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Paul Maharg*

The Periclean Plumber: Simulation and Legal Education

I. Introduction

Simulation has in one form or another been a staple of legal education. In medieval and renaissance 'hornbooks' in the English legal education tradition we can see hypotheticals that are simple simulations of problematic facts and legal principles – 'what if' scenarios, used by teachers and students. Hypotheticals are still in use in lectures and seminars, and as the basis for examination questions. However as educational theory and practice began to be more sophisticated in the nineteenth century, and studied as a form of empirical science, a number of approaches to learning and assessment began to emerge that developed hypothetical scenarios into more sophisticated contexts for learning.

As many educationalists have observed, simulation is a heuristic characterised by its protean, flexible and porous nature. A simulation is quite different from a lecture, for instance. A lecture is fixed in time and place, and students gather to it according to the timetable set out by institutions or academic staff. The lecture space is specially constructed: seating, viewing, visual aids, audibility, visible presence are all built into the architectonics of the teaching space. Staff have very different lecturing styles of course; but the event has a recognisable and repeated shape and rhythm to it. Contrast that with simulation which is protean in both its form and content: it could potentially take any shape or form. It is flexible in almost every aspect of its shape as a learning event. Indeed it is less of an event, in the way that a lecture or seminar can be called an event, and more of a performance or an enactment. Moreover this performance does not necessarily take place at specific time periods in specific places – students and staff may have the opportunity to engage in it according to much looser time scales than those governing lectures and seminars; and in a

* Ph. D., FRSA, NTF, PFHEA, Professor of Law at the Australian National University College of Law, and Director of the centre PEARL (Profession, Education and Regulation in Law). He is also part-time Professor of Law, Nottingham Law School. Prior to this he was Professor of Legal Education at Northumbria Law School, and before that Professor of Law in the Glasgow Graduate School (GGSL), University of Strathclyde where he was Co-Director of Legal Practice Courses, and Director of the innovative Learning Technologies Development Unit at the GGSL, as well as Director of the two-year, JISC/UKCLE-funded project, SIMPLE (SIMulated Professional Learning Environment).

variety of spaces, both physical and online. Partly as a consequence of their flexibility and protean nature, simulations are highly porous. They can easily adapt to be single-disciplinary, multi-disciplinary or interdisciplinary in nature, drawing upon different sub-disciplines. They can also adapt relatively easily to inter-jurisdictional performance, though there are a number of difficulties associated with that, as we shall see below.

Above all they are highly student-centred and task-focused. They concentrate attention because they force learners to come to decisions and make choices based upon knowledge, skills and values. As a result, one of the first things that students often have to do in simulation learning is to identify what they know and what they yet need to discover and learn to use. Because they fuse knowledge, skills and values they can be highly valuable forms of ethical education. Indeed the best forms of simulation involve the whole person – the affective and the ethical as well as the rational being.

In this article we shall first trace some of the early history of simulations in legal education that use digital technologies. Technology itself is a broad term that could encompass not just tools such as books, paper, pens, but physical learning environments (raked seating in lecture theatres, an invention of the later nineteenth century) and even educational curricular patterns (semesters, intensive programmes, etc). Here, we shall focus on digital technologies as these have been in use for the past 30 years or so: the effects they have had on simulations, and how sims have developed through two broad phases as a consequence of the influence of technology, educational theory and other pressures. Second, we shall consider a use-case of simulation in the UK, namely the work of the Glasgow Graduate School of Law (GGSL) at the University of Strathclyde, in the first decade of the new millennium; and where I outline some ways in which simulations as an educational approach could be made more effective within jurisdictions and globally. Third, we shall briefly consider two technological futures for simulation in legal education, and directions it may take more generally.

II. Simulation: Its development in legal education

Phase 1. Simulation and instructivism: the legal mind as computer

Maharg and Nicol (2014) trace some of the history of simulation and technology in their systematic review of the literature over a span of 42 years (1970–2012) in common law legal education. During that period, they note, the change of media had a powerful influence on the development of simulations. Citing Gitelman's distinction between 'media' and 'delivery technologies', where a delivery technology is a tool (e. g. a Betamax tape or a laserdisc) and where media includes the tools but

also, as Jenkins (2006) has it, the 'set of associated "protocols" or social and cultural practices that have grown up around that technology', they note that the enhanced functionalities of digital technologies over the period have greatly enhanced simulation theory and practice. Early games, for example, used staged instructional approaches to tasks that users carried out (Allen and Saxon, 1984). Interactive video was a component of the resources of early simulations (Killingley 1992; Hibbs & Vaughn 1994; Hogan et al 1989). But the interactivity that the technology supported was highly constrained (for example video-chunking on laserdisc that attempted to mimic responses to human decision-making) and involved no natural language processing, some AI but no machine learning. Communications, too, were limited by the interfaces afforded by software protocols, and in particular the ability to adapt a communication function. One of the significant tools of internet chatrooms is the ability to hold multiple conversations, and in multiple groups, and for this to be set up relatively easily by users. This was difficult to achieve within early simulations, so that communications tended to be off-sim, giving rise to a simulation that consisted of communications products (the end-products of planning and decision processes) rather than displaying both product and process, such as a wiki might reveal.

Gitelman's distinction also holds for other approaches in this first phase of simulation development. Indeed what is interesting is how theory and educational culture matched technology and its affordances. From the early 1990s onwards simulations based upon what were termed 'electronic casebooks' began to appear. Originally based upon the US concept of an annotated collection of cases on a particular area of law, these were electronic versions that presented users with questions, hypotheticals and alternatives, all referring to a database of actual cases. An AI engine, for example CATO, provided argumentational tools while HTML documents and hypertext links offered a rich environment for students to engage in case and argument comparison and practise case-based legal reasoning. Ashley describes how such casebooks could be 'characterized by flexibility in presentation, connectivity, and interactivity', though he noted that such environments 'may have a downside in complexity and demands on students (2000, 279) – a point I shall return to.

