult learners are motivated mainly by internal factors (Knowles 1984 p.12)

## Andragogy and constructivism

Andragogy and constructivism can be combined and adapted to support successful online delivery (Huang 2002). A constructivist approach to adult learning can create learner-centred, collaborative environments which encourage critical reflection and deep learning (Huang 2002). Huang has mapped andragogy against constructivism (see figure 3 in appendices) and highlighted the following instructional principles for successful online delivery:

- Interactive learning
- Collaborative learning
- Facilitating learning
- Authentic learning
- Learner-centred learning
- High quality learning

Huang 2002 pp.32-34.

Studies show that it is relatively easy to establish many of these principles online while some are more challenging. A review of the literature reveals the key factors behind successful information skills delivery are relevance, flexibility, active learning and recognition of prior knowledge.

### **Relevance**

Relevance is fairly easy to achieve by contextualising the information skills training within the specific discipline (Catalano 2010) and linking the training to a specific piece of coursework allowing students to applied their new skills immediately (Miller and Hensley 2010) While it is difficult to create authentic learning in an online environment instructors can help students transfer their skills into the 'real world' by using case studies or scenarios (Martin 2013). Some argue that an element of assessment is important to establish the relevance of the information skills training (Kenton, Blummer and Song 2010) .

### **Flexibility**

Adult online learners are generally assumed to be highly motivated and self-directed (Brookfield 1995 cited in Huang 2002 p.34) which works well for an active, learner-centred environment. However, they are a diverse group (Falasca 2011) and as such learning should be flexible enough to accommodate different learning styles (Brookfield 1986) . Flexibility can be achieved by creating discrete learning objects available at point of need, for example embedded into the VLE (Hess 2013, Shaffer 2011). A variety of modes of delivery (text-base, video, audio for example) are important to be able to support different learning styles and personal preferences (Hess 2013, Miller and Hensley 2010, Kumar and Ochoa 2012, Dewald 1999 p.150) . In particular self-paced and asynchronous learning methods are desired by distance students (Rapchak and Behary 2013).

### **Active learning**

Many articles emphasise the importance of active and experiential learning (for example Rapchak and Behary 2013, Dewald 1999 p.150). Individual, active learning can be encouraged through interactive quizzes. Dewald ( 1999 p.150) argues that online tutorials for adults can only be effective if they are "interactive, problem-based and incorporate activities such as quizzes or other active learning techniques". Instructional design experts stress the importance of communication tools in distance learning however research by Shaffer ( 2011) indicates that students are more likely to ask a fellow students or their lecturer than to contact their librarian. However, learner isolation is a concern and establishing a 'learning community' by using collaborative tools (for example wikis, blogs etc) mimics on-campus peer support and encourages collaborative learning (Francis 2014, Rapchak and Behary 2013).

### **Recognition of prior experience and knowledge**

Recognising learners' prior knowledge is a key principle of adult learning (Patterson 2009). It's not clear how accurately students perceive their own level of information skills (Miller and Hensley 2010). Encouraging students to diagnose their own learning needs allows adult learners prior knowledge to be recognised and could help students engage with the learning material (Falasca 2011). For example the University of Warwick (University of Warwick 2015) using a pre-entry diagnostic tool for

taught masters students to help them gauge their current abilities and make them aware of areas of improvement and, crucially, sources of help to make those improvements.

## Conclusion

Supporting postgraduate distance learners is challenging. Attempting to emulate the on-campus embedded, information literacy training in an online environment is difficult. However, by adopting an andragogic-constructivist approach librarians can accommodate the particular needs of the adult learner and put postgraduate distance learners at the centre of their own information skills training.

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## Appendices

- Master their subject, understand how it is evolving and how it interacts with other subjects
- Know how knowledge is generated, processed and disseminated, and how problems are defined and solved.
- Be able to critically evaluate information, and tackle uncertainty and information gaps with confidence and self-awareness
- Work independently and collectively.

- Be responsive and responsible

Item 1: Abertay University Graduate Attributes 2014

Frame	Focus	Underlying theory
Content	What needs to be known	Behavioural
Competency	What the learner should be able to do	Behavioural
Learning to learn	What it means to think like an information literate professional	Cognitive
Personal relevance	Usefulness of information literacy from the learners' perspective	Individual constructivist
Social impact	How information literacy impacts society	Social constructivist or social realist view
Relational	What are the critical ways of seeing information literacy	Social constructivist or social realist view

Figure 2: 6 frames of information literacy

(Adapted from Bruce, Edwards and Lupton 2006)

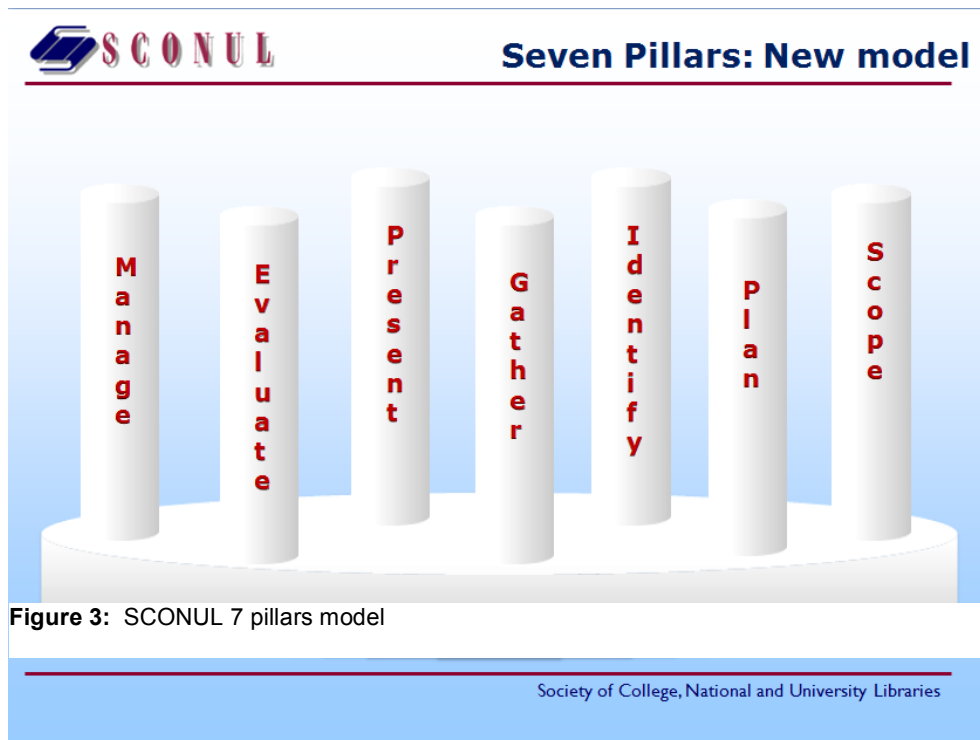
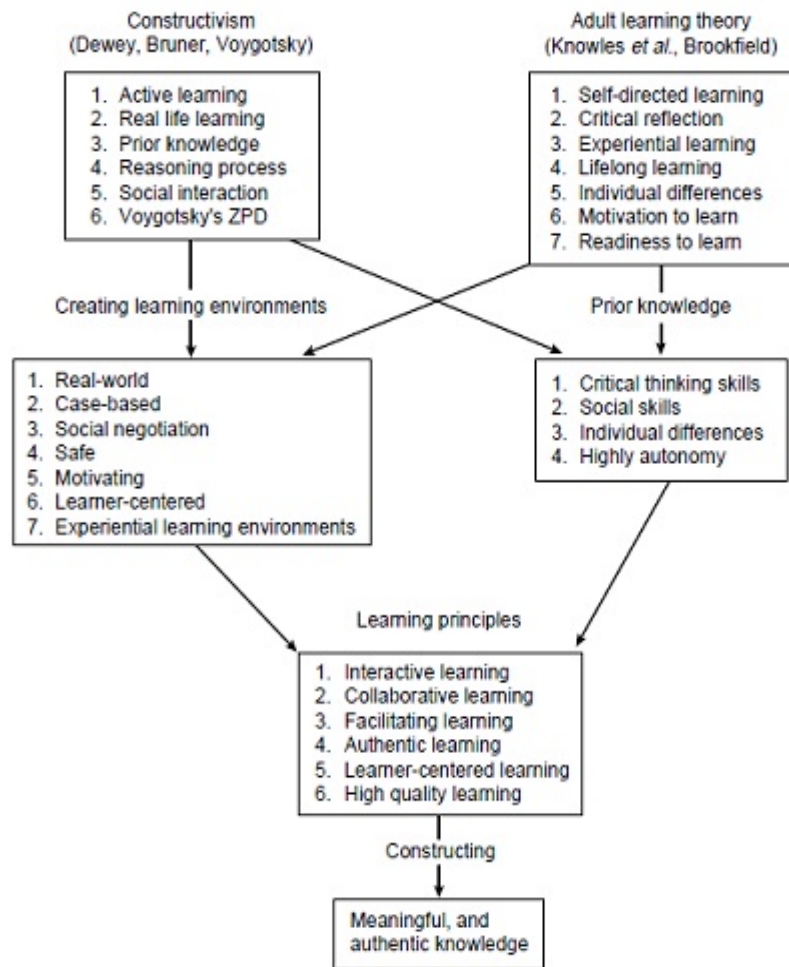


Figure 3: SCONUL 7 pillars model

**Appendix A: Constructivism applied in adult learning**



**Figure 4:** Constructivism applied to adult learning (Huang 2002 p.37)

## Teaching 2



**Designing a new module:  
“Structure and Geotechnics” with a specific focus on International students**

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**Abstract**

This paper presents the plan of developing a new module “Structure and Geotechnics (0834A)”, which is for the 2<sup>th</sup> year undergraduates. The background of students for the module would be expected as civil and geotechnical engineering with strong engineering mathematics knowledge. The teaching theories used for this design include Ausubel’s subsumption Theory, Bruner’s Constructivist Theory and Wertheimer’s Gestalt theory. As Abertay aims to become a more international University, theoretical analysis of teaching for an international class have been included. A new theoretical structure is formed for a case study of potential Chinese students presenting at the class.

**Keyword:** Module design, International Student, Abertay

**Introduction**

The process of designing a new module involves deep understanding of the student’s background, the knowledge of the module, and the purpose of delivery information to students, and also how the students could obtain the information. Such process is always a challenge, especially for including the consideration of international background students, but this process is very interesting.

The module of “Structure and Geotechnics” will be delivered in a new BSc course for the first time in the academic session from 2015 to 2016. It would be expected that there may be some Chinese students in our university of this course.

Most contents of the module are multidisciplinary in nature involving mathematics, structures and geotechnical engineering. Thus it will be very important for the students to gain a good insight in all of the aspects of such projects. The module will cover mainly the civil engineering and geotechnical aspects.

There are three major aims of this module, (1) to help students to get a deeper understanding of the Civil Engineering, and (2) to equip the students with enough knowledge for the future career, and (3) to provide a demonstration of teaching for mixed local Scottish students with international background students, mainly from China.

**Theory introduction for course design**

This section introduces the theories, which are employed in the design process of the module design, including Bruner’s constructivist theory and Wertheimer’s Gestalt theory.

Bruner’s constructivist theory may be used for the teaching on science and math learning[1-6], which is directly related to the subject. Bruner mentioned that learning is an active process, during which some new ideas or concepts may be formed by students. And this process involves the background of students based on the students’ current/past knowledge. However, this theory is based on the assumption that the students are all from a similar knowledge and background and from the same country. Even it may be also used for international background students, it would be necessary to add new things in the structure. A cognitive structure should be formed to allow students selecting and transforming information, constructing hypotheses and finally making discussion. Such kind of structure could be schema or mental models, which should be considered in the designing process. This structure is just like a foundation for the individuals to get and form new ideas. A dual way

communication then may be formed between the instructor/lecturer with Students. The lecturer can translate information to be learned into a format appropriate to the learner's current state of understanding, and encourage the students to discover principles.

A easy understanding over all structure of problems can lead to a better problem solving as suggested by Gestalt theory (Wertheimer's[7, 8]). This can be used as the principle of the course design, in which the given problem should be always with wide context for the best benefit of student to understand. The centre idea of this theory is "grouping", which represents the items/contents with similarities should be grouped. For example, in the geotechnics course design, shallow foundation, deep foundation should be grouped together.

One of the purposes of teaching is to inspire students form a genuine thinking style. In general, genuine thinking roots in a problem solving as stated In Wertheimer's model. Solving problem may cause tension force, and such kind of driving force then lead to a strain, of which produces modification of the situation in the direction for the purpose of solving problem, which then becomes a deeper understanding or a better solution. In the course design, the tutorial parts may play the role of inspiration for students and also reinforce the knowledge from lecturer. For instance, in the preparation of welding in the course design for structure part, the welding tutorial example have included a failure of the welding structure, and students were asked to give a solution for the problem by using their knowledge learned from lecturer notes.

### **Theory of teaching for international background students**

#### Part A: Challenges

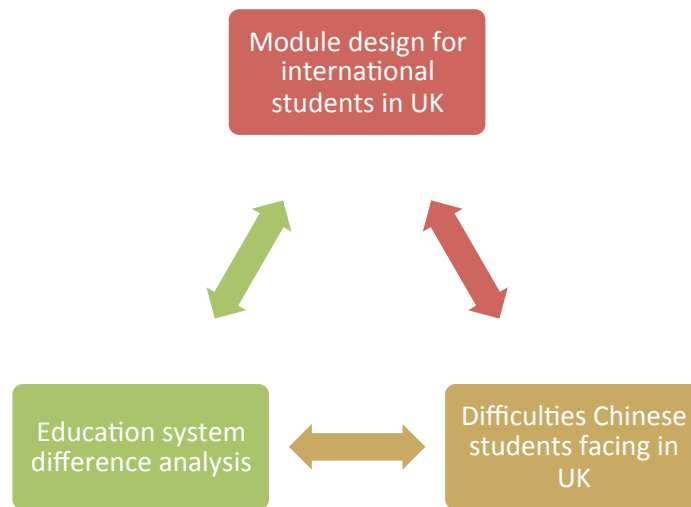
The above analysis is using general theory for the module design, based on the assumption that all the students coming from the same country. The challenges that instructors facing when design a course are the diverse backgrounds of international students [9]. The instructors have to figure out a way to engages students' prior knowledge to current course design, and think about how to engage the students. To specific for the students as international students, a new theory may be needed, however, there are fewer studies in this field so far. This section presents an analysis for module design for international students.

#### Part B: Case study and theory implementation

A deep understanding of the difference of education system of countries, identifying what key aspect of attractive point of UK education may be the first step to improve the international education in UK. Following discuss will use a case study for Chinese students in UK.

With the development of China economy in the past decades, more and more Chinese students go to overseas for education, and Chinese students becomes an important market for UK education. According to the Statistical from HESA, The number of international students in UK is 435,500 from 2013 to 2014, which increased by 3% than previous year. Chinese students are the biggest group in internationals students in UK with the number around 87,895 [10]. However, there is some big difference of the education system between two countries: China and UK [11].

Following structures have been proposed to give a structure for how to solve the problem: Education system difference analysis between the students' home country and UK may be the initial step to study the problem. After this, the difficulties that Chinese students are currently facing have been summarized. These two are the pillar of the module design for international students in UK as in Figure 1. The education system analysis can also predict the potential difficulties that Chinese students facing in UK in learning modules, and at the same time, the difficulties of Chinese students in Class may be somehow rooted in the difference of education system.



**Figure 1:** Overall structure analysis

**The analysis of difference between the Chinese education system and UK education system.**

Chinese modern undergraduate education mainly based on lecturing [12, 13]. A lecturer will make a presentation by using ppt or just blackboard. Most of the students will be very quiet at class, and do not ask question during the lecturing time. Students may ask question after lecturing time. Lecturer normally uses a published book as the teaching source. The advantage of this system is that the speed of teaching is very fast, and students can have very strong knowledge storage in a short time. However, the disadvantage is lacking of group work, inspiration and communication between lecturers and students. Moreover, the books published and used in class always include the research which is not at the forefront research, but quite a few years ago. In the education system, Chinese student normally have a very strong mathematics background[14-16], which could be an advantage of those Chinese students who is currently studying Engineering or Science degree in UK, which requests strong background of mathematics.

The weakness of the Chinese university system is actually a very strong point of UK education system [17]. UK undergraduates teaching involves a combination of lecturing, group discussion, strong communication between the lecturers and students, and also some course may also involve fieldtrip and industrial education[18]. UK system has generated more international advance research, and has lead the research in the world in past 50 years[19]. Oxford and Cambridge are very well known in China, even in normal family. This may represent the reputation of education of UK system. The long term reputation of research and education are the main two attractive points to Chinese students[20]. In this article, the attention will be focused on education only.

The major difficulties for Chinese students involved in the education system in UK [21] (Figure 2).

Language: Even most of the Chinese students come to UK with an excellent IELTS test results of English, however, such kind of test is not able to cover all the professional English in specific subjects such as Civil Engineering [22]. IELTS is mainly tested for normal communication. Even some students get very good scores in IELTS, they may feel very difficult when coming to class studying. Then it is necessary to give a pre-session of professional English module to cover the professional

English in specific area. For example, the English of Civil Engineering should cover the concept of stress and strain etc.

Not getting used to asking question [23]: The lecturer should be aware about Chinese education background and try to engage Chinese students into the discussion, and encourage them to ask questions.

Not getting used to group discussion/presentation [24]: Group discussion is a completely new thing for most Chinese students. During the group discussion, it would be good to separate Chinese students into groups without any other Chinese student present if possible, as Chinese often talk with Chinese in Chinese. This can help Chinese students engage in the discussion, and also join the life of UK.



**Figure 2** Difficulties faced by Chinese students

### **Module design with the special consideration for international students.**

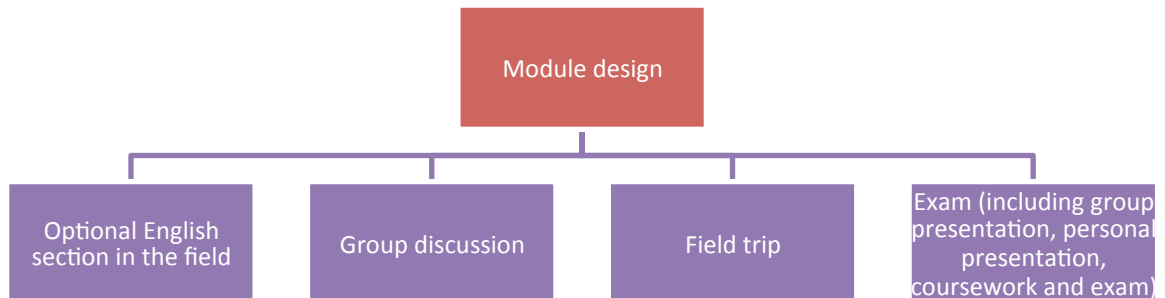
Based on the module theory for chapter 1 and theoretical discussion in chapter 2, additional consideration will be needed for the course based for international students, including an optional section for the model for two hours- professional English. Key words for the concept should be carefully selected, which can help the international students to break down the first barrier. A new model design for (a section to show most advance research should be incorporated, and invited lecturer who is very good in this field, to introduce the advance research)

In the course design, group discussion should be included in the consideration of the teaching [25]. This is could be an attractive point to Chinese students as this is also one of the major differences with China education system that Chinese students could experience in UK, In another way, this could also leads more inspiration for students.

Fieldtrip shows the real world to students apart from academic study in lecture room [26], and gives an opportunity to students for linking both academic study and industry experience. The field trip should be included in the teaching methods, and should be an important part and not just limited in UK. For example, University of Sheffield Landscape offered a landscape to venus city for two weeks, most of the Chinese students are very happy and join the group.

Exam should be a combination of group presentation [27], personal presentation, coursework and exam. This can give international student an opportunity for improve their speaking English, and also presentation skills, which will benefit for these students future.

How to make the module design suitable for mixed international background students is still a challenge and opportunity for most of the universities in UK. Lots of Chinese students pump into UK. Most recently, in Scotland, Aberdeen University signed a long term contract with Xindong fan, which is a milestone for Aberdeen University in attracting of Chinese students. More effort will be put in Abertay University to attract international students in the near future.



**Figure 3:** additional information for the module design for international background students

## Module design structures and overall considerations

### Module overall structure

This module will cover both geotechnical engineering and structure engineering, to provide students a critical understanding and skills associated with both engineering industry. The module includes four main outcomes to give students a better understanding of overall structure of the module [7, 8, 28].

### Minding mapping

At the start of the lecturer, the design problems will be introduced to students, which can help address the aim of the module and the overall structure. It will be in the context with other modules and the students can see a bigger picture after finishing the learning outcomes [1-8, 28].

The module then will be introduced how this fit in the whole course, and can benefit for the students future [7, 8, 28]. Using a design problem, small group discussion can have a clear understanding about what the students have known and what they have not [1].

After a small group discussion, then a mind map will be crated in an interactive all classes exercise [29]. Afterwards, a brief outline of the contents of the course will be introduced in a wider context of the module [7, 8, 28].

### Group design projects

Group design work and helps the students to develop proper communication, teamwork and problems solving skills [30]. It also enables students to have a deeper understanding of the knowledge from lecture into high levels of cognitive learning [31]. In industry, design and redesign are both normally important work components, and the presentation to clients is an appropriate manner needed in real industry. In this module, both structural and geotechnical engineering are covered, and then two separated design projects have been set.

One part of the module is focused on design of structural engineering including the connection, and house structures. During the design project, students will be asked to design a sports centre in a group with consideration of the essential knowledge in structural engineering. In Geotechnical part,

the design will be focused on the foundation design in groups of 3-4 students. Each group will be given a different location, different structure condition. Geological information will also be involved in this design, Students will be given solid maps, hydrogeological maps and solid and drift map for a selection of a proper sites. This design task will be for the purpose of proper design preparation for industry, and justify all the design choices in group presentations.

### **Assessment methods**

A various assessments methods will be employed to assess the students. As this course covers both Structure and Geotechnical Engineering, the assessment will be divided into two parts, Structures and Geotechnics, respectively.

For structure part, the students will be asked to give a group presentation for a specific project design, and also submit their portfolio. The presentation skills may be a very positive factors to employability [32]. For the geotechnical Engineering part, the student will be asked to submit a combination of lab work report and fieldtrip report. The combination of presentation, report and coursework may also contribute to the validity of the assessment (Race[33], p71). Finally, the students will have a 2 hours exam including both structures and geotechnics

### **Conclusion**

A design of a new module-Structures and Geotechnics (BN0834A) has been presented in this essay based on good practices and educations research. Specifically, a structure of course design for international non-native English speaking students has been generated, with a case study of Chinese students. This design may need further modification during the process of teaching, with the feedback from students, as even the module sign is based on education theory, however, the theory of teaching for international class is still in a developing process.

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## **A mixed methods pedagogical approach to teaching in higher education**

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### **Abstract**

Learning to teach in higher education is a crucial aspect of the modern day lecturer, in order to provide a service to students that delivers excellence and meets the aims and objectives of Abertay University's Strategic Plan and the Teaching and Learning Strategy contained therein. In order to achieve these aims, each lecturer must develop a personal pedagogical strategy that encompasses the facets of teaching that can deliver an excellent service to students. This essay sets out my personal pedagogical strategy, located within the Abertay University context and aligned with the Teaching and Learning Strategy, of student-centred learning, research-led teaching, and experiential-led learning, including the utilisation of the virtual learning environment and by engaging on a constant process of personal reflection.

