

'Needle Stick' - a role-play simulation: transformative learning in complex dynamic social systems

Kate Fannon

Abstract

This article presents a rationale for why role-play simulation is an effective and socially dynamic learning strategy for VET or HE. The factors of generational change, work world demands due to global economics and rapid technological developments are drivers for educationalists to focus more on the process of learning rather than the content. Role-play simulation offers learners not only the opportunity to practice problem-solving in practitioner contexts but also to engage in transformative learning through focusing on their interpersonal communication skills as they try to come to agreements and implement solutions.

Introduction

Needle Stick was designed and developed in the Fablusi™ learning environment for an action learning research project in 2002 to investigate goal-based elearning in a role-play simulation which modelled a complex social system. It dealt with the issues surrounding the operation of a Needle Exchange Program in close proximity to a school in a provincial city. For this I facilitated the online induction of 14 VET (Vocational Education & Training) lecturers distributed over 4 States, moderated the simulation and then facilitated the debrief both online and through a 5 end-point video conference. This learning strategy is highly immersive and engages the

learners by placing them as agents of the activity rather than as reactors to content. Given a scenario, the goals of private and public agendas in each role-profile and the published public profiles of other roles, and a range of informational documents, participants must negotiate solutions in collaboration with those they form alliances. This immersion and co-creation of the community and the solutions is a relational experience and as such is a dynamic model of learning rather than a distanced critical analysis.

There is significant tension in education between those who hold to traditional largely instructivist/behavioural views of learning and those who find themselves on the continuum of situated cognition and constructivism. There are, however, several factors which will lead tertiary educators to reassess instructional design and facilitation with more compulsion; these chiefly being the transition of many learners from the baby-boomer and X generation to the Y generation and the subsequent competition for such learners in an economic rationalist and global market. The educational rationale for the new learning is likely to be modelled on the findings of neuroscience and on appreciating the Y generation's intolerance for static displays of text and slow-paced, predictable learning. Perhaps this gap between generational learners can be best expressed by Stephen Downes' web log commentary on a simulation on running Enron which was reviewed by David Becker:

Think You Can Run Enron? Play the Game

Stephen Downes

Why create this simulation to promote learning? One of the best sentences I've seen this year explains it in a nutshell:

"We did a lot of surveys, and people over 35 merely disliked the e-learning content," he said. "The under-35 audience couldn't stand it."

There's a lesson there:

"It's turned out to be somewhat of an age thing. The people under 35 get it pretty quickly. The ones over 35, especially if they're traditional training people, ask where the bullet points are."

(Review by David Becker, CNet, July 10, 2002)

Educators will need to understand the motivations of the digital generation if learning is to engage and be effective. Sternberg (1998) reiterates what we know from brain science:

Motivation drives metacognitive skills, which in turn activate learning and thinking skills, which then provide feedback to the metacognitive skills, enabling one's level of expertise to increase.

Currently in Australia most role-play simulation work is being done by Higher Education, namely Macquarie University (Andrew Vincent & John Shepherd) and the University of Melbourne (Roni Linsler) in the field of political science and foreign policy, and by the University of Technology, Sydney (Robert McLaughlan) with Charles Sturt University (Denise Kirkpatrick) in the field of groundwater management. The Departments of Political Science in both Macquarie and Melbourne universities run their simulations in collaboration with international universities to maximise political perspectives and motivation. VET, given its training imperatives, needs to investigate role-play simulation more rigorously as it is ideally suited to the 'soft' skill development of a post industrial world where service industries dominate. However, the reality in HE and VET is that most elearning is a reflection of face-to-face learning: specifically lectures, readings, set assignments and tests of memory. The discussions about collaboration, problem or inquiry-based learning, situated learning and cognitive apprenticeships (Brown, Collins & DuGuid 1989) have not transformed what is delivered. Traditional learning is stressed by massification and economic rationalism but putting loads of content online in a lock step linear sequence contradicts the fundamental dynamics of a hyperlinked communication system, most of what we know about effective learning and brain science, and the performance requirements of the work world.

