The *Ps Framework*: Mapping the landscape for the PLEs@CQUni project

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The complex task of effectively using educational technology within universities is becoming more difficult as the shifting educational technology landscape brings into question many current institutional structures, practices and policies. This paper introduces the *Ps Framework,* a descriptive theory intended to reduce the complexity associated with making decisions within this changing landscape. The *Ps Framework* helps map out the changing landscape within a particular organisation, identify the diverse perspectives that may exist, and consequently aid decision makers to better understand the large amounts of complex and uncertain information involved in such decisions. The value of the *Ps Framework* is illustrated by using it to make sense of the landscape faced by the PLEs@CQUni project. This project aims to investigate, encourage and enable the use of social media, in the form of personal learning environments (PLEs), to supplement and enhance existing applications of educational technology at CQUniversity.

Keywords: PsFramework, taxonomy, e-learning, PLEs

Introduction

Universities are increasingly viewing the organisational selection, adoption and use of educational technology as an information systems implementation project. Such projects are rarely considered to be an unqualified success. Jamieson and Hyland (2006) suggest that there are relationships between decisions made in the pre-implementation phase of an information systems project, the factors considered in those decisions and the degree of success of the project outcomes. During the pre-implementation phase of an information systems project, decisions involve a high volume of information, are incredibly complex, and are associated with a high degree of uncertainty (Jamieson & Hyland, 2006). Bannister and Remenyi (1999) contend that given such difficult decisions, both individual and corporate decision makers will more than likely base their decisions on instinct. The *Ps Framework* attempts to assist the process of making the difficult decisions around the implementation of educational technology within a university.

Frameworks offer new ways of looking at phenomena and provide information on which to base sound, pragmatic decisions (Mishra & Koehler, 2006). Gregor (2006) defines taxonomies, models, classification schema and frameworks as theories for analysing, understanding and describing the salient attributes of phenomena and the relationships therein. The development of taxonomies, models and frameworks is quite common in most disciplines. Examples from the educational technology field include:

- the 4Es conceptual model (Collis, Peters, & Pals, 2001);
  This is a model to predict the acceptance of ICT innovations by an individual within an educational context. It proposes that an individual's acceptance of educational ICT innovations is based upon four concepts: environment, effectiveness, ease of use and engagement.
- the ACTIONS model (Bates, 2005).
  This framework provides guidance to the process of selecting a particular educational technology by drawing on 7 components: Access, Costs, Teaching and learning, Interactivity and user-friendliness, Organisational issues, Novelty and Speed.

How a design problem is conceptualised by the members of an organisation influences what they see as valid solutions to that problem, it impacts directly on the quality of the decisions they make about projects. Different members of an organisation will, as a result of their different experiences, have varying perspectives on a design problem. Too often, the full diversity of experience is so difficult to

capture, compare and contrast that decision-making processes often, both consciously and unconsciously, avoid the attempt. This paper suggests that the *Ps Framework* may be a useful tool for helping the diverse stakeholders to effectively share and negotiate their various perspectives and consequently, make sound and pragmatic decisions. The *Ps Framework* helps people map out and locate themselves within the landscape of educational technology and identify potential future directions.

CQUniversity commenced the PLEs@CQUni project in early 2007. The aim of the project is to provide students with mechanisms to support learner autonomy and self-regulation within a personalised learning space. This paper uses the PLEs@CQUni project to illustrate how the *Ps Framework* can be used to make explicit an individual's perspectives of an educational technology project. The aim is to demonstrate the value of developing such representations in order to make explicit the almost certain differences in conceptions between stakeholders. This is of particular importance to the PLEs@CQUni project as the representation described below is significantly different to that generally used by those attempting to implement new forms of educational technology within universities.

This paper starts by giving an overview of the *Ps Framework* and its seven components. The majority of the paper illustrates one perspective of the PLEs@CQUni project using the components of the *Ps Framework*. The paper closes with some conclusions and suggestions for future work.

