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Tackling Assumptions and Expectations; Implementing Technology in Higher Education

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Abstract. This article explores the assumptions and expectations underpinning technological implementation within Higher Education (HE). From the author's experience, technology appears high on higher education agendas in response to a multitude of economic and competitive drivers. However, the assumptions upon which technological implementation are based, derive from early research undertaken regarding the expectations of "Net Generation" students. From this early research, a popularised view of today's student cohorts as consumers and extensive users of technology has arisen. In contrast, assumptions have been made about the limited skills and amenability towards technology of staff employed in higher education. Contemporary literature, however, questions these early assumptions and challenges the concept of the technologically literate student. This article draws parallels with industrially based literature in exploring the consequences of erroneous assumptions upon the expectations of both implementers and users of technology within an organisation. Through discussion of the current tensions within higher education, reasons for a mismatch in expectations between the organisation and the user are explored, and suggestions made regarding compromise between the needs of mass delivered education and recognition of individual learning need.

Keywords: technology; net generation; expectations mismatch

Introduction

In a climate of increasing austerity, both private and public sector businesses have had to respond to a need for efficiency and cost effectiveness of operations (Dos Santos & Sussman, 2000; Kouzmin & Korac-Kakabadse, 2000). These demands occur at a time when technological ingenuity has seen the adoption of many highly innovative and wide-reaching tools that profess to make life easier, quicker or more pleasurable (Goggin, 2012). With extensive marketing for technology in everything from billboard advertising to television commercials, it is perhaps not surprising that industry increasingly turns towards innovations in this area in order to improve upon delivery and production efficiency (Liang, You, & Liu, 2010; Wu et al., 2006). In Higher Education, in particular, there

seems to be a drive for widespread technological implementation that moves ahead at an alarming speed. Heralded as meeting the needs of students and improving flexible access to learning, technological initiatives are represented as a necessity in a competitive market. However, despite what appear to be admirable intentions, professional experience has demonstrated a plethora of hurdles that appear to limit both the implementation of and engagement with these tools. Recent research suggests that implementation drivers based upon student need/want are unsupported and may ignore the complexities of the human psyche; with some students cited as finding technological initiatives detrimental to their learning or contrary to their preferences (Jones, Ramanau, Cross, & Healing, 2009; Salaway, Caruso, & Nelson, 2007; Waycott, Bennett, Kennedy, Dalgarno, & Gray, 2010).

Net Generation

Early work (Oblinger & Oblinger, 2005; Prensky, 2001a, 2001b) has proved popular with academic institutions, and has underpinned many assumptions made around the nature and requirements of “Net Generation” students entering higher education; those born in the 1980’s and 90’s (Howe & Strauss, 1991). Prensky’s earlier work has proved seminal in guiding institutional development to consider these students cohorts as effortlessly engaging with technology throughout their lives.

Prensky’s work outlined the development of a generation of individuals growing up with the use of technology and computers within their learning and everyday lives. Future expectations of continuing symbiosis with technology were felt to necessitate integration of much higher levels of technological innovation within further and higher education (Prensky, 2001; Oblinger and Oblinger, 2005). However, contemporary research in this field would suggest that some earlier assumptions have been made erroneously or without clear investigation and that these assumption, are not a true reflection of the reality within current higher education cohorts.

Erroneous assumptions

In considering the use of technology within a population as a whole, more recent literature generates metrics that challenge Prensky’s assumptions that the “Net Generation” will seamlessly integrate technology into all aspects of living. Both Horrigan (2007) and Kennedy et al (2008) use large sample studies (n=4001 and n=2096 respectively) to investigate the use of technologies amongst diverse populations. Whilst Horrigan explores a representative population of American citizens, Jones et al explore technological use amongst students attending differing Australian Universities. In both studies, findings have been used to categorize participants according to their level of use and engagement with mobile technologies, web 2.0 technologies and ICT as a whole.