**Key Words:** Pedagogy: Student-centred: Research: Experience: Reflection

### **Introduction**

Bad teaching is teaching which presents an endless procession of meaningless signs, words and rules, and fails to arouse the imagination ~ W.W. Sawyer

Teaching is about creating innovative ideas and to engender learning for students. These principles of teaching in higher education have become, over the years, difficult concepts to achieve, especially with the move from elite teaching to more mass teaching in modern universities with larger class sizes and greater access to higher education from an increasingly diverse society. Mathieson (2015) states that learning can no longer result automatically just by exposing students to experts and that academics need to have a basic and clear understanding of the various processes involved in higher education in order to create a suitable learning environment for the diverse range of students. Therefore, it is imperative that new academics have a clear pedagogical strategy to follow in order to facilitate student learning that addresses their needs in an increasingly difficult employment environment.

This essay will set out my pedagogical strategy that I am seeking to employ, in what is my first full year, as a new lecturer at Abertay University. I will discuss the expectations of Abertay University for its lecturers, as laid out in the Strategic Plan 2011-2015, that conforms to current Scottish Government education policy and how it fits with the Abertay Attributes. I will also discuss my pedagogical approaches that I follow in order to provide students with an innovative and exciting learning platform. My approach involves me using a mixed methods, or blended approach, of student-centred learning, research-led teaching, using my extensive professional experience in the police to facilitate experiential-led learning and also by utilising the virtual learning environment within the university.

### **Pedagogic Strategy**

As stated above, my pedagogic strategy will adopt a mixed methods/blended approach to my teaching of students at the university. However, before I explain my approaches, it is expedient to first outline what is pedagogy. The word 'pedagogue' comes from the Ancient Greek language and meant a 'trainer or teacher of boys', however in modern terms it means the knowledge and skills that a teacher needs to develop and learn if they want to become successful (Aers and Inglis, 2008), who further state that there are four recognised areas of pedagogy:

1. Subject and curriculum knowledge
2. Teaching skills and techniques
3. Teaching and learning models
4. Conditions for learning

These areas mean that it is important for a teacher, or lecturer, to choose the best approach to deliver the best teaching outcome for their students. For example, what is the best method that will suit a particular set of students? What stage are they at in their university 'life'? Can they deal with complex



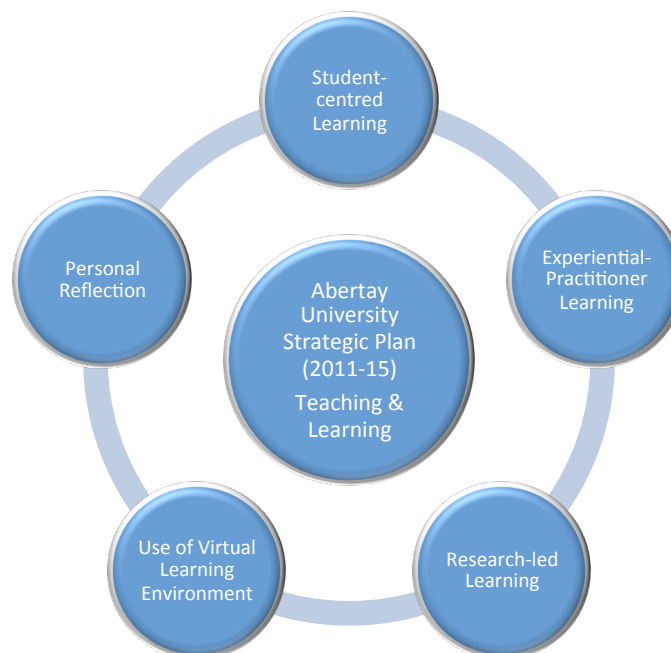
scenarios or theories? What is the best way to engage their attention and enhance their student learning experience? These questions can determine the best approach to teaching that will be followed and lead to what is known as the blended approach to teaching as different models are required for different situations. It is also important for the lecturer to create a good atmosphere in the classroom by developing good relationships with the students and thus ensuring that students can enjoy the experience of learning.

Abertay University's Strategic Plan (2011-2015: 4), sets out key strategic objectives for its customers, including its students and lecturers, one of which relates to Teaching and Learning. The three aims are:

1. Develop innovative learning environments that reflect real-world challenges and approaches to work.
2. Use active enquiry and project-based activity to ensure that our students can purposefully access and evaluate information
3. Develop graduates who, through exhibiting the Abertay graduate attributes, can contribute to, and shape, future economies and societies.

Fry *et al.* (2015) discusses the requirements for university strategic plans and the teaching and learning strategies therein, which provides lecturers with a framework to inform of the need to develop their curricula and how it should be delivered. This can include a requirement to address employability skills or work experience/knowledge, the use of the virtual learning environment and research-led teaching. It is vital that personal pedagogical strategies are set in this context, as laid out by the university.

The diagram below displays the values, which underpin how my personal pedagogic philosophy relates to the Teaching and Learning Strategy as outlined in the Abertay University Strategic Plan (2011-2015).



Taken together, each approach adds value to my teaching strategy and inter-relates with the university's aims and objectives. They allow me to develop, become a high-quality lecturer and be able to employ a range of innovative techniques and efficient and effective methods. I will now discuss each approach and put into context with my personal teaching philosophy, including personal reflection.

## **Student-centred Learning**

The student-centred approach, or learner-centred education, encompasses teaching methods that shifts the focus of teaching from the university lecturer to the student. It recognises that students are not 'empty vessels' and that they have their own perceptual frameworks. This approach is based on the 'constructivism' theories that views learning as a building process and it is up to the lecturer to adjust the structures of the mind, through which knowledge is held, also known as 'schemata, to allow new ways of understanding and knowledge to be learned. The focus of the lecturer should be on not what is being taught but on how effective the learning should be and that is the main preoccupation of the lecturer (Fry *et al.*, 2015).

It is also recognised that student-learning is highly socialised and that they should be encouraged to formulate and reformulate their hypotheses in problem-solving issues. To be able to do this, they should engage in conversation, listening, writing, reading and reflecting on what they have heard in lectures and tutorials. This is can be a challenge for lecturers to be able to nurture and positively engage with students in classroom situations away from the formal lecture theatre. On reflection, this is a facet of my teaching philosophy that I have found to be the most challenging and yet rewarding by positively engaging with students and hearing their views on topics.

Tutorials can be an important tool in the learning process for students and I see this as crucial to develop their understanding of a topic that may have been covered in the lecture theatre. I seek to follow the student-centred approach by encouraging and empowering students to participate freely in discussions, voicing their opinions, asking and answering questions. They should be able to engage actively with one another and not be afraid to speak up. In such circumstances, my role is as a facilitator, as opposed to an instructor. I can guide the students in making new interpretations of the material under discussion, thereby experiencing content, which reaffirms Rogers' (1983) notion that "significant learning is acquired through doing".

However, this approach has to be done with one eye on the sensitivities of some students. Each student is different. They have different personalities, backgrounds, learning styles, values and expectations. Some may have learning difficulty issues and these students have to be treated with respect and not 'forced' to take part or be 'put on the spot' unnecessarily.

Cowan (2006) discusses the issues of self-evaluation and reflection, which I believe is crucial to my teaching philosophy. For example, in a tutorial class recently, I was asked by a student not to ask them anymore questions as they felt as if they were under pressure to answer. On reflection, I realised that I had been asking the student too many questions, not to put that person under pressure, but because that student was volunteering the answers as they were the only one talking! I learned an important lesson to ensure that all students participate equally and not to single out or favour one in particular.

Evaluation and feedback also plays a part in my student-centred approach to teaching and the ability to learn from one's own mistakes is something that I take seriously. In addition to the university evaluation process, I regularly ask students how they perceive their teaching and learning environments and experiences. I find this allows students to express their feelings about my style of teaching and lecturing and allows me the opportunity to amend my approach if required. Similarly, structured feedback and evaluation of a student's work is also important to them to learn from their work. Proper feedback should be constructive and helpful, not pointing out errors or weaknesses, but also highlighting good work.

The student-centred approach is about engendering learning and fits well with the university's strategic plan for teaching and learning and helps me to be a good teacher by being constantly alert to student's needs and expectations.

## **Experiential-Practitioner Learning**

I am a retired senior police officer, who came into academia later in life, after 30 years' service. My field of teaching is criminology, the police and the wider criminal justice environment. My experience has proven to be of considerable benefit to my teaching and I have been able to impart my knowledge to students in their learning.

Fry *et al.* (2015) discuss the benefits of practitioner-academic and the traditional academic approach to teaching and states that they complement each other. They can bring together a rich variety of skills that can provide a valuable source of information and teaching for students.

My position as a practitioner-academic has allowed me to forge me academic knowledge with my practical experience, especially in policing. The university's Strategic Plan outlines how students can develop by exhibiting the graduate attributes and contribute to future economies and societies. The new attributes are displayed in a conceptual framework, as shown below, is used a guide to assist students engagement in their learning and also to enhance their employability skills.



I can contribute to these attributes by opening student's minds to the professional nature of the workplace and look to enhance their employability skills. For example, my introduction of outside speakers from criminal justice agencies has provided students with knowledge of work that they did not know of before. Coupled with my knowledge of the police throughout the UK, they have gained an insight into the workings of the police not available to them in the past.

Mentoring, as discussed by Hamilton and Stewart (2015), also plays a part in my experiential-practitioner-led teaching philosophy. I have been able to coach, provide advice and assist with work placements to students wishing to pursue a career in the police and over the past years have seen several students successfully join the police.

### **Research-led Learning**

Encouraging independent learning is an important outcome for the university; as stated in the university's strategic plan, research and the ability of students to use active enquiry and project-based activity is crucial to their development.

Grow (1991) discusses four stages of self-directed learning, progressing from the dependent learner; interested learner; involved learner; and independent, self-directed learner. My role as the teacher in this process is to teach the skills of self-regulation and independent learning. This teaching is facilitated by providing support and guided reading and encouraging students to think critically and analyse issues.

This approach to teaching, involved my close working with students to help motivate them and provide inspirational teaching and through guided discussion, which I provide in the tutorial classroom setting. The key stage in this process is the empowerment of students to make them better skilled in

communications, critical thinking, goal-setting and problem-solving and to help them to develop learning strategies themselves, self-management and project management.

The need of the university is that students meet the learning outcomes and reach an appropriate level of learning. Therefore, it is incumbent on me, as a lecturer, to assist students and facilitate their development by providing guidance from a distance, yet monitor, motivate, encourage, evaluate their work and provide constructive feedback at all times. This teaching philosophy will help provide students with the capability to develop their learning strategies, increase their confidence, motivation, effectiveness and ultimately their independence as a researcher.

### Virtual Learning Environment

The virtual learning environment (VLE) is an area of teaching that is becoming more and more important in university life for students and teachers alike. Abertay University is no different from other universities and is in fact, a world leader in electronic games development.

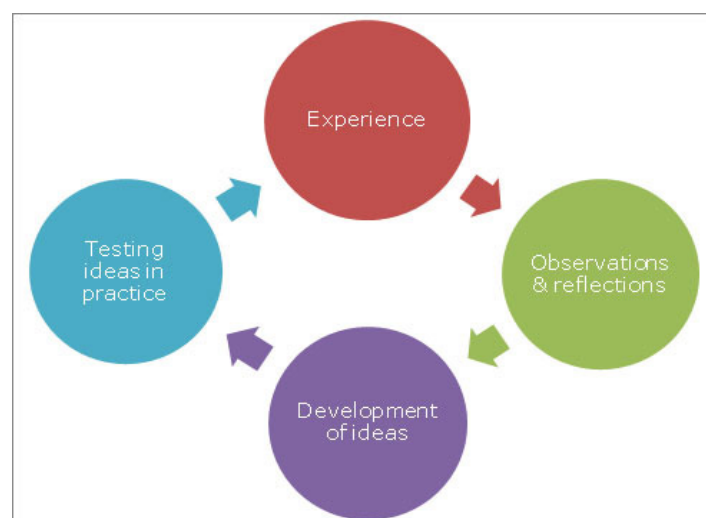
Students today are adept in their use of electronic 'gadgets' and are skilled in the world of social media. Therefore, it is important, that I as a new lecturer, ensure that I can embrace new technologies and use them to their fullest effectiveness. Digital resources are an important tool in the classroom and their use is encouraged. The use of social media and the internet are sources that have to be used properly, and can be a great source of information that can be used in the university environment.

Electronic marking, is an example of the VLE that has recently come to the fore in the university. It has undoubtedly been a source of frustration for some older members of staff, yet it has proven to be a useful tool for lecturers and students alike, eradicating the need for paper essays and hand-written feedback, allowing a more constructive medium for enhanced feedback for students.

### Personal Reflection

Personal reflection in teaching is a central facet of my pedagogical approach and all that I do in my professional life, both now and in the past. Schön (1995) describes two forms of reflection; reflection-on-action as revisiting mentally events that occurred in the past to gain an insight and an understanding of one's own personal behaviour to improve your professional ability; and reflection-in-action, on the other hand, allows one to demonstrate their skills of self-examination of their behaviour as well as others during an event or interaction.

The use of models in reflection is common and I prefer to use Kolb's Model of Reflection (1984) as shown in the diagram below.



Cowan (2006: 49)

The model acts as links between old and new experiences and provides insights and opportunities to challenge old and accepted practices and values. Using your experience in light of what happens in

your professional life, allows you to question your actions and how you might have dealt with a situation. You can make sense of what happened by reflecting on the outcomes and trying to determine new ways or ideas of acting and putting them into practice.

An example of such reflection-in-action occurred for me when I first entered academia as a new lecturer. My professional past was in the police at a senior rank and my development and training was very much in a disciplined and ordered manner. Orders and instructions were given on a daily basis and expected to be followed, even in meetings and training-based scenarios. Therefore, on entering academia for the first time, I was faced with the realisation that I would have to change and adapt my approach to become more of a consensual type person and teacher. One cannot give orders to students!

I engaged in a process of self-reflection and examined my own knowledge and abilities and developed a different set of teaching skills to become a more rounded and effective university lecturer. I have since developed further and recent feedback from students has been very positive in relation to my teaching. However, it is an on-going process of self-evaluation and reflection, looking to further develop and enhance my abilities and provided a better teaching experience for students and also for me. The model developed by Kolb is a never ending cycle and can be used on a continuous basis.

My past professional background has given me an opportunity to provide students with a unique teaching experience that I believe adds to their learning. However, I also recognise that I can always improve and teach myself to become a better lecturer and to address this, I have pursued any opportunity that I could to sit in and observe other, more experienced lecturers, to gain more knowledge by watching and learning how they conduct their teaching. This has proven to be beneficial to me and provided me with a wealth of knowledge. There is no doubt that lecturing is a skill that can be taught, eventually, but it requires innovative skills and confidence to make the experience interesting and fun for students. This skill takes time and effort on the part of a lecturer and personal reflection is an important and integral part of that process.

## Conclusion

I have sought to set out my personal pedagogical strategy that I have, and is still developing, in my first full time position as a university lecturer. My strategy has been set within the context of the Strategic Plan of Abertay University and seeks to address the aims and objectives set out in the Teaching and Learning Strategy. My approach involves using mixed (blended) methods to achieve my goal by using, student-centred learning, and research-led teaching, using my extensive professional experience in the police to facilitate experiential-led learning and also by utilising the virtual learning environment within the university. I also engage in a process of reflection of my academic performance in order that I may become a better and more effective lecturer, in order to enhance the student experience of those that I come into contact with. I am aware that this is an on-going process and one that provides a challenge on a daily basis. However, it is a challenge that is worthwhile and exciting. As the quote at the beginning of this essay states, "bad teaching is an endless procession of meaningless signs, words and rules, and fails to arouse the imagination", therefore, it is incumbent upon me to ensure that I can become the best lecturer/teacher that I can, in order to dispel the statement.

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## Pedagogy in Forensic Psychology

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### Abstract

My personal pedagogy is rooted in my professional status as a forensic psychologist. As an applied discipline, forensic psychology requires that teaching is evidence based (i.e., research informed) and grounded in a practice informed ethos. Consequently, my personal pedagogical model is based on four key overlapping values: a student centred approach; research informed teaching; practitioner informed teaching; and being a reflective practitioner. Distinctions between these values are blurred and inter-relationships complex and diverse when put into practice. Therefore, at the centre of my model is the overall concept of engaged and informed learning. Each of my four values are considered in turn, taking account of modern pedagogical thinking and examining this in context with my own personal experiences and philosophy of teaching.

**Key words** Student centred; research informed; practitioner informed; reflective practitioner.

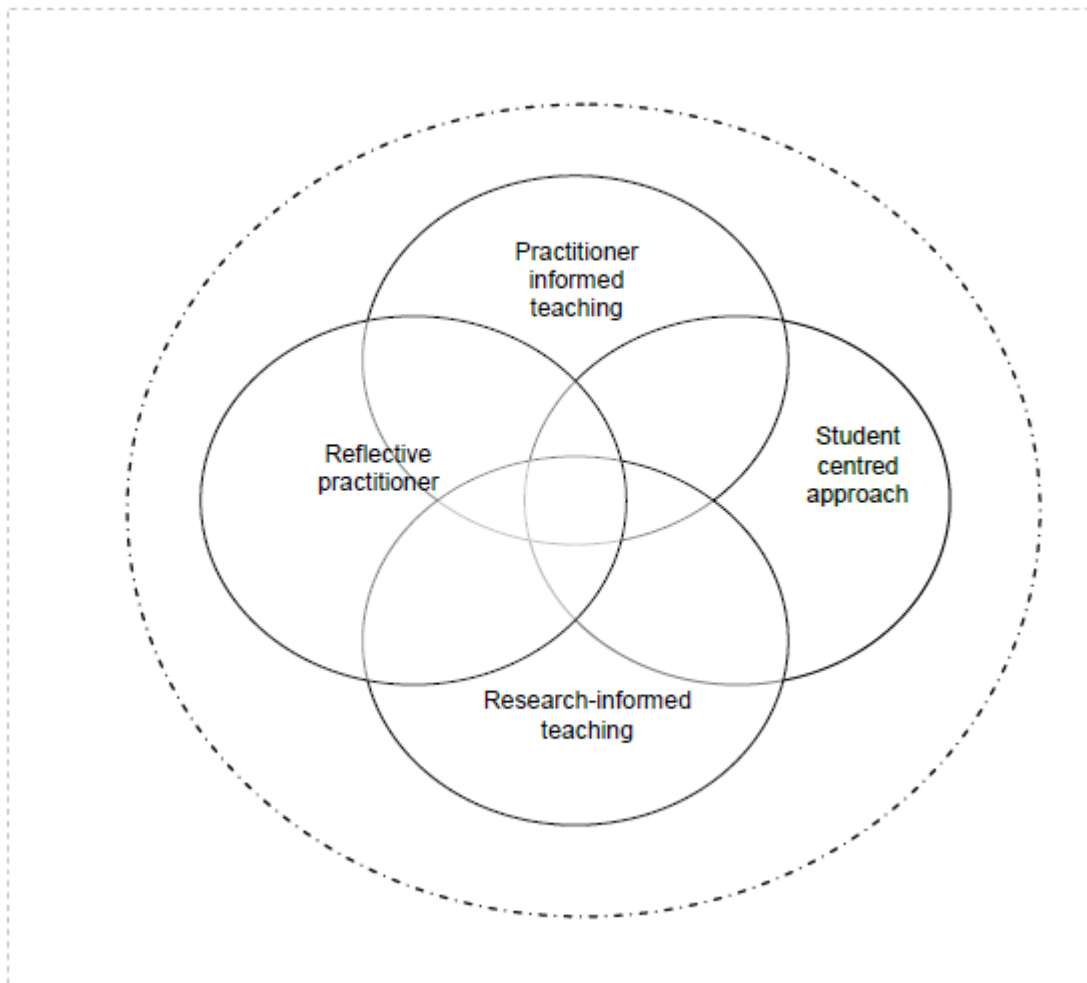
### Introduction

Discussion about the scholarship of teaching and learning and the development of pedagogical models has rightly become a core part of Higher Education policy and practice, as demonstrated by the number of peer-reviewed journals devoted to the subject (e.g., Teaching in Higher Education; Assessment and Evaluation in Higher Education; Studies in Higher Education). However, pedagogical theories and styles are still widely and controversially debated. At different extremes, some view the teacher in the role of a 'banker' paying out predefined units of knowledge to 'empty' students or, in contrast, as a 'midwife' supporting the birth of knowledge within students (see Blaxter, Hughes and Tight, 1998). Thinking back to my own undergraduate learning experiences of the early 1990s, they are characterised by memories of over-head projector acetates and a feeling of *physical distance* from the lecturer, on account of large theatre style classrooms, and *intellectual distance*, on account of minimal direct lecturer-student engagement in terms of teaching, assessment or feedback. Such experiences can be attributed to pedagogy where the teacher acts as a 'banker' rather than a 'midwife' and do not contribute to particularly valuable learning experiences (see Kirkwood, 1991).

The notion of a teacher as a 'midwife' is more in line with Leach and Moon's (1999) definition of pedagogy as 'the practice that a teacher, together with a particular group of learners creates, enacts and experiences' (p267). As a psychologist, this definition appeals to me as the suggestion of pedagogy as a joint activity makes perfect sense as a true process of learning has to be an active one, requiring effort on behalf of the learner as well as the teacher. Importantly, this emphasises the social interaction of the relationship and reminds us that a good learning environment involves building a culture of respect and responsiveness between the teacher and the group of learners. Four key principles directly associated with this underpin my own philosophy of teaching:

- A student centred approach;
- Research informed teaching;
- Practitioner informed teaching;
- Being a reflective practitioner.

My personal pedagogy is rooted in my professional status as a forensic psychologist. As an applied discipline, forensic psychology requires that teaching is evidence based (i.e., research informed) and grounded in a practice informed ethos. Figure 1 illustrates these principles and shows the overlapping nature of the inter-relationships between them. Visually the model is shown as four overlapping circles to emphasise that distinctions between the areas are blurred, and inter-relationships are complex and diverse when put into practice. At the centre of my model is the concept of engaged and informed learning, which draws attention to the processes by which this operates in the four different areas. In this paper, each of these values are considered in turn, taking account of modern pedagogical thinking and examining this in context with my own personal experiences and philosophy of teaching:



**Figure1:** Engaged and informed learning model

The concept of an approach to higher education which is anything other than student centred seems intuitively incongruous. Beyond a moral obligation to ensure future generations are ‘well educated’, modern advancements in Higher Education policy (i.e., students as consumers (Coughlan, 2011)) demand more than the traditional ‘teacher-centred approach’. Furthermore, it has been suggested that a student-centred approach helps students to develop a “can-do” attitude (Jones, 2007). On this basis, to ensure Abertay University graduates attain the innovative Abertay Graduate Attributes of being ‘Confident Thinkers’, ‘Determined Creators’, ‘Flexible Collaborators’, ‘Ambitious Enquirers’ (Abertay University, 2014), a Teaching and Learning Environment which has a student centred approach is critical.

But what do we mean by a student-centred approach? Jones (2007) describes it as “a place where we consider the needs of the students, as a group and as individuals, and encourage them to participate in the learning process all the time.” On this basis, students are not considered empty vessels, as indicated by the ‘teacher as banker’ conceptualisation (see Blaxter, Hughes and Tight, 1998), but have their own perceptual frameworks (University of Winchester, 2004).