The world of work transforms quickly due to global pressures and the pace of technological change, with the result that the most valued and valuable employees will be those with flexibility in analysing and responding constructively to change: not regurgitating memorised information or out-of-date solutions. What is more disturbing about online offerings in VET is the disproportionate amount of assessment through quizzes and other click, drop and drag interactivity. Quizzes rarely evidence deep learning, strategic thinking or competency but they are popular because the technology exists and feedback is instant. The latter is attractive but such learning is at the lower levels of skill development in the cognitive and affective domains: namely memory recall of knowledge and comprehension rather than the higher areas of analysis, synthesis and evaluation of Bloom's Taxonomy (1956). Needless to say, it does nothing for the development of important soft skills such as influencing, negotiation, accommodating and compromise. These interpersonal communication skills are the foundation of quality service industries and effective performance in management and work-based teams.

In addition, much online learning has high drop-out rates with learners giving up on reading vast tracts of information on eye-unfriendly screens. This will become even more pronounced as the Y generation moves through to tertiary education. This

generation will not tolerate static, linear online learning. Independently of educators, many in this generation have developed a set of communication skills including simultaneous parallel processing while they text message, chat, download music and finish their homework all at the same time with help from their pals on their mobile phones. Their affinity with collaborative multi-tasking is really a response to the nature of the networked digital world in which they have grown up. Educators, particularly those of the baby-boomer generation, need to tap into this very social multi-tasking when they design learning. It is a matter of seeing education as Dewey did, as a social process but not limited to the lecture or tutorial modes where one-way, one at a time interaction dominates. Indeed, Vygotsky espoused that “full cognitive development requires social interaction”(1978). The Internet must be treated as more than a repository for information and education is much more than accessing information. Education is about the selection, analysis and manipulation of ideas to solve a problem, to create new questions, or create a product/service. The power of the Internet is the networked communication which has vast collaborative learning potential. Well-designed learning can maximise both social and cognitive interaction.

Designing and implementing role-play simulation is one method of creating a social world where participants collaborate to solve a problem. In the simulation, *Contaminated Sites Management*, (McLaughlan & Kirkpatrick 1999), the participants had to understand the principles of environmental decision making in order to resolve conflicts of the stakeholders. In *Needle Stick* (Fannon 2002), the participants had to understand the issues around a needle-exchange program in a regional city in order to resolve a number of stakeholder conflicts about whether the program should be closed, relocated, or left to operate in its current location but with a range of new management and drug education initiatives. Central to a satisfactory outcome in this simulation was success in interpersonal or soft skills as the issue was social and did not have a framework of decision making particular to a scientific field. Though in reality, once we move from the known parameters of a science, the decision making will be strongly determined by interpersonal factors in communication.

How neuroscience informs learning design and implementation

The loading of content followed by testing also contradicts the research into brain science or neuroscience over the last decade. The research findings have initiated a discussion in education (Caine, R. & Caine, G. 1994; Marchese 1997) about how humans think and remember, and what that means for traditional teaching methodologies such as lecturing and the testing of information based on readings. Edgar Dale is known for his Cone of Learning (1969) which indicated the memory effectiveness of a range of learning methodologies after a 2 week period. As we

can see below in Fig 1, *Cone of Learning*, the traditional and mainstay teaching methodologies of tertiary education such as lecturing and giving out of readings are the least efficient in memory retention for learners:

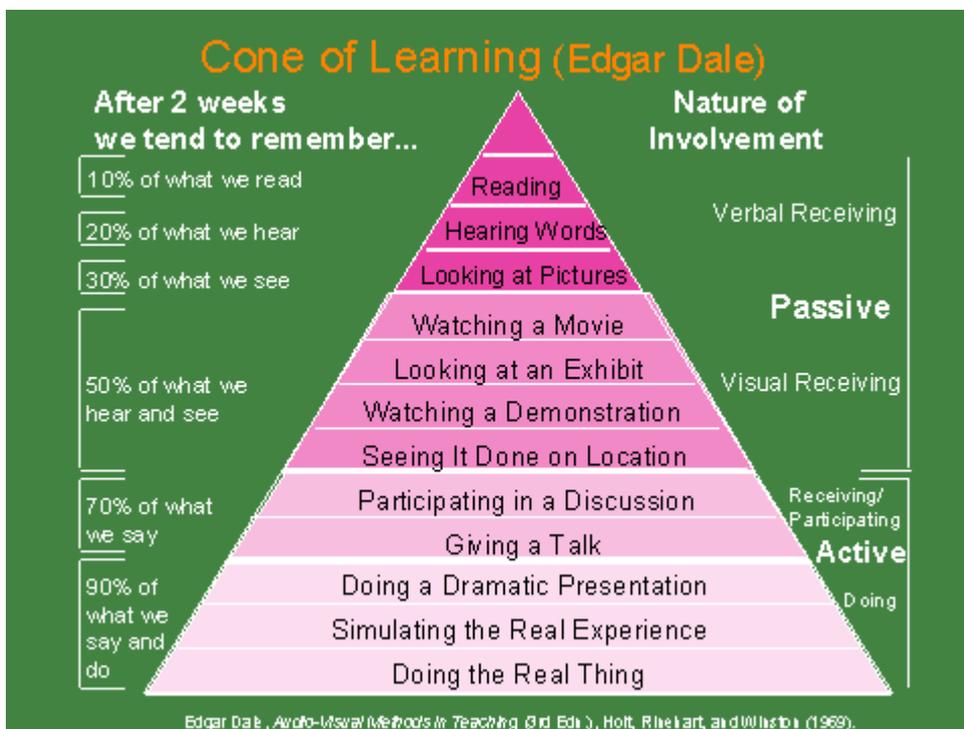


Figure 1: Cone of Learning - <http://www.cals.ncsu.edu/agexed/sae/ppt1/sld012.htm>

Even the use of audio-visual materials with all their production costs has only 50% memory retention. While discussions in online courses give greater learner participation than in most face-to-face courses, this teaching strategy is still only enabling 70% memory retention and an interesting question for future research would be the effectiveness of discussion/reflection after the learners have done a practical activity in an authentic context or taught others. It is quite clear from the *Cone of Learning* that situated learning such as apprenticeships, field trips, problem-based and collaborative learning, and role-play simulations are the most effective learning strategies in terms of long-term memory retention. These learning strategies are experiences where the learners must analyse and synthesise ideas for a context and put them into practice, must communicate with others in order to execute the task/s and must judge or evaluate what they do when they teach others. This is often called the 'ah-ha' factor when learners struggle mentally and come to form their own hypothesis

or realisation. These learning actions (analyse, synthesise, judge) also operate at the higher levels of Bloom's Taxonomy. The irony of human endeavour in education is that we are still struggling to devise meaningful and effective learning experiences for each new generation without moving far from the least effective teaching strategies. Indeed, while in 1956 Bloom estimated that over 95 % of the test questions in the USA required students to think only at the lowest possible level...the recall of information, Aristotle asserted, "*What we have to learn to do, we learn by doing*" and Einstein repeated, "The only source of knowledge is experience".

Neuroscience or brain-based research has made a number of discoveries including the following:

- Plasticity of the brain – its ability to realise new capacities, new rewiring across neurons in response to new experiences. So intelligence is not an innate capacity fixed at birth. It can change over a lifespan given enough challenge and safety.
- The challenge should arouse but not threaten. There needs to be emotional safety.
- The brain is social.
- Transformative learning occurs when the senses and emotions are engaged as well as the thinking capacities of the cortex. Learning is a whole person/ whole brain activity.
- The brain establishes meaning through patterning and emotions are crucial to patterning. The cortex (centre of thinking) is synaptically tied to the limbic system (emotions).
- Adequate time is needed for each phase of information processing. Learning is a process.

When we examine role-play simulation as a learning strategy, we can make a number of claims in relation to the above statements.

- Firstly role-play simulation is strongly experiential which challenges learners both logically and emotionally. The situation is purposely messy or ill-defined; the problems and their answers are buried within a range of personalities and their private agendas which have to be attended to before logical, well-informed solutions can be found. This mirrors more exactly the problematic situations that our learners will find themselves in when they join the work world. The plasticity of the brain to develop new capacities when challenged by experience is also proposed by Sternberg (1998) when he argued that learners' abilities are capable of being modified over time, that they are not fixed and innate, and

that expertise involves using both explicit and implicit knowledge within real world contexts. A reflection by a participant in *Needle Stick* restates how learners are challenged logically and emotionally as learning in a simulation is a whole brain activity:

I tried practising being more assertive about ‘my’ opinions – and the learning outcome idea was to be able to handle the flak ... without losing confidence! It didn’t work...though perhaps now after debriefing, I’ve shifted.