Despite the differences in geographical location and in representative sample populations, both studies find only a small proportion of their sample (23% and 14% respectively) to be representative of high technological users (loosely defined as those using a wide range of technologies significantly more than

other participants) within their lives. Other categories cite approximately 20% of the participant population to be representative of “middle of the road” users (defined loosely in both studies as those engaging with mobile technologies and with the internet but less likely to engage with other ICT outside of their social organisation), with a further 50-60% of the participant populations representative of less avid or disinterested users.

Whilst individually, the results of these studies could be questioned on the grounds of age and population demographics, the correlation between two diverse participant populations suggests a trend that may indicate erroneous assumptions in Prensky’s earlier work. If a population overall is demonstrating differing categories of technological users, it is perhaps unsurprising that recent research in higher education also finds differing requirements for technology amongst different students.

Application to higher education

When focusing more specifically upon Higher Education, recent research concurs with the findings of Horrigan and Kennedy et al. Jones et al (2009) undertook a large scale (n = 596 students) study investigating student engagement with common technologies. Jones et al’s findings demonstrated how students tended to engage extensively with common technologies such as mobile phones, computers and emails but were less predictable when considering activities such as Wikis or Blogs. The findings of the study conducted across five English universities found considerable variation in actual engagement and reasons for engagement with technologies, within the overall participant cohort. As such, Jones et al cite the need to consider more than just age and date of birth as a means of predicting student behaviour in response to institutional expectations for technological use.

As a large scale investigation utilising students that could be considered to be of the “Net Generation”, the findings of this study support contradiction of Prensky’s work. Furthermore, Waycott et al’s study (2010) undertaken in Australian Universities, exploring individual use of learning and social technologies amongst students and staff, further challenges Prensky. Findings from the study demonstrated a preference amongst students for the use of technology to organise and communicate socially but a reduction in comfort in using these technologies in a “learning context”. Contrary to many assumptions, Waycott et al also found that not all students were adept at communications and that in these cases technology was ineffective at improving their abilities. Thus, this questions not only amenability towards technology but also the underpinning epistemological assumptions made about abilities of those entering higher education. This study occurred within Australian universities and, therefore, may have some limitations in application to UK higher education. In addition, Waycott’s definition of what a “learning context” entails is unclear, however, the findings from the research echo the author’s experiences with UK based student cohorts and concur with underpinning learning theory that supports context driven application of pedagogy (Knowles, 2002).

With reference to learning theory, earlier work questions how homogeneity can be assumed of a “generation” of students with reference to application of technology skills to learning in higher education. Mortimore (1999) uses the concept of the “cognitive apprentice” to illustrate the importance of situation in skills development; demonstrating that transference to a different context is not always possible. Mortimore also recognises the role of relevance to the individual in motivating learning. Mortimore’s work is primarily focused upon the development of school children and, therefore, may be limited in application to adult learning. However, the notion of contextualised learning and individuality appears reflected in many seminal educational texts, from Dunn and Dunn (1979) to Schon (1988) and Knowles, Halton and Swanson (2011).

Whilst young people may be highly adept at the use of Facebook for social networking, translation to more formal use may not occur where relevance is unclear. Whilst children are taught to use computers as part of the national curriculum, this does not necessarily translate to competence with the tools in wider application. Thus, it is proposed that in considering technological use in higher education, care needs to be taken over using technology for technologies sake.

It cannot be denied that the internet is now integral to learning in all fields. However, the media of the internet is felt to have merely replaced that of books and the library. With a method of interface that has become commonplace across a diverse spread of contexts and that is relevant to the majority of users, its prevalence is unsurprising. The ease of access to information has, therefore improved but the essence of learning has not. Wiki’s, blogs, social networking etc... however, represent a change in lifestyle and approach to communications that may not have relevance in all educational contexts or to all individuals, thus, it is to be expected that the experience, amenability and engagement of individuals will vary.