Central to this is seeing students as partners in the Higher Education process (Healey et al, 2014). Advancing debates of recent years, the Higher Education Academy, in a publication last year, set out a new conceptual model that distinguishes four broad areas in which students can act as partners in learning and teaching (Healey et al, 2014): Learning, teaching and assessment; Subject-based research and inquiry; Scholarship of teaching and learning; Curriculum design and pedagogic consultancy. These broad, overlapping areas cover the full range of teaching activities, highlighting the need to engage students in *all* stages of the process of teaching and learning. In so doing, the teacher also works with students to determine learning strategies which are self-paced and designed to meet the needs of individual students rather than as a ‘blanket’, ‘one-size-fits-all’ approach



(University of Westminster, 2004). Consequently, students feel an investment in the learning experience and that it is something they *do* rather than something that is *done to them*. I question, though, how far along the journey we are in embedding these fundamental principles within the ethos and philosophy of Abertay University. As a relatively new member of staff, my own observations suggest that curriculum development, for example, is still something which is largely done 'to' rather than 'with' students. Whilst recognising the role of class representatives in the feedback processes which currently exist, I am endeavouring to give my own students more 'voice' (Healey et al, 2014). Specifically, I involve them in setting the learning outcomes and content of modules by engaging in review and feedback sessions with the whole class at the end of each module (and thus to inform the subsequent year). In addition, I am trying to introduce a more iterative approach to the design and delivery of 'learning sessions' which are responsive to ongoing needs identified by the class as a whole or individuals as progression through a module is made (and thus to benefit students within the current year). So far students have been extremely responsive to this approach which aims to put them 'more in the driving seat'.

As well as students being key partners in the learning process, I believe that a student centred approach is also about teachers making learning interesting creating a dynamic and engaging learning environment (University of Westminster, 2004). In so doing, students will be more inclined to participate actively and construct their own meaning on content, ideas, issues and concerns (University of Westminster, 2004). This has to mean moving away from the traditional forms of teaching (such as lectures) and moving to more innovative and dynamic methods where there is variety, stimulation and challenge – in terms of content, method and location. Arguably, one of the best examples of student centred learning relates to the undertaking of student projects and dissertations (Fry et al, 2008). My own undergraduate honour's project remains one of my most memorable learning experiences which allowed me the autonomy to conduct a small psychology research project and consolidated the (seemingly disparate) strands of learning from my degree programme. The individual learning and sense of personal achievement that resulted from this was a definite highlight of my degree. In the context of an honours project the student is making an autonomous (Healey et al, 2014) 'personal journey' through the knowledge or learning associated with their degree (University of Westminster, 2004) and being supported in consolidating this by regular review and feedback from their supervisor. In contrast to traditional forms of teaching, this learning process is largely driven by the student rather than the teacher – hence the more informed outcome. One final point which I would like to make in relation to this is that some of my project students speak of "our project" or "our research" which suggests that they actively view this aspect of learning as being in partnership. Given this aspect of teaching and learning has been in place for many years, it seems rather incredible that we are still trying to embed the fundamental principles of it within wider teaching and learning enhancement activity.

### **Research-informed teaching**

"[the best thing about the session was that you were] able to use examples from [your] own research"  
(feedback from a third year BSc Forensic Psychobiology undergraduate, October 2014)

The quote above, from my own module evaluation, serves to illustrate that research informed teaching enhances the student learning experience – especially when it is linked to the teacher's own research activities. Making reference to academic research in the manner quoted above has been referred to as 'research-led teaching' - where pertinent research findings are imparted to students as part of the focus of teaching (Griffiths, 2004). Widening and re-defining this as 'research-informed teaching', Healy (2005) added 3 additional categories: research-orientated; research-based, and research-informed. I believe passionately in the importance of all 4 aspects of research informed teaching being at the heart of my own teaching practice.

In terms of *research-led teaching*, which is the transmission of research findings, I actively seek to ensure that my teaching is grounded in current research based knowledge and, where pertinent, reflect my own research interests and contribution to knowledge. This is particularly important as an evidence-based approach (as in medicine) is central to forensic psychology is an applied discipline. Therefore, understanding 'what works' and in what circumstances is of importance. As well as understanding the findings of research, students of Psychology are taught to develop skills which allow the appraisal of research findings and, thus, appropriate interpretation of their usefulness, relevance and impact. To do this, students need to understand the research process and

methodologies which is described by Healy (2014) as *Research-orientated teaching*. In contrast, students learning as researchers via inquiry based learning is described by Healy (2005) as *Research-based teaching* and can actively help student learning (Gibbs, 2014). As well as formal opportunities via honours projects, this can be extended by exploiting beneficial opportunities to involve students in real research projects whenever possible. Developing student's skills in undertaking research is also important for increasing student motivation and engagement (Baldwin, 2005). Finally, the *research-informed* approach emphasises learning focused on writing and discussing papers or essays. Again, within psychology this forms an integral part of the style and focus of teaching and learning. Consequently, although Healy (2014) states that these 4 types of interaction may vary according to the discipline context, psychology is a discipline where all 4 elements are integral to the student development and learning experience.

### **Practitioner informed teaching**

“Very good knowledge of the subject from working in the field” (feedback from third year BSc Forensic Psychobiology undergraduate, October 2014)

When teaching an applied discipline I believe there are distinct advantages to having experience as a practitioner in that area. In my own discipline, forensic psychology, professional accreditation as a practitioner is increasingly becoming a prerequisite for recruitment to a position as a teacher of forensic psychology in higher education. As a practitioner with 16 years experience of being either directly employed by the police service or practicing as a consultant to the police, I believe my experiences and applied knowledge are an integral part of being an excellent teacher – as illustrated by the quote above from one of my recent students.

The direct relationship between teaching, research and practice has been presented as a simple triangle with each aspect at one corner (Donovan, 2005). In the past, this may have indicated that there are teachers or practitioners but rarely both. However, by having current experience of both, students can be engaged by teachers with experience of both theory and practice. Indeed, Cogill (2008) argues that ‘new ways of teaching and learning need to be found that critically engage students in rich learning environments’. In recognition of this, and to ensure graduates are most prepared for employment, some disciplines (e.g., Human Resource Management and Engineering), have established academic-practitioner partnerships to revise and revitalise undergraduate curriculum development and teaching design (e.g., Thacker, 2002).

My own experiences of teaching students forensic psychology have highlighted to me how the use of real life examples and the application of theory to real world occurrences more actively engage students and enhance their learning experience. In this context, teacher knowledge is more than just content or pedagogical knowledge (Shulman, 1987) but extends to knowledge of real world contexts (e.g., culture and politics) which affect the application of theory and the development of practice.

### **A reflective practitioner**

Reflective practice is increasingly seen as an important aspect of working practice across many professions from nursing (Heath, 1998) to higher education (Clegg et al., 2002; Biggs and Tang, 2007). Reflection is seen as ‘a means of surfacing experiential knowledge’ (Heath, 1998, page 1) and ‘turns experience into learning’ (Boud et al, 1995). Referring specifically to higher education, Day (1999, pg. 222) proposes that “it is generally agreed that reflection in, on and about practice is essential to building, maintaining and further developing the capacities of teachers to think and act professionally over the span of their careers”. On this basis, it seems intuitive and logical that teachers committed to professional excellence should engage regularly in reflective practices. Indeed, in a study of excellence in tertiary teaching, Kane et al (2004) found that engaging in regular and purposeful reflection enhanced teaching practice and integrated the many dimensions of successful teachers. As a result, they proposed a wheel-like model of tertiary teaching which has reflective practice at its core and directly connected to five inter-related key teaching dimensions: subject knowledge, skills, interpersonal relationships, research teaching/nexus, and personality (Kane et al, 2004).

The concept of purposeful reflective practice being at the core of my professional activity is something which I have embraced for many years now. This is in part born from a need to engage in regular

formally recorded and audited continuing professional development as part of my professional accreditation (e.g., Registered Forensic Psychologist and Chartered Scientist) but also a reflection of my own philosophy of learning from life's experiences (most likely grounded in my psychologist training). Using the principles of Gibb's Reflective Cycle (Gibbs, 1988), at regular intervals I take time to reflect on 'what happened', 'what I was thinking and feeling', 'what was good and bad about the experience'; 'what sense I can make of the situation'; 'what else I could have done' and what I would / will do when the situation arises again'. I generally do this at the end of each class and then at the end of each module for a more holistic review specifically for that module. On this basis, I have in place a 'continuous feedback loop' which allows me to actively respond to my experiences and learning, both as a module is running but also when preparing for a new semester's teaching. While engaging in my own reflective practice is, as Kane et al (2004) indicate, directly connected to my success as a teacher, I see engaging in *collaborative reflection* with my students as an integral part of the process of learning – both for them and for me. Critically, this is also fundamental to a student centered approach to teaching. To date my efforts have involved structured evaluations via questionnaires and facilitated group discussion as part of module review classes. Of course, while this approach is based on my own learning, as a reflective practitioner who believes passionately in the principles and benefits of such activity, I will be actively promoting reflective practice amongst my students for their own benefit.

## Conclusion

Teaching is a highly social enterprise, requiring constant development of human relationships and communication such that students feel valued by teachers and that their individual needs matter. With this in mind, and as discussed in this paper, my personal pedagogy is rooted in the overlapping values of: a student centred approach; research informed teaching; practitioner informed teaching; and being a reflective practitioner.

Approved in December 2015, the new Abertay University Teaching and Learning Enhancement Strategy sets out three objectives: reforming our curriculum, incentivising our students' performance, and raising the status of teaching across the University. Pervasive across these is the supporting of fresh ideas, a systemic change in practices and an institutional culture that embraces changes and responds by revising its approach to teaching and learning. My personal pedagogical model has, at its heart, the overall concept of engaged and informed learning which supports the new Strategy and should facilitate the promotion of positive learning experiences for students which are memorable and shared.

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## Learning 3

## Introducing Blended Learning

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### Abstract

Blended Learning is a well-articulated framework for the incorporation of on-line technology in module delivery. It introduces a wide range of on-line environments that can be used to enhance students' experience. More importantly, it also provides a sophisticated guidance on how to develop coherent and well integrated content that enables students to switch seamlessly between learning environments without losing sight of the logical thread running throughout the module. While building on the principles outlined in classic educational theories (e.g., constructive alignment, Bloom's taxonomy) the Blended Learning approach takes teaching and learning to 21<sup>st</sup> century by incorporating on-line environments as an inseparable part of student experience.

**Key words:** Blended learning, On-line learning, Face-to-face learning, Constructive alignment, Bloom taxonomy

### Blended Learning at Abertay University

Abertay University is making concerted efforts towards increasing the use of technology-mediated modes of module delivery and assessment. The University has taken a unified approach in making educational software available to its students, academics, and administrative officers and providing extensive training to enable full software utilization. Some recent examples of promoting the use of on-line resources include the introduction of compulsory on-line marking of students assignments through Turnitin and Blackboard to facilitate the provision of timely feedback; the introduction of Pebble+ to enable activities such as maintaining reflective journal and developing individual portfolios of projects; and the introduction of wiki as a virtual environment facilitating the work on collaborative projects.

These efforts reflect the University commitment to contemporary approaches to learning and teaching with a view of continuous improvement of the quality of teaching delivered to students. However, while the progress made in introducing new online educational environments has been praiseworthy, the introduction and dissemination of a clear and articulated teaching philosophy as to why and how new technologies should be implemented as part of the teaching process has somewhat lagged behind. In this article I present a recently developed framework that provides not only a guidance on what type of technologies are available to educators, but also links these technologies to the core aspects of the educational process, such as curriculum development, constructive alignment between taught content and assessment, as well as provision of support and feedback during the learning process. The framework is entitled 'Blended Learning' and has been developed by a team of academics and teaching support officers from Griffith University, Australia. Below I summarise the main principles of Blended Learning as postulated by the main authors of the approach, Debra Bath and John Bourke (2010). I then outline an example of how these principles can be followed in module development at Abertay University, devoting special attention to the concrete benefits that can be derived given the University's student cohorts and its relationship to national and international educational partners where modules conceived at Abertay are offered as part of these institutions' curriculum.

### What is Blended Learning?

To a large degree most universities, including Abertay, have adopted elements of Blended Learning: virtual environments such as Blackboard are widely used, the uploading of lecture notes and assessments materials has become a standard practice, and assignments submission is typically done online. Therefore, the main pre-condition for Blended Learning – the joint use of off-line and on-line environments – is already put in place at many universities. What is less developed is the closer

integration between off-line and on-line learning activities such that students receive a richer and more immersive learning experience from engaging in connected and mutually complementing sources of input and opportunities for interaction.

### **The process of Blended Learning**

The process of achieving Blended Learning includes the following stages: Planning -> Design -> Implementation -> Reviewing -> Improvement (Bath & Bourke, 2010). The aim is to arrive at a curriculum which ensures that both face-to-face and technology mediated activities result into meaningful and relevant student experience. I will briefly outline the main tasks completed as part of each stage to provide a background for developing a pedagogical model. Following the description of the Blended Learning approach I will discuss how its principles can be used in the development of a fourth year module 'Performance Management' to be delivered to students at Dundee Business School, Abertay University, at Fife College, and SEGI University, Malaysia.

### **Planning**

Planning should involve a careful consideration of three main aspects of the module to be developed: the purpose of the module, the context in which it is going to be delivered, and the characteristics of the students who will take the module. When considering the purpose of the module, we need to ask ourselves what knowledge, skills, and attitudes we aim for our students to achieve. Thinking through these key aspects of the module should result in formulation (or revision) of the module's learning objectives. It should also reveal what learning and teaching activities would best support students' learning. Once the key desired activities are identified, educators can proceed to consider what types of technology mediated teaching would be most suitable for engaging students into these activities.

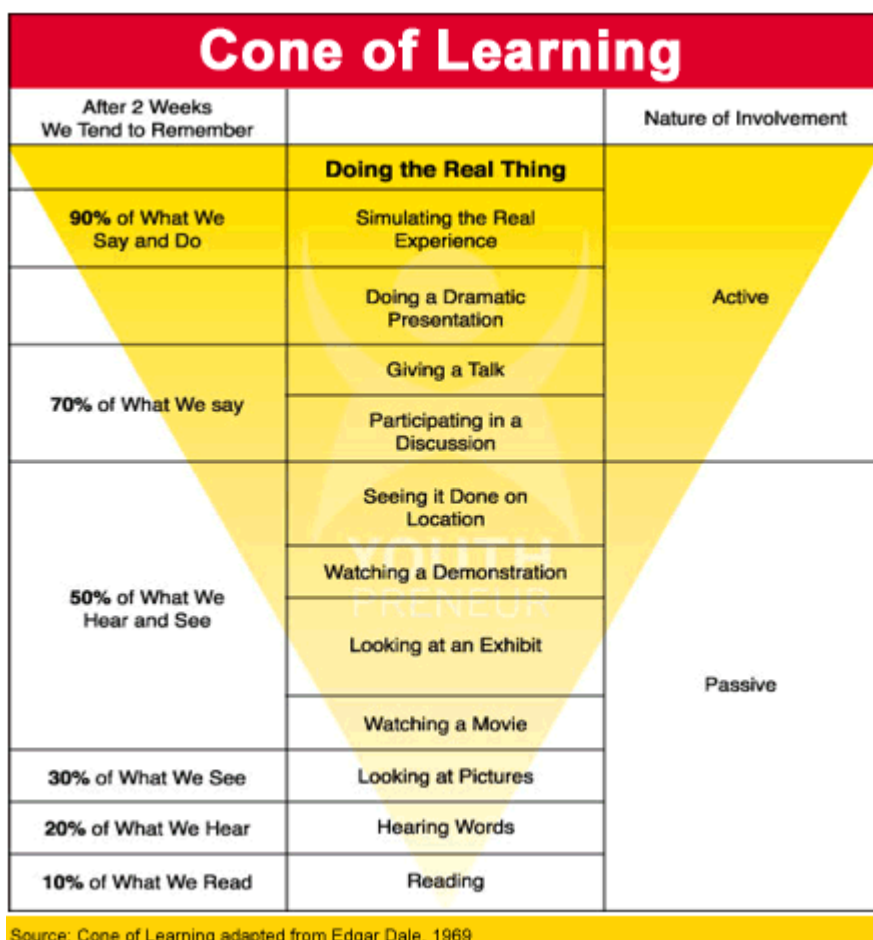
Consideration of the context in which the module is to be delivered concerns the current teaching environments, whether the module is delivered in one or more campuses or educational institutions, whether it is delivered by a single educator or by a teaching team. When the module is taught by a team, an evaluation of the motivation and ability of each staff member to engage in the use of technology should be assessed. Researching the context within which the module will be delivered can highlight certain constraints, but can also illuminate previously unidentified opportunities (for instance to streamline module delivery across institutions and to deepen the cooperation with fellow educators).

Lastly, and most importantly, planning should involve a reflection of the characteristics of the students who will attend the module: what is their background, why are they taking the module (e.g., is the module compulsory or elective for them), what is their level of familiarity with technology mediated learning. In addition, group size is also very important as it will determine what type of interactive platforms can be used (e.g., on-line conversation will be OK with a class of 10 students, but discussion forums may be more appropriate for larger classes). At this stage it is also a good policy to strategically opt for technology which will cater for students with disabilities or special needs.

### **Design and development**

The constructive alignment model of curriculum design (Biggs, 1999) provides an excellent framework in the development of off-line, on-line, as well as blended learning modes. A key requirement within the model is the implementation of explicit links among the module's learning objectives, the teaching and learning activities that the students are asked to engage in in the course of taking the modules, and the assessed outcomes. Bath and Bourke (2010) advise educators to utilize an approach whereby they specify how each learning objective will be taught and supported through learning activities, what resources will be recommended to students to use in achieving the desired learning outcome, and how their knowledge and skills alongside the particular learning objective will be assessed (see also Fink, 2005).

Dale's cone of experience framework provides a second useful framework for curriculum design and development (Dale, 1969). It differentiates between passive and active forms of learning and links engagement in certain activities to the type of learning and the percentage of information accessible for recall after a two-week delay as a measure of learning. As it can be seen on Figure 1 below, being the recipient of information generally leads to poorer learning outcomes, although it ranges in large margins, from approximately 10% of the information being remembered when the learning activity is reading, up to 50% when the information is presented via audio-visual channels. When the learning activity requires people to actively engage and generate responses themselves (e.g., through giving a talk or participating in a discussion/simulation), then the percentage of material available for recall raises up to 90%. Using Dale's cone of experience can therefore provide useful hints on 1) what activities educators should aim to include in their curriculum given the learning outcomes of the module, and 2) what types of on-line technology can be suitable for facilitating the achievement of the specified learning outcomes.



Guidance on the type of learning activities and on-line technology to be used can also be derived from a theoretical framework based on Bloom's taxonomy (Bloom, 1956 as cited in Bath and Bourke, 2010; see also Churches, 2008). According to Bloom (1956) learning objectives can be classified in a hierarchical order, from lower to higher order thoughts and skills. At the lower end of complexity lie processes such as remembering and understanding. These include recalling information and being able to explain ideas and concepts. In Dale's terminology these will be classified as passive forms of learning. The rest of the cognitive processes in Bloom's taxonomy – applying, analysing, evaluating, and creating – require higher level of engagement and self-generation of ideas and solutions. These processes fall within the active form of learning, as specified in Dale's model. Based on classifying activities as passive and active forms of learning, and along the increasing complexity of Bloom's taxonomy, Bath and Bourke (2010) have suggested a range of blended learning activities that can be



utilised within a module curriculum to achieve the specified learning objectives (see Table 1). These can be used as a starting point for educators looking to bring greater variety, richness, and stimulation in students' learning experience.

<b>Level of learning</b>	<b>Types of blended learning activities</b>
<b>Creating</b> Designing, constructing, planning, producing, inventing	Programming, filming, animating, video/ <b>blogging</b> , mixing/re-mixing, web publishing, <b>webcasting</b> , directing or producing – used to create a film, presentation, story, program, projects, media product, graphic art, vodcast, advertisement, model.
<b>Evaluating</b> Checking, hypothesising, critiquing, experimenting, judging, testing	Debate or panel (using <b>webcasting</b> , web conferencing, online chat or <b>discussion</b> ), investigating (online tools) and reporting ( <b>blog, wiki</b> , presentation), persuasive speech ( <b>webcast</b> , web document, mind map-presentation mode), commenting/moderating/reviewing/posting ( <b>discussion forums, blogs, wiki</b> , chat room, twitter) as well as collaborating and networking.
<b>Analysing</b> Comparing, organising, deconstructing, interrogating, structuring	<b>Surveying/polling</b> , using databases, relationship mind maps, online SWOT analysis, reporting (online charts, graphing, presentation or web publishing), mashing, meta-tagging.
<b>Applying</b> Implementing, carrying out, using, executing, editing	Simulation games or tasks, editing or developing shared documents ( <b>wiki</b> , video and sound tools), interviews (e.g., making <b>podcast</b> ), presentation or demonstration tasks (using web conferencing or online presentation tools), illustration (using online graphic, creative tools).
<b>Understanding</b> Interpreting, summarising, paraphrasing, classifying, explaining, comparing	Building mind maps, <b>blog</b> journaling, <b>wiki</b> (simple page construction), categorising and tagging, advanced internet (Boolean) searches, tagging with comments or annotations, <b>discussion forums</b> , show and tell (with audio, video <b>webcasting</b> ).
<b>Remembering</b> Recognising, listing, describing, identifying, retrieving, naming, locating	Simple mind maps, flash cards, <b>online quizzes</b> , basic internet searches (fact finding, defining), social bookmarking, Q & A <b>discussion forums</b> , chat, presentations.

**Table 1.** Types of blended learning activities suitable for achieving the level of learning set out in the learning objectives and classified according to Bloom's taxonomy.

To summarize, developing a module to be delivered in blended off-line and on-line environments requires solid preparation in order to present students with a coherent and well integrated content and set of activities. Bigg's (1999) structural alignment approach can be helpful in ensuring correspondence between the modules' learning objectives, the content to be taught, and the assessment to be undertaken. Dale's cone of experience (1969) and Bloom's taxonomy (1956) can be used to articulate the desired level of learning and determine the types of activity that may facilitate this desired level of learning. Finally, Bath and Bourke's (2010) work on identifying suitable on-line technologies for carrying out the respective learning activities (see Table 1) can help educators in their choice of online environments and technologies. Following the substantive development of the module, it needs to be implemented as part of the taught program.

## **Implementation**

The implementation phase requires making sure that educators who endeavour to deliver blended learning based modules have mastered the technology they have chosen to use and feel confident to guide students on how to use it. To this end, preparing a manual will be helpful so as students have written notes they can refer to when engaging with the on-line environment in their own time. It also involves creating a safety net from support from IT and library staff who can help deal with unexpected issues and provide maintenance support (e.g., archiving files, retrieving older versions of files). Finally, implementation of blended learning also involves gaining students' support and raising their level of enthusiasm for using the technology by highlighting the exciting features it has and the useful applications it may have in their future professional life.

## **Reviewing and Improvement**

As with any type of module, obtaining feedback regarding the various aspects of the students' experience is crucial if any improvement is to be made. Educators need not wait until the end of the module to ask their students for feedback. It may be obtained on continuous basis and used to improve the quality of teaching in the course of the module. This can be done by administering short questionnaires at regular time intervals throughout the semester (e.g., every three weeks) or after specific classes using new technology or mode of delivery. Timely and effective remedy to any problems raised by students can significantly lower chances for backlash against the use of blended form of teaching and learning.

In addition to responding to students' feedback, educators can measure the success of their approach against the learning objectives they have set out, as well as to reflect on both the teaching process and the achieved outcomes. To aid self-evaluation and reflection, Boud, Keogh, and Walker's (1985) three stage model can be used. In the first stage educators are invited to recall their experience, note their behaviour and feelings at the time they occurred. The second, reflection stage involves attending to one's feelings by using the positive feelings to retain reinforce enthusiasm in the module, while dealing with the negative one constructively, and then re-evaluating the experience. The third stage concerns the learning that has occurred during the reflection, for instance in the form of adoption of new perspectives, of decisions for change in future behaviour, and of any decision for review in values, attitudes, and beliefs.