Gary Neustadter critiqued the approach of the electronic casebook, arguing that it was constrained by the genre it attempted to escape from. For him, electronic casebooks merely mirrored 'the organizational structure and content of the paper version' and failed to transform the 'fundamental nature of the materials' (Neustadter 1998, cited Ashley 2000, 278). His critique is a version of the argument that, in Gitelman's terms, a delivery technology is enmeshed in the social practices of a medium, and transfers poorly to another medium. It has been restated by others more recently. In their *Manifesto for Teaching Online*, for instance, researchers from Edinburgh University argue that 'the best online courses are born digital' – in other words, they are conceived as digital, and designed and produced for the environment

in which they will be used. The research group contrasts the situation where staff who attempt to transfer a face-to-face course to the online environment mimic online the campus-based course, accepting the embedded metaphors and structures that too easily are transferred, without serious educational thought given to the problems of transference from one medium to another (Ross and Collier 2016).

This critique generally holds true for the simulations that arose from the electronic casebook. Powerful tools for instruction in case-based reasoning, electronic casebooks functioned less well when used as role-play environments. One can of course appreciate why such environments were developed and used. The tool-based metaphors, instructivist approaches and top-down directions suit a predominantly information science approach, stemming as they do from the underlying computational theory of mind that was embedded in many such projects (Bench-Capon, leng and Staniford 1998; Allen, Aikenhead and Widdison 1998). Moreover the fundamental description of legal reasoning as a form of logical analysis close to computational theory (supported by analytic philosophy – see Edelman 2008) suited the purpose of electronic casebooks. The substantial research base in jurimetrics and research communities in such approaches in the UK and the Netherlands also gave support to the approach, as did the computational construction of mind in classical cognitive psychology and educational psychology.

Even in sophisticated approaches such as that of Ashley, we can see the tensions arise between instruction and role-play/simulation. As Ashley points out, *"to be effective, instructional materials addressing analytical legal skills probably require a 'strong real-world purpose or context'"* (Ashley 2000, 279). Significantly, he quotes here the words of a composition researcher, James Stratman who, as a student of the distinguished rhetorician Linda Flower, took a much more constructivist view of the learning processes of how we learn complex tasks such as reading and logical analysis. Therein lay the problem for many of the electronic casebooks: their genre origin was instructivist, and in their adoption of electronic simulation they attempted to harness a more constructivist heuristic to instructivist tasks, cultures and contexts. The two approaches can of course be combined in a programme or module (I shall give an example of that below), but only with difficulty in the same application.

Phase 2: Simulation and constructivism – the legal mind as Periclean plumber

In the late 1990s and first decade of the new millennium a relatively new set of approaches to simulation in legal education was mapped out. In place of instructivist approaches, or splicings of instructivist and constructivist theory, there was developed a range of approaches that arose from communications and phenomenographical theory, the constructivism of Bruner and the pragmatism of John Dewey.

Bloxham's ambitious implementation of digital negotiations in Contract and Tort for undergraduate students at Lancaster University Law School is a good example of phase two (Bloxham and Armitage 2002; Bloxham and Armitage 2003). As they point out, the simulations they designed were influenced by the phenomenographical theories of Marton and Säljö, and the conversational theory of Diana Laurillard. The simulations were hosted on Lotus Domino software, an early virtual learning environment. Students entered the sims at their discretion within broad timescales, and the simulated web-based negotiations over contractual and tortious issues that they engaged in were supported by learning in seminars and lectures. Significantly different from phase 1 of simulation / technology developments was the idea of a more distributed simulation experience. Students focused not upon single applications as in the electronic casebooks, but were expected to draw more upon a range of affordances they encountered on the programme of study. The 2003 study proved how effective Bloxham's approach was. He took account of the difficulty that both students and teaching staff might have in engaging with the VLE; and partly as a consequence of his careful educational design and attention to practical details the simulation attracted high levels of student approval in feedback.

a) Use-case study: simulation at the Glasgow Graduate School of Law

Bloxham was one of a small number of legal educators interested in developing simulation who met at conferences and liaised with each other, the others being Karen Barton, Patricia McKellar, Maharg and the technology team that Maharg directed at the newly-formed Glasgow Graduate School of Law (GGSL) at Strathclyde University. There, pilot simulation environments were built and used with students from 1999–2006, coded first in Cold Fusion and later using a mixture of approaches to communications and pedagogical approaches, developed using Public Folders in Microsoft Office and other applications.

In 2006 the GGSL won funding to develop a simulation environment called SIMPLE (SIMulated Professional Learning Environment).[1] Developed over two years as an open-source application, SIMPLE gave staff tools to design and implement simulations, and gave both tutors and students the front-end simulation environments with which to interact with both fictional and real characters. The project was interdisciplinary, involving Management Science, Architecture and Law among other disciplines over eight different locations in the UK, and was used by undergraduate students, postgraduate research LLM students and by students on professional legal

1 For further information including our final project report and a code repository, see http://simplecommunity.org.

programmes. The simulations that were designed starting in 1999 were aimed at a professional postgraduate programme, the Diploma in Legal Practice, which students undertook prior to two-year traineeships with a legal service provider in Scotland or Brussels. Currently (2017), SIMPLE is still in use at Strathclyde University Law School, as well as in a number of other locations. At Strathclyde, that represents a history of 18 years of continuous simulation practice and theory, a history that has been researched and discussed by Maharg and colleagues (see for example Barton and McKellar 2007; Barton, McKellar and Maharg 2007; Maharg 2007).

While they were hosted on SIMPLE as a platform, the sims were designed not as an application but as a range of web-based functionalities and environments that would fuse with the work that students undertook in seminars and workshops. Thus the web was used to provide a workspace, called a virtual firm. Some subjects such as Civil Procedure had webcasts in place of lectures that were made available to students (thus our simulation approach could include instruction where appropriate). Many other resources were made available on a VLE for students. An example of this is the programme that began with a Foundation Course, an intensive and highly popular nine days of skills cycles for which a key resource was a set of multimedia workshops in legal writing, drafting, interviewing, negotiation and professional (as opposed to academic) legal research. Acting as a mnemonic during the rest of the programme for the experience of learning new legal skills, the multimedia resources served students as a resource for the remainder of the Diploma and even into traineeship.

