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A taxonomy for simulation learning designs: implications for repositories

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**Description**
Project EnROLE2 has been a two year $200,000 project funded by the Australian Learning & Teaching Council (ALTC) to encourage uptake of online role based learning environments, with particular focus on what is commonly referred to as role play. Role play is widely acknowledged to be a powerful teaching technique in face to face, blended and online teaching contexts and has been previously singled out as an example of good practice by ALTC predecessors: CAUT, CUTSD and AUTC. The first known example in Australia, and possibly the world, was Middle Eastern Politics Simulation by Andrew Vincent & John Shepherd which started at The University of Melbourne in 1990, continued when they moved to different universities in another state in 1994, and is also run by other universities (see Vincent & Shepherd, 1998). MEPS' 20 year history is well documented in books and videos (for example Alexander, 2005; Wills, 2009).

**Location**
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A taxonomy for simulation learning designs: implications for repositories

Sandra Wills
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Background
Project EnROLE\(^2\) has been a two year $200,000 project funded by the Australian Learning & Teaching Council (ALTC) to encourage uptake of online role based learning environments, with particular focus on what is commonly referred to as role play. Role play is widely acknowledged to be a powerful teaching technique in face to face, blended and online teaching contexts and has been previously singled out as an example of good practice by ALTC predecessors: CAUT, CUTSD and AUTC. The first known example in Australia, and possibly the world, was *Middle Eastern Politics Simulation* by Andrew Vincent & John Shepherd which started at The University of Melbourne in 1990, continued when they moved to different universities in another state in 1994, and is also run by other universities (see Vincent & Shepherd, 1998). *MEPS’* 20 year history is well documented in books and videos (for example Alexander, 2005; Wills, 2009).

The project goal was to encourage uptake of online role based learning environments by building a repository of learning designs for role-based e-learning which would better reward and recognise teachers already using role play and scaffold teachers wanting to get started with role play.

*The BLUE Report* (available on the website) describes the project’s outcomes and achievements in 4 sections representing 4 phases of the project: Building, Linking, Understanding and Extending. Over 60 learning design descriptions have been collected in the EnROLE repository. A key finding of the project is that a good practice database (repository) cannot be built without simultaneously building a community of practice and that the role of connector/broker is essential for community development.

Definition of online role play
A hurdle in the progress of Project EnROLE was pinning down the definition of online role play. As a newly emerging area, there was no agreed firm definition and the definition was prone to change as new examples evolved.

Early on we agreed to keep the terminology more broadly as “role-based e-learning” rather than the narrower term “online role play” and we defined online role-based learning environments as having the following characteristics:

- designed to increase understanding of real life human interaction and dynamics
- participants assume a role in someone else’s shoes or in someone else’s situation
- participants undertake authentic tasks in an authentic context
- task involves substantial in-role interaction with other roles for collaboration, negotiation, debate
- interaction between roles is substantially in an online environment
- learning outcomes are assessable and generate opportunities for student reflection.

\(^2\) enrole.uow.edu.au
Although this definition was reasonably broad there were a number of examples of practice that were encountered but were not included in the results because it was decided that they fell outside the definition.

One example was DRALE Online. Developed by Law academic, Martin Davies, and educational developer, Matthew Riddle, for Dispute Resolution and Legal Ethics at The University of Melbourne, students worked on four different cases for almost a full year.

Real case files have been modified to remove identifying information such as company names, and then placed on the system. Each student is assigned to a law firm with 4 other students. These firms are then made either plaintiffs or defendants, and matched with an opposing firm. When each student logs in, they have access to the appropriate case file – a set of documents as background to their case. They must read and understand their file, add their own documents during the course of the role play. Students have access to communications tools which allow them to send messages to the opposing firm and to their 'senior partner' (played by the tutor), to file documents with the court, or to serve documents as writs.

New documents from others appear in an inbox which reads like a 'To Do' list. The students can also see when another member of their firm is online when they log on. Documents which require authorisation have flags (using check boxes) to allow other members of the firm to approve or disapprove of the documents which are to be sent. At least 4 out of 5 of the firm must agree, with no disapprovals before a document can be sent. (Riddle & Davies, 1998, p.603)

I did not include DRALE in the list of online role plays as its focus was on the process of doing a job and passing documents between roles as part of that process rather than on the human interaction between roles. Instead of being put in someone else’s shoes, the roles performed the job that the Law students would be doing once they graduated.

