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Positioning Theory, Roles and the Design and Implementation of Learning Technology

Mark Johnson
(University of Bolton, Bolton, UK
mwj1@bolton.ac.uk)

Dai Griffiths
(University of Bolton, Bolton, UK
dai.griffiths.1@gmail.com)

Mi Wang
(East China Normal University, Shanghai, China
mi.wang.66@gmail.com)

Abstract: The concept of social role is a fundamental underpinning of the design and implementation of a wide range of learning technologies. However, the roles that are designed into technologies often ill-fit the real roles of teachers, learners and other stakeholders in educational institutions. This can exacerbate problems in adoption as stakeholders do not recognise the roles described for them in the technology. In this paper, Positioning Theory is used to explore the relationship between role, social context and communication drawing on specific examples of IMS Learning Design, Virtual Learning Environments, and Personal Learning Environments. With insights gained from this analysis, recommendations are made for theoretical focus on understanding the particulars of practice and identification of specific technical issues of interoperability rather than designing technologies based on idealisations of the roles of stakeholders within institutions.

Keywords: Social Role, Learning Technology Design, Positioning Theory, Interoperability Standards
Categories: D.2.1, D.2.2, D.2.12, K.3.0, K.4.3

1 Introduction

In the design and implementation of learning technology in institutions, theory operates at a number of levels. On the one hand, it underpins the rationale for what is done, why it is done, and who might benefit. On the other hand, it underpins the design of the technologies that are implemented. This broad application of theory can create confusion in the domain, particularly where theorised pedagogic outcomes are not borne out in practice through perceived shortcomings in technological design, or shortcomings in institutional structures [Elgort, 05]. The different levels of theorising underlie a disparity in educational technology between the design effort and success of developing learning technology and the adoption rate and apparent success of the technology within institutions. However, such disparity between design effort and adoption rate is not a general rule in computer systems design and implementation:

high development investment in software for accountancy or computer games (for example) can be a critical success factor in adoption.

Amongst the different theoretical paradigms for design and implementation of learning technologies, thinking about the 'social roles' of teachers, learners, administrators and other stakeholders is a common factor. However, 'social role' is a contested concept and in this paper argues that it is an insecure foundation for the design of learning technologies. Moreover, the difficulties of adoption may be related to the 'hard-wiring' of roles into technologies, and this hard-wiring directly impacts on the conversations that occur in institutions as technologies are presented to users. To unpick this relationship between the hard-wired roles in technologies and the conversations that occur amongst users, Harré's Positioning Theory [Harré, 99] is used as a way of making more effective distinctions about the different activities individuals engage with and the different social contexts within which they perform them.

The paper is in three sections. First an overview of the impact of thinking about social role in the design and implementation of learning technology and the conversations that occur in institutions is presented, drawing on the examples of IMS Learning Design, Virtual Learning Environments, and Personal Learning Environments. Secondly, Harré's Positioning Theory is introduced as a more dynamic way of thinking about social roles. This discussion leads to the consideration of different types of institutional context within which social roles are enacted. Finally, drawing on this analysis, the case for the refocusing of theory on the understanding of 'real practice' in institutions, as opposed to idealising practice is presented. Here it is argued that issues of technical interoperability present role-free ways of intervening with technology that solve practical problems which can directly meet the day-to-day needs of teachers and learners.

2 Social Roles and Technology

Within computer systems design, end-user analysis, which considers role within its remit, has a long history. Norman [Norman, 88], for example, has called for "people-focused design", with focus variously on the affordances of technology, or the construction of cognitive models of users. Moggeridge [Moggeridge, 07], Preece [Preece, 02] and others have promoted Interaction Design as a way of matching human systems with technical systems. Some of this work, particularly that concerned with Computer-Supported Cooperative Work environments extends participative design techniques explored by Mumford [Mumford, 83] which had some success in the UK health service in the 1980s. However, Dix [Dix, 03] has argued against explicit formalisation of user role in this matching with technology design:

> *"Within the microcosm of group interaction, authority roles can be entirely inverted. For example, if the managing director of a coal mining company visited the coal face, he should act under the authority of the supervisor at the face, for his own safety and that of the mine. These inversions can cause problems even in the computer-free situations – it is hard for the supervisor to say 'No' to the MD. But if a system demands an explicit controlling role, it is even harder for the manager to relinquish this explicit role, even if in the context the subordinate should be in control"*