The simulations were carried out by students collaboratively in the programme: each virtual firm consisted of four students who worked closely on the simulation, and who were assessed as a firm on the simulation, not individually. The assessments were high-stakes: if students failed them they could not pass the Diploma. Social learning was thus forefronted in the curriculum: students could not pass the Diploma as if acting as singleton individuals, cramming for written, closed-book examinations, which had been the 'signature pedagogy' and signature assessment mode for much of their earlier legal learning (Shulman 2005). They needed to liaise with each other, develop problem-solving skills, practise professionalism, learn how to act ethically in the simulations, as well as harness within this environment the more technical skills of writing and drafting within simulated transactions.

The concept of 'transactional learning' was critical to this approach to simulation (Maharg 2007). On a superficial level, the phrase referred to the definition of a legal simulation as a legal transaction. It was also an educational approach to legal learning, though, and in this context we characterised transactional learning in terms of seven traits:

active learning

through *performance in authentic transactions*

involving *reflection in and on learning*

deep *collaborative learning*, and

holistic or *process learning*,

with *relevant professional assessment*

that includes *ethical standards.* (Maharg 2007)

At a deeper level it was shorthand for an approach to learning that was hermeneutic and phenomenological in its approach. In Maharg (2007), and following Dewey's anti-epistemology and his refusal to define mind over against the world, I described our approaches to learning and social learning in particular as less a form of *inter*action with the world (because this still gives the sense of separate entities and processes) and more as a *trans*action within the world, where we are ineluctably agents in our own processes and actions, and where our tools for thinking and feeling are distributed in the world within us, physically around us, and in our endlessly oscillating movements backwards and forwards within time. This is of course the ground for many constructivist approaches to experiential learning. But as Dewey put it, to learn from experience was to 'make a backward and forward connection between what we do to things and what we enjoy or suffer from things in consequence' (Dewey, *Middle Works*, 9, 147). I summarised the Deweyan approach to learning as transaction as follows:

> Learning is therefore a transaction: not the acquisition of knowledge about the world (which like the stimulus-response model separates mentality and reality damagingly), but the acquisition, coordination and practice of habits, impulses and dispositions towards action in the world. As a result of learning, the world becomes richer, more meaningful, for the learner. (Maharg 2007, 11)

Dewey's philosophy of knowledge also included a philosophy of education and of culture. Towards the end of his life he wrote an extraordinary work, still relatively unregarded by educationalists, entitled *Art as Experience*. In it he defines the experience of art as transactional, where 'an experience is a product, one might almost say a by-product, of *continuous and cumulative* interaction of an organic self with the world', where that experience depended also upon imagination: 'all *conscious* experience has of necessity some degree of imaginative quality' (Dewey, *Later Works*, 10, 276).

If students were to use their imaginations in legal learning, they needed imaginative learning topologies on the web. The virtual firm space, seen from a student perspec-

tive, consisted of a document store, communications functions (e. g. chatrooms, FAQs, discussion forums), calendar and task management applications and other personal information management tools. But we also constructed a fictional town on the web – a typical west of Scotland small town, sited on the south bank of the river Clyde, not far from Glasgow, called Ardcalloch. It was represented by a map with clickable websites by and photographs of places, buildings, streets, shops, homes, factories and offices (Fig 1); and a directory (Fig 2). It had a history that consisted of an – irresistibly revisionist – account of Scottish history and Scots legal history going back to early medieval times (Fig 3).

Fig. 1: Map of Ardcalloch, zoomable with clickable sites

Ardcalloch

Ardcalloch Directory

Enter Search Terms | Businesses | Search | Please note search is case insensitive

Name	Address	ADeX #
APG Architects	41 Shaw Road, Ardoch, Ardcalloch	apg.business.ardcalloch
Ardcalloch Boatyard	The Waterfront, Alba Industrial Estate, Ardcalloch	ardcallochboats.business.ardcalloch
Ardcalloch Digital Exchange (ADeX)	Darien St	ADeX.Directory.ardcalloch
Ardcalloch Insurance Company	23 Steele Street, Rankellor Business Park,AR3 7SS	aic.businesses.ardcalloch
Ardcalloch Legal Information and Advice Service	14 High Street, Ardcalloch	alias.business.ardcalloch
Ardcalloch Medical Centre	50 Anthony Wayne Ave	amc.medical.ardcalloch
Ardcalloch News	76 High St., Ardcalloch	ArdcallochNews.News.ardcalloch
Ardcalloch Power Plant	12 Macadam Road, Alba Industrial Estate	PowerPlant.businesses.ardcalloch
Ardcalloch Riding School	12 Heather Lane, Ardcalloch, Scotland	ridingschool.business.ardcalloch
Campbells Auctioneers	23 Ardoch Road	campbells.businesses.ardcalloch
CDPH Architects	10 Arrol Ave, Alba Industrial Estate	cdph.business.ardcalloch
David Jones Engineering	16 Bell St	dje.businesses.ardcalloch
Erskines Stockbrokers	43 Ardoch Rd, AR1 8JH	Erskines.businesses.ardcalloch
Global Inc.	Darien St	global.businesses.calif
Halifax	40 Rankellor Road	halifax.businesses.ardcalloch
Jackson Health & Safety	10 Arrol Ave, Alba Industrial Estate	jhs.businesses.ardcalloch
Marlott Lane & McLagan Jones	56 Mckenzie St, Rankellor Business Park	mlmj.businesses.ardcalloch
Melville Welding	18 Bell St.	melvillewelding.businesses.ardcalloch
Millar & Bryce		millarandbryce.business.ardcalloch
NTL	64 High St.	ntl.utility.ardcalloch
Red Cat Hotel	15 Heather Lane	theRedCatHotel.hotels.ardcalloch
Research & Development Company	Darien St	rd.global.calif
Rigley's The News Agent		Rigleys.News.ardcalloch
Scotia Steel	20 Darien St. Alba Industrial Estate	ScotiaSteel.businesses.ardcalloch
Scottish Power	59 High St	scottishpower.utility.ardcalloch
The Sub Club	22 Mure Way	theSubClub.entertainment.ardcalloch
Thomas Beaton Funeral Directors	73 Semple St.	ThomasBeaton.businesses.ardcalloch
Wool Pack Inn	2 Mure Way	WoolPackInn.restaurants.ardcalloch