## **Introducing Blended Learning for 'Performance Management' module at Abertay University**

### **Planning**

#### **The context**

'Performance Management' is a fourth year module delivered at Abertay University, as well as at two partnering institutions - Fife College, UK and SEGI University, Malaysia. Currently educators from our partnering institutions are granted access to all materials made available on Blackboard, including lecture notes, tutorial activities, and assessments. They follow closely all aspects of the curriculum to ensure equivalence of the module as delivered at Abertay and at their respective institution. In addition, a video conference is held once per semester with students at SEGI University to allow for questions and clarifications around the assessment. While the current level of cooperation between Abertay and its partnering institutions has allowed a fairly uniformed delivery of the 'Performance Management' module, employing Blended Learning can serve as a means to further ensure the same content reaches students at all three institutions.

Another feature of the context of delivering 'Performance Management' is that a single educator teaches the entire module at each site. This leads to disruptions if the person is unavailable to take

classes because of illness or other commitments. Employing Blended Learning can increase the resilience of the module system by increasing the flexibility in mode and time of delivery.

### **Students' characteristics**

At all three institutions the majority students taking the module study towards a Bachelor degree in Business Administration. Performance Management is compulsory to all fourth year students enrolled in that degree. One implication of the compulsory nature of the module is that it may be expected students to have varied levels of motivation to engage in the module. Therefore, it is desirable that the blended mode of learning does not result into work overload for students as this may lead to dissatisfaction with the module. On the other hand, the compulsory nature of the module provides an opportunity to ensure that all students graduating with a Bachelors degree in Business Administration receive exposure to the main principles of 'Performance Management' and are provided with an opportunity to develop their knowledge and skills to a high level in this core domain of management.

### **Design and Development**

The development of the substantive content of the module falls outside the scope of this article. The important points to note is that module development will be carried out based on the frameworks recommended by Bath and Bourke (2010): constructive alignment and establishing correspondence between desired learning outcomes and activities employed as part of the teaching process. Below I provide a set of example of 1) how blended teaching can help with increasing the consistency of the module delivery in the three partnering institutions, and 2) how on-line activities and assessment can facilitate the acquisition of key knowledge and skills in the 'Performance Management' domain.

### **Consistency of module delivery across partnering institutions through Blended Learning**

To achieve greater consistency, two or three lectures and tutorial activities can be developed in a way that allows for completely on-line delivery. These classes can serve as pit stops whereby partnering institutions can double check whether their students have received all the necessary input. These on-line classes can be scheduled in critical periods, for instance after every three off-line classes. On the other hand, delivering the on-line classes can be scheduled flexibly, if such a need occur, in order to cover for an absent educator and eliminate the necessity for subsequent make-up classes.

### **On-line activities and assessment as facilitators of knowledge and skills acquisition**

I believe that the students' learning and experience can be enhanced by implementing a semester long log of reflective activity and a form of computer mediated peer-to-peer assessment. These two techniques are particularly suitable because they can help achieving two of the module's learning objectives: gaining first-hand experience in performance management practices, and developing an individual conception of the subject through reading, role playing, and reflection. The achievement of these objectives is already supported by in-class activities, such as self-evaluation, appraisal of others' performance, conducting appraisal interviews, and giving and receiving feedback. The inclusion of on-line assessments may further contribute to the achievement of the desired learning outcomes. According to the constructive alignment approach to teaching and learning (Biggs & Tang, 2011), aligning assessment with learning objectives has the capacity to encourage higher levels of understanding, and transform declarative into functioning knowledge. The reflective log will aim to encourage students to analyse their subjective responses to in-class activities and evaluate how such responses can affect workplace relationships. Maintaining a regular log can be incentivised by 10% of the overall grade.

Peer-to-peer assessment can also be very useful addition to the Performance Management module. Through this activity students will have the opportunity to apply their knowledge on providing

performance feedback and feedforward. It is expected that through this assessment students will transform the declarative knowledge gained through lectures and associated reading into functioning knowledge; that is, not only they should understand why, when, and what feedback they should provide, but also how to provide it (i.e. gaining procedural knowledge) and what are the appropriate situations for providing certain feedback (i.e., gaining conditional knowledge; Biggs & Tang, 2011). The peer-to-peer assessment will contribute 10% to the final grade. Despite the possibly lower reliability of peer-to-peer assessment (Lui & Carless, 2007), I believe that making the provision of feedback consequential for students' grade is important for the deeper acquisition of functional knowledge. As mentioned above, many of the students undertaking this module are studying towards a Business Administration degree. It is quite possible that they assume the role of middle managers and implement performance management systems. It is therefore essential that they develop their skills of providing performance feedback. To further increase the usefulness of the assessment as a learning tool, the structure of the peer-to-peer assessment will to a large extent mimic the on-line performance management forms used by many organisations.

## Conclusion

This article presented a conceptualization of an approach already implicitly adopted by most universities – Blended Learning. Although on-line environments are increasingly present in students' learning experience, I argued that it is worth adopting a systematic and well-articulated approach as to why and how on-line technology should be used in higher education teaching. Such an approach ensures that students receive coherent and well-integrated content and see close links between in-class and on-line activities. It also outlines clear guidelines on how to design a module that effectively fosters the acquisition of key knowledge and skills and designing the appropriate activities, given the learning objectives, by selecting appropriate on-line technology.

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# **A Reflective View of Pedagogical Teaching Framework Focused on Experiential Learning: Achieving University Teaching and Learning Enhancement Strategy and Graduate Attributes**

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## **Abstract**

Within teacher education reflection has been shown to be of beneficial use for improving practice across all stages of education. This article is reflective of individual teaching practice within Higher Education at Abertay University, specifically to the field of Sport and Exercise Science. Efforts to reflect on current practice in comparison to experiential learning are made. These are then compared to the 'Abertay Attributes' in order to determine the validity of including experiential learning within this field at the University. There are also comparisons made between classes where experiential learning is encouraged and the 'traditional' academic style of delivery, the lecture. It is strongly suggested that experiential learning enhances the learning experience of the student. There are also direct links with the aims of the teaching and learning enhancement strategy as well as the 'Abertay Attributes', most significantly the 'Intellectual', 'Professional' and 'Active Citizen' attributes.

**Keywords:** Experiential Learning, Teaching, University, Sport, Reflection.

## **Current Context and Background**

As of August 2014 I started in a new position at Abertay University. The primary role of this job is being involved as a project assistant for the Dundee Academy of Sport. The Academy is a partnership project between Abertay University and the local Dundee and Angus College designed to engage students in education by using sport as a context for this learning to occur. The students we work with are from all areas of the curriculum, from primary school pupils to postgraduate students (Dundee Academy of Sport Brochure, 2014). The other part of the role encompasses teaching on Undergraduate modules within the sport and exercise science department at Abertay University. This is something I have prior experience of at another University within Scotland with a notable reputation for sport within the Higher Education sector, The University of Stirling (Complete University Guide, 2015). The content I am responsible for delivering within these modules is primarily Sport Psychology and Sports Science. Due to recent nature of my arrival at the time of writing, I am less familiar with staff and the 'normal' or accepted style of teaching at Abertay. This has posed certain challenges.

Due to the multidimensional nature of my role with the Academy of Sport, I am limited in the amount of teaching hours I can provide to the sport department. With regard to my influence on style of delivery within each module I have so far been encouraged to conduct the lectures, tutorials and practical sessions in whichever way I feel is best for the students. This has given me great flexibility in my teaching style and allows me to develop a pedagogical approach I am comfortable with for delivery purposes and also that the students will benefit from. Therefore I have reflected on both my previous practice of teaching at the University of Stirling and also my experience at the same University as an undergraduate and Masters student. Reflection has been shown to be highly beneficial in improving practice in pedagogical fields such as teaching and coaching (Gilbert & Trudel, 1999; Hatton & Smith, 1995). This has allowed me to appreciate the strengths and limitations of various different styles of delivery. I also can appreciate the perspective of the undergraduate student having been in a very similar position myself within the last five years. Upon reflection, one key aspect of being a student is being engaged and involved in the area of study. This meant when classes involved more group or practical work the students, and myself, learned more efficiently and in depth. An example of this style of teaching I benefited from was a Social Psychology module where we were encouraged to create and conduct our own experiments, which had to be approved by the module co-ordinator. In these experiments we were encouraged to break and challenge normally accepted social behaviour or 'norms' and observe the behaviour of unwitting participants when they reacted to the situation they were placed in. The reactions were often humorous and controversial, and as such the student felt more engaged in the subject area. This type of behaviour could have been studied in a textbook or in a lecture, however this would not have been as engaging an experience as the practical style of learning we participated in. Upon reflection, the module co-ordinator referred back to these experiments in his later lectures. This certainly helped me as a student make between the theory of

social norms and the 'real-life' situations in which they occur. By conversing with other students enrolled on the same module, it became apparent many students preferred this method of teaching.

Of course, this style of teaching and learning has been used in many academic institutions including Abertay University. Examples where this type of approach has been used in Higher Education include biology laboratory classes, projects for external clients in Business Management and practical placements in a Dentistry course. These are in stark contrast to the 'formal' or 'traditional' methods of teaching within Higher Education that include hour-long lectures involving no participation other than sitting still, taking notes and listening to the teacher at the front (Beard and Wilson, 2013). This 'traditional' style of teaching in Higher Education does not offer the student an immersive learning experience when compared to the examples described previously in the laboratory and experimental situations. The examples discussed also allow and encourage the student to learn from these experiences, and thus may best fit the model of 'Experiential Learning'.

### What is Experiential Learning?

Arguably the most important author in experiential learning is John Dewey who explained experiential learning as a cyclical process of reflection, action and understanding and judgement (Dewey, 1938). The academically accepted structure of the model of experiential learning has remained cyclical and retains key aspects of the original model proposed by Dewey. One of the most widely cited models of experiential learning is that of David Kolb, which refers to four continuous cyclical stages of learning which are: Concrete Experience, Reflective Observation, Abstract Conceptualization and Active Experimentation (Kolb, 1984; 2014). Figure 1 below highlights the inner workings of this model.

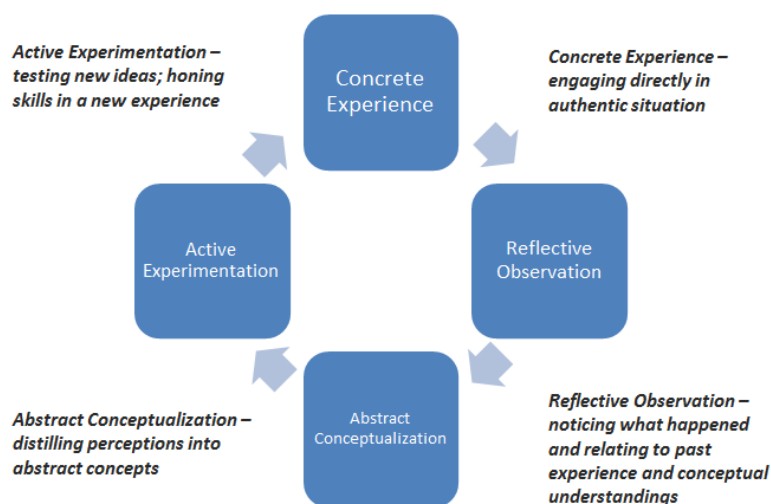


Figure 1: Experiential Learning Cycle (Kolb, 1984)

The 'concrete experience' refers to conditions that need to be present for information processing to occur. Once this information is processed it is reflected upon and then conceptualized into understanding. After this this knowledge and understanding is then tested and experimented with, which in turn forms a new experience and completes the cycle (Kolb, 2014). This cycle of experiential learning is endless and Kolb, Dewey and others propose learning can occur in this manner through all stages of life. Even in the most recent models proposed by authors such as Beard and Wilson (2013) the experience stage remains critical to the process. However Beard and Wilson differ from previous authors by highlighting the improved benefit of an 'immersive' experience. This means an experience that stimulates a variety of our senses and makes the learner feel involved in this experience (Beard and Wilson, 2013). This has been alluded to by previous authors (Keeton & Tate, 1978), however Beard and Wilson incorporated the vivid nature of this experience into his experiential learning model like no others before him. Within the model proposed by Beard and Wilson, there are six 'tumblers' of experiential learning referred to as the "learning combination lock" (Beard and Wilson, 2013) which are found within the external environment, the sensors and the internal environment. The external environment is comprised of two cogs (the learning environment and learning activities). The sensors

refer to the senses the students use to perceive the learning environment. Beard and Wilson hypothesised that by increasing the number of senses involved in the learning experience, the quality of the learning that can occur is also enhanced. Finally the internal environment is comprised of emotions in learning, reasoning and intelligence and finally learning and change. This is the final stage of the combination lock as it refers to the area where the learner has increased their knowledge and understanding and is able to then apply this knowledge to further academic and practical settings.

The external environment is the area where the facilitator has most control (Beard and Wilson, 2013). The teacher sets activities conducted within a class, and they have an impact on the learning environment. This is influenced by the leadership style of the teacher (Altman & Iles, 1998) and also by the methods in which the students work. A notable example of this has been when groups were formed to come up with an evaluation of environmental impact in the local area by reflecting upon previous experiences from previous academic research and also their own experiences in their lives outwith study (De Pedro Puente, 2007). By creating an environment for experiential learning to take place the authors in this study noted student contributions were markedly higher than in other tasks set previously (De Pedro Puente, 2007). There is more evidence of this experiential group project based work in academic settings working effectively too (Bell, 2010). De Pedro Puente did however express a limitation of the study which was that whilst the number of contributions was recorded, the quality of these contributions was not measured. With regard to student satisfaction it has been shown students within the Higher Education sector reacted extremely well to experiential learning within their course. Within the study, common words that were used by students to describe the style of learning included 'interactive', 'discovery' and 'fun' (Frontczak, 1999). When reflecting on tutorials and similar tasks that have taken place in my academic career thus far as a student and a teacher I would suggest getting students to contribute more often would increase the chance of valid and meaningful contributions being made to the area of study. The reason I say this is by adopting this approach it may help to negate situations in classes where somebody sits silently for the majority of the class. This is surely not beneficial to the student in question, therefore efforts to promote engagement within classes should be attempted.

### **How my Current Teaching Practice Links in to This Model**

In the modules in which I am currently involved in the delivery of tutorial and practical sessions I have made an attempt to create an environment suitable for experiential learning to take place. Certain classes lend themselves to experiential learning better than others. Whilst a lecture can be made experiential and have students being involved (Beard and Wilson, 2013), it could be argued tutorial sessions lend themselves better to an environment suited more for experiential learning. This is because a tutorial is often conducted in a smaller room, where the layout has students grouped round a desk, this lends itself better to group work, which has been shown to be beneficial for experiential learning to take place (De Pedro Puente, 2007). As well as tutorial sessions there are also practical sessions allocated to the sport psychology module in which I teach, these are based in a sports performance laboratory in the University where there is physiological testing and sports equipment available. An appropriate example of how the learning environment was manipulated in such a way where experiential learning could take place was in a sport psychology practical class. Social facilitation refers to the effect of crowd and competition on performance (Strauss, 2002). Specifically to sport this differs between complex, fine motor skills and relatively simple tasks that involve more effort and use of larger muscle groups. Performance of complex motor skills is adversely affected by the increased arousal as a consequence of a watching crowd and direct competition. Conversely, performance of simple, effort driven tasks is enhanced by the increased arousal associated with the increased social pressure and competition. In order for the students to experience this in a practical setting tasks were developed to fit in with the complex motor skills and simple, effort driven tasks. These were a timed football dribbling task (complex motor skill) and a timed period of the participant leaning their back against a wall with the angle between thighs and calves at 90°. This is commonly referred to as a 'ski-sit' and is a simple effort driven task. The students had to perform these tasks in three conditions (private/crowd/direct competition) with a partner timing them until completion (complex dribbling task) or exhaustion (simple 'ski-sit' task). The results went as hypothesized with the complex motor task being performed slightly poorer in the crowd and direct competition conditions in comparison to the private condition. With the simple motor task however the optimal performances came from the direct competition and crowd conditions in comparison to the private condition of the experiment. By conducting, and participating, in the experiment the students were able to engage a variety of senses in the process. They were able to 'see' the effects of social facilitation on

performance. When participating the students were able to 'feel' the psychological and physical responses of the body to direct competition and social crowd conditions. Finally they were able to 'hear' the crowd reactions to their performance within the task on both the crowd and direct competition conditions.

This links very well into Beard and Wilson's experiential learning combination lock. One area with a significant link to this is that the 'Sensors' (third tumbler) are the crucial link between the external and the internal environment. By increasing the number of senses involved in the learning experience as described above, the students are able to feel more involved or immersed in the activity (Beard & Wilson, 2013). Both tasks in this practical session involved a physical challenge, this links directly into the 'Learning Activities' (second tumbler) where it is accepted that if an activity is challenging or involves a journey then the learner is more likely to have a richer learning experience (Wright, 2000; Beard & Wilson, 2013). Throughout the module there have also been attempts within tutorials as well as practical sessions to set active group challenges, case studies and problem solving activities to try and engage the student further with the subject material. This has been shown to increase understanding and depth of knowledge (Omelicheva & Avdeyeva, 2008).

### **Traditional Academic Methods: Benefits and Limitations**

Lecture style teaching has been the most common way of teaching within the Higher Education sector for some considerable time. This is most likely down to the efficiency of this style of teaching rather than the quality of this style (Beard & Wilson, 2013). With regard to efficiency, lecture style teaching can allow hundreds of learners to attend a class at one time. This reduces the staffing cost as well as room cost for a University or College. Another benefit of lecture style teaching is basic knowledge of a subject area can be absorbed efficiently by a large number of learners at one time (Omelicheva & Avdeyeva, 2008). An alarming finding regarding lectures is around a third of all students find their lectures boring. This is not only due to the style of delivery, but also because of the academically accepted way of delivery which is by powerpoint slides (Mann & Robinson, 2009). Also over half of the students within this study admitted to the maladaptive boredom behaviours of daydreaming, doodling and chatting. Other common behaviours exhibited were texting and passing notes round the class (Mann & Robinson, 2009). The use of powerpoint will of course vary between academic institutions, however there is a correlation between students being engaged in their classes and their quality of learning (Beard & Wilson, 2013). The same correlation exists between levels of engagement and academic achievement (Mann & Robinson, 2009). Therefore these are findings which should be taken seriously. Whilst some authors argue that lecture style delivery can be adapted to be more engaging and experiential (Matheson, 2008; Omelicheva & Avdeyeva, 2008; Beard & Wilson, 2013), these attempts can cost considerable amounts of money, due to staff training time, purchase of appropriate technologies to increase active engagement and adaptation of physical learning environment. There may need to be further study to validate whether these costs are worthwhile, or whether the extra labour of smaller more experiential tutorial and practical classes are more financially, and time wise, more viable options.

### **How Experiential Learning Can Work Towards Achieving the Abertay Teaching and Learning Enhancement (TLE) Strategy and Abertay Attributes**

Based upon reflection and experience of multiple Higher Education establishments, there is much variance in strategy with regard to teaching and learning methods. At Abertay University the TLE strategic objectives and outcomes can provide a framework for teaching professionals at the University upon which they can shape their practice (Abertay TLE Strategy, 2013). There exists a direct correlation between these objectives and outcomes and experiential learning. A notable objective in the current TLE strategy is that the curriculum is in the process of being reformed with the aim to 'advance students' knowledge' and also to 'enhance students' preparedness for post-graduation and the world of work' (Abertay TLE Strategy, 2013). Regarding preparation for work upon completion of a degree programme, classes which promote experiential learning often involve working within groups to address client needs or even by being given case study problems to analyse and find solutions to. By giving the students a platform whilst at University to work on real-life situations linked to their potential future employment will help prepare them for these situations. This style of delivery has been successful for preparing students for work at other academic institutions (Bell, 2010; Beard & Wilson, 2013), so there appears to be no reason why this could not apply to students at Abertay.



Another of the Abertay TLE outcomes achievable by the use of experiential learning within the curriculum is the aim of a distinctive student experience that incorporates excellent learning and teaching. Experiential learning can help achieve this target as it is certainly a distinct method of teaching that varies greatly from the 'traditional' teaching methods of other academic establishments (Beard & Wilson, 2013). As stated previously, experiential learning environments are associated with a more problem solving based approach has shown evidence of greater student engagement and subject interest. This can help attain the high quality learning targeted within the institution. This is also linked directly to the target of 'Excellent Abertay Graduates' (Abertay TLE Strategy, 2013). This target features the idea that students should have a high knowledge base within their subject and can be comfortably working with others as well as by themselves. As many experiential learning tasks focus around group work, this would allow the students to become more at ease with working with other people. Also classes that encourage experiential learning have been shown to increase interest (Wright, 2000; Kolb, 2014) and a deeper knowledge base (Beard & Wilson, 2013) of a subject area which also directly links to this outcome target. Lastly, with regard to the TLE outcome targets, the expectation of teaching staff is they should feel empowered and be able to offer innovative and efficient teaching and learning methods. The experiential learning paradigm encourages practitioners to engage as many senses as possible during classes and also promotes altering the external learning environment to one which facilitates group involvement, problem solving and work like tasks (Beard & Wilson, 2013; Kolb, 2014). This allows teachers to be creative and innovative in their lesson plans and alter them accordingly with the ever changing demands of potential future employment opportunities of the students.

The Abertay graduate attributes are also a significant target of the TLE strategy within the institution. These are a set of skills and values Abertay hope to instil within their students upon completion of their academic programme. There are four attributes: intellectual, professional, personal and active citizen (Abertay Graduate Attributes, 2014). One of the key components of the intellectual attribute is students should be able to identify and work out solutions to problematic situations. By incorporating group work and employment style challenges suggested by exponents of experiential learning this could be achieved. An example of this within my own teaching practice would be giving a group of sport psychology students a case study of a basketball team with low levels of team cohesion and working out suitable ways to identify this and work out a solution tailored to the specific needs of that group. This would involve them reflecting on their own experiences of team environments, utilising different assessment techniques and taking into account environmental factors associated with that team in order to develop a progressive plan. The professional attribute involves students being able to make decisions and solve problems. As well as this students should also be motivated to continue learning. Experiential learning environments can work in conjunction with this aim as increased engagement is a common finding associated with this type of environment, which can only stimulate motivation to continue study within their field. The ability to solve problems can be developed within experiential learning environments, perhaps through the use of a practical session revolving around attentional narrowing and physiological arousal with the use of an eye tracker in a golf putting task in a sport psychology class for example. The final attribute that experiential learning environments could help attain would be the active citizen attribute. Key components of this attribute are being able to deploy skills and to be socially respectful of others. Practical classes involving experiential learning could be used to allow students to demonstrate skills by offering attentional narrowing solutions as described in the putting example explained in the professional attribute. With regard to being socially respectful, this can be achieved by way of incorporating group work within experiential learning environments. Without being respectful of others within the team, the ability to perform the task or solve the problem at hand would be severely diminished. This would help prepare students to be socially respectful upon graduation at Abertay.

## **Conclusion**

Experiential learning environments and tasks have been shown to increase levels of student engagement, motivation and even academic achievement within other higher education establishments when compared to traditional methods of delivery, notably lectures. As my current teaching area is within sport, where students are normally engaged in participation of the same area, steps will be taken within my own teaching to incorporate experiential learning within my teaching. Whilst there are challenges to achieving this such as inappropriate physical environments, challenging the status-quo of traditional academic methods of delivery and the relative inefficiency of smaller tutorial or practical lessons when compared to lecture style delivery, these are not

insurmountable. Even traditional lecture style delivery can be made more interactive and engaging by use of appropriate technologies and room layout. Keeping students engaged and offering a variety of different learning environments helps cater for a number of different learning styles and is also in keeping with the objectives and outcome targets of the modern TLE strategy, and graduate attributes at Abertay University. This style of teaching and learning should be considered across various schools within the institution, as it is a model applicable to any academic discipline. Reflecting on my experiences as a student and a practitioner, I am aware of the potential benefits of this style of teaching and learning and will endeavour to incorporate it into my practice at appropriate times.