- The comment above also illustrates that learner’s abilities are capable of being modified over time and that learning is a process. Soft skill learning outcomes will develop over a considerable time of working on them.
- The challenge, however, is located in a relatively safe space where learners can rehearse their negotiation and decision making skills with the support of a moderator and peers with whom they have formed simulated alliances. They can do this before being placed in a real situation where the repercussions of poor negotiation are far greater. The power of role-play simulation is that it frees participants to be ‘other’ and to rehearse the skills of being ‘other’ without the pressure of known peers and their judgements about who they are. It effectively provides a mask and a relatively safe place to try out skills and organisational roles, and back up their arguments with evidence from research as they pursue their goals. A debriefing comment by one participant in *Needle Stick* emphasises how important safety is:

Forming alliances worked well for me as it gave me a sense of security from which to launch out.

- Role-play simulation is transformative because it engages both cognitive and affective domains equally within a whole reality. Each participant is proposing and defending agendas which are meshed in a personality outlined in their role and executed through the worldviews and communication capabilities of each individual participant. As a consequence of such strong emotional and mental involvement with the roles, many learners will experience a range of both positive and negative feelings as they would in a conflict situation in real life. Debriefing is essential to deal with these experiences and to enable learners to detach from their roles as well as to draw out the learning from the experience.

- Role-play simulation is in essence a social experience: it cannot happen without a group of people interacting within a social context to solve a problem. They form a virtual community, sometimes termed a “parallel universe”.
- The power of a role-play simulation compared to face-to-face role-play is that it does not have the time/sessional boundaries of f2f role-play but is run over several weeks. The extended timeframe of virtual communities more closely recreates the complexities of real-life negotiations and changing agendas over time and between meetings where not all players are cognisant of all the discussions or new agendas. This is so as different roles/players have access to different ‘rooms’ with different levels of rights for reading, writing and editing, and players are privately forming alliances through sim mail (email internal to the simulation environment). The opportunities for reflection and mental processing inherent in an extended time-frame provides adequate time for information processing as new mental models are formed. This was commented on by a participant in the debriefing phase of *Needle Stick*:

I appreciated the headspace between postings that allowed me to formulate my ideas and work through other participant’s postings. This isn’t really available to the same degree in f2f.

- The phases of implementing a role-play simulation start from induction, proceed to the simulation and then debriefing. The immersion in the simulation followed by debriefing accords with Kolb’s work on experiential learning cycles where immersion in the experiential task is followed by reflecting on what has been experienced, interpreting the events, understanding the relationships and considering what action should be taken next time (if the scenario was in the real world or the social context was modified).

Marchese (1997) talks of “grudging compliance and sullen disengagement” where students are forced into high stress, competitive learning. He is referring to American classrooms but this applies equally in Australia where the vast majority disengage before year 12 and those who continue face very high levels of competitive and memorisation stress. A significant factor in this stress is that learners are trying to understand knowledge abstracted from the situations in which it is used by experts or practitioners. This brings us back to the argument for cognitive apprenticeships by Brown et al. (1989). Though role-play simulation is not situated directly in the concrete work world as per the apprentice or trainee, it does simulate a real world scenario. Here the learners must propose and negotiate within a social context just as the expert practitioner in the work world not only uses domain specific knowledge, but

continually tests and refines the product or service as it is negotiated with clients and customers. In essence, role-play simulations are collaborative anchored rehearsals for later practitioner contexts and take the learners along the path of Sternberg's developing expertise. Bransford et al. (1989) stress that the problems of these practitioner contexts need to be challenging and interesting. When we consider how role-play simulations are used by some universities to develop not only understanding of political science issues but also how the communications operate in this context, then we have indeed challenging learning. Vincent and Shepherd (1998) run role-play simulations in the Department of Political Science at Macquarie University and in an interview by Robyn Maher, 'Politics come to life – Simulating the Art of the Possible' (in Convergemag.com), Vincent comments on both the nature of effective learning where students practice or 'discover themselves', and of its relevance and quality in terms of the expert practitioners in the Australian Foreign Affairs Department:

I see learning as more than extracting information from books. It's a process of self-discovery and learning about yourself and how an individual interacts with the world around them. Simulations have a number of advantages as a learning method where the aim is to gain an appreciation of processes or complex dynamic social systems. Things students discover themselves, they never forget. In a very practical sense, I believe participating in the simulations has given our students an advantage in the job market. For example, a number of our undergraduate students have been placed in the Australian Foreign Affairs Department.