Fig. 2: Ardcalloch Directory

Ardcalloch

Directory Map Introduction History: Origins

1000 Years of History

Origins

The name of the town is Celtic in origin. 'Cailleach' means 'old women' or cowled women', possibly referring to nuns. There is a legend that the priory of St Cerulus was built on the site of an earlier Celtic foundation attributed to St Kentigerna, the daughter of Cellach, Prince of Leinster (early eighth century, d. 733). The island of Inchcailleach in Loch Lomond, where she died, is apparently derived from the same root. According to Bede, a chapel, dedicated to her, and containing some of her bones, was erected some time in the tenth century. No trace of this has been found, though it is probable that the Premonstratensian foundation of St Michael in the fourteenth century was built upon the site of this early chapel. Bede's account is corroborated by the *Orkneyinga Saga* which relates that Earl Rognvald, great-nephew of Saint Magnus and builder of the foundations of St Magnus cathedral, on his crusade to the Holy Land, visited her shrine around 1132 to pray for his safe deliverance. St Kentigerna must have listened to the Earl, for he returned to Orkney two years later, after a remarkable series of adventures.

There is also evidence that Ardcalloch was originally a settlement which grew up around the Clyde crossing at this point in the river, which is the lowest crossing point for the major settlement on Dunbarton Rock, on the other side of the river. It would appear that in early medieval times it was possible to walk across the river at this point at low tide. There were local stones that marker poles were driven into the mud for this purpose; and indeed there are records made by James Watt that bear this out. During the work he carried out in preparation for his report on the river in the later eighteenth century, he recorded that "there are the remaines of wooden stakes driven deep into the mud of the river, from one side to the other as if put there for the purpose of guiding travellers across the river, else for the siting of fishing nets".

Watt's deduction was given corroboration in 1885 when workmen excavating a railway spur to the docks came upon a roadway of neatly laid stones, indicating a causeway that led down to the old ford. Local historians surmised that it was the Roman road to Dumbarton, and later archaeology has confirmed that this was indeed the direction of the road.

During the 1760s workmen repairing the roadway at the crossing point unearthed a hull composed of planks pegged to a wooden frame and set in a keel. From contemporary accounts it would appear that the vessel was constructed using viking techniques. The vessel was preserved in a house turned into a museum of the Clyde, which was later demolished by a bomb in World War II.

Fig. 3: History of Ardcalloch, Origins

Within this fictional graphic and informational environment we developed simulation as a form of situated learning. This was useful for enabling students to integrate knowledge with skills, and to integrate academic learning with professional learning

and practice. It also helped students to develop their professional identities and voices. Part of the problem of developing professional voice on web applications is that the tools are often too crude to match the varied sophistication of tone and lexis that students need to learn. Early on, therefore, we began to think of the concept of the web as providing a variety of spaces for voices. It was important that students should be able to use it for informal chat around work, for practising many varieties of professional attitude and behaviour, for trying out ethical approaches to ill-structured problems, for constructing drafts of documents leading to formal legal documents. We designed intimate spaces for small-group social learning (virtual firm chat forums, for instance), more formal containers such as client files that contained formal legal documents such as missives, and public spaces such as client bulletins posted to virtual firm sites. We trained students to use these environments and it was clear from feedback that (unlike the complicated instructivist environments of phase 1 simulations) students could use the environment and manipulate it for their learning goals.

Simulations themselves needed to be varied according to the sub-area of law and the transactions associated with it. A personal injury (PI) transaction, for instance does not only deal with Delict or Tort: there are constellations of other domains that are often drawn into the transaction, and students need to understand how to deal with them, and how to communicate that understanding to other professionals and to clients. These include tax, welfare law, possibly family law, quantum for damages and injury, and civil procedure. A PI transaction thus could include nested transactions within it that students needed to practise, if they were to engage in an authentic PI transaction.

b) Design tools for simulations

Ashley's comment above on the difficulty that can arise for students using complex digital environments to develop case-based reasoning skills applies also to digital simulations, and to staff as well. From a staff point of view, there are considerable design and administrative difficulties. The design task is inevitably multi-disciplinary, involving legal academics, apps developers, educationalists, students and administrators. The teaching staff also need to be trained in use of the new environment.

The design of one simulation, namely the Personal Injury (PI) negotiation project, is a good example of the process, the issues that arose and how the design process affected software product and learning. The immediate context affected our work – for example numbers of students. Our Diploma in Legal Practice started with 154 students (i. e. 36 firms of four students, 18 transactions) which rose to 286 students, i. e. 64 firms, 32 transactions. That meant we had to design simultaneous scenarios for between 18–32 transactions. They could not be identical or the risk of plagiarism

would be too great. In PI therefore we designed and wrote a narrative the chassis of which was the same (an employee of the University of Ardcalloch trips and injures himself while in the course of his employment, claims against the University, and the claim is pursued by one firm representing the client, and defended by another representing the University's insurer), but which differed in details, some of them trivial (names, addresses), others highly relevant to the process and outcome of the transaction (type and extent of injuries sustained, availability of witness reports, actions of the employee, content of expert reports on injuries, client wishes, and the like). We developed the documentation using a document server that contained the documents within a framework for each transaction and fed in the relevant details for each particular transaction. The result was a transaction that was broadly similar in shape but which, once begun, moved like a chess match, with moves made by the firms creating of each transaction a unique decision tree and document trail.

Representing the narrative in a form that could be understood by code and by humans was problematic (Gould et al 2009 deal with this issue in greater depth). There were of course standard forms of notation for modelling the behaviour of systems that were available, such as UML (Unified Modelling Language). However this would not be very accessible to non-technical staff such as administrators or academics. We needed a form of graphical representation of simulation narrative that was easy to use, simple to understand and was suited to being transformed into some form of machine-understandable instructions.

