# Navigating the e-Learning Terrain: Aligning Technology, Pedagogy and Context

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**Abstract:** Over the last ten years e-learning has rapidly emerged as a potentially effective mode of higher education, but it is still unclear what factors are important in the design of an effective e-learning course. e-Learning has been described as being a "disruptive technology" that changes how learning is approached in higher education (Garrison and Anderson 2003). The extensive changes in the technologies over the last decade have the potential to influence the way we engage with knowledge, but the potential will only be realised if we integrate this with an understanding of learning, and design the use of e-learning technologies accordingly within different contexts (Laurillard 2005). This paper explores the influence of the areas of technology, pedagogy and context on e-learning practice in higher education. Three vignettes relating to e-learning are presented which represent the shifts in technology and the tensions and influences of this on context and pedagogy. These vignettes provide the background context within which to discuss the design of an e-learning alignment guide (eLAG). This guide is a navigational tool, which offers e-learning designers a perspective on navigating the e-learning topography. It is devised to assist practitioners when navigating the changing and complex terrain of e-learning and teaching. The key finding of this paper is that technology, pedagogy and context need to be closely aligned in order to realise the potential of e-learning in higher education.

**Keywords:** e-learning, higher education, technology, pedagogy

## 1. Introduction

Privateer (1999:77) posits that "it makes little sense for academia to continue a tradition of learning significantly at odds with technologies that are currently altering how humans learn and interact with each other in new learning communities". A common theme explored in e-learning literature is the role that technology plays in changing the ways in which we learn (Prensky 2001; Siemens 2004). (Laurillard 2005a) posits that the extensive changes in the technologies available for learning over the last decade have the potential to change the way students engage with knowledge. She cautions, however, that the promises made for e-learning will only be realised if we begin with an understanding of how students learn, and design the use of learning technologies from this standpoint. These positions illustrate prominent arguments in the field of e-learning, which highlight the tensions that exist between a technology dominated approach or a pedagogy lead design of e-learning in higher education. This tension and pull between pedagogy and technology highlights the need to investigate the relationship between technology, pedagogy and context in a changing e-learning environment.

The development and growth of new information technologies over the past decade has led to substantial changes in e-learning. Often the best way to identify these changes is to examine the practice — what effect the changes have on the learner. The following three vignettes illustrate these changes via practical examples that serve to provide the background context for this paper. The vignettes provide three scenarios of learning within a postgraduate special education context — each illustrating a different reciprocal interaction between technology and pedagogical practice. This evolution through the three examples provides the backdrop for the development of an e-learning alignment guide outlined in the next section.

### 1.1 Vignette 1:

Samantha is a primary school teacher and lives with her two young children on a farm outside of town. She has taken a year off teaching to further her study in extramural postgraduate special education. She received her course handbook and readings in the mail and has read the required texts and journal articles set by the lecturer. After putting her children to bed she sits at her computer, downloads a journal article, finishes typing her essay and prints it out. She will courier her essay assignment to the lecturer tomorrow for marking and will start reading the journal article for her next assignment.

### 1.2 Vignette 2:

Paula is in her second year of teaching and doing part-time post-graduate online study to improve her skills in working with learners with diverse learning needs. Although she is traveling on her two-week holiday break from school, she has gone to an internet café to catch up on course-work and interact with classmates in her e-learning environment. She logs in to the class forum, reads the discussion thread that the lecturer is


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facilitating on one of the set readings, types in her responses and poses some more questions. She reads two of the assignments already submitted online by other students and types in her formative feedback and peer rating of their work. She uploads her assignment for peer-evaluation and types in her reflections in her online journal. Two of the members of her study group are currently online so she logs in to the chat room for a synchronous discussion with them on their collaborative wiki assignment. She ends with a short note of congratulation to a fellow student on her wedding. She notes the time for the next virtual lecture with the lecturer and downloads the two prescribed readings to read on the beach during the rest of her holiday break.