This intuition is reflected in work on the concept of social 'role' in the social sciences. Mead [Mead, 34], Goffman [Goffman, 59] and Parsons [Parsons, 51] contain a deep critique of functionalist interpretations of user-roles as it is often used in technological design. Within the literature, role is variously portrayed as a structural-functionalist phenomenon where repeated behaviours in an institutional context become normalised and conditioning (as with Parsons), or for Mead as an interactional phenomenon where role is emergent from individual communications and constituted from interactions with other role-players [Mead, 34]. Goffman's work on the 'presentation of self' echoes Mead in seeing interaction as a continuously emerging context for the revealing of role and social identity [Goffman, 59]. Given this deeper emergent perspective on the concept of social role, there are questions to be addressed concerning the way roles are conceived not only in the design of learning technology but in the theory upon which much of that technology is based. From Activity Theory [Engestrom, 87] – which is a foundation of Interaction Design - to Pask's Conversation model [Laurillard, 93], distinctions are made about roles with regard to the division of labour, or the distinctions between teachers and learners. However these descriptions can ill-fit the details of particular teachers, particular learners or particular lessons. Yet role descriptions effectively find their way into the 'learning design tools' for teachers' or learners' learning environments. In education, the delineations between teachers, learners and administrators can be problematic in the way Dix describes in the quoted passage above. In educational institutions, roles are emergent and highly individualised.

Harré's 'Positioning Theory' [Harré, 99] seeks to find a way through the complexities of social role by focusing on communications and their impact on the 'selves' of individuals in relation to an environment. Building on Mead, Goffman and Laing, Harré's formulation can be useful in constructing a framework for thinking about role in e-learning, the design of technologies and the underpinning theory which influences design. Harré's prime concern with communication reflects our experience that within educational institutions, adoption of new learning technologies follows communications. The variety of communications which individuals receive ranges from formal 'training' to informal sharing of practice between teachers. Sometimes technology 'champions' within the institution are used to stimulate this. Harré's theory has been used to make distinctions about the communications about learning technologies which do and don't gain adoption. The resulting framework aims to reveal the extent to which the roles encoded into the affordances of technologies influence the communications that occur around them, and the consequent likelihood of those communications leading to adoption. Focusing on communications rather than the technology itself prompts reconsideration of the role of theory in the promotion of e-learning in institutions.

3 Conversations about learning technology

The following conversation occurred in the author's university between an e-learning researcher and a member of staff about their willingness to use the Learning Activity Management System (LAMS) [LAMS, 11] within their teaching:

LEARNING TECHNOLOGIST: "Using LAMS, you can create sequences of activities."
TEACHER: "What do you mean by activities?"
LEARNING TECHNOLOGIST: "Well, things like forum discussions or maybe chat, or .. there's a great mindmap tool"
TEACHER: "I like the idea of a mindmap tool, but in the past I've struggled to get learners to engage in a forum"
LEARNING TECHNOLOGIST: "Ok.. This is how you can do it anyway. Down the left hand side of the screen you can see the activities available to you. You click on an activity and connect it with other activities."
TEACHER: "But if I just wanted to get them to talk, I'd use the forum in the VLE. Why would I do it here?"
LEARNING TECHNOLOGIST: "Because you can sequence the activities"
TEACHER: "But I think if I wanted them to do something else, I would just tell them 'I want you to do something else now'"
LEARNING TECHNOLOGIST: "But this tool allows you to string a whole sequence of activities together and you can monitor the progress of your students"
TEACHER: "I'm not sure it would be worth the effort of thinking about stringing activities together. Also, I tend to change my plans as things happen. The monitoring's interesting though, but I already look at the VLE statistics."
LEARNING TECHNOLOGIST: "Wouldn't you want to automate the sequencing of learning activity rather than coordinating it personally?"
TEACHER: "No, I would prefer to do it personally – that way I feel more in control of what the learners are doing"

In the above discussion, the learning technologist's interventions are shaped by what the technology can do. Implicit in these statements is some idea of the theory which went into the construction of the technology. From this short exchange, it can inferred that the technology is based on the idea of automatically sequencing learning activities, and that this is deemed to be something that teachers do. The teacher in the discussion essentially disagrees with this proposition – at least to the extent that they see that the technology can help them with their role as they understand it. There is ample evidence in the literature that this particular teacher's scepticism with regard to the sequencing of activities is not unique (see for example [Berlanga, 08]). However, our focus here is on the way the conversation proceeds. For example, when the teacher expresses scepticism about getting learners to engage in forums, their concern is initially overlooked by the learning technologist who is more keen to show what the tool can do.

Conversations like this can change people. But if teachers do not see anything 'in it for them' for engage in the technology, the adoption of new technologies is unlikely. Part of what puts this teacher off is the fact that the roles and functionality that have been built into the technology do not match their own idea of their role. The central issue is that there appears to be a relationship between technology design – and more significantly, the theoretical presuppositions of design – and these sorts of conversations.