We turned to IMS Learning Design (LD), developed at the Open University of the Netherlands from their Educational Modelling Language. IMS LD uses a structure that draws upon the analogy of a theatrical play, where a play is made up of Acts, with each Act following a narrative line in which each of the Characters perform activities that are, or affect, the narrative. Activities are the core of the LD model – indeed activities can have sub-tasks or sub-plays. The result is a comprehensive specification that allows for complex learning designs to be modelled.

For our purposes and our wider readership, however, LD was still too complex. We therefore adapted a concept from both UML and LD, namely the Activity Diagram, for that was key to our design process, and to the representation of activities as tasks and workflow. The visualisation of this was critical if we were to have multi-disciplinary conversations around transactions that were at once authentic to legal practice, ethically sound and educationally effective.[2] Academics, professionals such

2 The Activity Diagram therefore functioned much as an example of Peter Galison's concept of the 'trading zone', an interdisciplinary space that is constructed between the

as lawyers, students, technical staff, administrators, educationalists needed to use it to understand the process and critique the transaction, not just as a legal transaction, but as an educational, professional, learning, coding and administrative transaction. A simplified Activity Diagram looked like Fig 4.

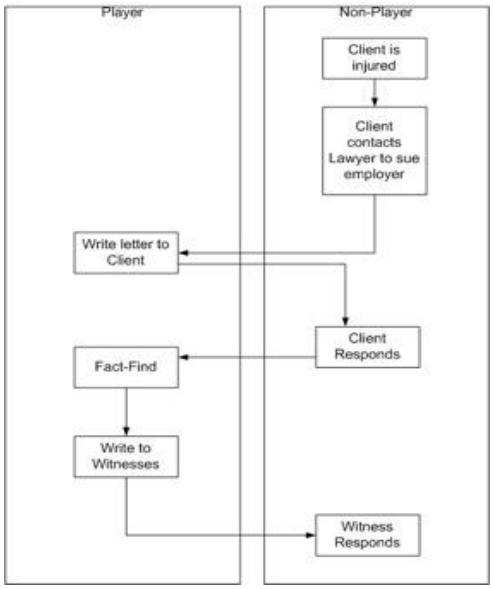

Fig. 4: Simplified Activity Diagram (Hughes 2007)

But this is too schematic and misses out a lot of important information regarding the status of who carries out which actions – for example who is fictional, who is real. It is also difficult to form a narrative of a professional transaction that contains only the core elements, upon which many others are built. It occurred to us that the abstract concept of a simulation or simulation-as-narrative was causing problems for staff, and that staff found it easier to analyse tasks if they imagined characters carrying out the tasks. A character-based approach, however is difficult to generalise to any form of simulation and simulation Activity Diagram: it breaks down into individual characters that cannot be replicated in a Diagram. We therefore categorised characters as either learners (Player Charaters, PCs) or fictional characters (Non-Players Characters, NPCs). Tasks were performed by either category of person. To this basic categorisation we added Staff Activities – a wider group of actions than

> discourses of professionals and disciplinary actors who require to collaborate on projects (Galison 1997, 803).

tasks. This paralleled the fourth and final category, namely Critical Events, which were events that occurred through the agency of neither PCs nor NPCs (Salen and Zimmerman, 2004). As the author fleshes out the simulation with reactions to events, the tool represents visually the relationships and flow of information within the sim.

To accommodate these new categories, we altered the orientation of the LD diagram by turning it 90 degrees (Figs 5 and 6) and reading it not top to bottom but left to right. We altered the 'swim-lines' visual metaphor to lines as on a musical stave. We then named the lines (from lowest to highest) Critical Events, Player Activities, Non-Player Activities and Staff Activities. Each task thus became a note on the stave, now called the Narrative Event Diagram (NED). More information could be added in notes to the tasks. In our discussions with designers we noted that some activities were grouped as stages, and so we gave designers the option to insert a group description below the set of tasks ('Project Stages') and to subdivide this group with musical 'bar lines'. The result was a more flexible diagram and one that could accommodate change in task patterns or even rhythm and tempo.

I have written elsewhere of the importance of tempo to simulation (Maharg 2011 – a subject still not properly researched in the literature), both across a number of simulations in a curriculum, and within a simulation. Students, we noted, were very sensitive to tempo, not least because a simulation tended to be a new environment for them. To adapt the metaphor further, they could sense the presence of tempo-changes in tasks (or in musical terms, rhythmic hemiola, a feature of Early Music dance forms as well as contemporary Western classical music). Having practised a simulation once, of course, they were more attuned to the tempo of the tasks and events that made up the musical piece in future iterations.

Rather as there can be multiples staves on a conductor's or a choirmaster's score, so we had the ability to display the NED of a multipart simulation. Thus while some simulations such as winding up the estate of a deceased client are single simulations (in the sense that the transaction comprises one client, with the student lawyers acting for that client), more often than not adversarial simulations such as a civil court action or a PI negotiation required two completely different staves. In a PI transaction we could view either Claimant NED (Fig 5) or Defender NED, or we could view the two together (Fig 6). This was very useful to map the placing of tasks undertaken by students, and plan for 'pinch-points' in a transaction when students would have to undertake tasks quickly, or where one side had too much or too little work to do. Simplified versions of the diagrams, too, were made available to students to enable them to 'read' the simulation in advance, and plan their work.