### 1.3 Vignette 3:

Grant is a special needs teacher at a rural school who, despite his isolated work place, stays connected with others in the field and continually updates his skills and knowledge via his personalized e-learning space. After the day's teaching he logs on to his computer and reads the blogs of three practitioners from different parts of the world who are part of his community of practice. He adds his comments to their postings, and updates his own blog making links to their ideas and his professional practice. He reads the three new resources that have come directly to his home-page via his RSS feeds, and downloads a podcast of a lecture on autism to listen to on his ipod while traveling home. He then gets a video-*Skype* call from a colleague overseas with whom he is collaborating on a journal article and he opens their wiki space to discuss with him the changes he has made on their article. Before logging off for the day, he uploads to *Flickr* the photos from the school sports day to share with the school community.

The learners described in the three vignettes above are all engaging in e-learning. The difference between them lies in the kind of e-learning they are experiencing in terms of the context, technology and pedagogy that is being used. Each of the three scenarios reflect a different approach to e-learning: (1) scenario one describes the use of non-networked computers within a pedagogy that uses an information-transfer mode of instruction; (2) scenario two involves an interactive learning environment where class members co-construct meaning and interact online through networked computers; (3) scenario three describes a self-directed, connected, informal learning environment that is individualised, located within an authentic everyday work context and contributes to the wider learning community through the use of self authoring and social networking technology.

The three vignettes represent the shifts in technology and the interplay, tensions and influences of this on context and pedagogy in higher education, where: (1) Samantha is learning ***about*** special education using an e-learning environment that enables her to access information and complete assignments to send to her lecturer for evaluation (monological transmission mode); (2) Paula is learning ***to be*** a special education teacher using a closed, formal e-learning environment that facilitates online collaboration and co-construction of meaning through discussion with fellow students (dialogical interaction); and (3) Grant is learning ***as*** a special needs practitioner using an open, informal and personalised e-learning environment where he designs his own learning and contributes to the learning of others through self and joint publishing and networking within a global Community of Practice (multi-conversational networks).

As described in the three vignettes, there is a dynamic relationship between technology, pedagogy and context and all need consideration when engaging in designing e-learning environments. Given the rapidly changing e-learning terrain, this paper focuses on charting the shifts in technology and foregrounding the implications of these shifts for pedagogy within different contexts. An e-learning alignment guide (eLAG) outlines the signposts, landmarks and indicators in the three e-learning zones of technology, pedagogy and context, in order to show the changes that occur within them. This guide is a tool for alignment of these three e-learning zones. It offers e-learning designers and educators a perspective on navigating the e-learning topography and, as a navigational aid, provides some structure for traversing through the shifting and sometimes complex dimensions of e-learning in higher education.

## 2. The e-Learning alignment guide (eLAG)

The eLAG consists of three zones of the e-learning environment: technology, pedagogy and context, and within each zone, various layers, which impact on practice. The zones and layers have been mapped along a continuum from a more *traditional, homogenous and formal* orientation towards an *emergent, diverse and informal* orientation - in order to illustrate the trends, shifts and currents that have occurred within e-learning over time. The eLAG is conceptualised as a dynamic tool in that it can be used to plot alignment between and within zones when designing or reflecting on e-learning environments. It serves to analyse, discuss,

navigate or critique the ever-changing terrain of technology, pedagogy and context in e-learning environments.

## 2.1 The technology zone of the eLAG

It has been argued that technology itself is neither good nor bad and that it is the way that it is used that matters (Bates 2005; Nichols 2005). There are counter arguments that technology can never be neutral, and that particular technologies have specific affordances that might facilitate certain approaches and minimise others (Dron 2006; Feldstein & Masson 2006). For Bates (2005), a useful approach is to identify the kinds of learning that different media facilitate best, and under what conditions. The issue then, is whether we are using technology to do the same things, or taking advantage of the unique capabilities of the technology to do things differently (Oblinger and Hawkins 2006). McLuhan's (1965) adage that 'we create our tools, and then our tools create us', highlights the reciprocal relationship between technology and its users. He suggests that there is always a dynamic interplay between the two and that this varies in different contexts and is continually changing. This is illustrated in Figure 1 below which presents the technology zone of the eLAG, which spans a continuum from what can be referred to as 'traditional' to 'emergent' in terms of both product (tools) and process (use) of e-learning. This continuum can be applied along a number of different layers including: tools and media literacies; computer hardware and software; affordances /design orientations; and e-learning approaches.