Research undertaken by the author (Taylor, 2012, 2014a, 2014b) investigating the use of video-based communications for the support of individual students, has demonstrated the complexity of introducing technology into an existing system and in gaining acceptance and engagement from not only students, but also staff. Parallels are drawn with research (Gerdsri, 2013; Verjans, 2003) that has explored the implementation of technology into blue collar industries and commercial organisations. All of these bodies of work, though markedly different in context, have explored the omission of the human factor in technological implementation planning. Whilst organisations appear to consider goals, objectives and context for a new technological initiative, there seems to be little reference to the wider psychological, behavioural and experiential factors that complicate technological engagement. In higher education, it is felt that the nature of a learning environment necessitates greater consideration of the human element central to practice. When wider factors are integrated, the process of introduction and engagement with technologies in higher education, can be seen to be considered to be working within a complex adaptive system

(Beckner et al., 2009) This complexity is recognised in literature exploring person-environment fit theory.

Expectation Mismatch

Utilising the Person-Environment Fit theory (Edwards, Caplan and Van Harrison, 1998), organisational psychology suggests job satisfaction, stress levels and wellbeing of employees to be strongly influenced by a match between job/organisational characteristics and employee characteristics (Kristof-Brown and Guay, 2011). Overall, research in this area demonstrates how failure of an organisation to consider the match between employee characteristics and that of the role/organisation results in stress (Kristof-Brown, Zimmerman and Johnson, 2005). Person-Environment fit is not a new field of study and has been verified in varying employment contexts. However, the subject has developed over time, to recognise the complexity of measuring outcomes that are influenced by human behaviour. There are limitations of this field, in particular, with defining "fit". In addition, critics of the theory (e.g. Edwards and Billsberry, 2010), discuss multidimensional aspect of research investigating people and the environment that they inhabit and consequently, are critical of a field of research in which constructs and predicted behaviours vary on such a scale.

Through a survey approach recruiting 1875 participants from employees primarily within the United States, Edwards and Billsberry explore the ability of combined multiple dimensions of fit to predict overall perceived fit. Whilst limited in generalizability to different cultures and employment demographics, their study identifies how different factors influence different aspects of a person's fit within an organisation, and suggests that these factors may change over time and with circumstance.

In the context of technological implementation in higher education, variation of individual response to the implementation of technology appears often to make assumptions about age or technological exposure, and hence, measurements of impact continue to rely upon quantitative measures of performance. Contemporary literature, however, suggests that attitudes and abilities, rather than age and experience, combine to be the most powerful predictors of technological use (Charness & Boot, 2009).

From the employees perspective, the introduction of technologies into existing working practices may threaten their perceived fitness for practice or operating approach (Hagenson & Castle, 2003) and, therefore, their fit within their role. From a student perspective, technology offers both opportunities and challenges that may, or may not be a welcome inclusion within their learning environment (Waycott et al, 2010). Individuals vary in terms of acceptance of technology along a continuum from technophobes to tech-enthusiasts with a corresponding response to drives to integrate it further into practice or life (Coget, 2011). For those less comfortable with technology, the introduction of initiatives driven by the institution may present a challenge to their status quo.

Coget suggests that technophobes will view technology more as an intrusion into their existing approach to life. This is in contrast to individuals with experience of the potential benefits of a particular technological tool, who are more likely to embrace new initiatives into a wider sphere of practice. The complexity of psychological theory associated with the way individuals respond to challenge is outwith the abilities of this article to explore. However, the impact of individuality upon engagement with technology can be explored as a match or mismatch of expectations.

Person-environment fit theory is used to underpin suppositions, that with technological implementation, stress, anxiety and negative responses are a result of a mismatch in expectations between employer/organisation and employees or users of technology (Verjans, 2003). Supporting Gerdri (2013), emphasis is placed upon the potentially problematic road mapping for implementation that arises as a result of the theoretical nature of many of the early stages of planning.

Gerdri recommends acknowledgment of the impact of technology upon individuals and roles in order to illuminate potential sources of stress or conflict. Though Gerdri focuses upon the nature of road mapping for the process of implementation, it is interesting to note the clear emphasis upon the needs of the individual and recognition of their expectations within the organisation, rather than singularly upon the organisational ambitions.