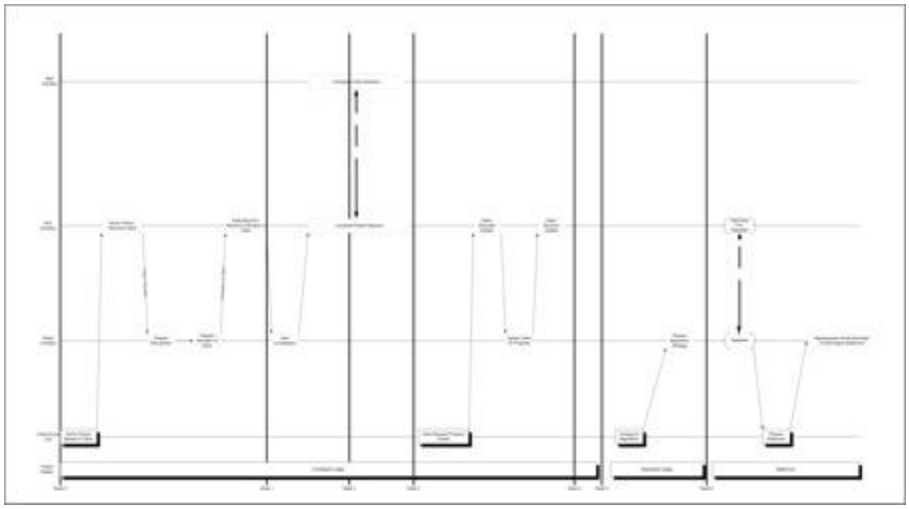

Fig. 5: Narrative Event Diagram: Personal Injury (Pursuer only)

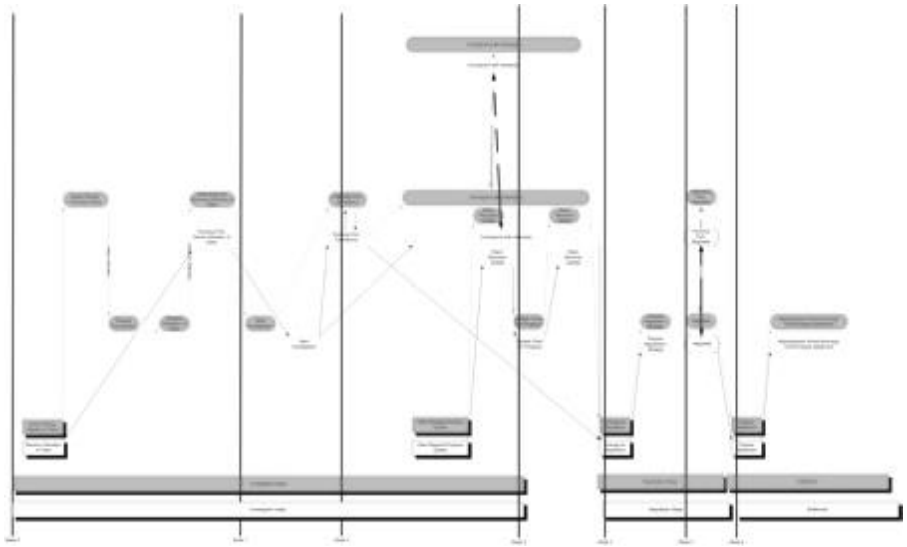

Fig. 6: Narrative Event Diagram: PI (Pursuer and Defender staves mapped onto each other)

In the PI transaction firms were supported not by workshops, seminars or lectures or any of the usual furniture of the academic curriculum. Instead, and following the

dictum that we design anew for the internet, we supported student learning via passworded forums, one for pursuer firms representing clients, one for defender firms representing the University.[3] At the end of each year the student and staff questions and answers were collated, edited and added to a sophisticated list of FAQs for the following year's firms.

Did the diagrams help those involved with simulations to design sims and work with them in the multi-disciplinary SIMPLE project? This is a complex question. We found that the diagram was very helpful for our technical staff who in any event understood how such diagrams operated. It enabled them to discuss complex details of code and workarounds. The diagram, though stripped back in complexity, helped represent existing simulations for academic staff. Predictably, perhaps, it was more powerful for those staff whose disciplinary backgrounds gave them familiarity with the construction, reading and manipulation of such diagrams (architecture, management science) and less effective for those staff who were unused to such forms of communication (lawyers, social workers – Gould et al 2009).

Once the NED had been developed, the simulation required to be resourced online, face-to-face and with textual and other affordances. In addition we also mapped out communications forums for students, teachers and others. A good example of this occurred in the PI transaction. Since the transaction was almost entirely online and carried out in real-time, we needed to feed information to the firms when they requested it. We therefore recruited and what was effectively a new category of law school staff, namely a 'transaction facilitator', who was trained to:

1. use the SIMPLE environment,
2. act in a number of roles,
3. feed information in real-time to the virtual firms, depending on which actions they took and which requests they made,
4. use document sets that had been prepared for them,
5. Adapt and improvise upon the document sets.

3 The only face-to-face encounter we designed was a 15 minute 'surgery' with a lawyer who acted as a mentor for the purposes of the transaction. Students were told in advance that they should think of the surgery rather as if it were visiting their doctor, but from staff feedback it was clear that many students had difficulty adapting from the relatively passive role of seminar to that of an active surgery. Many of them agreed later that it was a focused and powerful form of moving them on if they were stuck in the transaction.

In addition the facilitators, who were often legal trainees or young lawyers, would play all fictional characters and thus had an overview of the transaction as it developed within the firm, and between the opposing firms. They had a detailed knowledge of the transaction, sufficient legal experience to improvise on variation and were supported with an online forum should situations arise where they needed advise or extra documentation. They were an educational innovation in legal education: as far as we were aware there was no similar form of legal educational employment in law schools. Their place in the overall PI transaction environment is described in Fig 7.