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## **Assessment for Learning: Using Formative Assessment for Enhanced Learning in Management Education**

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### **Abstract**

The paper highlights a pedagogical model that can be used in management education and can overcome a common problem – passive students' learning. The model establishes links between three stages of continuous assessment, so that assignments progress from simple to more challenging, whilst a lecturer provides a student with assessment *for* learning. Progression in the assignments' complexity is accompanied by formative assessment. Stage One focuses on preparation for coursework by engaging students in reflective writing and by giving students an assignment to make a group presentation. At Stage Two a student prepares a one-page outline of the coursework, identifies key recommendations relevant to his project and receives feedback and feedforward from a lecturer. At Stage Three a student works on his coursework and submits a paper. This way a student can build on his own learning experience by incorporating feedback and feedforward and may successfully engage in the creation of knowledge.

**Keywords:** assessment, experiential learning, pedagogical model, process-oriented learning, reflective writing

### **Introduction**

Whilst higher education undergoes rapid changes, universities face challenges, such as more intense competition students and resources as well as reduced public funding. In this ever increasing competition, universities have to be more efficient in the design and delivery of their academic programmes in order to ensure high quality of education and greater student satisfaction. The latter stems from a variety of sources, out which the learning experience in the classroom (and beyond it) is undoubtedly one of the critical components. Pursuing the objective of identifying ways of how to make teaching more effective and enhance the student learning experience, this paper aims to elucidate the pedagogy model that the author has developed for certain modules in the business management field, such e-Business Strategy (i.e., strategy for digital business) or Strategic Management.

The design of the pedagogy model for teaching management has been triggered by and aligned with the new strategy that the University of Abertay Dundee has adopted in December 2013 for teaching and learning enhancement (Abertay University Teaching and Learning Enhancement Strategy 2013). Whilst Abertay University as an entire higher education institution intends to implement a new pedagogy model for the whole organisation, new approaches to teaching and learning should also be designed specifically for certain schools and divisions within the university due to unique features of subject areas (e.g., undergraduate programme in nursing versus the undergraduate programme in law) and related peculiarities of teaching methods. Hence, the pedagogy model for management education should (a) fit in the broader university-wide model and (b) feature certain adaptation for students who study business and management. The paper outlines the pedagogy model that satisfies these two requirements.

The paper is structured as follows. It begins by a brief introduction of the proposed pedagogical model, its core and its principal features, so that a reader can have a clear understanding of the model's focus. The paper then elucidates theories and concepts that underpin the model.

Subsequently, the paper highlights Abertay University's teaching and learning environment that is rapidly changing and that explain why and how the proposed model has emerged. This is followed by the detailed description of the model and of how it can be used in teaching. The paper concludes by providing a summary of the model's benefits for student learning.

### **The model: principal features**

The pedagogy model aims to establish the direct links between three stages of continuous assessment, so that assignments progress from simple to more challenging, whilst a lecturer provides a student with assessment *for* learning. Hence, progression in the assignments' complexity is accompanied by formative continuous assessment and ultimately results in summative assessment. The assignments in a module are given as follows:

Stage 1: Preparation for coursework:

1A. Assignment for reflective writing

1B. Student group oral presentation

Stage 2: Assignment for Structured Feedback Week - preparation for coursework.

Stage 3: Coursework.

The detailed discussion of the model's elements and justification for its structure are provided in a separate section below.

### **Theoretical background**

The model draws on the interplay of three theories/concepts: experiential learning theory (Dewey 1938; Kolb 1984); process-oriented learning (Glover *et al.* 2002; Moog *et al.* 2006; Spencer and Moog 2008); and reflective cycle (Gibbs 1988). Whilst each of these theories/concepts has its own meaning and value, they also can be viewed as complementary. Their interplay, hence, may have a synergistic effect and result in more effective teaching practices and enhanced student learning. The discussion below highlights each of the three theories/concepts.

In experiential learning theory (ELT), learning is viewed as a process in which a person uses her own experience to reflect, conceptualise and get involved in further actions that all create new knowledge. In Kolb's ELT, the learning cycle model plays the key role. The model includes four principal elements: (1) concrete experience, (2) reflective observation, (3) forming abstract concepts followed by (4) active experimentation (Kolb 1984). Figure 1 in the appendix describes the stages of the learning cycle. The learner begins at any stage and then proceeds through other learning cycle stages, and then begins a new cycle, hence forming a continuous learning process (Kolb 1984). Additionally, Kolb's ELT defines four learning styles including diverging, assimilating, converging and accommodating (Kolb 1984). The latter, for example, refers to the person's ability to learn from primarily hands-on experience.

Kolb's learning model found many uses in various fields such as training, adult education, pedagogy, human development, teaching of languages, psychology and philosophy (Kolb and Fry 1975). An additional field that extensively uses experiential learning is management education. However, the application of ELT in this field reveals some theoretical limitations, namely regarding the influence of social power relations on concrete experience, which Kolb's ELT largely disregards (Vince 1998). It is the societal aspect (i.e., society's influence in a broad meaning depending on the context) that ELT does not fully incorporate and underestimates (Mouraviev and Kakabadse 2014).

The ELT benefits include active, rather than passive, learning associated with a person's own experience. Active learning fosters the pattern of independent learning, enhances analytical skills,

facilitates deeper understanding of what a person is doing and why, and increases person's satisfaction from the entire learning process.

The concept of process-oriented learning emphasises the significance of the process that evolves around interaction between the learner and her learning. Influenced by a variety of factors ranging from curriculum design to team work to lecturer's interventions, process-oriented learning includes specially designed activities aimed at facilitation of the learning cycle, active group discussions (as opposed passive learning) and discovery of concepts/knowledge by students during the class, whilst reinforcement occurs after the class (Glover *et al.* 2002; Spencer and Moog 2008). Although the process-oriented learning concept overlaps to a certain extent with Kolb's ELT, the distinct emphasis on the learning process undoubtedly has its value as creation of knowledge clearly is highly dependent on *how* a student is engaged in the process. From this perspective, the overlap between the two theories is useful for both learning' conceptualisation and the pedagogical practice.

Yet another concept that provides theoretical underpinnings for this paper's pedagogical model is the concept of a reflective cycle (Gibbs 1988). The learner's reflective cycle includes a number of stages - description of an event; expression of feelings; evaluation of what happened and whether it was a good experience or not; analysis; conclusion; and an action plan that leads to the beginning of a new reflective cycle, i.e., description of a new event (Gibbs 1988). Figure 2 in the appendix describes the reflective cycle. The reflection cycle echoes the experiential learning theory as they both conceptualise how an individual makes progress in her learning that stems from an action, experience or situation in which a person was involved. However, the reflective cycle concept and reflection in general also have their own benefits, such as that an individual plays an active role in her development; her critical thinking is being stimulated by each stage that follows a previous stage; an individual has full opportunities to link theory to practice; and an individual may develop personal views and theories about her practical experience that triggered reflection.

In summary, three overlapping theories and concepts including ELT, process-oriented learning and reflective cycle provide robust theoretical underpinnings of the pedagogical model in management education as their benefits for teaching and learning are complementary and, hence, are likely to create synergistic effect for enhanced learning.

### **Abertay University's teaching and learning context**

This section highlights the context at the University of Abertay Dundee from the teaching and learning perspective and answers the question of why it is necessary to understand this context. This context is characterised by the new Abertay University's strategy for teaching and learning enhancement (Abertay University Teaching and Learning Enhancement Strategy 2013). Its implementation began in January 2014 and by spring 2015 many new initiatives have been launched, although the strategy is far from completion. The strategy has set three priorities:

1. Reforming Abertay's curriculum,
2. Incentivising students' performance and
3. Raising the status of teaching

(Abertay University Teaching and Learning Enhancement Strategy 2013).

One of the overarching objectives is to create at Abertay a new pedagogy model that would successfully meet the challenges of the higher education's transformation. Whilst the detailed discussion of the strategy' drivers is beyond the scope of this paper, Abertay's new pedagogical model aims to shift the emphasis of student learning from subject knowledge (i.e., understanding facts, figures, terminology and basic concepts) to a more advanced model that focuses on development of students' abilities to perform critical analysis, apply knowledge in a variety of setting and further extend acquired knowledge. The expected shift is dramatic in its depth and scope. It

requires a radical change of curriculum with intent to offer new and revised modules that are more appealing to students, whilst each module will carry 20 credits as opposed current 15 credits. The shift also requires a change in pedagogical practice: instead of aiming to accomplish knowledge transfer, lecturers need to re-consider their teaching techniques, assignments and assessment schemes in order to focus on development of students' critical thinking, analytical skills and students' ability to apply what they have learned. Additionally, lecturers need to identify and employ tools that would create incentives for students' learning, i.e., teaching strategies, assignments, projects, group work and discussions that would foster learning in the classroom and also beyond the classroom. One of the key elements of Abertay's new pedagogical model (and the tool to facilitate students' learning) is the emphasis on *formative* assessment, providing feedback to students and feedforward, which the model proposed in this paper has adopted as a core component.

Transition to a new pedagogy model for the entire university may be successful when the model exists not only at the level of Abertay's policy documents but also when teaching staff in each school and division implement own pedagogical models that are tailored to the peculiarities of academic programmes. Whilst Abertay's model sets the overall objective, provides conceptual framework and gives general guidance, each member lecturer has to come up with her/his approaches to teaching that would be aligned with the University's framework for teaching and learning. To summarise, the pedagogy model for management education (that is proposed in this paper) has been developed in response to Abertay's rapidly changing teaching and learning context and is fully aligned with the university's strategy.

### **The pedagogical model: the rationale and critical details**

The model's general purpose is to increase teaching effectiveness and enhance students' learning by focusing on formative assessment, i.e., assessment *for* learning. Aligned with the broader Abertay's objectives, the model intends to overcome a common problem – passive students' learning. The latter happens due to the variety of reasons, e.g., lack of motivation to study, lack of time to study because of work and family commitments, lack of interest in the subject, and disengaging teaching methods that separate students from knowledge creation and make them used to what may be called 'spoon-feeding'.

Naturally, this raises the question of how to break the passive learning pattern and make teaching and learning more effective. The proposed model answers this question, at least in part (as there might be many other pedagogical models), by suggesting to use the concept of assessment *for* learning, rather than using assessment for merely recording what a student has achieved to date and issuing a mark for a certain assignment. Based on this concept, the model focuses on formative assessment that would facilitate further learning and knowledge creation by students. The tool to achieve more active learning is to give students assignments throughout the term that are progressively more challenging. This way a student can build on his own learning experience by incorporating feedback and feedforward from the lecturer. Table 1 summarises the logic adopted by the proposed pedagogical model.

Problem	Many students are passive learners and are disengaged from knowledge creation
Question	How to engage students in active learning and make it more effective?
Solution	Use the assessment <i>for</i> learning concept by giving assignments and providing formative assessment that would facilitate further learning
Tools	A series of progressively more difficult assignments; continuous assessment with the focus on feedback and feedforward

The model's details are as follows. Assignments are grouped and they form three stages. Each stage can be viewed as a step in student' progression to knowledge creation. Table 2 summarises the model's stages and activities that they include.

Stages	Assignments	Marked or not marked; assessment
Stage 1: Preparation for coursework	1A. Assignment for reflective writing  1B. Student group oral presentation	Marked. A lecturer provides feedback and feedforward for Part 1B.  Marked. A lecturer provides feedback and feedforward for Stage 2.
Stage 2: Structured Feedback Week	Assignment: Prepare a one-page outline of the coursework, identify key recommendations for the company's e-business strategy	Not marked. A lecturer provides feedback and feedforward for Stage 3.
Stage 3: Coursework	Assignment: A paper (3,000 words) in which a student creates an e-business strategy for a company of choice	Marked. A lecturer provides feedback.

**Table 2.** Assessment for learning: Progressively more challenging assignments and formative assessment

Stage 1 includes two parts. Part 1A is an assignment that requires a student to do reflective writing. For example, in the e-Business Strategy module this assignment will require a student to reflect on his/her recent experience with online business, such as purchasing a good or service online. As reflective writing does not require the employment of theory, a student can highlight his/her experience regarding looking for a product on the Internet, finding product's details on a certain Web site, and can reflect on this encounter from the customer perspective (i.e., how attractive the value proposition was and why). At the same stage, Part 1B is an assignment that requires students to form a group and make an in-class oral presentation together with the group members. The topic should focus on more advanced experience with online business, such as purchasing automobile tires online, having them delivered to a local shop and then having them installed on a car. This will require students to use at least some theory and concepts (e.g., partnerships in e-business or creating a competitive advantage) and also connect theory with their own experience. This is aligned with experiential learning theory (Kolb and Fry 1975; Kolb 1984), process-oriented learning (Moog *et al.* 2006) and the reflective cycle model (Gibbs 1988; Gibbs and Simpson 2004). Each completed assignment is assessed and a lecturer provides feedback. Most importantly, a lecturer provides feedforward that aims to give guidance for student's coursework. The latter is a paper (i.e., an analytical project) that students are required to submit at the end of the term. Hence, a student can assess his own learning experience using which he/she can approach coursework with more knowledge and greater confidence.

At Stage 2 students are given an assignment specifically for the Structured Feedback Week. The assignment requires a student to draft a one-page outline of the coursework, identify key ideas and make a few recommendations for the company's e-business. Whilst this assignment is not marked, it gives a student a good opportunity to sketch a plan for his/her paper (i.e., coursework), think about main ideas around which she/he can design a paper and receive feedback and feedforward from a



lecturer. Naturally, the principal motivation for a student in this case will be an opportunity to verify his/her ideas with the lecturer and receive guidance for the final write-up that counts for a high percentage of the final mark. The author's own experience in spring 2015 (Term 2 of 2014/2015 academic year) teaching e-Business Strategy shows that most students were very keen on using this opportunity. They signed up for individual meetings with the lecturer and received extensive feedback and feedforward.

At Stage 3 students submit their coursework (a paper) in Blackboard and ultimately receive lecturer's summative assessment and feedback.

In summary, a student is expected to use the opportunities of each stage and engages himself/herself in all assignments that are progressively challenging (i.e., they require more academic effort, getting familiar with the literature, studying theories, and making connections between theory and practice). By going through each learning stage, a student is likely to receive richer educational experience, which is characterised by active engagement in learning and knowledge creation by his/her own efforts, guided by formative assessment. Ultimately, this is likely to result in better academic performance (i.e., final marks) and, most importantly, students' better preparation for their professional career.

## Conclusion

The concluding section summarises the model's benefits as follows:

- The pedagogical model gives students an opportunity to begin their studies through the lens of personal reflection and to receive feedback and feedforward on this reflection.
- The model provides guidance to students regarding how to advance to the next stage at which each student is involved in group work that also facilitates learning by the exchange of opinions and insights into the group presentation. The latter is supposed to help students to make connections between theory and practice.
- The model gives students ample opportunities to form principal ideas about their future coursework and discuss these ideas with a lecturer during the Structured Feedback Week. The benefit here is that discussion does not entail any threat of being penalised for putting forward invalid ideas and unjustified recommendations because the assignment for the Structured Feedback Week is not marked. Furthermore, the benefit is the acquired confidence that a student is on the right track with his/her paper, which is based on the feedback and feedforward from a lecturer.

Whilst the variety of pedagogical models that lecturers at Abertay University employ may be large, each model has to contribute to the overarching Abertay's goal – to create a stimulating teaching and learning environment that ensures learners' active engagement and enhances graduates' employability and enterprising skills.

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## **Technology-enhanced teaching and learning**

## Using a technologically-enhanced Blended Learning model and Facebook as a tool in higher education teaching

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### Abstract

In order to provide excellent service to the students, customers and businesses, Abertay University has set out a clear Teaching and Learning Strategy and a Strategic Plan. To achieve the aims set therein, I have developed a unique pedagogic model to deliver an excellent service. In this paper, I will set out my pedagogic model, which is located within the Abertay context. I have adopted technologically enhanced blended learning - which to me is a powerful synergy of traditional face-to-face teaching approaches with carefully selected online learning strategies. When combined together, the two approaches can have profound impact on student engagement, critical thinking, communicative confidence and intellectual capacity. In this paper, I will be critically reflecting on my academic practice and appraising this model, and the use of Facebook as a learning tool along with traditional approaches.

**Keywords:** blended Learning; Facebook; communities of practice; pedagogy

### Introduction

*"The learning process is something you can incite, literally incite, like a riot."*  
(Audre Lorde, 2012: 90)

A good teacher has sufficient knowledge and expertise of the subject area. However, only an excellent teacher will know that this alone is not sufficient. Along with subject based knowledge one has to develop strategies to actively involve students in/incite the learning process, effectively communicate information in the classroom and formal settings, but also outside of the classroom in informal settings, demonstrate adaptability in teaching approaches, and enhance student engagement and intellectual capacity (Matheison 2014). This will in turn foster an environment conducive to learning, turn students into problem solvers, independent thinkers and make them take ownership of their own learning. To achieve the above I have developed and employed my very own pedagogic strategy during the twenty two months of teaching at the Abertay University. In this paper I will highlight this strategy and ways in which it fits within the Abertay Strategic Plan. Throughout the paper, I will draw upon my reflections and examples from my teaching journal, so as to explain the working of this model.

### Pedagogic strategy

Most of the challenges that I encountered in my initial teaching practice were directly or indirectly linked to student engagement with academic reading. The inconsistent engagement had a potential to affect knowledge and understanding of the subject matter, and to negatively impact on student performance in assessments and end of the year exams. I noted that students found it slightly difficult to retain interest in academic literature (for certain modules) and as the semester progressed, they started falling back on reading. The gap in reading was then supplemented with information largely 'cherry picked' from tabloid newspapers and other rather unreliable internet sources. This ideologically loaded information, coupled with insufficient engagement with academic material, lack of empirical evidence gathering and understanding of/or connection with core theories, had a potential to create confusion and lower their interest on the course. I had to quickly adapt and construct a pedagogic strategy to address these emerging problems and to foster student engagement on the course. I started embracing technologically enhanced **blended learning** as a pedagogic model, so as to enhance student engagement and interaction. According to Oliver and Trigwell (2005), blended learning is the *"integrated combination of traditional learning with web based on-line approaches"* (2005: 17). Therefore, I used FB as an online learning tool, to share useful materials and encourage discussions – whilst retaining my role as a "facilitator" (as opposed to a lecturer). FB was implemented cautiously and I was careful: (1) not to create a classroom outside of the classroom (Sheely 2006). Therefore, my input and comments were limited in nature; (2) not to share predominantly academic literature and instead use a combination of blogs, short reflexive/critical

pieces, podcasts, YouTube videos and articles from the mainstream newspapers (Boulous, Maramba and Wheeler 2006). This encouraged students to broaden their knowledge, to read, watch, listen, think, reflect and connect at their own time and pace, and later expand with the help of academic articles; (3) not to post lecture overheads or other announcements, as that was done via Blackboard. All students in my class were registered FB users and had no problems in navigating the site/app. There were several reasons as to why I chose FB over other social networking sites and online learning platforms. To start with, FB contributes to an increase in the opportunity to operate in an improved learning environment through enhanced communication and incorporation of collaborative teaching and learning approaches (Wong et al. 2011). This was particularly important to me and it built an online **Community of Practice** through its interactive features, which can be implemented successfully within the Higher Education context. For instance, FB is equipped with dynamic features, such as, ability to post videos, weblinks and pictures. However, Group is one of the most powerful features on the site, and it can encourage and enhance collaborative learning. Learners can join an existing Group related to their interest, and they can use the site features for sharing information and performing variety of tasks. FB Group features can build an online Communities of Practice, as they meet the three fundamental components of communities i.e. domain, community and practice (ibid: 319). Students in my class were instructed to join selected subject specific “Groups”, for which I was the administrator. On a personal level, I continue to broaden my knowledge and learn from social networks, predominantly Twitter (where my account has attracted close to 3000 followers) and also through FB Groups (although to a lesser extent). Therefore, I wanted to pass learning and knowledge accumulation strategies/skills to the students. However, students objected to using Twitter and found it rather limiting (as posts were restricted to 140 words) and lacking user-friendly features, but they were very willing to participate in FB Groups. Below is the critical appraisal of this strategy and ways in which it fits within the Abertay’s plan:

### **Misgivings of the institutional VLEs**

To start with, FB was used to overcome certain functional issues within the institutional VLEs, as Blackboard did not accommodate social connectivity tools and personal profile spaces, and in a way replicated traditional models of learning and teaching in online environments (Sheely 2006). My recommendation of weekly monitored chat discussions on Blackboard did not attract much interest from students. One reason being: student’s needed solid Internet connection to access the Blackboard website via computer. Few students also mentioned that, Internet speed in their locality is very variable (as they lived in small villages and towns on the outskirts of Dundee) and it obstructed their participation in online activities on Blackboard. However, they found it reasonably easy to connect with FB via mobile phones from anywhere. Further, VLEs created a classroom outside of the classroom, and it goes back to the top-down model of teaching (Sheely, 2006). Therefore, the use of VLE doesn’t fit with the blended model and turns it into an entirely formal approach. When FB is employed as a learning tool, it moves away from this very hierarchical form of learning and empowers students through connections and social interactions. It is much more dynamic and evolved in that sense. Finally, students consider Blackboard as a platform to access lecture notes, readings and assessment related factual information (as oppose to learning and interaction tool) – taking into account other advanced, interactive, social networking platforms – VLEs seem technologically obsolete. This was very succinctly explained by one of the students during seminar:

Not that I don’t find Blackboard useful – it contains all the lecture slides, readings and assessment information. But that’s all. When you suggested online monitored chat on Blackboard, I was like “urgh- not again.” I much enjoy and learn from your FB posts, and also like to see what others are posting. It makes me feel like a part of something. Blackboard is just dull.

### **Fostering student engagement and criticality**

By using technologically enhanced blended learning pedagogic model and FB as a tool, I created an informal learning environment and made learning highly independent and self-driven (McLoughlin and Lee 2007). Formal learning is described as highly structured (one that happens in the classrooms), whereas informal learning happens through observing, communicating with others, asking questions, reading, reflecting, finding new information and exploring (ibid). Informal learning rests primarily in hands of the learner and use of FB allows learners to create a learning space that facilitates self-learning activities, connections with academic/subject-specific Groups and becoming part of a social network (ibid). Whilst FB is seen as less powerful by certain scholars (such as, Selwyn 2009) when compared with traditional models of learning (that focuses on structured top-down approaches in

teaching and learning), it nonetheless offers an opportunity to **re-engage** individuals with learning, and promotes **critical thinking**, which is one of the traditional objectives of education (Bugeja 2006:1). After I posted materials on FB, it was within matter of minutes that students started clicking on the links (see appendix 1 and 2) and even shared the posts on their “Wall”; however, it was only when they attended the seminars, I was able to capture the extent of their engagement, understanding, interpretation and connection with the module/lecture (and academic literature). It was extremely important to me that such connections were explored thoroughly, as I used informal learning to supplement formal learning and not substitute it. For me informal learning outside of the classroom was merely a continuum, rather than either/or dichotomy (also see: Attwell, 2007). Therefore, by using this pedagogic model, I intentionally merged formal and informal learning spaces, and tried to boost student engagement, critical thinking, and problem solving skills. Students were very responsive to this approach, and it was evident from some of the discussions that took place in the classroom – as one (3rd year) student mentioned:

You post some really amazing articles on Facebook. Your posts remind and encourage me to go through the lecture slides and suggested readings. Sometimes I even go beyond and do a bit of my own research. The other day I found out there is an organisation called TellMAMA, who measure anti-Muslim attacks ... I am thinking of doing my final year project connected with this module [i.e. Politics of ‘Race’ and Ethnicity] and more specifically on your Race and Gender lecture. I want to further explore racist hate crimes against Muslim women in Scotland.