Drawing on this experience (and many like it), it can be asked:

a. What is the relationship between learning technology theory, the concept of social role, and the design of technologies?
b. What are the mechanisms which link the functionality of technology and the conversations which encourage adoption?
c. Should theory be used to design learning technologies?

4 Role and the Theorising of the individual in Teaching and Learning

Amongst the various taxonomies of learning technology, 'role' appears as a common factor connecting relationships of stakeholders to content or assessment and different forms of interaction. Conole [Conole, 07], for example, lists 'role' as an inter-related factor around which different approaches to teaching and learning with technology can be situated. The inter-relatedness of these categories means that each characterisation of 'role' can have a counterpart in technology design, implementation and pedagogy.

Given this, there is a question as to how each of these technological forms conceives of 'role'. A list of these technological forms and pedagogic designs could cover a range of topics in learning technology from e-portfolio to automated tutoring systems. For the purpose of this discussion and on the basis of focusing on interventions which have well-documented positions on social role, the following recent developments in learning technology can be considered:

a. IMS Learning Design and its original conception in the Educational Modelling Language of Koper [Koper, 01]
b. The work of Britain and Liber [Britain, 02] on the Virtual Learning Environment and the Laurillard/Pask conversation model
c. Personal Learning environments

4.1 Role in IMS Learning Design

Koper's work on the Educational Modelling Language (EML), which later became IMS Learning Design, contains an explicit theorisation of 'role' where he not only considers the role of teachers (as designers of learning) and learners (as participants in learning activity), but articulates deeper descriptions of the roles played by learners within activities themselves [Koper, 01]. Koper makes a clear delineation between 'Role', 'Resources' and 'Activities', arguing that these are effectively the 'primary colours' of education, from which different emphases on pedagogy, assessment, techniques and tools can be grounded. In Koper's view, teachers design and coordinate learning activities. The pedagogy behind a teacher's approach will depend on how they organise learners with resources (including tools) and activities. In Koper's conception, this organisation may well entail creating activities which organise learners into specific sub-roles in a learning activity (for example, an activity which speicifies some sort of role-play).

Koper's representation of how the 'roles' that learners, teachers and support staff might play within a learning activity and how they are coordinated with people and resources to produce learning outcomes is shown below [see Fig. 1]. Activities take place within 'environments' which contain tools and resources, whilst each activity

has a structure. However it may be remarked – particularly in the light of Mead's critique – that this structure doesn't allow for the emergence of role over the course of an activity. Role, in this conception, is regarded as an 'organisational category' for people doing activities with things. The process of designing learning activities is a process of determining what roles and what activities individuals are going to perform.

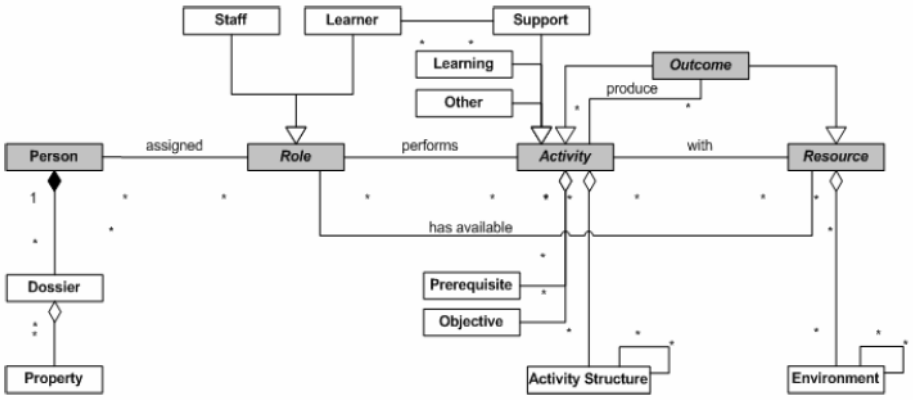

Figure 1: Koper's Conception of Role in IMS Learning Design

However, despite the rigidity in Koper's thinking about role, the Educational Modelling Language contains a deeper position regarding learning technology: that learning technology is fundamentally an organisational intervention, allowing teachers to organise their delivery in a variety of different ways online. Conceiving of role as an organisational category helps with the process of thinking through the organisational tasks teachers and learners have to accomplish.