The range of practitioner contexts is as wide as there are practitioner fields. The participants in *Needle Stick* came from a variety of vocational areas and after experiencing a role-play simulation, three participants had the following suggestions:

1. In my vocational area (Child Care) you could use it for a variety of different situations, especially OH&S, attitudes and beliefs of students about different family structures and parenting styles, and also difficult situations involving ethical dilemmas.
2. I am planning to use Fablusi with Human Services lectures assessing skills in observation and client contact...as a strategy I think it's applicable to almost any area of soft skills learning.
3. It would work extremely well in Industrial Relations, Manage Employee Relations Change and Employee Separation, Performance Management, HR Policy, HR Consultancy and Work Teams to name a few.

Web-based role-play simulation as opposed to computer-based simulation

There is considerable confusion between these two types of simulation. Simulation is commonly understood as the artificial creation of a real world system so as to teach us how it functions. This may be mechanical as in a flight simulator or trying to model human systems for business, military strategies or the youth leisure market of *SimCity* where the needs of animated people must be met through the building of a house, managing transport and their daily physical needs such as sleep and toileting! Most of these simulations of human behaviour are rule-based – either heuristic or algorithmic and as such are incapable of capturing the number and range of variables possible in the complexity of human interaction that is also often ill-defined. The result is that these rule-based simulations create very limited realities which can be counter productive as they oversimplify and approximate what can happen in any situation. The learner cannot create or enter any other variables. Even if the player is given up to 3 or 4 choices in each response, that is but a small fraction of the number possible. Prensky (2002) in *Why NOT simulation?* cites Jaron Lanier, an artificial intelligence researcher as arguing:

...it is folly and arrogant to even try to simulate humans because we will never get there – people are too unpredictable and surprising. Classifying people into, for example one of six (or 20, or 100) character types for purposes of simulation, as many behavioural models do, may be useful for some purposes, but may not buy you very much in terms of achieving “real world” accuracy.

Educators should be devising learning where learners are engaged in a process of interpreting each individual's thinking and decision-making within a social context, and then respond effectively – but that response will also be framed by each learner's very individual cognitive and affective mental models. We need to remember here that the mind is a unique configuration of brain cell connections in response to experience. If we consider again the Maher article on the role-play simulations run by Vincent and Shepherd, the title is very telling. Maher talks of 'simulating the art of the possible'. Here we come to the core of what makes role-play simulations so different from computer-based simulations. While the latter are very limited in what is possible in human responses because they are rule-based, role-play simulations are unbounded – they have no limitations on the participants' responses or initiatives. This kind of simulation is web-based within a learning environment that calls for participants to analyse a scenario within the perspective of a role, comprehend the perspectives and goals of other roles and then use common communication tools such as email and conferences to resolve a conflict. The structure and nature of this learning is not bounded by preset rules: it is created specifically by the participants and they must accept responsibility for what, how and where they lead themselves

– as in the real world. As they must also collaborate to form alliances to achieve their goals, role-play simulation in learning environments like Fablusi™ are ideally suited to soft skill development.

Having no metaphorical context or animated characters as in rule-based simulations and games, gives role-play simulation freedom from the mental limitations of reality once it is visually defined. The most visual and creative ‘place’ is the human mind, and role-play simulations can build on this dynamic as the interactions are ‘disembodied’ and hence each learner fills in the visual context from their world knowledge. This also accords with cognitive flexibility theory whereby pre-existing knowledge is retrieved to ‘adaptively fit the needs of a new situation’ (Spiro et al. 1991). This is preferable to the cartoon-like animations of rule-based simulations which dumb down the practitioner’s context. It is also preferable to design learning that starts where the learners are and to be informed in design by the knowledge from brain science which states that we only learn new concepts when we can meaningfully place them in the existing mental models of our uniquely wired, uniquely organised brains. This brain-based research also supports the learning theories of situated learning and constructivism of which Reeves (1994) states:

Instead of an empty vessel, the learner is regarded as an individual replete with pre-existing knowledge, aptitudes, motivations.