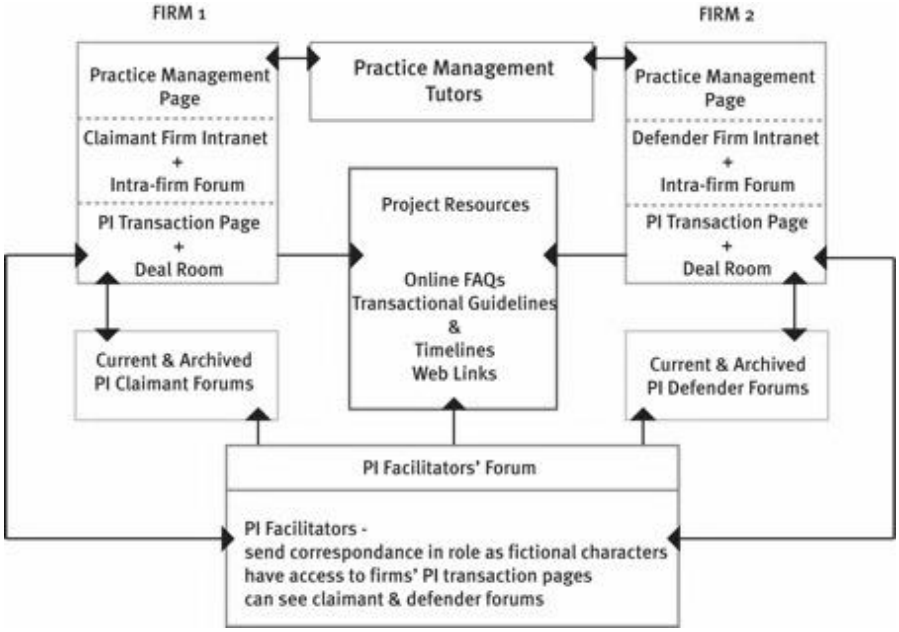

Fig. 7: PI transaction – Forums and communications lines between participants in the simulation

What I have described above in this brief use-case study are some of the simulation practices that took place within SIMPLE in a postgraduate professional programme. But SIMPLE was used for the whole range of law school curricula. Karen Counsell's use of the SIMPLE environment for first year, first-semester undergraduate students in a Torts course (Counsell 2014) proved in the SIMPLE project that properly-designed simulation could support students whose conception of legal reasoning and legal literacies was at an early stage of development. As she relates, the simulation replaced an essay – all else in the Torts remained more or less the same. Her results were significant. Not only was the drop-out rate within the module

reduced, but she noted a 10% rise in student results in the module's examination. What this proved (given that all other affordances within the module were similar to previous years) was that undergraduate students could transfer their learning and increased understanding of the subject from the simulation to an examination. Subsequent years proved that this result was not merely an outlier or due to a version of the Hawthorne Effect.

Simulation can also be used in postgraduate research programmes. Paliwala outlined a simulation that took place within an LLM (Maharg and Paliwala 2002, described in more detail below); while Counsell describes a negotiation in the context of a Nominet (ie domain name) dispute that took place between students on a LLM programme in Hong Kong. While these examples and others detailed in Maharg and Nicol 2014 prove that simulation is a powerful heuristic in undergraduate education and at postgraduate research stages, it is probably fair to say that, in the UK and USA at least, simulation has had most impact within professional programmes in legal education.

Nevertheless I have argued elsewhere (Maharg 2012) that simulation is one of a number of heuristics that can help us to take a creative swerve around one of the most problematic cultural and jurisprudential issues in common law legal education, namely the division between academic legal education and professional legal education. As long ago as 1967 William Twining characterised it as the difference between educating the lawyer to be Pericles (distinguished statesman, orator, public figure) or educating the lawyer to be a plumber (concerned with technical matters, pipe-joins, etc – Twining 1967). In its place, I argue that we should aim to education neither: instead, we should adopt constructivist approaches to the whole educational process in order to educate Periclean plumbers.

c) Inter-jurisdictional simulation borrowings

So far, we have been discussing simulations that take place within single institutions, or between institutions in a single jurisdiction. But as I noted in the Introduction, the porous nature of simulation as a heuristic makes it an ideal educational design to cross boundaries. In the SIMPLE project one of our pilot projects was an architecture project that involved a contractual dispute between contractor and subcontractor and drew in the architects working on the project. The discipline boundaries here between construction law and architecture were clearly the site of the simulation (Agapiou, Maharg, Nicol 2010).

Jurisdictional boundaries can be crossed as well as disciplinary boundaries, and between different families of law. Paliwala proved that a digital simulation could be run between a common law and a civilian system (Maharg and Paliwala 2002, 96–7). His project involved students from the EDHEC Business School in France and

the International Economic Law LLM class at Warwick University in the UK. The simulation was designed around a negotiation between teams of lawyers where the French team represented a French company manufacturing and selling fragrances that was interested in selling its products on an internet site whose owners were represented by the EDHEC team. There were intra-team communications via conferencing and f2f meetings, and inter-team negotiations via email and a final two-hour video conference.

This was a pilot project – a single simulation example without any further infrastructure. A more developed simulation infrastructure project was developed by Maharg, staff at the GGSL and Dutch academics and developers based in a government-funded initiative, RechtenOnline (2009). Over a period of several years the GGSL team worked with teams of Dutch developers and academics to help them develop their own simulation environment using the educational and design principles that had underpinned their own simulation practice. The Dutch teams built their own online town, Sieberdam, and used the environment to develop and implement over twenty games and simulations across Dutch schools, FE, HE disciplines. Eventually, Sieberdam and the RechtenOnline Community Service were folded into one organisation, Cyberdam, which was funded in the *Learning in a Virtual World* project by the Dutch government office, Maatschappelijke Sectoren & ICT.

Following its initial co-development with Sieberdam, the GGSL developed two inter-jurisdictional simulations that involved Scots law students at the GGSL and Dutch students. One involved volunteer students from GGSL and law students in the HU University of Applied Sciences, Utrecht in the Netherlands (Maharg and Nicol 2009). The sim was hosted on the Dutch Cyberdam simulation platform. In their detailed study of the Cyberdam project Mayer, Bekebrede and Warmelink (2009, 15–16) outline the development of Cyberdam and the strong influence that SIMPLE and Ardcalloch had upon the Dutch initiative (Stichting Rechten Online 2009). They also point out that Cyberdam, a dedicated simulation platform as is SIMPLE, could be used by disciplines and subjects across the Dutch educational system.

The Scottish-Dutch project was focused on EU employment regulations regarding maternity leave across the two jurisdictions – a relatively straightforward scenario, but involving a number of complex points of EU and municipal law. The Scots law students acted as legal advisors to the Dutch law students in their simulation, where the Dutch students were advising either the employee or the employer of their rights and obligations under law. The sim was a pilot project for the Scots students who were already undertaking simulations in the SIMPLE environment, but the simulation was a high-stakes assessment for the Dutch law students.