Staff experience

From experience in higher education, the introduction of technology is often met with mistrust by many of the staff involved. Until recently, an assumption has been made that staff experience anxieties over new technologies whilst students do not (Waycott et al, 2010). As a result, much of the research into technological implementation within higher education has assumed an imbalance between perceptions of staff and students, representative of the digital divide between older staff and younger, technologically literate students (Underwood, 2007). Implementation planning has, therefore, focused upon education of staff in new technologies in order to meet the needs of the student (Tohidi, 2011).

With reference to person-fit theory, these assumptions appear an oversimplification of a complex problem. Whilst older individuals may be reticent in adopting technology as a result of lack of experience, lack of knowledge and familiarity, it also has to be acknowledged that priorities, environment, purpose and life experience to name a few variables, are considerably different between older staff and younger students. Thus, even if Prensky's supposition of older reluctance to engage with technology is accepted, the reasons behind this are likely to be more complex than demographics.

Recent research supports this, proposing that it is not unfamiliarity with technology or a lack of understanding amongst staff (Steel, 2006) that generates anxieties, but much wider aspects (Kennedy, Judd, Dalgarno, & Waycott, 2010; Tohidi, 2011; Waycott et al., 2010): From concerns over workload, the impact upon the learning experience, mistrust of the organisational agenda and

anxieties over the lecturer role, for example, the multitude of possible influencing variables can be seen to potentially perpetuate a mismatch of expectations between organisation and employee (Verjans, 2003).

Prediction of areas of anxiety and tension, and the impact of technology upon a workforce is further challenged by the nature of large organisations. The constantly changing nature of employee networks, the concept of individuality, and the changing dynamic components of learning and technology, prevent the establishment of a set of conditions to study (Holland, 2006). Therefore, assumptions made based upon data from other institutions, industries or from previous experience cannot be accurately applied to implementation in the host organisation. This complexity makes accurate study challenging and, therefore, recognition of the specifics of the environment into which a technology is proposed to be used becomes vital in anticipating sources of conflict.

The expectation of both individuals and the organisation can be further compromised without realistic consideration of the initial stage of integration. Enabling users to effectively utilise new technologies often necessitate a steep learning curve and a commitment of time to learning the tool at the initial set up (Keengwe, Kidd, & Kyei-Blankson, 2009). McKenzie et al (2001) investigated the common practice of faculties encouraging the increased use of technology within learning and teaching, through the act of buying technology and making it available. Though this study is based within a US institution, the findings echo the experiences of the author. McKenzie et al suggest that institutional expectations that staff will engage with and utilise technologies within the classroom if they are provided, ignores the cultural element of motivation. Keengwe et al (2009) support McKenzie et al's proposals in suggesting that support, time and leadership are central to the successful implementation of technologies, through a change in expectations of those involved.

Though Keengwe et al's small scale study perpetuates the assumption that staff are reluctant to engage with technology in teaching due to a lack of familiarity; their investigation again highlights the wider influencing factors surrounding the uptake of technological initiatives. In particular, Keengwe et al acknowledge the importance of providing the time to engage with and learn about a new technology, not just in terms of how to use it, but what it may be able to do. Without this recognition of the initial time commitment, expectations of improved efficiency, altered performance or innovative practice may not be immediate. In this case, a mismatch between expectations and initial output may be reflected in frustration and conflict between the instigating organisation and employees utilising the given tool.

Student experience

Person-environment fit theory could just as easily be applied to the student experience as to that of employees. Failure of technological initiatives within higher education is often blamed upon student apathy or failure to engage. This cognitively dissonant (Festinger, 2010) response effectively vilifies the individual

in order to continue supporting the organisational demands. In considering adult learning theory in particular, this emphasis upon organisationally driven agendas, at the expense of student need seems unlikely. Whilst the student voice becomes increasingly important to university evaluation and performance measures (Woodall, Hiller, & Resnick, 2012), it seems strange that individual perceptions regarding technologies do not appear to be investigated more fully when planning for widespread innovation. However, from professional experience, the intricacies of engaging with technology appear to be inadvertently ignored in favour of more global measures of satisfaction or engagement.