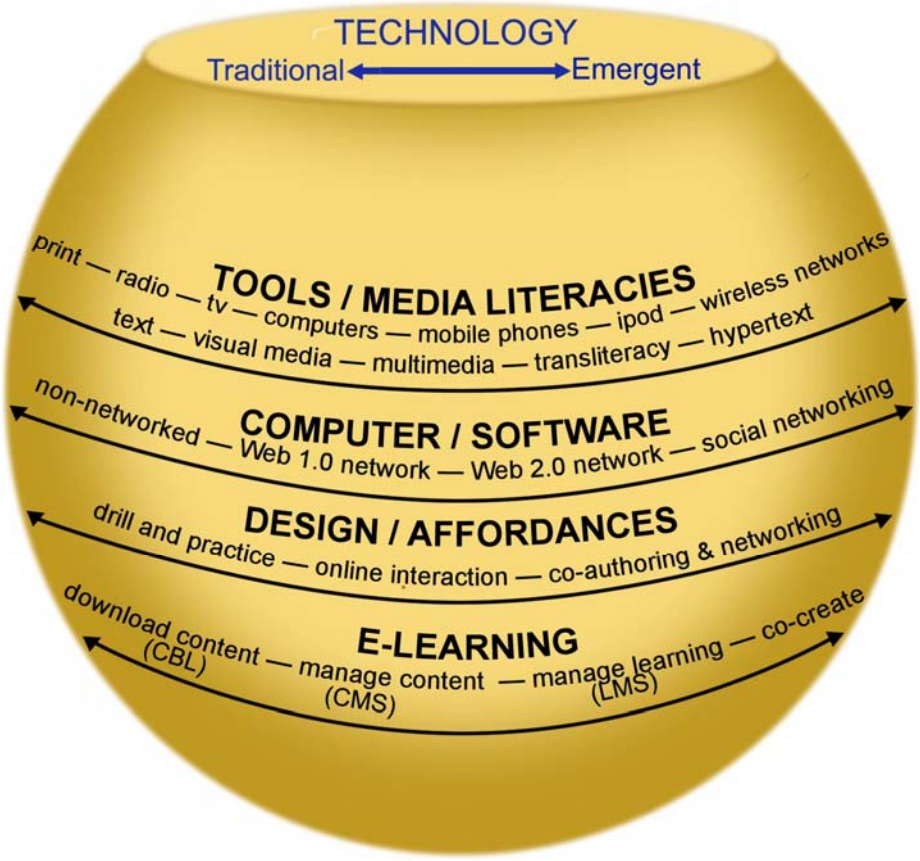


**Figure 1:** The technology zone of the eLAG

### *2.1.1 Tools & media*

The evolution of technology used for teaching and learning can be traced back to the invention of the printing press in the fourteenth century and on to the introduction of the postal service and the telephone, both of which had an impact on distance education. It develops further in the twentieth century with the introduction of radio broadcasts in the 1920's, film in the 1930's and television in the 1950s, which again influenced, in varying degrees, the practice of teaching and learning. However, the rate of these technological changes was, as Bates (2005) points out, relatively sedate compared with the rapid acceleration of technology post 1980 with the introduction first of non-networked computer based learning, then networked computer use

and subsequently advances which today include the world wide web, search engines such as Google, mobile phones, learning objects, wireless networks, and virtual reality learning sites (Bates 2005).

New technologies do not necessarily replace old technologies but rather they subtly change how and when we use them, as a broader range of choice becomes available to educators. This increasing choice ranges from reading print and books as more traditional forms of media on the left of the continuum to 'reading' movies and images and communicating via mobile phones, email, the web and social networking tools on the right of the continuum. For education to benefit from these shifts, skills in 'transliteracy' are needed. This involves shifting between, and communicating through, diverse media, including: books, oral narration and note-taking on the traditional end of the continuum *and* wikis, podcasting and uploading video clips to the web on the emergent end. The continuum of media literacy now extends from what is characterised as being linear, ordered, text based and physical to more networked, chaotic, web based and virtual approaches.