Via email, Riddle debated with me whether DRALE Online was a role play. He says:

The DRALE project is important for me because I see it as sitting at the top of a sort of family tree of case-study based role-plays that were subsequently developed [my bold] -- most of which I seemed to work on at some stage, I suppose because of my growing interest in role-plays as a teaching and learning method.

I am familiar with First Fleet..., the Mekong e-Sim, and Middle East Politics.... I would say that DRALE is a bit different, but not all that different, from those examples. The main difference would be that students aren't given a character to bone up on and play -- they must play the role as they themselves would act if they were given the case "as a lawyer". They also work in teams. They don't have fictionalised/historical characters, but they do have individual "roles". The most important thing is that these are roles that many of them will later take on as professionals. (Email correspondence, March 2006)

Riddle goes on to describe a tool called STRATA which was developed at The University of Melbourne to assist academics wanting to use this type of teaching approach and mentions another example which was developed in STRATA but which he does not categorise as role play:
STRATA was aimed at delivering case-based and role-based materials [my bold], and could handle individual (role-based) delivery as well as groups, as well as time-release of materials. It was first used for a project in the Department of Information Systems known first as ISIS and later as OAC. This project is really an "interactive case-study" project rather than a role-play. I don't think it could be regarded as a role-play in any real sense -- although students do take on a "role", and receive information as though they are acting in that role, they don't really interact with each other [my bold]... I see that as part of the definition of a role-play: it takes a minimum of 2 players. (ibid)

Late in this project, we encountered a grouping of role plays in the UK which were very similar to DRALE Online and were developed using a tool called SIMPLE. Ardcalloch, the original role play, was not called “role play” by the designers. Instead they chose the term “transactional learning” because their emphasis, like DRALE, was on the transaction of legal documents (Barton, McKellar & Maharg, 2007).

Ardcalloch was a virtual town environment for the learning of law at the professional stages of legal education in Scotland, and in particular the Diploma in Legal Practice.

Within this town were located the virtual law offices of postgraduate law students who interacted with resources and online fictional characters in order to complete legal transactions – for example buying and selling property over the web (Conveyancing) or winding up the estate of a deceased client of their firm (Private Client)...

The Ardcalloch environment consisted of the following:
- Map and directory of a virtual town (Ardcalloch), which was used as the project context, and provided content for specific simulations. The virtual town provided the implicit simulation world of the transactions undertaken by students.
- Virtual professional workspace
- Monitoring and mentoring capabilities
- Communications routes between simulated characters, students and staff
- Teaching, learning and assessment templates, including curriculum guidelines (Hughes et al, 2008, p.8)
These types of learning design, in which the roles were secondary to the purpose of the simulation and where the emphasis was on process or transaction, were decided to be out of the scope of the project. However they were significant examples and during the course of the project I formulated a proposal to view them as being at one end of a continuum of role-based learning designs in general rather than being a completely separate species.

Also throughout the project I had rejected the word “simulation” to describe online role play, as used by the Middle Eastern Politics Simulation, and perpetuated by Ip and Linser, arguing that simulations involved one role playing against a computer model. Again, although roles were involved, they are not interacting with each other. However the word simulation kept appearing in the UK context e.g. SIMPLE so I re-examined the definition to see if I could make it more encompassing of transactional learning and simulations in general.

A Simulation Triad

In agreement with Linser, Naidu & Ip (1999) I now propose that role plays are a type of simulation and I have developed a Simulation Triad framework (Figure 2) to better position this emerging type of simulation, accounting for the myriad ways of designing role-based learning environments that the project had catalogued. The Triad also indicates the relationship of role-based learning to problem-based learning (and case-based learning as inferred by Riddle above).

Going back to earlier literature on (face to face) role play, I note that Gredler (1992) divides simulations into two main categories:
• **Tactical decision simulations** focus on analysing data and on achieving particular outcomes from the decisions based on that analysis. The learning outcomes are capabilities in data selection, organization, interpretation and management.

• **Social process simulations** focus on interactions among people and how their beliefs, assumptions, goals and actions influence decisions. The learning outcomes are the ability to work in social systems, to build insight or empathy, or to develop communication skills.