Integrative thinking

The various contributing factors for mismatched expectations discussed above suggest separation between the organisation, the employee and the student. In the context of educational theory, this is perhaps not surprising with the perceived role of the educator in facilitating the learning of the individual and being managed by the institution. However, critics of mainstream educational theory and thinking suggest that the failure of initiatives such as technologies in a learning institution, is not so much due to a mismatch of expectations as to a lack of understanding of the interactions between organisations and individuals (Stacey, 2001). Professor Stacey's background is in organisational research and management with his more recent role as an academic in a higher education institution. As such, his perspective represents it is felt, both ends of the spectrum, from organisational expectations to those of the individual.

Stacey (2001) argues that this perception of divide and separation of roles is predominant in mainstream thinking about education and learning within organisations. With reference to cognitive and even humanist models of education, Stacey contends the presumption that the student is the generator of knowledge, separated from the role of peers and the academic, and that the academic's role is one of facilitator or mentor/demonstrator. Stacey intimates that in mainstream thinking the organisation's role in a student's learning is merely as a home in which the activity takes place and a supporting infrastructure for the process, with the student becoming the commodity of learning output. His opinions regarding this isolation contrasts with more recent educational theory that illustrates the complex, collaborative nature of relationships between educator and student (Knowles et al., 2011; Mann, Gordon, & MacLeod, 2009). However, his inclusion of the organisation as part of the learning experience, suggests that in order to fully understand the impact of technological initiatives upon learning, there needs to be acceptance and exploration of the intricacies of interaction between all elements of the learning experience. Thus, any planning for implementation of technologies within higher education needs an awareness of the multi-factorial nature of influences upon expectations, and therefore, "person-environment fit".

Tensions in higher education

The ability of an organisation, employees and students to perform as an integrated unit in learning and teaching is further complicated by tensions

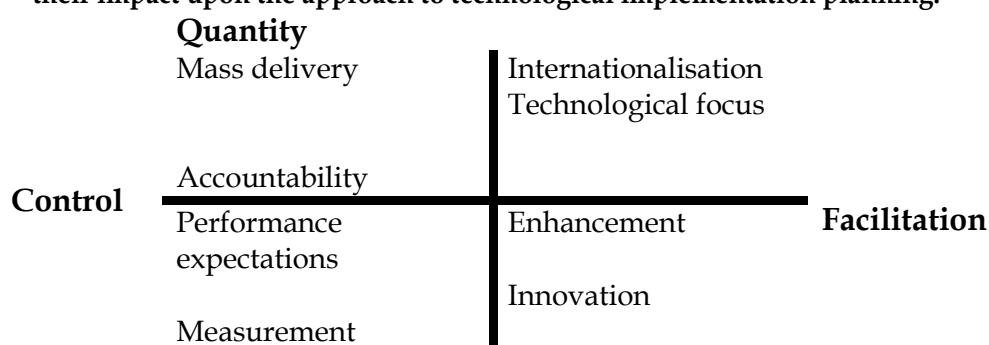
within the field of higher education. Drivers used to underpin rationalisation of higher education ironically promote a conflict between the needs of the institution within a competitive market and those of the consumer. Altbach et al, in their series of books from 1999 (Altbach, Reisberg, & Rumbley, 2009) to the present day illustrates how core issues have progressed for example, from consideration of accountability and multiculturalism to the economics of competition.

Rolfe (2012) discusses the “MacDonaliation” of higher education, citing a change in culture, and confusion over the role of learning institutions in the modern age. With increasing emphasis on costs and competition, higher education institutions are under pressure to provide education for “the masses”. In 1974, investigation into the role of higher education suggested that the 15% youth engagement with the process to be indicative of separation between the elite and mass education (Trow, 1973). However, at present, the UK engages closer to one third of the youth population in higher education, suggesting a move towards “education for the masses” with the resultant impact upon costs. In addition, the move away from the “elite” has the potential to significantly impact upon pedagogy, with changes in motivation, approach, life experience and learning methodology amongst students (Rossi, 2010).