### *2.1.2 Computers/ Software – web 1.0 to web 2.0*

The second level of the technology zone illustrates the evolution of computers and software on a continuum from the traditional non-networked or stand alone computers on the left through to web 1.0 networked systems and then the emergent Web 2.0 or social networking systems on the right hand side of the continuum. The use of non-networked computers for education involved independent learning using the computer for information downloads, drill and practice and word-processed documents. Networked computers saw the introduction of first Web 1.0, which allowed for interaction between users through the use of emails and then the development of Content Management Systems and Learning Management Systems (eg *WebCT*, Blackboard etc). Later developments saw the emergence of technologies known as Web 2.0 or social software which enable users to create information online as well as share this with others, engage in conversation and co-create knowledge. As Downes (2006) describes it, the shift from Web 1.0 to Web 2.0 technology has been a shift from the web being a medium in which information is transmitted and consumed, to an environment in which content is created, shared, remixed and passed along.

### *2.1.3 Design/affordances*

The third level of the technology zone illustrates the shifts from traditional tools on the left side of the continuum which afford a drill and practice approach to teaching and learning, to emergent tools on the right of the continuum which support social networking and self directed learning. McLuhan's (1965) maxim that 'the medium is the message' is useful when considering what different media afford. The continuum shifts from where the medium allows for the message to be *one way* (transmission mode teaching that is monological), to *two way* (interactive, dialogical teaching and learning) or *multiple ways* (networked, multi-conversational learning). For example, print based learning is *one-way* communication as the message cannot be changed and moves from the author to the reader, or the teacher to the learner. This can be contrasted with individual postings to a discussion forum in a web based course where users interact with each other in *two way* communication between teacher and learner/s. Collaboration on a single document (for example a wiki), or hyperlinking within a blog, where potentially limitless anytime, anywhere users can respond, allows for *multiple* networked communication.

### *2.1.4 e-Learning*

The fourth level of the technology zone illustrates how shifts in the previous levels of media and media literacy, hardware and software developments, and affordances of tools, impact on e-learning. Traditional non-networked computer learning is situated on the traditional of the continuum, and is mainly limited to downloading content, whereas moving along the continuum, with networked computers, possibilities emerge for whole courses to be put online through Content Management Systems which offer the potential for anytime-anywhere interaction and discussion between course participants. Within this approach, content and organization of learning is still very much teacher/institution controlled and managed. On the emergent end of the continuum, social software and Web 2.0 tools afford a learning environment where students can move from 'information' to 'conversation' to co-create content through the 'read-write web'. The shift involves learners being instantly networked with others anywhere in the world through 'publishing' their writing as an author (via a blog), their photographs, or commentries (uploading photos to *Flicker* or videos to *YouTube*). The challenge here for educators is how to identify and maximise what is valuable in using these tools, and minimise what is not. While many educators acknowledge what the shift to e-learning 2.0 affords (Attwell 2007; Begg et al. 2007; Downes 2006; Murray 2007), there is still significant tension in formal learning contexts related to actualising these.

 

## 2.2 The pedagogy zone of the eLAG

While changes in technology have the potential to impact significantly on learning in terms of affording a more open and flexible learning environment, pedagogical practices are fairly resistant to change. In order to actualise the full potential of the technology, an aligned pedagogical approach is needed as outlined in Figure 2 below. The shifts in pedagogy show a movement from practices promoting homogeneity to more open systems where diversity is facilitated and learning is located within personalised authentic life-long and life-wide contexts.