Another (4th year) student mentioned:

I read your post about detention of women last night. It was very interesting and some of the information is very closely connected with the module on prisons, which I did last year. I think we could apply prison abolitionist theory to argue that detention centres should be closed down, as they are spaces of harm, human rights violations and it takes freedom away from people who have not committed any crime. I will be reading XYZ’s article tonight about detention centres and racism, and will be writing an essay on asylum and refugees.

Whereas my own reflections indicated that students were paying close attention to FB posts and it is actively directing their reading and knowledge. For instance, a student picked a very critical report from one of the Groups. S/he then sent that report to me for sharing it on the Abertay Sociology page. While marking the student coursework’s I noticed that same report has appeared on the reference list of 6 students. What became increasingly evident that students not only absorbed knowledge, but they also tried to expand on it by referring to academic and various other online sources. Furthermore, by adopting this approach and posting useful articles I noted that, chances of students accessing unreliable online materials and tabloid newspapers as a reference point in the seminar discussions (and subsequently coursework’s) was significantly reduced.

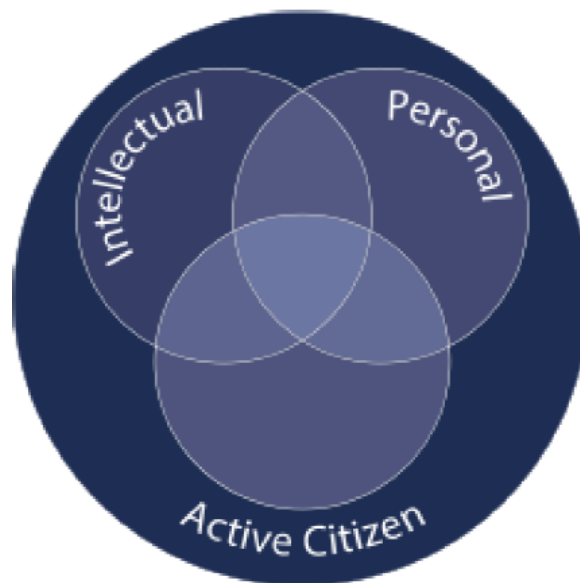
### **Building intellectual/social capacity and communicative confidence**

After the initial two weeks of adopting FB, students were encouraged to search and post relevant materials connected with the lecture from reliable online sources. It should be noted that, members of a CoP are practitioners, and they can develop a shared repertoire of resources (Wong et al. 2011:319). This was also done to foster a *culture of research*, making the process of *discovery and finding* attractive and a rewarding experience. At the same time, it enabled students to distinguish between various sources of information (i.e. reliable and unreliable). By encouraging students to post in the “Groups”, I further moved away from the traditional top-down structured teaching approach. This strategy also facilitated learning through socialisation and slowly built student’s communicative confidence. It was extremely important to me that quiet students were engaged and felt part of a class/community. I increasingly noticed that, introverted and shy students started clicking on “like” initially, and later started expressing their opinions through comments (albeit in limited words) and even posting articles and information. During an informal feedback session, one of the quieter students stated:

Articles that you posted last week were very powerful and I had to leave a comment. I don’t really like commenting on FB, as words can be misinterpreted easily. But your posts not only pushed me to comment, but it also pushed me to comment in a correct manner. I found it very interesting.

Learning through socialisation has a direct positive impact on student interest in the subject material. Duffy (2011) argues that FB could be used for teaching and learning, as it enables students to share

knowledge and information with the “Group” members’ and the associations between them. FB provides a range of educational benefits by: *“allowing students to ... take creative risks, and make sophisticated use of language and digital literacy skills, and in doing so, the students acquire creative, critical, communicative, and collaborative skills that are useful in both educational and professional contexts. (p. 288).* Therefore, this blended learning model neatly achieves the **Abertay Attributes (Fig 1.)** – as it encourages development of students’ intellectual and social capacity, gives them tools to find creative solutions to real world problems, and work within a complex and interdisciplinary contexts. I have noted that it also triggers intellectual, communicative and collaborative confidence amongst students, train them to take creative risks and help them broaden their knowledge base (as outlined above).



**FIG.1 Abertay Attributes**

### **Selective applicability of FB**

I will have to confess that my pedagogic model was developed as an experiment to boost student engagement and use of FB was on a trial and error basis. I noted that, students were more responsive to FB only for certain modules, such as, the Politics of Race and Ethnicity and Human Rights. Issues surrounding ‘race’ and human rights are politically contentious and fiercely debated, and for such topics students preferred reading short sharp pieces and newspaper articles; however, for modules that were more theory dense (for e.g. Penal Institutions), students preferred reading only academic journal articles/books and responded to formal structured learning. I felt this was partly because of the fact that when learning about key philosophers and theorists, students preferred reading primary sources and “connected” with traditional learning, and they did not show much interest in blogs, videos etc. Therefore, technologically enhanced learning should be more module specific, as opposed being universally accepted and applied on every course. Student engagement needs to be closely and thoroughly monitored, as done above. Nevertheless, even for theory dense modules, students responded favourably when I posted information about books and journal article links that were relevant to their course (see Appendix 3). I must also add that more exploration of this model is needed, so as to map student responsiveness to blended learning (or lack of) on certain courses.

### **Overcoming the criticisms of FB**

Despite of proving beneficial, FB has been subjected to series of criticisms. Few scholars (for e.g. Selwyn 2009) have strongly cautioned against the use of FB for teaching and learning, as students might be reluctant to use it for learning purposes, shifting its focus away from being an academic tool and becoming considered purely as a site for socialisation and sharing pointless information. In his

study, Selwyn noted that students did not use this site for educational purposes and their interactions were limited to offering negative comments on learning/lecture/seminar experiences, casual comments about events, sharing factual about teaching and assessment requirements, seeking moral support for assessment or learning, and even boasting oneself as being academically incompetent and/or disengaged (2009:157). Therefore, I approached FB with caution and used it in a considered, balanced, strategic, logical and objective manner. Whilst I did not actively police student posts and they were free to express their opinions and thoughts; however, I made it explicit right from the outset that “Group” was purely a medium to disseminate valuable academic information linked to the lectures and all personal communication and exchange of mundane information should be done outside of that space. In contrast to Selwyn’s pessimistic conclusion, I found that giving a set of instructions about online conduct and importance of maintaining an informal learning space, made students self-aware and cautious. Throughout my practice, I have not noticed any student exchanging information that is not connected with their learning. Therefore, FB not only supported self-regulated learning, but it also empowered students intellectually. Although, there might be students who are not on FB or find it difficult to navigate, in which case additional training might be needed for blended learning to be successful. Lastly, issues related to online conduct and ethical protocols need to be clearly defined – which is something I aim to look into in the coming months.

## Conclusion

In this paper, I have critically evaluated my pedagogic model (which is still in the development process) and FB as learning and teaching tool. So far, in my teaching practice, I have found out that blended approaches can facilitate learning, by increased interaction and collaboration between students and staff. I noted that by adopting technologically enhanced blended learning, student literacy, critical thinking, and collaborative and communicative skills can be significantly enhanced. This approach could “*better motivate students as engaged learners rather than learners who are primarily passive observers of the educational process*” (Ziegler 2007, 69). However, I also understand the limitations of my model and if not implemented cautiously and evaluated on regular intervals, it could heighten student disengagement and disconnection from education and to the detrimental effect that it may have on traditional skills and literacies (Brabazon, 2007). As a critical academic, I believe in intellectual and scholarly empowering of students, and fostering independent critical thought; therefore, to me, a careful implementation of online learning with tradition approaches has a strong potential to retain and foster student engagement.

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## Appendix 1

<http://www.nytimes.com/.../o.../who-gets-to-go-to-the-pool.html...>



### Who Gets to Go to the Pool?

A white cop, black teenagers and this country's long history of water as a site of racial anxiety.

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## Appendix 2



**Abertay Sociology**

Published by Monish Bhatia [?] · 6 April · 🌐

Abertay lecturer in the Herald. Dr Monish Bhatia on asylum seeking women in detention centres: <http://www.heraldscotland.com/.../refugee-detention-centres-a...>

hs

**Refugee detention centres are harming women - they should close, say experts**

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### Appendix 3

**Abertay Sociology**  
Published by Monish Bhatia [?] · 13 May · 🌐

Our colleague Christos Memos has recently published a book called "Castoriadis and Critical Theory". Copies are now available in the Library. See below for further details about his book.

[http://www.palgrave.com/.../castoriadis-and-critical-theory.../...](http://www.palgrave.com/.../castoriadis-and-critical-theory.../)



**CASTORIADIS AND  
CRITICAL THEORY**  
Chris, Critique and Radical Alternatives

### Castoriadis and Critical Theory

Combining philosophical and political analysis, this study offers a comprehensive reassessment of Castoriadis' contribution to critical theory in and through his critical confrontation with both the crisis of the traditional Left and the crisis of modern

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## The use of Social Media within the context of student engagement and learning in Abertay

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### Abstract

From a technological point of view, in the last ten years, the learning experience could receive high benefit from the spread of tools of so-called Web 2.0 (RW.ERROR - Unable to find reference:16). On the one hand, there has been the development of blogs, wikis, social bookmarking tools, sharing platforms media, and so on, but social networking sites have also seen growth. In this scenario Facebook has become one of the most popular Social Networking services (SNSs) and considering the recent need to enhance technological progress in teaching and learning environments Facebook may represent a powerful tool. This pedagogical project shows continuous active learning for the student and the potential positive benefits of using Facebook in teaching and learning, particularly for the development of educational micro-communities (Facebook Groups).

**Keywords:** Social Media, Facebook, active and peer learning, reflection

### Introduction

Since the late nineties researchers in the field of e-learning, first, and Technology Enhanced Learning (TEL), after, have progressively turned their attention to the study of the potential of telematics networks in formal and informal learning environments and also in the development of professional communities.

The advancement of information and communication technologies (ICT) (O'Reilly 2005) has changed the behavior of people in the way they share information and interact with each other (Hughes et al. 2012). This is evident by the success of the social networking means of Facebook, Twitter, Plurk and many more.

The phenomenon of e-learning has shaped the last two decades of training in various disciplines, offering new ways of distribution and use of educational contents. The increasing availability of low-cost connections and the spread of different virtual learning environments (VLE) played a decisive role in encouraging, in particular, the removal of boundaries of space and time and the development of online courses (Follows 1999). More than 40 years ago, in 1969, the first connection between Stanford University in San Francisco and UCLA in Los Angeles was attempted; today it would not be possible to imagine designing, delivering and/or assessing a learning course without the help of the network, whether it is used as a source of upgraded materials for the teacher, a digital environment in which to store materials or a useful environment where students and staff can interact and cooperate. In the first phase of its development, when it was known as Distance Learning Training (DLT), the network was used less. Its evolution depended on technological advances and has only coincided with the evolution of e-learning in the latter stages of its development. (Comeaux 1995)

The spread of digital technologies as they applied to social media has created a culture where young people participate in creating and sharing content, radically revolutionizing communication, their interaction and their learning as students. The advent of digital technologies and widespread use of social networking is providing teachers and educators with new tools to develop learning methodologies that take advantage of peer learning achieved through engagement with these technologies. Students spent more time online rather than with their teachers in a conventional teaching classroom. For example, in the 2010 U.S. National Education Technology Plan, Transforming American Education: Learning Powered by Technology (Transforming American education: technology-enhanced learning), the US Department of Education asked teachers to "apply the advanced technologies used in our daily personal and professional lives to the entire education system to improve student learning." (Woolf 2010).

A social network consists of any group of people linked together by different social connections, ranging from casual acquaintances to work relationships or family connections.

Social networks have the following characteristics: they

- Offer online tools that participants will use with contacts and friends;
- Allow users to communicate and share material;
- Enable participants, by registering and creating a profile, to begin to interact;
- Allow the publication and sharing of links, images and video;
- Are "virtual plaza" where the community is built up.

Siemens & Weller (2011) state that the social network (SN) encourages dialogue between equals, promotes sharing of resources and enhances the development of communication skills. These advantages, however, are more easily obtained if we rely on open environments such as Facebook, since to be effective and motivating environments the SN requires a critical mass of users that cannot be ensured by a closed environment. The SN also erases the distinction between learning spaces, social spaces and play areas, suggesting that a mix of all the activities together can be a fertile environment (Siemens and Weller 2011).

### **Sharing of knowledge: the social media tool**

There is an indissoluble link between technique and teaching, between instrument and objective, between function and media. The speed of developments in technology in the last 5-10 years in the world of education and training is a new experience for both lecturers and students.

All IT tools, social networks (SN) included, are devices that allow users to do many things, to respond to real needs and to provide a simplified way to run an operation. So Flickr allows users to share photos, YouTube does the same with movies, Twitter allows a fast exchange of brief thoughts, Facebook puts together socializing, friendship and sharing, LinkedIn promotes professional exchanges and so on. In simple terms, each SN allows the creation of something quite specific. But it is a tool, not a goal. To reverse the order of reasoning, i.e. starting from the tool and developing reasoning design around it, means adapting the teaching to the tool.

### **Aim**

One of the first to introduce the concept of peer learning were Boud et al (1999), who described it as a learning process to be used in a work place. But a peer to peer learning concept has been better developed in many other recent works (such as McCarthy 2015; Boud, Cohen and Sampson 2014). With the rise in the use of web platforms and the enhancement of related technologies learning from peers has consequently become more natural.

In line with the teaching and learning strategy the purpose of this paper is to investigate how social media could be better used in Abertay University. The aim of this work is to evaluate the model of "peer to peer social learning" through the use of Facebook in the continually developing teaching and learning environment at Abertay University.

### **Methodology**

It is possible to create and develop or better, to use social media for didactic purposes, without any specific technological skills thanks to a wide range of free services, including user-friendly interactive communication technology that offers important opportunities for the creation of content and interaction with other users. Our main pedagogical model was applied in the first year module *HS0701A.S2 Human Physiology 1: Introduction to Nutrition and Metabolism* during the academic year 2014-2015. The purpose of this model was primarily to promote active learning through reflection from a social media environment through promoting learning from peers.

Problem Based Learning (PBL), a style of active learning, was also generally used in this class and for this reason the class was divided into three smaller groups (A,B,C).

Each smaller group was subdivided into groups of four or five students. Every small group was formed with students from different scientific backgrounds: Food and Consumer and Biomedical Science. Four Facebook groups were created called:

- *HS0701A Human Physiology 1 Group A*
- *HS0701A Human Physiology 1 Group B*
- *HS0701A Human Physiology 1 Group C*
- *HS0701A Human Physiology 1 Total*

Facebook groups have an online space where people can interact and share content with others. Groups are a great tool that allows students to work on collaborative projects with each other and with their teachers. In this case, it is also unnecessary to be a “friend” of someone to interact with him in a group. When the tutorial was running strictly as PBL, the student was asked not to post anything on FB to avoid influencing students reading their colleagues’ posts. Once all the output had been collected from the students, all the answers (in this case a diagnosis for a patient) were posted on each FB group. All students could then read what their colleagues had focused on more in their diagnosis, sharing their knowledge; once all the students had read all the posts, additional resources on this topic were shared by the tutor in each group to better understand the weak points of their output.

For tutorial output that was not in PBL style, the students were asked to post it directly on their relative FB groups after the class tutorial.

The picture below shows the learning interaction between the students and the tutor.

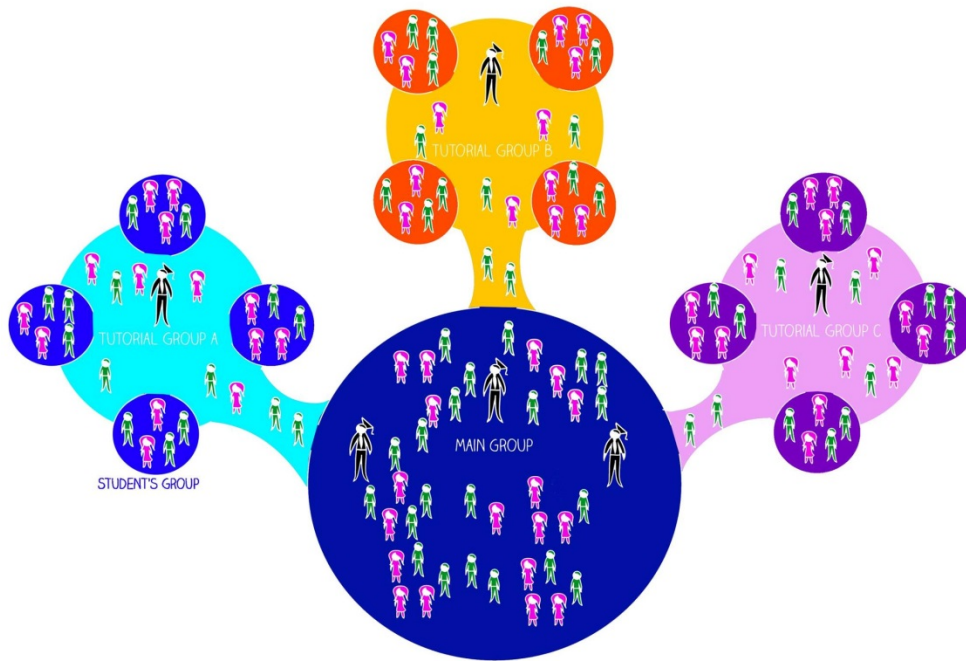
The tutor role in the PBL exercises and in the Facebook peer-to peer-learning was mainly to support the student learning by:

- Directing the learning process through regular monitoring of the students on the tutorial output exercises.
- Encouraging the students to better develop their tutorial output with more detailed writing on a specific part of their output.
- Asking the student to clarify any concepts not well developed in their output, or to give sources or evidence supporting their PBL exercise guiding them on their own learning

The use of mini group (groups made only from students, without the tutor) during the PBL exercises helps the students’ interaction during the preparation of the tutorial output, because in this group they can feel free to write “away” from the eyes of the tutor and the other members of the Facebook mini group can give immediate feedback to the writer of the first draft in the mini group, before it is submitted in their relative Facebook group. In this way the student can find their own path to learning.

The small circles in picture 1 represent the interaction between the students; they created their own PBL group where they could discuss the tutorial output without any interaction with the module tutor. The circle also intersected with the module tutor and these are the Facebook groups where the students wrote down their output.

In the center of the picture is the main Facebook group where all the information and the materials to promote reflection were shared.



**Figure 1:** Structure of student's interaction with the module tutor using Facebook groups

### **Continuous assessment**

The Facebook groups were also used as a continuous training tool because the students were asked to focus specifically on a particular aspect of their output, and to run a small research project on a topic related to this or to some interesting information which arose as a result of discussion during the class tutorial. Students were asked to post these additional outputs in the Facebook total group where all students could read and learn from what their colleagues posted.

Writing outputs in this new environment (the tutor also asked the students to try to be concise with a guideline of approximately 200 words where applicable) promoted reflection on one hand and on the other hand allowed the tutor to check if the students were working correctly on the topics with this new "ON-LINE" way of interacting with the students.

In addition the same student was asked to provide a question set (multiple choice questions) which could be used for a Blackboard mini quiz assessment.

The process of asking the student to formulate a question and to also provide several incorrect answers plus the correct answer is a smart tool to detect if the student has internalized their output. The students that do not read (learn) the outcomes from their peers are not able to correctly answer the module assessment.

Although it was not possible to assess the level of active participation in this "new form" of teaching and learning with the current coursework, mid-term assessment in the form of mini quizzes were created to cover their active participation in Facebook groups.

### **Feedback**

During the tutorial we had an open feedback session in each group. Three students were asked to summarize their group feedback on this "new teaching and learning" methodology:

"I think Facebook is a good idea for everyone to communicate and discuss if there is any problems. It's good for communicating with others and useful when working on a project in a team. I enjoy this

way of learning as it's easy to access useful links on projects we get in lectures and helps improve our learning reading other people's thoughts and answers through the page."

Another student group reported that "Learning, using Facebook can be very useful. Most people have Facebook on their mobile phones so have instant access to added material and can be up-to-date with all material unlike portals such as Blackboard, that requires signing-in and remember to check regularly. It can be more convenient when uploading work, if you can type work straight onto your phone, with more ease perhaps than Blackboard would be. It feels a little invasive at first, as only close friends can see my profile. However I set my profile as private as possible. Unfortunately working in groups at the moment often means someone is always left doing the 'homework' after class ends. Saying this, it publicly (within the Facebook groups) shows who is doing more work than others."

The third wrote that "The use of Facebook throughout university learning is exceptionally beneficial for each the students and lecturers involvement. Using the set-up of Facebook group pages for specific modules ensure that there is an easily accessible place for locating information, sharing questions that may be in thought, further reading, out of class activities and tutorial activities. It succeeds in being highly beneficial in engaging the involvement of every student, information and questions that may be in thought, can be easily shared through the use of Facebook, whereas in class quite possibly some students may feel less lenient to do so due to feeling hesitant and self-conscious. It provides a great and manageable base for constant communication regarding modules and ensures a great way to gain knowledge on questions you may have, from fellow students and lectures, that may not be entirely clear otherwise and cannot be asked in class time. It is a very easy way for lecturers to contact students as in this day and age, rarely anyone is without a mobile or in oblivion to the Internet/Facebook. Although, it may not be beneficial for a select few number of students, as many of the older generation tend not to participate in the use of Facebook more so than the younger students. However, I believe it is more beneficial than not due to the outweighed advantages."

## **Conclusion**

According to an estimate in 2014, "Facebook has passed 1.23 billion monthly active users, 945 million mobile users, and 757 million daily users each month on Facebook, the popular social network created by Mark Zuckerberg in 2004, worldwide" (Facebook Press 2014). The removal of frontiers of space and time that characterize distance education is in this virtual environment one of its greatest achievements and dissemination of texts, images and video, shared and re-shared by a bulletin board, enhances the opportunities for contact with the target language and the possibility of interaction and negotiation of meanings.

Within this scenario one of the added values of the didactic use of Facebook and other online platforms designed for teaching (like Moodle, Schoology, and Mybigcampus) lies in the engagement of the student and they feel part of a virtual place.

When a tutor opens a group on FB it means that the tutor tries to facilitate students' participation within this environment: their social networks already live there and so it is easy to get into this "new" environment and add school work to other activities.

In contrast, when students are asked to join another teaching platform such as Moodle, the student is asked to enter a "cold" environment, in which they can only study and therefore feels less warm and malleable to their interests.

In other words we can say that as generally the students already use Facebook on mobile phones, at home or even on the bus teaching can reach them even in these moments. This can open new opportunities for teaching and learning.

Moreover Facebook can be freely and easily accessed using different devices such as a mobile phone, tablet, or PC. From an instructional perspective, integrating Facebook into a course doesn't require extra development costs from the school. However, simply incorporating Facebook into a teaching activity could lead to collaborative learning from the students.





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## Assessment and Feedback



Horan (1991) further describes common characteristics of an effective teacher as displaying the following attributes:

*“An in-depth knowledge of their subject area, demonstrated knowledge of and use of a variety of teaching techniques, showed interest in teaching, were organised, were respectful and interested in students, encouraged student participation, and regularly monitored student learning to provide feedback”.*

Attributes we may all identify with as good teaching, but it may be instructive to take a further moment to reflect upon either our own teaching characteristics or characteristics of teachers during our own experience as a learner. Perhaps disorganised, disengaged, or lacking knowledge and skills springs to mind but as a consequence of either of these the last characteristic will inevitably prevail, **“failure to monitor student learning to provide feedback”**.

Take into consideration a scenario were a student turns backs to a time as a learner at University, waiting nearly a month or two for a grade mark let alone feedback, for some this scenario might bring back memories. You might be forgiven for thinking this may be an isolated case but here is another interesting take on feedback...