Online role play simulations, as originally defined in this study, included social process simulations, but not tactical decision simulations. They involved realistically complex interaction between the roles, perhaps better described as personas, rather than building sophisticated models that generated experiences (data) for the student to analyse.

Rather than continue with strict definitional boundaries, I now suggest that there is a continuum, in which online role play may involve a simulated problem context and analysis of related data, but where the focus of learning is on how the roles interact in dealing with the problem.

The Simulation Triad takes as its starting point that all simulations involve roles and rules and a problem (sometimes called case, situation or scenario). Developing a framework that recognises design decisions according to the amount of emphasis put on Roles versus Problem versus Rules means that other examples can now be accommodated without compromising the integrity of the role play design that emerged in Australia following the Vincent and Shepherd model. Some of Gredler’s terminology for simulation categories has been adapted to label the three sides of the Triad.
My Triad graphic also serves to indicate the differing role of the computer in online simulations. Traditional simulations such as those that model Nuclear Power Plants are computer-based, the learner interacts with the computer, whereas role plays are computer-mediated, that is, the learner interacts with others, via the computer.

Because of the way the project originally defined role-based e-learning, the majority of the 60 online role play learning designs collected in Project EnROLE’s repository are along the role-problem continuum and the examples that were previously excluded belong along the role-rules continuum. However Figure 3 maps a few examples from the repository onto the Triad in order to illustrate the diversity of role-based designs.

![Simulation Triad](image)

**Figure 3 Situating online role play examples on the Simulation Triad**

**One scenario: two differing learning designs**
An illustration of the differences between types of simulations is provided in a paper by Kristin Demetrious in Project EnROLE’s Online Role Play Symposium at ascilite 2007 in Singapore.

*Save Wallaby Forest* was first developed as an online role play in the university’s Learning Management System for a Public Relations course at Deakin University (Demetrious, 2004) and later re-developed as an e-simulation *PPressure Point! Getting Framed* (Demetrius, 2007) for the same course.

The role play aimed to deepen students’ understanding of the theoretical frameworks of pluralism and Marxism and the complexity of relationships between groups in society. It asked students to adopt an allocated perspective and ‘cast’ themselves as either a property developer or an environmental activist in a public debate. Participants in the role play were anonymous and randomly divided into two groups. Anonymity was designed to facilitate greater involvement, and
thus to help students experience ‘what and why’ the situation/debated developed... In the first step, participants watched a four-minute video that set the scene with generic information about an environmental planning dispute. Next they were asked to research their particular theoretical position through hyperlinks to web information. Then, in their separate groups, participants were provided with further ‘private information’, a detailed ‘role profile’ description, and a group task to complete. The group task was to produce a 500-word speech to post at a public meeting. Finally, after they had posted their speeches representing different perspectives, the two groups were encouraged to critique each other’s position. (Demetrious, 2004)

The online participation, which takes between 4 to 10 hours over several weeks, plus the essay, contribute to 40% of students’ overall mark.

In my experience, the exciting pedagogical dynamics of the online role-play also place unexpected demands on both teachers and learners. Students’ capacity to participate fully in the exercise can be affected by such things as distance for example, students that are located in different time-zones, or by an unwillingness to commit. Furthermore, like most group-work, Save Wallaby Forest is subject to the sometimes unpredictable social processes of membership formation that may affect the extent of a participant’s inclusion or exclusion. Indeed, these dynamic and problematic factors influenced my decision to offer online role-play in the post-graduate study area of Deakin University where smaller cohorts of around 40-50 students were a more manageable size for the learning activity. PRessure Point! GF, while based around similar learning themes as Save Wallaby Forest, was developed for large undergraduate cohorts where students interact with the technology as individuals. (Demetrious, 2007, p.189-90)

The e-simulation uses the same story and characters that were developed in Save Wallaby Forest, but puts students in virtual workplaces, with a deadline and task to complete.

The different technology used to create the e-simulation is much more complex than the standard LMS discussion forums used for online role plays but opens up other possibilities and takes some new directions.

PRessure Point! introduces more ambitious pedagogical outcomes than the development of a set of work related skills, although, unlike the online role-play Save Wallaby Forest where team work is central, it is designed as a ‘stand alone’ activity where individual students control the learning process. (Demetrious, 2007)

The differences between the two learning designs around the same teaching resources are explored in Table 1 (derived from Demetrious, 2004 and Demetrious, 2007).