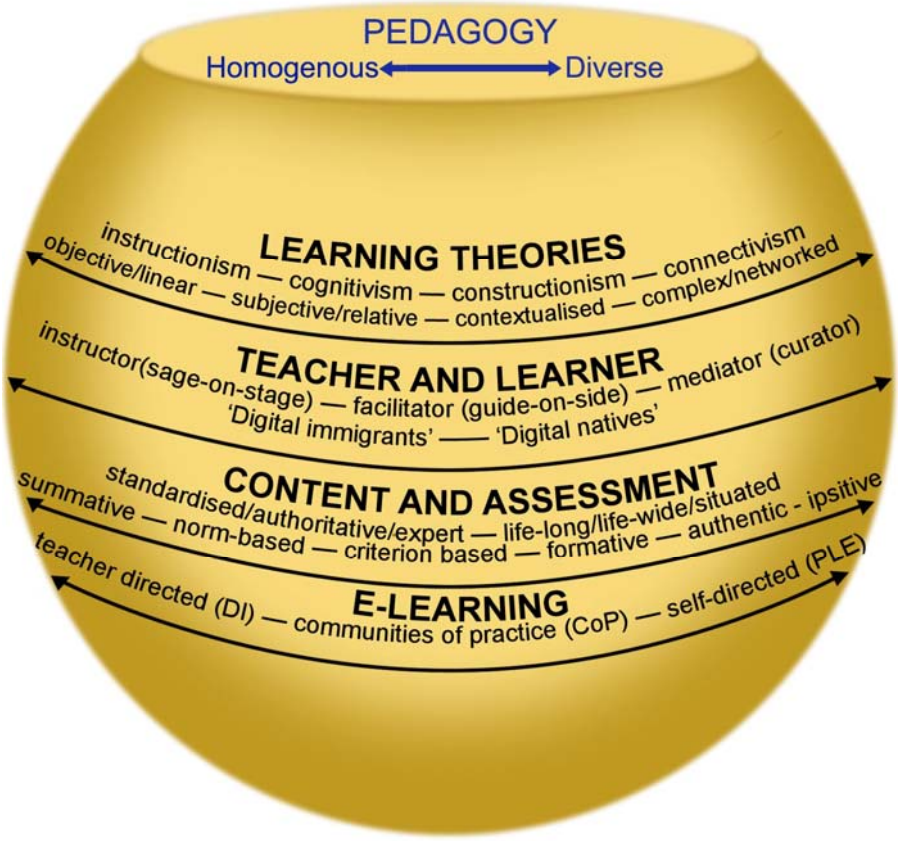


**Figure 2:** The pedagogy zone of the eLAG

### *2.2.1 Learning theories*

The first level of the pedagogy zone illustrates the progression of educational theory or models from the traditional, more homogenous approaches on the left of the continuum to the more emergent, open and diverse approaches on the right of the continuum. In terms of educational theory or models, a continuum can be traced in our understanding of what constitutes learning from instructionism to cognitivism and constructivism to what Siemens (2004) calls 'connectivism'. This continuum is an adaptation of the work done by Conole et al (2004), and illustrates our conceptions of knowledge as being objective entities that need to be transferred to the learner by an 'expert' teacher on the one end, to a view that knowledge is subjective and mediated through interaction in contextualised settings at the other end. This view in turn has developed to approaches on the continuum where knowledge is seen as chaotic, complex and residing in ever-changing networks (Brown 2000; Downes 2006; Siemens 2004; Wenmoth 2006) that are co-created by individual learners through interaction with each other. As Laurillard (2005:13) puts it, " if you were to believe that teaching is about imparting knowledge, then the main requirement of the lecturer would be the possession of that knowledge. For some time, this has been the prevailing view of university teaching, and therefore academics are appointed on the basis of their qualifications in subject matter knowledge." However if teaching is not just about imparting information and learning is not just about acquiring knowledge then what is it, how different is academic learning from everyday acquisition of information, and what are the implications of this for e-learning?

### *2.2.2 Teacher and learner*

The second level of the pedagogy zone illustrates a range of teaching approaches on the continuum from a transmission model focusing on instructional training or the 'sage on the stage' approach, to the facilitation mode of 'guide on the side' or Feuerstein's mediation approach (Mentis and Dunn-Bernstein 2007). Pedagogy has shifted in the digital age to more open conceptualisations of teachers as digital designers or what Siemens (2007) suggests is more of a 'curator' style approach which involves a combination of the 'expert' sage and the guide.

The role of the teacher as mentor (Mitchell 2007), guide, designer or curator of the learning experience aligns well with the changing role of the learner. This has shifted from the notion of a passive student engaged in downloading information to the self-directed learner who is comfortable with all the media and technologies of the digital age and an active and collaborative member of a community of learners. It has been suggested that today's students learn differently and can easily feel disconnected from an education system that was designed for another time (Prensky 2001).