The *Ps Framework*

As a descriptive theory, the *Ps Framework* is proposed as a tool to make some sense of the complex, uncertain and contradictory information surrounding the organisational adoption of educational technology. The seven components of the *Ps Framework* identify many (any claim to exhaustive coverage would require additional research) of the important factors to be considered in such decisions. The seven components of the *Ps Framework* are:

1. Purpose
   What is the purpose or reason for the organisation in adopting e-learning or changing how it currently implements e-learning? What does the organisation hope to achieve? How does the organisation conceptualise its future and how e-learning fits within it?
2. Place
   What is the nature of the organisation in which e-learning will be implemented? What is the social and political context within which it operates? How is the nature of the system in which e-learning will be implemented understood?
3. People
   What type of people and roles exist within the organisation? What are their beliefs, biases and cultures?
4. Pedagogy
   What are the conceptualisations about learning and teaching, which the people within the place bring to e-learning? What practices are being used to learn and teach? What practices might the people like to adopt? What practices are most appropriate?
5. Past experience
   What has gone on before with e-learning, both within and outside of this particular place? What worked and what didn't? What other aspects of previous experience at this particular institution will impact upon current plans?
6. Product
   What type of "systems" or products are being considered? What is the nature of these products? What are their features? What are their affordances and limitations?
7. Process
   What are the characteristics of the process used to choose how or what will be implemented? What process will be used to implement the chosen approach?

The relationship between the seven components can be explained as starting with purpose. Some event or reason will require an organisation to change the way in which it supports e-learning. This becomes the *purpose* underlying a *process* used by the organisation to determine how (*process*) and what it (*product*) will change. This change will be influenced by a range of factors including: characteristics of the organisation and its context (*place*); the nature of the individuals and cultures within it (*people*); the conceptualisations of learning and teaching (*pedagogy*) held by the people and the organisation; and the historical precedents both within and outside the organisation (*past experience*). This is not to suggest that there exists a simple linear, or even hierarchical, relationship between the components of the *Ps Framework*. The context of implementing educational technology within a university is too complex for

such a simple reductionist view. It is also likely that different actors within a particular organisation will have very different *perspectives* on the components of the *Ps Framework*s in any given context.

Having briefly introduced the *Ps Framework* and its individual components most of the remainder of this paper seeks to illustrate how the *Ps Framework* can be used to inform a specific project. Given space limitations it is not possible to examine all 7 of the components of the *Ps Framework*. The two components not considered here are past experience and pedagogy. These two were not included as readers of ASCILITE papers are likely to be more familiar with these than the other components. One quick summary is that while there exists a range of effective pedagogical approaches for e-learning, the uptake and use of these by the majority of teaching staff is limited.

The following is not intended as definitive representation of the *Ps Framework* for the PLEs@CQUni project. Instead it is meant to make explicit the thinking of one stakeholder, and serve as a starting point for additional discussion with others, which will eventually lead to decisions about how to implement the PLEs@CQUni project. It is intended to illustrate the components of the *Ps Framework* and introduce the framework to a broader audience.

Product

Decision makers must attempt to gain a consensual understanding of what the product is, and its implications for the institution. The current characteristics of the concept of personal learning environments (PLEs) make this very difficult. This is, in part, because there remains a diversity of interpretations of what a PLE is (Johnson & Liber, 2008). It is made increasingly difficult because PLEs can be seen as a new approach to the use of technologies for learning (Atwell, 2007); and, perhaps even a different paradigm for learning (Jones, 2008; McLoughlin & Lee, 2007). These significant differences make it difficult to conceptualise what a PLE should be, its most appropriate form, and what impacts it might have.

This is particularly true if decision makers move beyond limited conceptualisations of educational technology that view it as fixed, neutral and independent of context. Such narrow conceptualisations of what technology is, its effects, and how and why it is implicated in social change, results in technology being taken for granted or assumed to be unproblematic (Orlikowski & Iacono, 2001). Broader conceptualisations see technology as one of a number of components of an emergent process of change where the outcomes are indeterminate because they are situationally and dynamically contingent (Markus & Robey, 1988). Ongoing change is not solely "technology led" or solely "organisational/agency driven", instead change arises from a complex interaction among technology, people and the organisation (Marshall & Gregor, 2002). Technology will tend to serve the goals that motivate the people guiding its design and use and is most likely to reinforce old systems rather than break new paths (Lian, 2000).