4.2 Role in the VLE

Organisational thinking dominates Liber and Britain's analysis of the VLE. They showed how VLE technology could address the organisation problem of teachers and the institution in needing to scale-up the delivery of learning experiences. The essence of Liber and Britain's argument is that the VLE forms an essential element in the self-regulation of a viable education system as it adapts to challenges of greater learner diversity, widening participation and increasing personalisation. The viability of the system is conceived through the lens of an abstract multi-layer feedback model originally conceived by the cybernetician Stafford Beer in the 1970s [Beer, 73]. Beer saw his Viable System Model as a 'lens' which could be overlaid on a variety of different social and biological systems to reveal insights into the effectiveness of their operation. Most commonly, Beer applied this principle to the viable operation of businesses, where the model would show how the complexity of the business operation was and wasn't being well-managed, and how shifting the balance of

regulation in the system could remedy business difficulties. Other applications of the model include the analysis of beehives.

Where Koper's EML sees teachers creating activities for learners with resources, which will in turn entail the prescription of learner roles, Liber and Britain see balancing the needs for the viable delivery of education, using technology to shift the balance of regulation of educational experiences so that they can cope better with the challenges of a diversified student body, distance provision, etc. Whilst Liber and Britain only focus on the roles of teacher and learner, they draw attention to the fact that conversation through the technology forms the basis of learning experiences.

Here, they cite the Pask/Laurillard [Laurillard, 93] conversation model as the backbone of their pedagogic argument concerning the teaching and learning benefits of Virtual Learning Environments. This model itself also presents a conception of the roles of teachers and learners: teachers set activity goals and describe conceptions, and learners take part in activities and teach-back their understanding of these conceptions, with the teacher assessing if the learner's understanding is any good and setting new goals as appropriate. Conversational and social technologies within the VLE are highlighted by Britain and Liber as being particularly adept at supporting this pedagogical activity. However, beneath the basic social functionality of the technology, Britain and Liber's model passes over the personal experience of using VLE tools. This issue, which became increasingly important as VLEs became widespread, became the focus of work on Personal Learning Environments.

4.3 Role in the Personal Learning Environment

In their work on the Personal Learning Environment (PLE), [Johnson, 08] articulated a further level of recursion to the Viable System Model: that of seeing the individual learner as organising themselves and maintaining their individual viability with technology. Learners, they argue, have to do things, and many of those things they do with technology. These 'things to be done' form the basis of the organisational and communicative challenge for learners, where communications might involve 'doing assignments' or maintaining friendships or personal finances. With the means of making those communications becoming increasingly technological, the PLE articulated new ways in which the management of learning communications could be centred around learners rather than institutions.

The PLE focuses on the fact that the vogue for learning technology, particularly in institutions, introduced as many problems as it solved. One of the biggest problems with the rapid emergence of institutional learning systems was that they made a lot of demands on learners, but they often offered functionality that was available in other ways outside institutions. Increased access to high-speed computer networks meant that learners and teachers were not bound by institutional systems because they had available to them powerful personal systems. However, it wasn't as simple as getting everyone to use Web2.0 services like blogging or wikis. For it was found that whilst some would self-publish and self-publicise using these services, there were many learners (and teachers) who were not comfortable doing this, preferring institutional solutions. Unpicking these issues within the context of the PLE depended on thinking more deeply about the nature of 'selves', their relationship to personal organisation with technology, and more fundamentally the differentiation between thinking and action.

5 Rethinking Roles and Selves

The PLE's focus is on the organisational context of the self in learning and its relationship to technological practice. This concern leads away from the conversational focus of the VLE or the organisation focus of Learning Design to a deeper conception of the biological, psychological and sociological make-up of the 'self'. Building on the socio-psychological work of Laing [Laing, 61], Austin [Austin, 62] and Goffman [Goffman, 59], the fundamental issue is how 'selves' are conceived and created in social life through the use of technology. Away from technology, both Laing and Goffman regard the context for revealing of self as an environment of communications by others to which individuals contribute: the speech acts of individuals in a context help condition how others behave through what Austen calls the 'illocutionary force' (the intention behind the performance of an utterance) and the 'perlocutionary act' (the psychological consequences of a speech act). However, what is not clear in the work of Laing or Goffman is the linkage between the outer world of communication and the inner world of selfhood and how the two inter-relate.

This is the problem which Harré's Positioning Theory [Harré, 99] aims to clarify whilst also addressing the problem of the emergence of roles. Harré makes distinctions both about the self and about communications. In thinking about the self, he identifies three main components: an embodied self, an autobiographical self and a social self. The embodied self Harré describes as "the unity and continuity of a person's point of view and of action in the material world, a trajectory in space and time. The embodied self is singular, continuous and self-identical" [Harré, 04]. The autobiographical self concerns the 'hero or heroine' of various stories which the individual might have in their head. Finally, the social self concerns "the personal qualities that a person displays in their encounters with others." – a concept which is closely allied to Goffman's conception of persona.