### *2.2.3 Content and assessment*

Just as the role of the teacher and learner shifts to accommodate new approaches in the digital age, so too does content or subject matter and assessment processes. The rapid growth of knowledge is a relevant factor impacting on decisions about what content to include in curriculum. According to Gonzalez (cited in Siemens, 2004) half of what is known today was not known 10 years ago, and the amount of knowledge in the world has doubled in the past 10 years and is doubling every 18 months. What constitutes relevant, up to date content for any discipline or course then becomes debatable, and as Siemens (2007) suggests, content becomes more a conduit for conversation or interaction than an end in itself. The move from more homogenous to diverse pedagogies raises questions around the separation between formal and informal learning. Recognition of different form of knowledge and skills gained outside of school or formal training institutions (Green et al. 2005) align well with a more divergent approach. While formal learning is individual and highly organized, the rest of life is more social and unpredictable.

### *2.2.4 e-Learning*

e-Learning can be aligned with tools and pedagogies across the continuum from conforming and passive to diverse, interactive and self-directed. On the teacher directed side, e-learning is characterised by downloading of information, class websites or content/learning management systems, whereas the learner-directed end of the continuum is characterised by diverse learning opportunities within communities of learners/practice and personalised learning environments using social networking Web 2.0 tools. In traditional forms of learning the teacher or institution has control over the choice and management of the content and the assessment of learning. Learning in this sense is like a "walled garden" which is outside the context of the learner's everyday life, environment and informal learning. Personalised learning environments reverse the process and put the learner at the centre (Attwell 2007). A personalized learning environment is where the tools and, to varying degrees, the choice of content for any particular subject area belong to the student and the boundary between formal learning and informal everyday learning is blurred. PLEs are a potential model for opening the 'walled gardens' of the educational institutions to outside worlds (Attwell 2007).

## 2.3 The context zone of the alignment the eLAG

While shifts in both technology and pedagogy show significant potential to disrupt or change traditional ways of teaching and learning, it seems that for educational institutions the 'business-as-usual' format of classes and lectures, projects and exams, and tightly prescribed content and curricula still dominates. As Snowden puts it, "one of the great challenges is going to be to allow a co-evolution of the capability of 2.0 tools with the needs of organizations" (Snowden 2007:3). This co-evolution of contextual issues range from formal to informal and can be considered in a number of different layers as outlined in Figure 3 below:

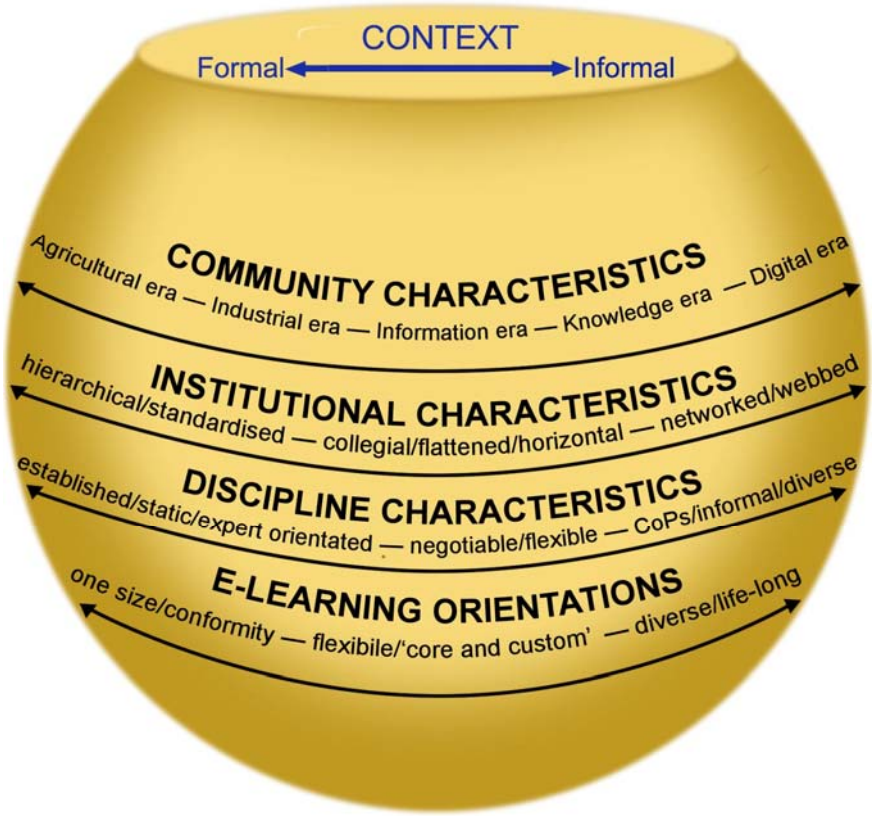


**Figure 3:** The context zone of the eLAG

### *2.3.1 Community and Institutional characteristics:*

The stability and consistency of educational structures are both its strength and its weakness. The strength is evident in its endurance, but the weakness is becoming increasingly apparent in its inflexibility to adapt to changing times. The Industrial and Information eras saw the rise of the large educational institutions based on a hierarchical structure, which suited the prevailing emphasis on scientific and empirical modes of knowledge. Within this structure, centralised and standardised systems emerged for managing teaching and learning, the legitimacy of knowledge, and the evaluation and progress of teachers and learners (Howley and Harnett 1992). In a knowledge society however, a more flattened and horizontal approach might be better aligned with new technologies and pedagogies that facilitate organic networks of knowledge management through online interactions and connections (Hinton 2007). Biggs (1996) sees the managerial model and quantitative framework of institutional control of universities as often operating at the expense of a more learning focused orientation. Tensions arise, for Biggs, when administrative convenience wins over educational considerations.

### *2.3.2 Discipline characteristics:*

Linked to the range of institutional characteristics that influence learning, so too can discipline specific characteristics determine the kind of pedagogy and technology suitable. Some areas tend to align more with a didactic pedagogy and e-learning technology that facilitates content management. Other areas align more with the flexible end of the continuum where creativity and diversity are encouraged and learning is facilitated more through collaboration within communities of learners or communities of practice. Social constructivist pedagogies and technologies that afford networking and co-creation of content are better aligned with this orientation.

### *2.3.3 e-Learning orientations:*

Mitchell (2007) describes the e-learning landscape and information literacy focus of academic institutions as being represented in terms such as: accredited, age-specific, authoritative, reputable, scholarly and structured. This is contrasted with the learning landscape of many students' personal information experience which she describes as diverse, fast, global, immediate, informal, innovative, and media-rich (Mitchell 2007).

While dichotomies are not always helpful or accurate, this distinction can be mapped onto the continuum outlined above in the context zone of the eLAG and raises tensions that need consideration when designing e-learning environments. Mitchell's analysis highlights again the distinction between the formal institutional approach where commercial, copyrighted, peer-refereed and published material is considered suitable for selecting and cataloguing information and content, whereas at the informal end of the continuum many students' informal learning experience is open, opinionated, participatory, personalized and very public. Resources are shared, tagged and generative. (Mitchell 2007) The difference between these two lies in issues of power and control of learning and accreditation.

## 3. Application of the e-learning guide

e-Learning involves a complex interlinking of pedagogy, technology and context, and the e-learning alignment guide (the eLAG) provides a way of considering alignment of these dimensions when designing e-learning environments. For example, in vignette one on Samantha's learning, early forms of e-learning support a *uni-directional* (teacher to student), transmission mode, monological pedagogical style where the technology used by teachers and learners aligns with information and content transfer using CD-Roms and personal computers. Later forms of technology, know as Web 1.0 or networked computers align with an e-learning approach which accommodates learner interaction within a community of learners – as outlined in scenario two of Paula's learning - through the use of Learning Management Systems. This allows for *bi-directional* (interactive, conversational) interaction but is largely driven by the institution and teacher through the use of software prescribed by the institution and course content structured by the teacher. Emerging tools such as blogs, wikis, podcasts and other social networking tools and folksonomies of web 2.0 (Downes, 2006) align with a different, more individualised conception of pedagogy and knowledge management – as outlined in scenario three of Grant's learning – which accommodates *multi-directional* (networked, multi-conversational) learning.

## 4. Conclusion

This paper outlined the influence of the areas of technology, pedagogy and context on e-learning practice. Three vignettes relating to e-learning were presented providing the background context within which to discuss the design of an e-learning alignment guide (the eLAG). This alignment guide offers practitioner a perspective on navigating the changing and complex terrain of e-learning and teaching, and highlights the importance of aligning the three e-learning zones of context, pedagogy and technology. Without alignment, tensions arise — particularly where new technologies are at odds with current institutional contexts. The resolution of these tensions provides a rich area for ongoing research.

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