The level of uncertainty around the PLE notion makes it more likely that decision makers seek to apply existing perspectives to the new concept. Consequently, it has proven useful to specifically address the question of what a PLE is not. Answers given include:

- A PLE is not made up of a single tool.
- The PLE is not specified, owned or hosted by the university.
- The PLE will not be common across all students.
- A PLE may not necessarily involve the use of information and communication technologies.
- The PLE will not be a replacement or duplication of the institutional learning management system.

It is common for the notion of a PLE to be positioned as a replacement for the LMS model of e-learning. The PLEs@CQUni project emphasises the role of PLEs as a counterpoint (in the musical sense where two or more very different sounding tunes harmonise when played together) to the institutional LMS. This is necessary because of a local condition where the selection of an open source LMS, as the institution's sole LMS, is a major action in the current institutional strategic plan. Within this context it is important that the application of PLEs are seen to supplement and not compete with the institutional LMS. This local adaptation is an example of how different change trajectories can arise out of interactions between technology, people and the organisation.

While a PLE need not necessarily involve the use of ICTs, the PLEs@CQUni project will make significant use of the underlying philosophy, affordances and services provided by social software and Web 2.0. It will seek to leverage these capabilities to supplement the institutional LMS and attempt what Green et al (2005) have identified as a necessary reversal of "the logic of education systems ... so that the

system conforms to the learner, rather than the learner to the system". The emphasis for the PLEs@CQUni project becomes not on how CQUniversity can provide the tools, but on how CQUniversity can support the tools that learners (students and staff) already make use of.

It is not uncommon for decisions around educational technology to descend very quickly into a focus on selecting a product. A potential consequence of this product focus can be seen in the almost universal adoption of just two different commercial LMSs by the Australian higher education sector (Coates, James, & Baldwin, 2005). Equally, the recent and growing trend towards open source learning management systems can also be seen as an extension of this faddish emphasis on product. A situation where the overwhelming "proof" provided by a broader community's rush towards a particular product is seen to make unproblematic the accompanying insensitivity to contextual needs (Swanson & Ramiller, 2004). Personal Learning Environments (Atwell, 2007), social software (McLoughlin & Lee, 2007) and e-learning 2.0 (Downes, 2005) could easily end up as being just the latest in a line of e-learning related fads unless more consideration is given to contextual needs.

In summary:

- The "PLE product" is not owned, specified or provided by the university.
- Each learner makes their own decisions about the collection of services and tools that will form their "PLE Product".
- The University needs to focus on enabling learners to make informed choices between services and tools and on allowing for integration of institutional services with learners' chosen services and tools.
- The PLE work will act as a counterpoint to existing and new investments in enterprise systems, by combining them with the students' customised environment in order to provide previously unavailable services.
- The final nature of the PLE product and its relationship with the institution will emerge from the complex interaction between technology, people and the organisation.

People

The fundamental aim of the PLEs@CQUni project, like most other applications of educational technology, is to improve the quality of learning and teaching. An on-going message from the study of educational technologies is that it is not the provision of features, but their adoption that really determines their educational value (Coates et al., 2005). The most accurate measure of a system's success may lie within the realms of user acceptance and use (Jones, Cranston, Behrens, & Jamieson, 2005). Developer-based implementation processes assume that a superior product will be automatically attractive to, and used by potential adopters. Adopter-based theories, however, seek to understand the social context, its participants and the social function of the innovation (Jones & Lynch, 1999). In this project the potential adopters are the students and staff of the institution. The perceptions and beliefs of both students and staff will play a significant role in the success of this project.