Educational institutions are comprised of 'selves' in the form of teachers, learners and administrators who communicate with one another. Harré, in developing Laing's position, argues that 'self' can be seen from the perspective of communicative dynamics of speech acts of 'role players' on the one hand, with the 'personal narratives' of those actors on the other. Harré's emphasis on narrative concerns the intentional (i.e. in one's head) conception that individuals have of one another and themselves. He sees a relationship between this intentional conception and the speech acts which are performed by actors, which in turn contribute to a normative conception of role. In essence, where the role theorists see a correlation between role and function, Harré sees a correlation between intentional narratives and communication in a normative social context which is continually transformed by communicative acts. In this set-up, in place of 'role', he posits 'Positioning' as the emergent effect of particular normative conditions, particular communicative acts and particular narratives: a 'role' is a position produced through social structure and communicative acts. For Harré, following Austin and Searle, (and ultimately [Wittgenstein, 51]), the issue with communication is to understand how we 'do things with words'.

6 The Co-determination of Individual and an Environment of Communication

Harré describes the relationship between normative 'positions', speech acts (shown as 'illocutionary acts' in [Fig. 2]) and intentional 'storylines' in the triangular relationship shown below [see Fig. 2]

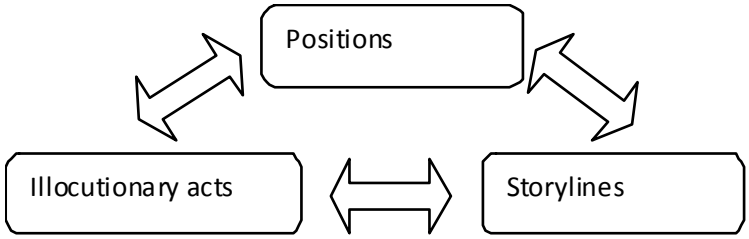

Figure 2: Harré's Positioning Triangle

The basic principle is one of co-determination between the intentional and social aspects of individual agency and communication. The social dimension is represented by 'Position'. This is the normative social context of action: the workplace, family, club, etc. The psychological dimension is represented by 'storylines': these 'stories in the head' are linked to the social context (position), but also shape the illocutionary (speech) acts which reproduce and transform that social context. This relationship can be used as a 'lens' through which to view various kinds of agency. For example, technological agency contributes to the normative environment of communication (position) which in turn can be transformative of individual narratives and subsequent technological actions.

The co-determination of communication and intentionality is mirrored by other work in sociology. The relationship between social structures and individual agency as articulated by Bhaskar [Bhaskar, 79], Archer [Archer, 95] and Giddens [Giddens, 86] similarly presents a co-determining relationship. Bhaskar's Transformation Model of Human Activity, for example, articulates that individual agency reproduces and transforms social structure, whilst social structure conditions and constrains agency. Whilst Harré does not posit with Bhaskar a real social structure independent from agency, he does articulate the causal power of normative 'positioning' in a social structure, which is reproduced and transformed through speech acts and which constrains agency through shaping storylines, which in turn shape speech acts. A similar conception of transformation that links communication to agency is contained in the theory of communication articulated by Luhmann [Luhmann, 95]. Like Harré, Luhmann sees a circular relationship between communication and self-hood. For Luhmann, communications are causal on the production of new communication; indeed, Luhmann's theory tends to privilege the viability of communications over the individuals who make them: individual viability depends on the making of successful communications. This is done through a process of making utterances, with each utterance contributing to an environment of what Luhmann terms 'information',

which is then perceived and interpreted as 'meaning' by others. The result of this process is the making of new utterances, and so the process continues.

With these dynamic paradigms in mind, rigid theorisation of role becomes difficult to defend. But with this theoretical examination comes a need to reconsider practical implications in learning technology. If the roles of individuals cannot be clearly identified, in what way can technologies be designed for stakeholders in education? However, the problem may not be one of design, but rather one of changing practice within the institution in order to help it adapt to a changing world. In order to achieve this, focus might better be placed on deeper understanding of the context for intervention, rather than designing technologies for stakeholders.

7 Understanding Positioning and Role in Conversations about Learning Technology

The context of encouraging technological adoption includes the social setting of an educational institution, the particular affordances of technology and the speech acts of the individuals concerned. Those speech-acts are influenced by the design of technologies, and they tend to concern statements about the 'roles' of teachers who might use the technologies. These statements (depending on how they are made) may or may not be deemed an accurate description of their function by teachers. Soon into a conversation about learning technology, both parties will have formed some sort of narrative about the other person, judging for themselves whether either the technology is any good, or whether they will want to engage in it. This will depend on the sorts of speech-acts that are performed, the manner of their performance and the functionality of the technology concerned.