Contrary to Stacey’s recommendations, organisational drivers, targets and competition within higher education inevitably quantifies knowledge and learning leading to objectives and measurement. This change in culture away from the original concept of universities as institutions for the pursuit of knowledge and enlightenment (Oakeshott, 1950: in Rolfe, 2002) has seen organisations move more towards accountability and measurability, which necessitates considering learning as a commodity. This is a generalisation and not a criticism of learning institutions’ motivations. However, the influences of this direction of movement can be seen to polarise learning and teaching elements in higher education, creating what are felt to be the following illustrated tensions between: mass delivery of curriculum vs. individual learning need, quantity vs. quality and innovation vs. accountability.

Figure 1 below, is aimed at representing, in simplified form, some of the key tensions that are felt to arise in this context.

Figure 1: Simplified diagram representing polarised tensions in higher education and their impact upon the approach to technological implementation planning.





With emergence of a global market for higher education, many of the parameters by which institutions operate have altered: With diverse student groups from differing cultures and social backgrounds, an understanding of expectations becomes ever more challenging. This change in performance expectations has created additional difficulties for those managing institutions; difficulties which it is suggested, some senior management are ill equipped to deal with (Fahy, Hurley, Hooley, & DeLuca, 2009). As such, unrealistic or unfeasible expectations are felt to potentially further complicate expectation mismatch between organisational management and participants in technological initiatives.

The constantly changing nature of higher education and the individuality of those engaging with it, represents a changing, dynamic set of components and, therefore, challenge the establishment of a set of conditions to study (Holland, 2006). Possibly, this underpins the reasoning for why much literature investigating the implementation of technological lacks exploration of wider influences. Although complex adaptive systems theory suggests the need for recognition of a diverse range of influencing factors, it is questioned whether this is feasible in reality. Thus, in an organisation requiring policy decisions and advanced future planning, the tension between organisational and individual need necessitates compromise. It can be seen how clear communication and realism in order to prevent mismatch of expectations, and on-going transparent evaluation in order to address arising issues (Dorrian & Wache, 2009; Hannon, 2009) may be necessary amongst all participants engaged with any new technological initiative.

Conclusion

In the context of delivering widespread education to large cohorts of students, the need for compromise is recognised. As a consequence of various tensions within Higher Education, this article has highlighted the need for balance between the needs of the organisation and the individual. Whilst the underpinning pedagogical and organisational reasoning for technological implementation may appear sound, the involvement of the human element inevitably complicates an otherwise relatively simple concept. The requirements of the individual are a necessary consideration in response to adult education theory, principles of individual need and in recognising the financial impact of the student as a consumer. However, large scale, long term planning for a large organisation will, by its nature, limit the responsiveness of the system. Whilst Stacey (2001) advocates the integral nature of the organisation and the individual in learning, the use of league tables and resulting comparisons, necessitates measurement of learning in the form of performance indicators. As such, any initiative designed to improve the teaching or learning experience must be justified both in a measurable manner and in terms of cost effectiveness.

Thus, whilst this article advocates the importance of the individual and an understanding of differing expectations, as central to the process of technological implementation planning, the reality of applying this in a large scale institution is recognised. Therefore, a compromise is suggested in the form of respect, on a macro scale, for the breadth of influencing factors affecting student and staff amenability towards technologies. Acknowledgement of the integral nature of the organisation, staff, peer and student experiences, and of the intricate nature of human psychology, may facilitate more realistic expectations and, therefore, expectations match between organisation and users of technologies. Studying technological implementation is challenging due to the constantly changing nature of cohorts, technologies and context. However, through observation of engagement and response, and listening to anxieties perhaps some of the mismatches seen in Verjans (2003) earlier work can be avoided in contemporary application.

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