In order to change the way teaching staff approach teaching, it is necessary (and very difficult) to change their conceptions of teaching and learning (Trigwell & Prosser, 1996). Teaching staff, as knowledge workers, have considerable autonomy about how they perform tasks and often can and do resist the imposition of changes to routine (Jones, Gregor, & Lynch, 2003). It is not uncommon to see universities attempt mandated change through strategic projects that require compliance. Such practices tend to induce camouflage or conformance (Snowden, 2002) which give the mere appearance of compliance. Unless academic staff are effectively engaged and own the change, outcomes will be of limited value.

Some suggest that the affordances of Web 2.0 technologies provide an opportunity to move away from the highly-centralised industrial model of learning, towards achieving individual empowerment (McLoughlin & Lee, 2007). However, educators are likely to use the technology to do things the way they have always been done, but with new and more expensive equipment (Dutton & Loader, 2002). Snowden (2002) argues that when faced with large amounts of new information, human beings do not make rational, logical decisions. Instead they match the patterns in that information with those from their own experience or that of their collective. The limitations this imposes creates problems with traditional requirements gathering and analysis practices used in information technology projects. These practices seek to generate exhaustive lists of user requirements from people who have not been able to use the new systems and consequently must rely on existing patterns generated through previous practice and only the vaguest understanding of the potentials of the new product.

Universities are constantly faced with problems of declining enrolments (Ramsden, 1998). At CQUniversity it is recognised that this is resulting in increasing numbers of students who are not sufficiently gifted or motivated to survive poor quality teaching. Unfortunately, incentives to teaching well are being reduced, while student expectations increase (Ramsden, 1998). At the same time students are dealing with increased demands on their time and consequently have less chance to cope with changes in practice that would be required for student-centred or lifelong learning. There are concerns that many students may struggle to make this change without external assistance (Longworth, 2002). Student expectations and values place a constraint on innovation (Dutton, Cheong, & Park, 2004). Any change in practice needs to engage effectively with the expectations and values of students.

In summary:

- The PLE project will fail if learners (both staff and students) do not engage with this concept.
- People are not rational decision makers. They make decisions based on pattern matching of their personal or collective experiences.
- There is little value in asking people who have limited experience with a new paradigm or technology what they would like to see or do with the technology.
- The project focus should be on understanding, working with and extending the expectations of the participants within the specific conditions of the local context.
- A particular emphasis must be on providing the scaffolding necessary to prepare learners for the significant changes that may arise from the PLE concept.

Process

The process used to manage most implementations of educational technology within tertiary institutions is, or at least claims to be, purpose driven. Such teleological design processes start with the setting of an ultimate purpose and spend the rest of the design process attempting to efficiently achieve this pre-determined purpose (Jones & Muldoon, 2007). Kenny (2002) identifies the conflict between this classical "project management" approach and the way teaching staff traditionally work, connecting this back to the lack of distinction between different types of projects. Table 1, adapted from Kenny (2002), outlines four different types of organisational activity.

The adoption of PLEs entails a radical shift in how educational technology is used, in how the organisation functions and in the ethos of education (Atwell, 2007). This change in the ethos of education typically involves a significant move towards lifelong learning, which represents a paradigm shift (Longworth, 2002). This suggests that the PLEs@CQUni project falls under Kenny's (2002) categories one or two, it involves radical change of some sort. Such projects, which involve high degrees of uncertainty or change, need to be managed differently to more routine projects (Kenny, 2002).

Table 1: Characteristics of four categories of organisational activity (adapted from (Kenny, 2002))

Characteristics	Descriptions
Category One Broad radical change or innovation	Strategic Projects with high to very high levels of uncertainty and wide organisational impact.
Category Two Localised radical change or innovation	Projects with high to very high levels of uncertainty but low organisational impact.
Category Three Broad incremental change or continuous improvement	Projects with low levels of uncertainty but wide organisational impact.
Category Four Localised incremental change or continuous improvement	Projects with low levels of uncertainty and low organisational impact.