Table 1 Comparison of Save Wallaby Forest role play and PRessure Point e-simulation

<table>
<thead>
<tr>
<th></th>
<th>Save Wallaby Forest role play</th>
<th>PRessure Point! e-simulation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Student roles</strong></td>
<td>• 2 roles – half the class plays each role</td>
<td>• 1 role – individual student interacts with computer simulation</td>
</tr>
<tr>
<td></td>
<td>• randomly assigned</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• anonymous</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• roles communicate via the computer forum team work essential</td>
<td></td>
</tr>
<tr>
<td><strong>Learning objectives</strong></td>
<td>• theoretical frameworks of pluralism &amp; Marxism</td>
<td>• theoretical frameworks of pluralism &amp; Marxism</td>
</tr>
<tr>
<td></td>
<td>• experience real-world unethical activity e.g. astro-turfing &amp; green-washing</td>
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</tr>
</tbody>
</table>
In summary, both ICTs address different aspects of democratic and constructivist learning principles, however, I found that Save Wallaby Forest has more creative potential for students than PRessure Point! GF. This is because the role-play uses technology that facilitates communicative interaction and also because the dynamics of teamwork leads to greater opportunity for dynamic creativity and input by students. In comparison, PRessure Point! GF is more rigid. Students are pointed at the resources and aside from varying levels in their ability to write a media release, most will produce similar looking and sounding documents. However, PRessure Point! GF exposes students to more alternative viewpoints than the online role play which may lead to a richer learning experience. Moreover, in Save Wallaby Forest, the intensive moderation and input required by students and teachers offsets the value of collaborative, dialectic learning. Therefore, PRessure Point! GF, while less participatory, exposes students to a wide range of ideological views in a highly engaging way and can be used successfully with large groups. (Demetrious, 2007, p.191)
Other examples that are more like *PPressure Point* in their emphasis on the problem and their use of only one role to explore that problem include *Virtual Patient* at Glasgow Caledonian University (Figure 4) and *Accident Investigation* at University of the West of England. Both constructed in Second Life, they share with *PPressure Point* a richer, more graphically immersive interface which creates an aura of authenticity via the setting of the problem rather than via the roles. The emphasis is on interaction with rules and processes for diagnosis rather the interaction between roles.

![Figure 4: Virtual Patient Second Life simulation, Glasgow Caledonian University](image)

**Implications of the Simulation Triad for Learning Design Repositories**

EnROLE’s Simulation Triad visually positioned role based learning in relation to simulations in order to better explain what role play is, with its emphasis on student interaction between roles, in role. However it also serves to position it in relation to problem based learning. This broader definition provides scope for other learning designs to be added to the repository by showing us how to broaden the keyword index. The repository could therefore include learning designs variously described as:

- Role Based Learning
- Problem Based Learning
- Case Based Learning
- Scenario Based Learning
- Situational Learning
- Collaborative Learning
- Computer simulation
- Scientific modelling.

Developing a taxonomy of learning designs was an issue grappled with in a previously-funded AUTC project on Learning Designs³ as well as in a number of UK projects such as DialogPlus⁴, Phoebe Pedagogic Planner⁵, Compendium LD⁶, London Pedagogy Planner⁷. I propose the Simulation Triad as the basis of a taxonomy of learning designs.

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³[www.learningdesigns.uow.edu.au](http://www.learningdesigns.uow.edu.au)
⁴[www.nettle.soton.ac.uk/toolkit](http://www.nettle.soton.ac.uk/toolkit)
⁵[www.phoebe.ox.ac.uk](http://www.phoebe.ox.ac.uk)
The Triad has the potential to change the way repository managers design a keyword index, differentiating more finely within the keyword “simulation”. The Triad approach also has the added benefit of being a visual representation of the taxonomy. The “slider metaphor”, developed to position role based learning activities in the field of simulation, is being considered as a navigation interface on top of the EnROLE repository. Other repositories of learning designs have expressed an interest in exploring this navigation interface and we are looking at opportunities for collaborative research and development in order to improve accessibility of repository information.

References


1 www.kn.open.ac.uk/public/workspace.cfm?wpid=8690
2 www.wle.org.uk/d4l