Understanding the ways in which the political context of education can affect the design of technology and the storylines of individuals and their speech acts can provide a framework for thinking through the issue of intervening with technology online. Different political contexts in an organisation position people in different ways. Flood [Flood, 91] characterises this aspect of institutions by characterising three types of organisational politics: Unitary, Pluralist or Coercive. In a Unitary organisation, there are common goals and interests and values and beliefs are highly compatible. In a pluralist context, there is basic compatibility of interest but values and beliefs diverge to some extent, and there is less agreement upon ends and means. In a coercive environment, there are no common interests and values and beliefs are likely to conflict, and inevitably, some coerce others to accept decisions. Flood overlays on this a categorisation between simple and complex systems, where simple systems are comprised of few elements and few interactions and interaction between elements is highly organised governed by well-defined laws. Complex systems, on the other hand, are characterised by a large number elements with many interactions between them where the interaction between elements is loosely organised.

Given this characterisation, the political environment of education seems closest to Flood's Complex-Pluralist position: academic freedom of individuals and groups rubs and against the imperatives of a economic enterprise, stakeholder groups can have divergent views of what the institution does, and where the problems lie, and consequently feel free to adopt positions contrary to what they might feel themselves

forced to adopt. In this situation, each communication of individual stakeholders contributes to the continually emerging context of the organisation, as well as affecting the individual storylines of stakeholders. Putting Flood's distinctions together with Harré's identification of the three elements of Positioning Theory shown in Figure 2 highlights the uniqueness of the educational environment with regard to the adoption of technology. It can be argued [see Tab. 1] that in a unitary environment, there is greater consistency in the individual storylines of actors, and therefore consequently, a greater degree of coordination and stability in the reproduction of normative values. In a coercive environment, whilst individual storylines diverge, the speech acts of individuals in those environments are constrained by the coercive context.

	Unitary	**Pluralist**	**Coercive**
Position	Continually reproduced and consistent	Continually reproduced and transformed	Continually asserted and constraining
Storyline	Shared and consistent	Divergent	Divergent
Illocutionary act	Expressing shared values	Expressive of divergent values, but constrained by normative expectations	Constrained by asserted position

Table 1: Institutional Political environment and types of Positioning

In a pluralist environment, individuals have freedom to choose the technologies that suit them, but their freedom is attenuated by the context within which they operate. Within the relatively unrestricted social environment of education, individuals seek to maintain their viability within the social context they find themselves by reaching for those technologies they know work for them, those techniques which they are happy with, etc. Encouraging change to established patterns of practice with new tools means engaging individuals in a conversation where they see what's in it for them to change. However, the potential success of this conversation may be hampered by the functional role-determined affordances of the technologies that might be promoted.

This categorisation can be developed to consider the effect that technologies which encode user roles can have on these dynamics [see Tab. 2]. Such technologies effectively coerce ideas about user role. In the light of having conversations to encourage adoption of role-infused technologies, the resulting interaction risks not only being seen as a challenge to individual autonomy, but more deeply a challenge to personal identity, and as long as the legitimacy of defending individual autonomy persists within an organisation, the adoption of such technology is unlikely to occur.

	Unitary	Pluralist	Coercive
Position	Technology deployment is determined by common consent adhering to shared values about roles	Technology coerced in a pluralist environment	Technology coerced in a coercive environment
Storyline	"We will adopt this for the good of the organisation"	"What's in it for me?"	"There is no alternative"
Speech act	Expressing shared values	Expressive of divergent values, likely rejection of technology	Constrained by asserted position and by technological affordances

Table 2: Institutional Political Environment and types of positioning with role-based technologies

Using Flood's categories and Harré's Positioning Theory, it can be seen that the design challenges for technology in different institutional contexts present particular and distinct problems. Traditional role analysis techniques will work in a coercive context, participatory design might be well-suited to a unitary context, but neither of these techniques is likely to be effective in a pluralist context. Indeed, the more complex the pluralist situation, the more communications are made, and the less straightforward the process of adoption of technology becomes. Using these distinctions, confusion about the disparity between the effort of design and the success of adoption can be addressed by understanding more fully the nature of the organisational context of higher education. However, there are some technologies which do gain adoption within Higher Education. Therefore, having identified the nature of the organisational context of intervention, it is necessary to consider the nature of the storylines and illocutionary acts which are successful in encouraging adoption of technology.