Kenny (2002) identifies a number of key success factors for projects involving radical change. These include: exploration of many ideas; use of open communication and idea sharing; project aims based on broad strategic goals; unsuitability of micro scheduling and planning; flexibility to adapt to change; and project accountability that places emphasis on progress and learning. Similar ideas are encompassed by the notion of ateleological design processes discussed by Jones and Muldoon (2007). Kurtz and Snowden (2007) describe naturalistic or social complexity design approaches which work by focusing on starting

conditions, catalysing and facilitating interactions between individuals and communities and then nurturing the emergent positive patterns.

In summary:

- Classic, structured project management practices are completely inappropriate for the PLEs@CQUni project.
- An approach based on ateleological or naturalistic design is likely to be more appropriate.
- Project aims should be based on broad strategic aims and place emphasis on organisational learning.

Purpose

A traditional design process starts with the establishment of a fixed purpose, that is, a clear goal of what is required. Management require a clear understanding of any change to be instigated through educational technology. (Klink & Jochems, 2003). Clarity of purpose around the role of an LMS within an institutional learning and teaching framework is seen as necessary to ensure good governance (Wise & Quealy, 2006). The key success factors identified by Kenny (2002), and described above, suggest that this approach is inappropriate for projects involving radical change. It has been argued that this fixed purpose approach to e-learning within universities significantly limits flexibility and choice for learners and learning (Jones & Muldoon, 2007). An alternative is not to have any pre-fixed purpose, but instead to engage in an open process that places an emphasis on collaboration, flexibility and negotiation around needs and issues of the participants within the local context and participants. This process must emphasise progress, learning and the need to achieve a broad strategic goal (Kenny, 2002).

CQUniversity has recently undergone a major re-branding exercise, which has resulted in a new tag line "Be what you want to be". There is an accompanying emphasis on customisation and flexibility as illustrated by the following message on the institutional web site:

CQUniversity interacts in a customised way to your individual requirements. Not all universities can say that and few can say it with confidence. We can.
http://content.cqu.edu.au/FCWViewer/view.do?page=6588

The broad strategic aim of the PLEs@CQUni project is to enable and support the claims embodied in the institution's new brand.

In summary:

- The project will cultivate an emergent methodology.
- The project will focus on responding to local contextual needs.
- The overall purpose of the project is to support the institution's new brand.

Place

The context within which a project takes place has significant impact on what is appropriate and what might work. In the *Ps Framework* the place component consists of two broad sets of factors: organisational and societal. Organisational factors arise from the nature of the organisation and its cultures, aims, processes and capabilities. Societal factors arise from the social, political and even geographical context within which the organisation operates.

Forces for change in the external environment in which universities operate have been a focus of attention of many authors for a number of years. These forces include: increased access and growth in participation; reduced public funding; increased costs; increased calls for accountability in outcomes and subsequent arguments around autonomy; the changing nature and growth of knowledge and disciplines; industrialisation and industrial relations policy; and internationalisation (Coaldrake & Stedman, 1999; Cunningham et al., 2000; M. Green & Hayward, 1997). These forces raise a number of issues for education systems, in particular how best to adapt such systems to the changes in the socio-economic landscape and provide the best educational opportunities and outcomes (Knight, Knight, & Teghe, 2006).

The tendency towards fads and fashions (Birnbaum, 2000; Pratt, 2005; Swanson & Ramiller, 2004) are often accompanied by a lack of understanding or emphasis on the impact of contextual needs (Swanson & Ramiller, 2004). The understanding of how information technology can create value for an organisation is largely dependent upon how the organisation views itself. Soh and Markus (1995) identify at least three

different perspectives on how organisations view themselves (rational, goal-seeking entities; coalitions of power constituencies; or entities converting scarce resources into valued outputs) and three corresponding ways of measuring performance.