Constructivist learning theories rely on cognitive disequilibrium as the learners construct their meanings from a range of resources and in the process must reconstruct their existing schema and cognitive structures. This is indeed transformative learning. As a constructivist learning strategy, a role-play simulation allows each participant to make their own decisions and also be confronted with negative responses from others and negative outcomes in terms of their goals. This is often the fulcrum of learning, as it is the disequilibrium or what one participant, ‘Amy’, in *Needle Stick* called ‘difficult feelings’. Remembering that the primary learning outcomes for this role-play simulation were soft skills, the participant playing ‘Amy’ had targeted maintaining self-esteem in the face of opposition to her opinions. The following are parts of her reflection in the debriefing (names have been replaced by X, Z & M to preserve confidentiality):

Message no. 445 posted by X (s000101) on Thu Sep 12, 2002 08:54

Subject Difficult feelings

Maybe Amy came across as a bit of a prig? Still, I wasn’t prepared for how I was going to feel about some of the responses to her!

And in a later posting:

Message no. 454 posted by **X (s000101)** on Fri Sep 13, 2002 09:26

Subject Re: Public v Private personas

Z asks "What made the role play more difficult to hold public and private spirit together?" and that is exactly the question that's been bugging me. The only answer I've come up with is embarrassing to admit!

Amy had a conservative role and I like to see myself as a bit more open, tolerant etc. I wanted to be with all you cool guys who were out there supporting the drug users; instead I sounded like some moralistic stay-at-home-mum from the 50's! Yet the more I had to write as Amy, the more I came to think she was dead right!!!

So, had I been more comfortable with the conservative in me, i'd probably been more able to laugh off the responses.

Another participant responds to 'Amy' with some interesting reflections on the disequilibrium she experienced in the process of relating to Amy during the role-play over the arguments to relocate the NEP (Needle Exchange Program), and what that meant for her in real life:

Message no. 461 posted by **M (gs0004)** on Mon Sep 16, 2002 11:53

Subject Re: Public v Private personas

actually **X** ..I reckon you did a top job as Amy...even though (or especially because?) you/she really got up my shiraz slurping, leftie nose !

and by the end I have to sneakily confess that I could really see the strength in Amy's argument about moving the NEP...but I wasn't game enough to admit it ..her well argued case didn't impact on me nearly as much as what I felt as her irritating usurping of the moral high ground..so there was learning for me and my character (Cyn) there...separate the argument from the 'arguer'... something I still have trouble with in real life Cheers

M

Whatever the difficulties, the final participant evaluations from the role-play simulation were positive about the value of this learning strategy, recognising how engaging it was as they were immersed in a role and another community which they created. Because the learners control the direction and final outcomes, the learners ultimately control the design – every time a particular role-play simulation

is rerun, the directions and outcomes will be different as it will mirror the sum of the participants involved with all their individual capacities and biases. In the constructivist paradigm, each learner interprets or construes the world according to their existing metaphors and then attempts to construct within that internal reality - but parallel to this, the conflicting world views and metaphors of other roles/participants will create disequilibrium and consequently a modification of the worldview and the decision making. We can see this in the participant's reflection below. Not only did 'Y' have to defend her views in the face of strong opposition in the community, she had to resolve internal conflicts between a surface view of disliking being in a socially conservative role and realising that her deeper values supported this role's view – not what in theory she thought she supported. Once she recognised this, she could make compromises to achieve her goal:

Message no. 466 [Branch from no. 454] posted by **Y (s000197)** on Tue Sep 17, 2002 08:57

Subject Re: Public v Private personas

Reading **X**'s message really made sense - I like her had a conservative role which I didn't agree with but was able to live with more and more as the role-play went on - in fact by the end although I totally supported the NEP in theory, I was convinced in my real self that to have put it so near the school in the first place was ridiculous and asking for trouble. I think what made the whole thing possible for me was when I realised I could stop campaigning for the closure of the NEP and instead jump on the relocation bandwagon at the same time as supporting the education, fence etc.

This level of engagement and ownership of learning direction goes far beyond drop and drag exercises even if in response to comprehending audio or video! In that kind of interactivity, the learner is reacting to content rather than co-constructing the content or learning event. In instructivist learning there is no scope for the deep learning displayed by 'X' and 'M' or 'Y' in the debriefing quotations above where they were actually engaged in analysing their own internal processes, making judgements very openly, and starting a process of synthesising or integrating the new understandings.

Social-process design

Needle Stick is what Gredler (1999) would call a "social-process simulation" as the participants take on individual roles in a virtual or 'simulated' social group with the aim of experiencing the complexity of negotiating particular goals and managing

successful decision making. Gredler also describes three other major forms of experiential simulations: data management, diagnostic and crisis management.