8 Positioning Theory and the application of theory in Learning Technology

Whilst the reasons for the lack of adoption of Learning Design tools might be attributed to their codification of stakeholder role, technologies like RSS, Object embedding, XCRI or Content Packaging (SCORM, IMS Content Packaging, etc) have been relatively successful in gaining adoption at different levels in the institution. At the same time, the successful adoption of the Virtual Learning Environment and institutional email must also be considered. Some technologies, such as RSS or object embedding, emerge to solve particular technical problems which occur regularly in technological practice. As such, it is possible to introduce the technology in direct

response to user need rather than introduce its functionality out-of-context. In Positioning Theory terms, the speech acts made by a learning technologist might focus on the particular problems of a teacher and then, having identified a problem situation for which RSS (say) is a solution, the technology can be presented. The focus of a conversation therefore is on understanding the particulars of practice rather than the particular functionality of the technology.

With the adoption of the VLE, the situation is more complex. The VLE does codify roles of teachers as designers, and learners as consumers. In this sense, it is a coercive technological intervention. [Tab. 2] indicates that the VLE, in coercing these role descriptions, within a pluralistic environment, would cause teachers to ask "what's in it for me?" However, as sufficient numbers of staff adopt the technology, and sufficient numbers of learners use the technology, then the VLE can become part of the normative fabric of the institution. Thus, through a 'tipping point' mechanism, the VLE became part of the positioning by the institution of its teachers.

This 'tipping point' mechanism, which also applies to other institutional learning systems (e.g. plagiarism-detection systems, or e-portfolio) draws attention to the fact that whilst the general character of the University political environment is what Flood would call pluralist, elements of the environment can become more coercive through the establishment of new norms of practice, and that technology can play a role in this process. At the same time, it is worth reflecting that away from the autonomy of teachers, many aspects of the administration of the institution will not be pluralist in character, but often closer to a coercive model. In these contexts, it is easier for technologies to be adopted.

Within these two examples, there is a distinction to be made between those technologies which meet a specific technical requirement (like RSS or Object Embedding) and those technologies which enshrine specific user roles (like the VLE). It should also be added that the VLE also addresses some technical problems (for example, the sharing of files or the managing of classes). However the technical functionality of the VLE can also be met with most groupware systems, and typically institutions posses a variety of ways in which such functionality can be accessed, which can sometimes present deeper problems about the choice of appropriate technology.

The upshot of the analysis shown above [see Tab. 2] is that a conversation about a technology which does not have user roles built into it is a different sort of conversation from that which concerns a technology which does. With the former the conversation concerns a process of identifying instances in real practice where the problems the technology addresses occur and then suggesting the technology as a solution to those problems. With the latter, the conversation concerns the functionality and the articulation of a rationale for adoption which will often amount to a defence of the theory which went into designing the technology in the first place. Within the pluralist environment of education, the demand "what's in it for me?" is likely to lead to a degree of head-scratching.

9 Theory and the Particulars of Practice

By its nature, educational theory is universal in character. Positioning theory places greater emphasis on the particulars of individual communications. Whilst educational

theory deals with abstractions concerning the underlying universal mechanisms of learning, cognition, or the underlying thinking about organising the institution, Positioning Theory deals directly with what might be seen as 'rhetorical' aspects of intervening with technology in educational institutions. Understanding the particulars of practice requires a re-examination of the causal significance of theory in those rhetorical acts that underpin a technological intervention. With its focus on individual 'storylines' of actors, there is an acknowledgement of the different dimensions of theorising and the relationship between theorising and action from an individual level to an institutional level. 'Stories' and theories are similar in character, and individual theories (whether they are the theories of learning technologists or individual teachers) are causal in the emergence of new practice.

At a personal level, theory exists within the context for creating personal stories about the ways individuals are positioned. At this level, theory is a causal factor in the utterance of speech-acts, and it may be the case that personal theories are at odds with normative theories within the institution, which will also impact on the sorts of communications that are produced by individuals. For example, staff in acknowledging the "importance of technology" may appear to accept the assignations of role and function afforded by a technology whilst secretly believing that little will change and consequently their words and actions may contradict each other. At the author's university, few individuals who attend training sessions for new technologies go on to adopt those technologies and techniques in their own teaching.

Amongst senior management, theory exists also in a 'story' form, although typically such stories have a more political character. Political stories naturally contain ideas about 'role' (although these are rarely consistent), but they may be more defined by identifying differences in the ways particular individuals perform certain roles (for example, "Teacher A is terrible in class, but quite good at supervision"). Senior management is also exposed to pedagogical theory, but there can exist dissonance between personal theories and accepted pedagogical theory. In between the two, theories of institutional management present various conflicting paradigms for thinking about education. Learning technologists typically fall into a group associated with senior management, but rely on policy decisions for impact on the institution. Their thinking about the 'role' of individuals, drawing more strongly from pedagogical theory, may be more abstract than that of senior managers.