There has been inadequate recognition of the inherent differences in organisational cultures, academic cultures, education and training philosophies as well as teaching and learning values and traditions within different cultural groups (Calder, 2000). A critical strategy for effective e-learning is to recognise the different cultures of learning among and within organisations (Lea, 2003). The fact that there are many parties involved magnifies traditional problems of politics, management expectations, hidden agendas, disruption to the balance of power, technical concerns and differences in cultural values (Gregor, Jones, Lynch, & Plummer, 1999). The notion of best practice, or the most appropriate way to solve a problem, is composed and framed by the varied perceptions and aspirations of the multiple stakeholder sub-cultures that constitute an organisation such as a university (Luck, Jones, McConachie, & Danaher, 2004).

The application of best practices implies that it is possible to identify and codify a good way of doing something and that employees can be successfully encouraged to follow that practice. This type of approach is only possible in simple contexts that are stable and where clear cause-and-effect relationships are easily discernible (Snowden & Boone, 2007). Most of the situations and decisions in organisations are complex because major change introduces unpredictability and flux. Hence, traditional approaches to project management involving fail-safe projects are inappropriate (fail-safe projects are large projects which are so important that they are designed to ensure the likelihood of failure is reduced or ideally, removed). Instead, the organisation needs to allow solutions to emerge by probing with safe-fail projects (safe-fail projects are small projects which can fail without overly negative consequence to the broader organisation). Safe-fail projects, by their very nature, enable experimentation and learning (Snowden & Boone, 2007).

In summary:

- The project must engage with broader societal issues without sacrificing local contextual issues.
- It must aim to engage and work with the different cultures that make up the institution.
- It should use a number of safe-fail projects, reinforcing those with positive outcomes and eliminating others.

Conclusions and further research

This paper has illustrated the potential of the *Ps Framework* to define the landscape for the PLEs@CQUni project. Large-scale projects like the PLEs@CQUni project require additional support because decisions need to be made on complex, uncertain and contradictory information. The *Ps Framework* offers a new way to make explicit the diverse perspectives of relevant stakeholders and improve the ability to compare, contrast and make more inclusive and appropriate decisions. It is suggested that the true benefits of the *Ps Framework* arise when it is used consciously to make explicit the diversity of perspectives held by members of the organisation and active steps are taken to respond to and use this diversity within projects.

The *Ps Framework* with its emphasis on purpose, place and past experience increases the chance that decisions are not based on simply accepting fads or fashions. For example, the representation of the PLEs@CQUni project discussed here distinguishes itself from the current "PLE fad" (that a PLE is a competitor to or replacement for an LMS), in that it emphasises the importance of complimenting existing organisational technologies (such as the LMS) and building on those to provide benefits to staff and students. This conceptualisation retains and enhances existing organisational investments and practices while also stretching the boundaries to accommodate innovation in learning and learning technology.

There remain a number of outstanding questions to be answered about the Ps Framework, including:

- How can it be effectively used across an organisation to gather and harness the diversity of perspectives? What benefits does doing so bring? Do the costs outweigh the benefits?
- How can stakeholders be encouraged to make explicit conceptualisations that they take so much for granted that they don't even realise they hold them? What are the results when this is done successfully?
- To what level are each of the components of the *Ps Framework* evident in the research literature and institutional practice associated with the organisational implementation of educational technology? Is

there an over emphasis on some components at the expense of others? Is there any correlation between the level of consideration and project outcomes?
- Are the components of the *Ps Framework* exhaustive in their coverage? Are they easy to understand and use for analysis?
- Can decision-makers appreciate the value and benefit something like the *Ps Framework* can provide?

The last question is perhaps the most difficult. One of the reviewers of this paper noted, "nothing in the article creates a radical departure in terms of implementing technology". To a large extent this is true, much of the fundamental knowledge in the Ps Framework is well known, if held in disparate disciplines. And yet the authors of this paper continue to see examples of educational technology projects where decisions are made based on the instincts and prejudices of a small number of decision-makers. Few decision-makers bring a full appreciation of the complexity of the organisational landscape facing educational technology projects. Consequently, the answers they develop to questions such as "Where are you in the landscape of educational technology?", "Where do you want to go?" and "How do you get there?" are often less than appropriate. Used intelligently, the *Ps Framework* might help develop better answers.

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