**Lecturer A Question:** *Don't you give your degree students feedback?”*

**Lecturer B Answer:** *“No never! I give the external marker feedback on why I gave the grade marks but never the students that would take to long”. (Anon, 2014)*

Analysing this statement let's ask whether the feedback serves to satisfy the students, external marker or the teacher. It may simply be a result of the culture within an institute and the value placed on feedback, but on reflection and identifying feedback as a personal weakness as well as a weakness of some colleagues and arguably college/university processes, effective feedback is a core component of the learning process.

In a paper written by Professor David Nicol (2008) of Strathclyde University for QAA Scotland, an independent body which develops and operates quality assurance and enhancement arrangements that reflect the needs of higher education in Scotland (part of the UK-wide Quality Assurance Agency (QAA) for Higher Education), it states:

*“While much has been written about the power of teacher feedback as a means of enhancing learning, evidence of its effectiveness as currently practised in higher education (HE) is not compelling, at least for the majority of institutions with large student cohorts. The UK National Student Survey (NSS) shows that students are less satisfied with the quality of teacher feedback than with any other aspect of their course.”*

Not compelling but on the other hand even although the evidence may not be evident, it's also important to ask the right questions and it has been suggested that the UK National Student Survey (2013) should change the wording of some of their questions to be less task focussed and more student centred, for example:

*“Feedback on my work has been prompt” changed to “Feedback on my work has been timely” and “I have received detailed comments on my work” changed to “I have received helpful comments on my work” Other questions which are asked within the NSS survey relating to assessment and feedback are: “The criteria used in marking have been clear in advance, assessment arrangements and marking have been fair, and feedback on my work has helped me clarify things I did not understand”*

Whilst the value of such surveys may be debated they can't be ignored and ironically the only objective deemed as ongoing in the learning and teaching section of Abertay Universities strategic plan for 2011-2015 is:

*“Every student receives feedback on assessed work assignments within a specified time frame [status-ongoing]” (Abertay, 2015).*

In contrast the universities assessment policy is for feedback to be returned to students within 10 days, indeed this is important enough to list in the strategic objectives but clearly work is still required to meet the objective. Perhaps changes to the delivery of traditional teaching and assessment methods are in order or other logistical problems such as funding and time. What every the root causes, transitioning students still need support.

Invariably institutions of further education have traditionally followed a practitioner based learning style through an **assessment of learning** or **assessment as learning** model, whilst universities have leaned more towards research or **assessment for learning**, also sometimes referred to as formative assessment (William, 2003). Now one might be forgiven for thinking formative assessment is a means for students to gage their own learning before summative assessment, but as Sadler (1998) outlines, it is also there to accelerate learning which requires direction and therefore feedback.

*“Formative assessment refers to assessment that is specifically intended to generate feedback on performance to improve and accelerate learning” (Sadler, 1998).*

Indeed the ultimate goal of **assessment for learning** is to create lifelong self regulated learners who take responsibility for their own learning, mirroring Education Scotland’s Curriculum for Excellence (2014) aim to *“increase learners’ engagement in, and responsibility for, their own learning”* (see Appendix 1.a). However this may lead to a misconception that learners who are self regulating don’t require a great deal of feedback in order to achieve, but on the contrary there are still many more transitioning undergraduate learners who require a great deal of guidance to become self regulating learners. Nicol & Macfarlane-Dick (2007) outline the Seven principles of good feedback practice facilitating self-regulation. “Good feedback practice is broadly defined as anything that might strengthen the students’ capacity to self-regulate their own performance”.

Table 1 Seven principles of good feedback	
1	Helps clarify what good performance is (goals, criteria, expected standards);
2	Facilitates the development of self-assessment (reflection) in learning;
3	Delivers high quality information to students about their learning;
4	Encourages teacher and peer dialogue around learning;
5	Encourages positive motivational beliefs and self-esteem;
6	Provides opportunities to close the gap between current and desired performance;
7	Provides information to teachers that can be used to help shape teaching.

From the list above in table 1, it can be concluded that feedback is also used to inform the teacher about the learning progress so they can make informed decisions on how to shape their teaching. Often referred to as **closing the feedback loop** and more often performed during student class/course evaluations, using feedback to inform the lecturer is also very relevant and necessary at the individual level in the support of academic transitioning. Nicol & Mcfarlane-Dick later outlined the goals of assessment and feedback in the Assessment and feedback paper for the Quality Assurance Agency for Higher Education (2009). Below is the section specific to feedback, a full list can be viewed in Appendix 1.b.

*“To what extent do your assessment and feedback processes help to encourage social bonding and the development of learning communities?...  
 To what extent do your assessment and feedback processes enhance your students’ motivation to learn and be successful?...  
 To what extent do your assessment and feedback processes inform and shape your teaching?”*

Taking a more critical view, the questions above are posed at the teacher to reflect upon the assessment and feedback process and may sit uncomfortable with some, who will defend the role of the teacher as an expert in the field and as such can exert academic judgment without question. However such a narrow view can seem to be a somewhat weak argument against a lack of any justification or judgment decision given to students analysing feedback that is limited, illegible or lacks clarity. Perhaps a symptom of policies, procedures, priorities and pressure on time, but most learners and some teachers can probably relate to and agree it clearly does not validate an expert academic

judgement. Strangely enough, an internet search for “how to give feedback” will probably present you with more business related sites than academic but as business managers already know, care must be given on how to construct and present feedback, get it wrong and it can have the opposite effect on performance. Amanet (2015)

*“Unclear feedback fosters a sense of helplessness and hopelessness because it offers no clues about how to improve”.*

- *“Poorly thought through feedback diminishes a supervisor’s credibility”*
- *“Inaccurate or ungrounded feedback leads to resentment”.*

There is no doubt, feedback is a supportive process and as such should be presented in a critical but constructive manner. One method is the hamburger approach of sandwiching a critical comment between two constructive comments i.e. Constructive Comment-Criticism-Constructive Comment. Example:

*“You have raised some good points for discussion in this report, however you really need to work on your grammar and spelling, I would be happy to help support you and there is a notable improvement from the previous report so well done”.*

But even this approach should be used sparingly as over exposure can lead to an expectation and some students may find it patronising.

To be fair most teachers are never taught how to give proper feedback and it is an incorrect assumption that they inherently have this skill. In chapter 2 of ‘How to Give Effective Feedback to Your Students’ Author Susan Brookhart (2008) gives some very insightful examples of good and bad feedback (appendix 1.d).

In essence, pedagogy is a word derived from Ancient Greek, meaning to teach a child or child-learning. On the other hand Andragogy means man-learning or adult learning. Knowles (1980) devised the four principles of adult learning, later adding a fifth principle in 1984 in which he describes adult learners as self directed and internally motivated to learn (See Appendix 1.d). The question pertains to what happens between leading the child through learning (Pedagogy) and setting goals for a self-directed adult learner (Andragogy).

## **Conclusion**

Feedback is a fundamental part of the learning process, and while Dylan Williams (2003) differentiates variants in assessment and learning styles using conjunction words such as “assessment **of** learning” and “assessment **for** learning” there could be many more plays on the words to describe assessment and learning but fundamentally “assessment **is** learning” and its core function is to provide feedback on the learning process.

To formulate an analogy of learning using a train as the vehicle, learning outcomes would be the interval destinations and assessment a check that it was safe to proceed to the next outcome, but feedback would serve to be the guidance on how to keep on track to reach the next destination.

Carefully constructed critical feedback is a difficult and time consuming process, get it wrong and it could have an opposite desired effect. It is for these reasons that often feedback is over looked when ultimately the aim is to speed up the learning process and reach that destination. But take care, feedback should not give the answers, merely lead to the answer or inform the student on how to improve, ultimately leading to a more self regulated learner.

*“I never learned from a man who agreed with me” (Robert A. Heinlein, n.d)*

As learners progress a balance should be struck between teachers given feedback and peer assessed feedback, increasingly allowing for further self regulated learning, yet still feedback is the core element to learning during transition. This can be achieved through feedback which leads the student to find the answer for themselves using methods such as Socrates questioning to develop their critical thinking further (see appendix 1.c).

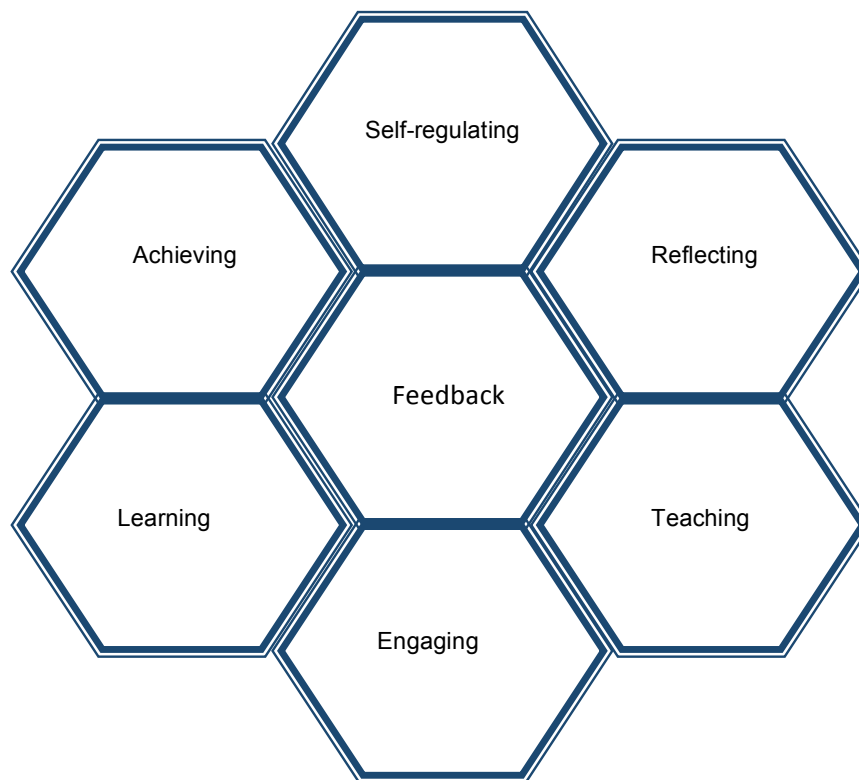
*Socrates (470BC-399BC) "Education is the kindling of a flame, not the filling of a vessel."*

With this in mind and analysing feedback as the means to which both the teacher and learner communicate to gauge learning, it is important to show feedback as a core element in the process. Therefore the proposal on page 6 formulates a pedagogical model reflecting the link between feedback and key aspects of learning.

### **Pedagogical Model**

The proposed pedagogical model below in figure 1 "The Building blocks of learner Feedback" shows the relationship between various aspects of learning with feedback as a core building block. In order to reach any aspect of learning identified in the blocks from any other, it must be reached through feedback for example; teaching-feedback-learning or learning-feedback-self-regulating.

**Figure 1: Building blocks of learner feedback**



Without re-inventing the wheel the model simply indicates the importance of feedback in relation to all other aspects of learning, and serves as a reminder of feedback's role in the teaching and learning process.

We must also remind ourselves that teachers are not all good teachers by default nor neither because they are an expert in their field. Good teachers must learn how to teach through methods such as a community of shared practice, scholarship schemes and reflection. Indeed ultimately our role is to provide guidance through the learning and teaching process.

To answer the original question “Is it time to take a critical review of feedback practices within higher education?” well for the reflective practitioner the answer is “no” they are probably already providing effective feedback but for the non-reflective academic expert in their field the answer is probably “yes” it is time as there is much more to teaching than subject knowledge and skills.

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## Appendices

### Appendix 1.a Curriculum for Excellence Principles

successful learners	confident individuals	responsible citizens	effective contributors
<p><b>attributes</b></p> <ul style="list-style-type: none"> <li>enthusiasm and motivation for learning</li> <li>determination to reach high standards of achievement</li> <li>openness to new thinking and ideas</li> </ul> <p><b>capabilities</b></p> <ul style="list-style-type: none"> <li>use literacy, communication and numeracy skills</li> <li>use technology for learning</li> <li>think creatively and independently</li> <li>learn independently and as part of a group</li> <li>make reasoned evaluations</li> <li>link and apply different kinds of learning in new situations.</li> </ul>	<p><b>attributes</b></p> <ul style="list-style-type: none"> <li>self-respect</li> <li>a sense of physical, mental and emotional well-being</li> <li>secure values and beliefs</li> <li>ambition</li> </ul> <p><b>capabilities</b></p> <ul style="list-style-type: none"> <li>relate to others and manage themselves</li> <li>pursue a healthy and active lifestyle</li> <li>be self-aware</li> <li>develop and communicate their own beliefs and view of the world</li> <li>live as independently as they can</li> <li>assess risk and make informed decisions</li> <li>achieve success in different areas of activity.</li> </ul>	<p><b>attributes</b></p> <ul style="list-style-type: none"> <li>respect for others</li> <li>commitment to participate responsibly in political, economic, social and cultural life</li> </ul> <p><b>capabilities</b></p> <ul style="list-style-type: none"> <li>develop knowledge and understanding of the world and Scotland's place in it</li> <li>understand different beliefs and cultures</li> <li>make informed choices and decisions</li> <li>evaluate environmental, scientific and technological issues</li> <li>develop informed, ethical views of complex issues.</li> </ul>	<p><b>attributes</b></p> <ul style="list-style-type: none"> <li>an enterprising attitude</li> <li>resilience</li> <li>self-reliance</li> </ul> <p><b>capabilities</b></p> <ul style="list-style-type: none"> <li>communicate in different ways and in different settings</li> <li>work in partnership and in teams</li> <li>take the initiative and lead</li> <li>apply critical thinking in new contexts</li> <li>create and develop</li> <li>solve problems</li> </ul>

### Appendix 1.b Assessment and feedback Academic

The Quality Assurance Agency for Higher Education 2009 Nicol & Mcfarlane-dick (2006)

Good assessment and feedback practice should:

**1 Help to clarify what good performance is (goals, criteria, standards)**

*To what extent do students on your course have opportunities to engage actively with goals, criteria and standards before, during and after an assessment task?*

**2 Encourage 'time and effort' on challenging learning tasks**

*To what extent do your assessment tasks encourage regular study in and out of class and deep rather than surface learning?*

**3 Deliver high-quality feedback information that helps learners to self-correct**

*What kind of teacher feedback do you provide, and in what ways does it help students to self-assess and self-correct?*

**4 Provide opportunities to act on feedback (to close any gap between current and desired performance)**

*To what extent is feedback attended to and acted upon by students in your course and, if so, in what ways?*

**5 Ensure that summative assessment has a positive impact on learning**

*To what extent are your summative and formative assessments aligned and supportive of the development of valued qualities, skills and understanding?*

**6 Encourage interaction and dialogue around learning (peer and teacher-student)**

*What opportunities are there for feedback dialogue (peer and/or tutor-student) around assessment tasks in your course?*

**7 Facilitate the development of self-assessment and reflection in learning**

*To what extent are there formal opportunities for reflection, self-assessment or peer assessment in your course?*

**8 Give choice in the topic, method, criteria, weighting or timing of assessments**

*To what extent do students have choices in the topics, methods, criteria, weighting and/or timing of learning and assessment tasks in your course?*

## **9 Involve students in decision-making about assessment policy and practice**

*To what extent are students in your course kept informed or engaged in consultations regarding assessment policy decisions?*

## **10 Support the development of learning groups and communities**

*To what extent do your assessment and feedback processes help to encourage social bonding and the development of learning communities?*

## **11 Encourage positive motivational beliefs and self-esteem**

*To what extent do your assessment and feedback processes enhance your students' motivation to learn and be successful?*

## **12 Provide information to teachers that can be used to help shape their teaching**

*To what extent do your assessment and feedback processes inform and shape your teaching?*

### **Appendix 1.c Socratic questioning**

#### **1. Questions for clarification:**

- Why do you say that?
- How does this relate to our discussion?
- "Are you going to include diffusion in your mole balance equations?"

#### **2. Questions that probe assumptions:**

- What could we assume instead?
- How can you verify or disapprove that assumption?
- "Why are neglecting radial diffusion and including only axial diffusion?"

#### **3. Questions that probe reasons and evidence:**

- What would be an example?
- What is...analogous to?
- What do you think causes to happen...? Why:?
- "Do you think that diffusion is responsible for the lower conversion?"

#### **4. Questions about Viewpoints and Perspectives:**

- What would be an alternative?
- What is another way to look at it?
- Would you explain why it is necessary or beneficial, and who benefits?
- Why is the best?
- What are the strengths and weaknesses of...?
- How are...and ...similar?
- What is a counterargument for...?
- "With all the bends in the pipe, from an industrial/practical standpoint, do you think diffusion will affect the conversion?"

#### **5. Questions that probe implications and consequences:**

- What generalizations can you make?
- What are the consequences of that assumption?
- What are you implying?
- How does...affect...?
- How does...tie in with what we learned before?
- "How would our results be affected if neglected diffusion?"

#### **6. Questions about the question:**

- What was the point of this question?
- Why do you think I asked this question?
- What does...mean?
- How does...apply to everyday life?
- "Why do you think diffusion is important?"

## Appendix 1.d

### How to Give Effective Feedback to Your Students` Author Susan Brookhart (2008)

Examples of Good Feedback	Examples of Bad feedback
<ul style="list-style-type: none"><li>• Selecting two or three main points about a paper for comment</li><li>• Giving feedback on important learning targets</li><li>• Commenting on at least as many strengths as weaknesses</li><li>• Returning a test or assignment the next day</li><li>• Giving immediate oral responses to questions of fact</li><li>• Giving immediate oral responses to student misconceptions</li><li>• Providing flash cards (which give immediate right/wrong feedback) for studying facts</li><li>• Using written feedback for comments that students need to be able to save and look over</li><li>• Using oral feedback for students who don't read well</li><li>• Using oral feedback if there is more information to convey than students would want to read</li><li>• Demonstrating how to do something if the student needs to see how to do something or what something "looks like"</li><li>• Communicating with an individual, giving information specific to the individual performance</li><li>• Giving group or class feedback when the same mini-lesson or re-teaching session is required for a number of students</li><li>• Making comments about the strengths and weaknesses of a performance</li><li>• Making comments about the work process you observed or recommendations about a work process or study strategy that would help improve the work</li><li>• Making comments that position the student as the one who chooses to do the work</li><li>• Avoiding personal comments</li><li>• Comparing work to student-generated rubrics</li><li>• Comparing student work to rubrics that have been shared ahead of time</li><li>• Encouraging a reluctant student who has improved, even though the work is not yet good</li><li>• Identifying for students the strengths and weaknesses in the work</li><li>• Expressing what you observe in the work</li><li>• Being positive</li><li>• Even when criticizing, being constructive</li><li>• Making suggestions (not prescriptions or pronouncements)</li></ul>	<ul style="list-style-type: none"><li>• Returning a student's paper with every error in mechanics edited</li><li>• Writing comments on a paper that are more voluminous than the paper itself</li><li>• Writing voluminous comments on poor-quality papers and almost nothing on good-quality papers</li><li>• Returning a test or assignment two weeks after it is completed</li><li>• Ignoring errors or misconceptions (thereby implying acceptance)</li><li>• Going over a test or assignment when the unit is over and there is no opportunity to show improvement</li><li>• Speaking to students to save yourself the trouble of writing</li><li>• Writing to students who don't read well</li><li>• Using the same comments for all students</li><li>• Never giving individual feedback because it takes too much time</li><li>• Making comments that bypass the student (e.g., "This is hard" instead of "You did a good job because ...")</li><li>• Making criticisms without offering any insights into how to improve</li><li>• Making personal compliments or digs (e.g., "How could you do that?" or "You idiot!")</li><li>• Putting up wall charts that compare students with one another</li><li>• Giving feedback on each student's work according to different criteria or no criteria</li><li>• Putting a grade on work intended for practice or formative purposes</li><li>• Telling students the work is "good" or "bad"</li><li>• Giving rewards or punishments</li><li>• Giving general praise or general criticism</li><li>• Finding fault</li><li>• Describing what is wrong and offering no suggestions about what to do</li><li>• Punishing or denigrating students for poor work</li></ul>

## **Assessing visual arts: moving towards a digital portfolio and presentation**

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### **Abstract**

This paper reflects upon the modifications made to assessment methods for a visual arts module. Upon reviewing the existing assessment procedures for the module Life Drawing, and investigating pedagogical models, relevant teaching theories, and giving due consideration to the University's Graduate Attributes, the project concludes that it has been beneficial to replace the physical portfolio submission with a curated and annotated digital portfolio, accompanied by a short presentation. It is considered that this amendment has increased student awareness of their progress and learning and offers a more valuable opportunity for self-reflection. The empowerment given to students to reflect, understand and communicate their progress is a significant part of experiential learning and of many revered learning theories. This student-centered approach to assessment should encourage more in-depth understanding of their achievements and assist in the planning of further development.

**Key words:** Assessment, Visual Arts, Portfolio, Experiential Learning

### **Introduction**

The purpose of this project was to investigate how to improve the assessment of students' work within the context of visual arts. The amendments to the assessment methods are designed with the ambition to increase student engagement with their learning; encouraging reflection, deeper understanding of their achievements and to discover more effective ways to approach marking and offer feedback. It was also important to consider ways to assess students' visual arts portfolios in a more meaningful and efficient way. The project has investigated changes to coursework submission for modules AG0711a Life Drawing 1 and AG0811a Life Drawing 2, which are 07 and 08 level modules within the Computer Arts programme. These modules are practical learning modules that are designed to develop observational skills, technical drawing skills, encourage visual enquiry and synthesis of ideas within the realms of drawing the human form. The coursework for these modules involves the development of a portfolio of drawings which explore a variety of materials, scale, perspectives, narratives, themes and poses (from long single studies to multiple quick drawings of action and movement). Historically all work generated through the course was then submitted in its entirety via a physical portfolio for assessment without opportunity for the student to reflect, select and submit a considered and edited portfolio of their strongest work. Feedback was then delivered in a written format without opportunity for discourse.

The project reflects upon the historical approach to the assessment of life drawing within these particular modules. With an ambition to develop and improve the assessment of these modules the project draws upon relevant teaching theory and pedagogy models with regards to teaching, learning and assessment within visual arts. The project references the University's Graduate Attributes to ensure that the design of the module coursework and assessment methods support the students to become Confident Thinkers, Ambitious Enquirers, Determined Creators and Flexible Collaborators. The project explores how the implementation of a curated and annotated digital portfolio accompanied by a short presentation facilitates a better opportunity for reflection and understanding, an integral part of the learning cycle.

### **Assessment**

When considering the most appropriate method of assessment it is important that we understand that assessment is a form of communication; an exchange between the learner and the instructor.