Understanding the particulars of practice means understanding the dynamic between personal stories, normative positions and the communicative acts which individuals perform. In understanding this dynamic, it may make little sense to create technologies with groups of users in mind. Instead, it becomes more important to 'act technologically' within the context of communicative acts with individual stakeholders. Applying such a theoretical approach to the engagement with learning technology entails learning technologists becoming skilled 'positioners' within conversations about teaching and learning practices whilst also being equipped with the means to intervene effectively to address particular problems of practice. With skilled positioning, the conversation about learning technology starts not with the affordances of technology, but with the teacher's practice.

10 Technological Implications

Our argument therefore is that theory should retreat from the design of learning technologies and focus on the particulars of teaching and learning practice. However, this raises the question of the grounds for the specification and development of new technologies in education.

The process of teaching and learning with technology throws up technical problems. Typically, problems of search and discoverability of resources, or self-publishing, or authentication, or interoperability between systems will not be problems which are peculiar to learning technology, and solutions to these problems are likely to be found in the wider technological community. In this way, the specification and design of learning technologies can be lead by a mapping between the technical problems that are experienced in the practice of education to the emerging technological solutions to those problems in the wider world.

Typically, the technical issues arising from daily teaching and learning practice with technology raise questions such as "How can I transfer my quiz to a different system?", "How can I give access to my course for a group of external partners?", "How can I edit this video to customise it for my learners?", "How can I run this old computer program on new hardware?". Interoperability is the fundamental connection between each of these issues, and behind interoperability lies the adherence to technical standards. In this way, a link between the challenges of the particulars of practice may be mapped onto specific requirements for the adoption, development and support for new levels of interoperability.

Recent examples of this include the interoperability of widgets in learning platforms using the W3C widget standard [Wookie, 11], which directly addresses the question "How can I use the same tool across different platforms?". Alternatively, XCRI as an e-learning standard directly addresses the question "How can my course information be repurposed in a variety of forms and purposes across the institution and between institutions?" More recently, the WebVTT [WebVTT, 11] standard addresses the question "How can I subtitle my videos and have the text searchable within a web document?"

The technical effort to realise existing interoperability standards in education can therefore co-exist with a deeper theoretical effort to understand the real problems of teaching and learning with technology and arm learning technologists with an array of tools which address the direct problems of teachers and learners without presupposing the roles of different stakeholders.

11 Conclusion

The panorama of learning technologies presents some confusing features. Why do some technologies which were not designed for educational use (e.g. the Web search engines, YouTube) result in deep transformation of educational practice? Why do some learning technologies which seem well thought through, and with a strong base in educational theory (e.g. IMS LD), fail to transform educational practice? Why do some learning technologies which seem restrictive and poorly thought through from the point of view of educational theory (e.g. VLEs), become pervasive in educational

institutions. This paper has presented the case for an overarching explanation of these issues focused on the problems raised by the design of learning technologies 'for' users as described by different 'roles'. Two theoretical approaches to explain how these problems lead to seemingly contradictory manifestations have been introduced. Firstly, positioning theory has been used to argue that building-in roles into technology which are grounded in theories about learning is to be avoided. The roles inherent in the functionality of the technology can shape the conversation that occurs when teachers and learners are encouraged to adopt the technology which can lead to positioning situations where teachers don't recognise the role that's been designed for them. Secondly, Flood's characterisation of the differences between the social contexts of institutions allows for a richer comparison between those contexts where technologies are introduced.

The case has been presented that insight would be gained by a shift in the focus of theory in learning technology from the design of interventions, with their associated demarcations of role, to a deeper understanding of the particulars of practice. This move has two implications:

1. the design of technology should be driven by the functional requirements emerging from technical issues arising from teaching and learning with technology;
2. the identification of new functional requirements is gained from a deeper understanding of the particulars of practice

By creating technologies to meet technical and functional requirements grounded in emerging technical issues, the nature of conversations learning technologists have with teachers and learners shifts from articulating roles and justifying theories which underpin the design of technologies, to inquiring about practice and meeting specific problems with specific technical solutions.

Positioning Theory spells out a relationship between an inner world of individuals and an outer world of communication. With its emphasis on the relationship between the speech acts of individuals, their personal theories and ‘storylines’ and the normative context of education, it can help in gaining a broader understanding of the institutional context of learning technology. However, there is yet no clearly articulated mechanism for how the inner world and the outer world of communications (including technology) might interact. Yet, behind all theories of education lies some degree of speculation about how the inner world and the outer world are connected. The challenge for learning technologists is to explore this, but in ways where a process of theoretical testing and development can take place without adversely affecting the communications within real institutions.

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