There is a strong tendency in tertiary education for anything in the arena of role-play and games to be considered a bit of warm-up fun to be got out of the way so the serious business of imparting hard information can be accomplished in the tight time lines of curriculum delivery. However, in the explosion of information in every field, we need to rethink what skills and understandings an educated person will need to possess in order to function professionally in the following decades. They will need skills in prioritising and manipulating the new waves of information, in rethinking the application and validity of established theories in particular practitioner contexts, ability to analyse ill-structured situations before problem solving, and most important of all, they will need to be able to work effectively in the human social systems so as to implement any of their ideas. It is interesting that Laurillard (1996) in *The Changing University*, asks the reader to consider the value of academic knowledge in the current world. She reiterates Vygotsky's emphasis on the social aspect of learning, and Dewey's emphasis on integrating theory with practice, which was later reinforced by the research done by the National Training Laboratories, Bethel, Maine and represented in their Learning Pyramid. Laurillard goes on to talk of:

...the many studies now that document the difficulties students have in maintaining the links between theory and practice, and in matching the academic theory to the world around them, in knowing how to position themselves in this world of strange languages, specialist symbolisms, and all those well-articulated and strongly-held points of view.

These concerns have also been taken up by cognitive flexibility theorists who pose that the simplistic reductionist and linear instruction that dominates tertiary fields actually fails the learners who cannot deal with real world complexity and the ill-structured scenarios they will need to problem-solve. These failures are called 'failures of transfer' (Spiro et al. 1991). Role-play simulations, however, have the potential if well designed and well moderated to become a major learning strategy in enabling learners to operationalise theory in both professional and social contexts and to develop the strategies and communication skills involved in the process, particularly when challenged, as will be the case in the work world. As such, role-play simulations are models of cognitive complexity and are more dynamic scenarios than the case-based instruction proposed by Spiro, et. al. (1991). Their cognitive flexibility theory revamped constructivism for advanced knowledge acquisition so that "prior knowledge that is brought to bear is itself reconstructed, rather than retrieved intact from memory, on a case-by-case basis (as required by the across-case variability of ill-structured domains)".

A weakness in this theory is that while it is espoused as an integrated theory of learning, it does not consider the emotional (limbic) component of thinking nor does

it attempt to take the conceptual knowledge of specific knowledge domains into the practical social systems where skills such as negotiation are the translators and implementers of a practitioner's world. It is in the practitioner's world where the most variability occurs. This means rethinking problem-solving as comprising more than objective and external factors. The ill-structured problem needs to include its implementation and that entails conflicting stakeholder perspectives. If the brain is social, then learning needs to connect social and emotional intelligence with logical processing. Advanced learning instruction also needs to situate itself in specific social systems and begin the process of equipping learners with the generic communication and social system skills that an effective practitioner requires in a knowledge economy. As one of the participants in the *Needle Stick* action learning reflected:

I think the hardest thing with a lot of the soft skills is that we all know the theory.

I very rarely have a class who tell me things totally off the track, however they

don't always demonstrate the attitudes and beliefs that they can clearly talk about.

Role-play simulation can deliver this whole learning as all three dimensions of the human brain are simultaneously engaged in solving a range of problems set within a scenario. However, the focus on soft skill acquisition is not easily quantifiable as it is both person and domain context dependent. By person context dependent, it is meant that the process of skill acquisition is referenced to each person's unique schema of social and emotional intelligence as well as the logical understanding of the skill itself.

Conclusion

To maximise learning outcomes, educationalists need to proceed from simple to complex, provide a range of perspectives including conflicting ones, and engage the whole person – emotional and logical. In some fields there will also be a major kinaesthetic component. The operation of soft skills is also highly dependent on the real world context in which the practitioners find themselves. Here there will be a range of variables such as culture (including sub-cultures), economics and enterprise goals which will constantly shift. It is no small feat to attempt both individual and organisational change by being cognisant of all these changeable external factors as well as those operating in the schema of the individuals. Role-play simulation is one learning strategy that mirrors the ill-structured, unpredictable complexities of human exchange in our organisations and our work world and as such offers powerful learning.

For access to the full project report and the *Needle Stick* simulation, (including details on design, induction, moderation and debriefing), go to: <http://www.picknow1.com.au/homepages/katemf/sparks/default>

Kate Fannon works at Adelaide Institute of TAFE, Adelaide Australia

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