(McAlpine 2010) It is therefore imperative that we understand clearly the purpose of assessment to ensure that this communication is meaningful, useful and honest. (McAlpine 2010) There are a variety of reasons for assessing students, including: offering motivation, providing learning opportunities, giving feedback and grading. (Rust 2002) It is widely understood that there are two major forms of assessment, formative and summative. Formative is intended to develop the students' learning further by offering feedback so is most helpful when programmed to take place in the middle of the module. Summative assessment aims to identify what the student has learnt throughout the module and usually to provide a grade. Within this project the focus is placed on the design of the summative assessment however it is hoped, and can be argued, that feedback given via the summative assessment should still enable the student to develop further in future learning experiences and is indeed an intrinsic part of the learning process. (Rust 2002)

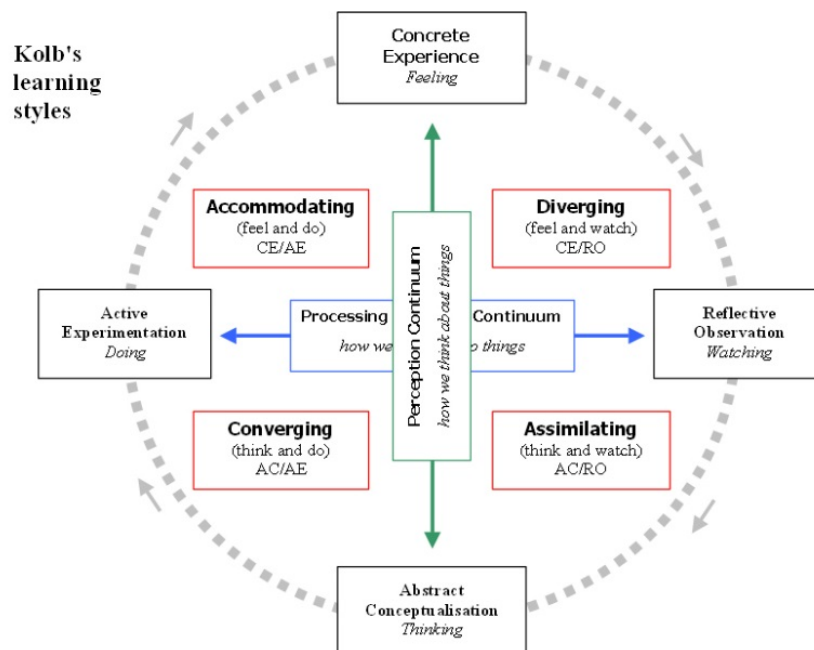
There are a number of ways in which we assess our students, including but not limited to: essays, dissertations, exams, observations, assignments, individual and group projects, presentations and portfolios. For the purposes of this project it would be appropriate to focus on modes of assessment that are particularly useful in developing and improving the specific modules highlighted within the project. We will therefore give further consideration to portfolios and presentations as the most appropriate methods of assessment for Visual Arts coursework. In the most basic sense, portfolios are a collection of documents (images, text, artifacts) that are presented to demonstrate skills, knowledge and understanding. Portfolios can be paper-based or electronic. Depending on the context, portfolios can manifest in many different forms, performing a variety of functions and modes of implementation. Research for this project focuses on the role of portfolios within Higher Education and more specifically their role in Visual Arts Higher Education. Within HE we can identify four modes of implementation for portfolios; for admissions to Higher Education, during the Higher Education course, on entry into the profession and for ongoing professional development (Meeus, Van Petegem, Van Looy 2006). This project focuses on the use of portfolios during the Higher Education course. In recent years we have seen a shift towards greater tailoring of courses to the needs of professional practice, searching for more competence-oriented educational formats. Portfolios are considered widely as a valuable competence-orientated educational tool (Meeus, Van Petegem, Van Looy 2006). Within the field of Visual Arts education a number of different types of portfolio assessment can be identified. These include but are not limited to: a best works portfolio, an expanded art portfolio, a mini portfolio, and a process portfolio (Beattie 1997) For the purposes of this project we will use the term portfolio in the context of a 'best works portfolio' where the student presents their strongest work which has been produced over a defined period of time (English 2010).

In addition to the digital portfolio the project also introduces a new assessment element; a short presentation. It is widely believed that the most effective way of stimulating student interest in assessment is to offer them a variety of types of assessment (University of Plymouth 2009). In support of the portfolio submission a short presentation has been introduced (mini viva). A viva is an oral discussion of the work where the instructor can ask questions directly to the students regarding their work, offering feedback and advice. The student has the opportunity to discuss their learning, achievements and future developments. It isn't unusual for this kind of short presentation to accompany another form of assessment.

### **A Pedagogical Model**

Through investigation in to relevant teaching and learning theories it can be argued that the most appropriate pedagogical model for the visual arts modules under investigation in this project is Kolb's (1984) Experiential Learning model. The rationale for this is that the students participating in the Life Drawing modules are carrying out practical activities that put in to action the theories and concepts explored more broadly within the Computer Arts course. They acquire conceptual knowledge regarding the principals of Visual Arts practice and then have the opportunity to apply and test this

knowledge via practical activities in a real studio environment. There are also a number of interdisciplinary characteristics of the module, which is a core value within Experiential Learning principals. It is asserted that experiential methodology doesn't approach subjects as singular entities but rather seeks to make connections between disciplines (Wurdinger 2005). This is in effort to provide real-world learning opportunities that prepare students for working life beyond education. The learning activities programmed within the module and the defined learning outcomes encourage the students to apply their skills and knowledge across various disciplines; from traditional arts to digital arts, across different cultural environments (theatres, museums, studios and outdoor public spaces), for a variety of implementations (for entertainment, cultural exploration, educational tools) and to use their visual language to explore and interpret subjects out-with their immediate field e.g. Working in Communities of Practice to collaborate with learners and practitioners in other disciplines.



© concept david kolb, adaptation and design alan chapman 2005-06, based on Kolb's learning styles, 1984  
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Kolb's Experiential Learning model involves a four-stage learning cycle which is further supported by a series of four learning styles. This theory is based on the notion that learning is a process where concepts are derived from and continually modified by experience (Kolb 1984). The theory is intellectually rooted in the research of psychologists Dewey, Lewin and Piaget whose work is greatly concerned with cognitive behavior, learning and social science. Experiential Learning theory takes a holistic integrative perspective on learning that combines experience, perception, cognition, and behavior. (Kolb 1984)

"Learning is the process whereby knowledge is created through the transformation of experience" (Kolb, 1984)

The four stage cycle of learning can be examined for further understanding. The first stage of the cycle is identified as the Concrete Experience. This is where the learner experiences a situation, they are immersed, they feel, they experience. Reflective Observation involves the learner taking time to consider the experience, think about the meaning and reflect upon the event. The learner then proceeds to the Abstract Conceptualization stage where they begin to use the experience to generate a new idea or to reform an existing idea, to unveil new understanding or alter existing preconceptions.

The next stage is Active Experimentation where the learner applies this new knowledge and understanding in a practical way to create a new learning experience. The cycle begins again and continues to build the learning in a meaningful way.

In addition to the learning theory there are four learning styles which allow for a diverse range of preferred approaches to learning to be understood. These learning styles allow us to consider which approach to learning might be appropriate for different personalities so that we can customize learning experiences accordingly. It is, however, important to expose learners to all types of styles as they develop and evolve, providing stimulus, challenges and sustaining interest. The four learning styles can be understood as follows. The Diverging learner performs best through group work, where the activity involves ideas-generation and brainstorming. Learners within this category are likely to prefer to watch and feel rather than actively participate. Within the Assimilating category learners tend to be logical and succinct in their approach. They enjoy the opportunity to explore abstract concepts in an analytical way and are more attracted to theory based learning as opposed to practical learning. The Converging learner is a practical problem solver who enjoys tasks which are more technically orientated rather than interpersonal or people focused. Finally, the Accommodating learning style is a more intuitive and perceptive approach. They tend to enjoy practical, experiential learning activities and are considered to be the most common type of learner amongst the general population.

The advantage of Kolb's Experiential Learning theory is that it allows us to understand the needs and traits of the individual learner whilst framing it in way which offers us an approach to learning which applies to all. It is focused and clear whilst retaining flexibility and adaptability.

### **Moving to a digital curated portfolio and presentation**

"There are two goals in the experiential learning process. One is to learn the specifics of a particular subject, and the other is to learn about one's own learning process." (Kolb 1984)

The structure of teaching activities and learning experiences within these modules currently represent Kolb's pedagogy model fairly successfully. In each class the students participate in a practical drawing activity that involves them employing their knowledge and skills to tackle an artistic challenge, be it technical (perspective, scale, foreshortening) or conceptual (conveying a narrative, theme, emotion). This represents Concrete Experimentation. Frequently these sessions will close with a period of time set aside for reflection on the challenges, achievements and areas for further development, either as a group or one-to-one with the instructor. This represents Reflective Observation. Throughout the module students are encouraged to maintain a sketchbook in their own time. This is looked upon as a visual diary, where they can digest information shared in class, experiment with techniques and ideas, and explore other arts practitioners. This represents Active Experimentation. Through regular discourse students are encouraged to make connections to other elements of their learning and consider how the skills and knowledge gained within this module can be applied to other areas of their practice. This represents Abstract Conceptualisation.

The learning activities within the module are designed to encourage reflection and offer regular opportunity for feedback, however the previous assessment method did not provide ample opportunity for the students to demonstrate this self-reflection and understanding. Historically the assessment for this module involved the student collecting all work created throughout the duration of the course in a chronological order and submitting it in its entirety to be assessed as a physical portfolio. The positive aspect of this was that it allowed the assessor to take a holistic look at the students' creative outputs throughout the semester and to gauge step by step the progresses and challenges faced by the student throughout the module. Conversely, it meant that the students had no say in what was submitted and no opportunity to communicate (either written or verbally) their own perceptions of their progress, achievements and areas for development. It also meant that they were forced to submit their weakest work rather than having the opportunity to present themselves in the best possible light.

From an efficiency perspective the assessment of the portfolios was incredibly time consuming and physically demanding. With over forty students submitting twenty large scale (A1) drawings, the assessment process involved the examination of almost nine hundred pieces of work. The assessor would then write individual feedback to the student but have no scheduled opportunity to converse with the students about their submission.

Having identified these issues a number of amendments were made in an attempt to address them and to hopefully improve upon the current approach to assessment. The portfolio submission has remained however it has been reconsidered and re-framed. The student now submits a curated and annotated digital portfolio, where they select and document ten pieces of work, which they perceive as their strongest; a 'best works portfolio'. They should annotate these drawings to provide rationale for their selection, referencing the learning outcomes as guidance for their selection and annotations. This is submitted as a PDF document via Blackboard. The submission is then followed by a short presentation where the students are invited to bring three physical pieces of work. During this time they have the opportunity to elaborate on the annotated comments and to dialogue with the assessor regarding their progress, achievements and areas for further development. Immediately after the presentation the assessor offers direct feedback and the student is encouraged to take note of the feedback given to ensure that it is heard and understood, and available to reflect upon beyond the feedback session.

Feedback on the changes has been gathered from a number of sources, from student feedback via annual reports and through peer observation sessions with fellow colleagues partaking in the PGCert course. Thus far the response has been positive. Students have responded to say they enjoy the learning environment and have found the feedback given very helpful. Colleagues have commented that the time set aside at the end of each session to reflect and offer feedback was a good way of preparing the students for assessment and encouraged a culture of reflection and communication of ideas, thoughts and comments.

It seems that there are clear synergies between the attributes of the Experiential Learning model and the qualities of the Portfolio as a valuable mode of assessment. Both are reflective, student-centred, and provide real-world experience. This assertion is articulated well by Davis who states

"As students develop their portfolios, they begin a journey of self-exploration and self-acknowledgment. They will better understand how and what they have learned through their experiences." (Davis 1999)

The assessment methods has evolved to identify more clearly with the University's Graduate Attributes, particularly in preparing students to become Confident Thinkers and Ambitious Enquirers. It is considered that the existing coursework is well designed to encourage and challenge students to become Determined Creators and Flexible Collaborators.

## **Conclusion**

This paper reflects upon the modifications made to assessment methods for the visual arts module Life Drawing, following investigations in to approaches to assessment, pedagogical models, relevant teaching theories and the University's Graduate Attributes. The project concludes that it has been beneficial to replace the physical portfolio submission with a curated and annotated digital portfolio, accompanied by a short presentation. It is considered that this amendment is a more effective and efficient mode of assessment from the perspective of the assessor. From the student perspective it hoped that this amended approach has increased awareness of their progress and learning and offers a more valuable opportunity for self-reflection. The empowerment given to students to reflect, understand and communicate their progress is a significant part of experiential learning and of many revered learning theories, however it was felt that the previous assessment method did not offer ample opportunity for this.



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## Remote online assessments within Food Science – does it breed student engagement?

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### Abstract

ICT systems are commonly used within academic teaching and learning usually used as formative assessments and / or summative multiple choice examinations. Student engagement is a key driver of module development and ultimately secures student attainment within the course. The Student Employability Application Remote (SEAR) model has been developed to enhance the student experience within the food suite of programmes in Abertay. The model represents the use of remote online summative assessments which use innovative methods of assessment. The summative examination uses the application of knowledge provided by the student to write a report for a real life scenario, the student is encouraged to use a higher level of complexity to solve a problem. In addition to this problem solving, the student is tasked with a 'treasure hunt', where the student is asked within the two hour exam period to find three reliable sources of information for a selection of pathogenic bacteria. The student is then rewarded (if they use academic peer reviewed articles or governmental or accreditation body's websites) and penalised (if using news articles and encyclopaedia entries) as required. The model specifically links application of knowledge in remote online summative assessments with active learning and student engagement which drives the course development and employability of the learner.

**Keywords:** Food studies, remote online assessment, student engagement; student experience

### Introduction

The use of ICT systems for student engagement, assessment and experience is a driving factor behind university and lecturing commitments. In the age of instant assess, students have been shown to enjoy the variety of online formative assessments, instant access to staff and resource material. Limniou and Smith (2014) determined the role of feedback on summative assessment and the use of ICT systems for this and concluded that the assessment allowed the students to perform a task, assess the outcome, receive individual feedback and reflect on it to improve their learning. Therefore the authors suggested that the group of students went from being a passive vessel of knowledge to mindful, reflective, active and independent learners (Limniou and Smith, 2014). With this idea students can reflect on what they do and how they do it on a regular basis.

Understanding the main barriers to online assessments has been previously categorised by Nix and Wyllie (2011), who explain that barriers to widespread use of summative eAssessments are wide, and assessed confidence as being a major barrier. The authors showed that confidence indicators in the use of formative assessment and feedback was a useful tool and was believed to be appropriate for its use (Nix and Wyllie 2011). Redecker and Johannessen (2013) further insisted that the old testing paradigm, which was a one way communicational experience, whereby the pedagogy affected the technology used, where pedagogy was used to advance teaching and learning ICT programmes for use in educational scenarios, the way that pedagogy has been used in the past. The authors provided evidence to suggest that the 'new testing paradigm' had technology leading innovation in teaching and learning; and that pedagogy was 'lagging' behind (Redecker and Johannessen 2013).

Student engagement is an important factor in the level of student performance, however, module design is deemed to be the most appropriate where the teaching encompasses all learning styles (Brown *et al.*, 2014). Web based learning systems are explored within the literature, where Katuk (2013) explored two different types of web based learning, fully-guided to partially-guided learning. The results suggested that student who underwent the fully-guided learning had a negative change in the engagement patterns, whereas students who underwent partially-guided learning exhibited a positive change in engagement patterns, although the author suggests more studies are required to validate this finding. The study found that the fully-guided learning activity instructions were not always engaging, where background knowledge was noted as an attribute to this (i.e. not flexibility for the learner). It was also discussed that to encourage engagement with the fully-guided learning experience activities should include a mechanism that requires or fosters engagement, or at the very least main its consistency. These types of activities are designed solely to encourage student led learning and encourages motivation (Katuk, 2013).

Similarly Vaughan (2014) described that to encourage student engagement within blended undergraduate courses, the design of modules to become active and collaborative learning experiences in which students have the responsibility of their own learning, which includes in some respects the validation of their own understanding through debate and peer review (Vaughan, 2014). Teaching fully online can become the norm within the academic community, Collins *et al* (2014) showed that to become an online course within the business ethics area, technology centralised the online course, where almost daily contact with students was given, including spreading the topic coverage over a week, which allowed more time for reflection, which benefited more introverted students. This type of course enabled these types of students to become involved in online interactions with peers and aided in the student learning retention (Collins *et al*. 2014).

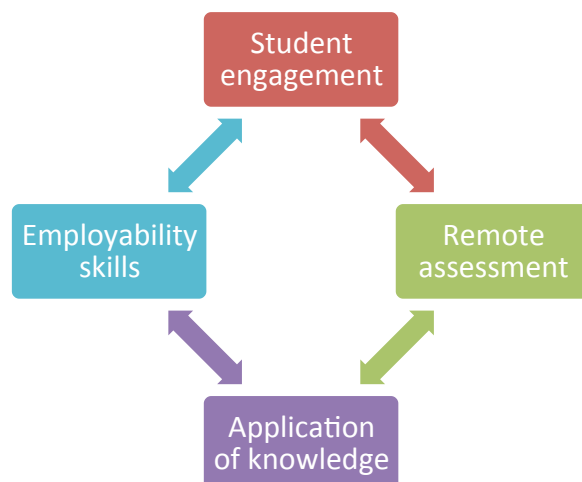
It is argued that multiple forms of assessment and active learning pedagogies can engage students that offset the lower cognitive skills of surface approaches. Indeed, passive lecture-based courses with exclusive examination-based assessment have been shown to have negative or detrimental effect to learning. To combat some of these issues, active learning should replace passive lecturing, and study process questionnaires can be used as effective tools that should be used alongside other innovative teaching styles, it is thought that these types of questionnaire assess the impact of innovative teaching on the engagement and learning of the student (Bevan *et al*. 2014).

From the previous literature it is clear that to encourage student learning and engagement within the module / course, particular aspects need to be discussed, the level at which the learning is given, including flexibility to the learner, the environment that the student is provided with (both external environments and virtual environments) and any the application of knowledge or use of real life scenarios to deliver greater student engagement (Katuk, 2013; Collins *et al*. 2014 and Bevan *et al*. 2014).

### **FC0703A Food Hygiene and Safety**

FC0703A Food Hygiene and Safety is the module for which the Student Engagement Application Remote (SEAR) model (Figure 1) has been developed for. This module follows the Royal Environmental Health Institute Scotland (REHS) Intermediate Food hygiene syllabus and lays the foundations of food microbiology, food poisoning agents including pathogenic bacteria, food spoilage (yeasts and moulds), preservation techniques, cross contamination and pest control. This module also introduces the student to Hazard Analysis Critical Control Point (HACCP) which is an industry standard used to risk assess the production of food products to ensure that the company / producer is producing safe food products. This module is a prerequisite and fundamental for the whole course and as well as the industry itself.

### **Proposed Model**



**Figure 1: SEAR Model**

Figure 1 shows the Student Employability Application Remote (SEAR) model designed to ensure that online assessment meets the general teaching and learning strategy as defined in Abertay's Teaching and Learning Strategy (2015). Remote on line assessments are hypothesised to increase the student engagement within the module (by incorporating new teaching and learning styles) and these types of exams can be made to assess the students application of knowledge (in a real world scenario). Both student engagement within the module and the application of knowledge, in a real world scenario, would increase the employability of the student through information gathering (providing the students understand what type of sources could / should be used). The career of the student is deemed to be industrially related and therefore the application of knowledge, rather than the regurgitation of knowledge are preferred. Linking into this is that knowledge of researching; including the decision making skills of the student (i.e. what is a preferred source and what is not), is part of the teaching and learning involved within the undergraduate courses.

The students in order to fully become employable should have the knowledge and skills to undertake the chosen career. Although the food and drink sector is a vast sector that incorporates many different and versatile job opportunities, the role of academics in full filling the obligation of student learning is to provide them with the correct skills to become employable.

### **Employability**

Employability is a key graduate attribute; the courses at Abertay are tailored to enable the student to undertake critical thinking, experience industrial problems and assess strategy's to provide the student with key knowledge to progress in their chosen career. Students during their undergraduate (post graduate) studies should be exposed to a range of different assessments, including summative and formative assessments.

Assessments are key stages within the academic calendar that are devised as a way of assuring that the material given to the students is correctly understood and that they can relay that information back to the tutor. Grades are awarded and this is the fashion in which students achieve their degree and includes their classification. The pedagogy of assessments currently devised in many cases solely looks at the student being able to provide information back to the tutor in a question set, from multiply choice to essay styles (Collins *et al.* 2014)

### **Application of knowledge**

In order to understand if a higher level of learning assessments can be devised to understand the students' capability of application of knowledge, and with this application breeds employability. The industrial nature of many of Abertay's degrees shows that students gain a certain type of experience at Abertay, this experience being linked with industry, and therefore will allow a straightforward assimilation into the working environment. Application of knowledge is a vital key graduate attribute that will allow employability within the work environment (Bevan *et al.* 2014).

When assessing students' ability to understand complex themes within the modular approaches of current Abertay systems, to assess the student on their knowledge is of a certain level implies that knowledge is only information. Therefore in order to turn information into 'knowledge' the student should apply the information into a real world scenario or understand the concept of using information as knowledge.

### **Student engagement**

Student engagement within the module is of the utmost importance; engagement increases attainment of students, increases the students' awareness of the modular material and fosters lasting relationships with tutors. Student engagement directly feeds the overall experience of the student during their tenure at university. The highly competitive nature of the academic world, with more universities than ever before and each university offering the student certain experiences, greater choice breeds' competition, student experience needs to be understood. For Abertay to become a university of choice for studying, the student experience is an important factor, alongside world class facilities and members of staff, and industrially linked academic experiences. The student experience is that of how the student interacts, understands and enjoys the learning experience within the university in which they are studying. The current method of analysing this is through the National

Student Survey (NSS), where students are asked a series of questions ranging from academic to services (NSS, 2015).

### **Remote assessment**

Formative assessments are currently used frequently throughout the academic discipline using various programmes and specifications, Blackboard being the main way of increasing student engagement within Abertay. Summative assessments using ICT systems are used less frequently, and tend to be in the area of multiply choice type questions that are used at a lower level to test the students' ability to soak up information. Multiply choice questions (in the belief of the researcher) are a great way of assessing the students learning through formative feedback and reflective activities, but are a poor choice for summative assessment. Multiply choice type examinations do not test the student understanding of a topic area; instead test the student's ability to repeat instructions or information given (Nix and Wyllie 2011; Redecker and Johannessen, 2013).

Remote examinations have been previously discussed (introduction section) and showed to be a useful way of assessing the students ability to reach academic rigor. Online remote examinations mean that students do not necessarily need to be within the university to undertake an examination. This negates the need for large specialist rooms with ICT systems that are potentially only used at particular times within the academic year.

### **The interactions of the model**

Remote summative assessments are not entirely a satisfactory way of assessing student learning on its own. Coupled with application of knowledge, where students are encouraged to use the internet to gain answers for their questions (giving the sources and explaining why a particular source was deemed to be reliable) can form part of an assessment criteria that enables students to use the power of the internet to help them answer a real world scenario.

For example the question sets a scenario: they are a technical assistant within a food company, they have failed a hygiene audit. Certain things are not correct (i.e. the layout of the facility, the food product was not controlled correctly). The student is also told that the product they make was contaminated with a type of bacteria. The question asked them to write a report that explains what methods need to be put into place to prevent such a problem, including finding information about the bacteria (using three source of reliable information). The exam question involves a 'treasure hunt' type question, which will award students who use appropriate types of reliable sources (i.e. academic peer reviewed articles, governmental information sites and awarding bodies sites), they will be penalised using unreliable sources (i.e. news articles, none peer reviewed encyclopaedia entries etc.).

The interaction of this type of questions involves a different type of learning for the student, which encompasses teaching styles they would not entirely be familiar with. This encourages the engagement of the student within the module, as they are proposed an unfamiliar task with requires understanding of the knowledge area, which stretches the students and encourages them to fully understand the intricate detail of the modular work.

Because this exam type question is applying the knowledge in a real world scenario, this ensures that the students understand the industrial qualities of the material and therefore increases their employability within the sector. Working on real world scenarios enables the student to greater appreciate the interactions within the industry and gives them experience of working on industrially linked problems.

### **Conclusion**

Using the SEAR model, the use of remote online summative assessments can be fully incorporated into food hygiene and safety modules to foster key attributes for the students' career. Employability is a large part of the attractiveness of the food programmes of study in Abertay and therefore requires innovative methods of assessments that are in-line with the Abertay Teaching and Learning strategy, but more importantly increase or sustain student engagement through active learning.

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