After initial uncertainty in the forms of communications to be used, the inter-jurisdictional sim worked surprisingly well, and not only as an inter-jurisdictional

legal problem. Students learned much about how to manage relationships in a professional client/advisory situation. In the focus group feedback afterwards one Scots student commented that

> They [the Dutch students] asked a huge question! They asked us, 'Tell us about employment law in Scotland'. They had specific facts but they didn't ask specific questions until the very end, when they had lots of new information. (Maharg and Nicol 2009, 34)

This observation raised what had been a problematic issue of communication and relationship for the Scots students. The relationship between legal adviser and client in a business context requires both sides to be active and assist each other. Quite how to go about that task was part of the learning that students had to undergo. It is a mark of capable professional advisers, after all, that they can give the client confidence in the quality of their client-centred work as well as in the quality of their legal advice. As we described the situation in our chapter,

> The Dutch students […] could be expected to have specific facts, since that was what they were required to collect. But it was not entirely their job to formulate specific questions about the facts. That was partly the task of the Scots law students, who needed to be more proactive not only in thinking about the types of questions that the Dutch students would ask, but also about the types of information they would need in response to those questions. As advisors they needed to help the Dutch students formulate the important questions of the facts and the legal topic. Since they did not think about this client-based aspect of the simulation, they found themselves uncomfortably short of time to answer queries. (Maharg and Nicol 2009, 34)

In the final chapter of the book Warmelink, Bekebrede and Mayer quantitatively analysed the educational effectiveness of 14 simulations and games, based upon seven hypotheses that provided insights into how the games and simulations were effective and why. Their study is still probably the most detailed quantitative study of the effectiveness of a simulation platform in Higher Education; and their results reinforce the power of simulation as a heuristic. The *Maternal Leave* simulation was one of the top three simulations based upon cumulated student scores according to specific parameters (Warmelink, Bekebrede and Mayer 2009, 106).

d) Simulation platforms adapted across jurisdictions

Where Paliwala's pilot cross-jurisdictional simulation used generic and proprietary applications such as email and video-conferencing, SIMPLE and Cyberdam are sophisticated, custom-built, open-source simulation environments. The Dutch initiative, as we have seen, involved academics and designers adapting the GGSL principles and approaches in their development of a simulation platform for the Dutch

educational system. But simulation systems can also be copied and adapted across jurisdictions. This is what happened at ANU College of Law's Legal Workshop, where the open-source SIMPLE code was forked and heavily adapted in subsequent iterations to provide a simulation platform for professional Australian education. The process has been described and analysed by a number of commentators. Seul-gi Lee and Ferguson (2015), for example, argue that the local factors that affect Australian legal education (they include geographies, the history and cultures of legal education programmes and recent regulatory controls) make the use of simulation an important heuristic. They analysed the ANU College of Law Legal Workshop adaptation of transaction learning, and show how it 'deepens and enhances student professionalism' (2015). They then investigate the consequences of such professional programmes and approaches for the design of regulatory regimes in legal education. Their last point is a profound one, made also in the Legal Education and Training Review (LETR) of professional legal education in England and Wales, namely that innovation in legal education requires innovation in regulatory practice and attitude if it is to succeed and be sustainable within a jurisdiction (LETR 2013).

III. Possible futures for simulation in legal education

I have outlined two general phases in the recent history of simulation in legal education in common law jurisdictions. What is the next phase for simulation-based legal education? As I pointed out early in this chapter, there is a close relationship between the affordances of the new technologies and the development of design and theory around them. This will continue into the future, and I shall give two examples of directions that may be taken by future simulation designers and educators.

Case study 1: Machine learning and simulation

The first case study is a current project that has set out to develop a suite of applications that will support simulation learning, and which is based in Canada. The core partners are Queen's University, Ontario, and Ametros Learning, a Toronto-based for-profit e-learning company.[4] A number of law schools internationally who were involved with SIMPLE and other forms of simulation will assist in testing and giving feedback on prototypes and Beta builds. Using the already-existing Ametros Digital Simulation Platform the two-year project, which began in 2016, sets out to design and build a new framework combines a case-based decision framework (that

4 For more information see https://www.queensu.ca/gazette/stories/simulating-real-world-challenges?utm_source=e-queens-gazette_faculty.

includes *inter alia* virtual mentors, stage-by-stage feedback on task and contextualized decision making), a simulation engine, an adaptive learning engine (embedding AI using IBM's Watson platform), informal and formal assessment modes, a guided authoring system and SCORM compliance and data processing. Apart from the adaptive learning engine, the other functionality was already present in SIMPLE and Cyberdam. The critical factor design factor, of course, will be the authoring system. SIMPLE's authoring system was complex and rich in functionality; but we found that few academics were sufficiently technologically literate to design within it. It is critical that the Queen's project design a more useable environment. This is not an easy task, as we discovered in SIMPLE.

Nevertheless, the significantly new function of Queen's University's project is the use of an adaptive learning engine. As we have seen, the first phase of simulation projects contained no machine learning, relatively little interactivity between machine and user, and sims were often bounded in their design as a result (Barton and Maharg 2006). In all the SIMPLE sims, simulation design could be made more open and allowed for greater decision-making on the part of students and staff performing in the sim. This was often achieved by the supply of information by facilitators in real-time. Machine learning and natural language processing technologies would now seem to be sufficiently sophisticated to automate aspects of the production of documentation. If it proves so – and this is one of the key hypotheses that the Queen's University team has set itself to discover – and if it is usable by academics and designers, then it will be a significant step forward in simulation infrastructure design.

Case study 2: Augmented reality (AR) and simulation

According to the New Media Consortium Horizon Report 2016, augmented reality (AR) is one of the fast-approaching technologies for HE – only two or three years away from significant take-up. Recently though there have been significant moves, both in the design of the hardware and perhaps more significantly in the number of education corporations prepared to develop with it. In a widely publicised joint project Pearson has teamed up with Microsoft's Hololens initiative to create content and approaches to mixed reality learning.[5] AR in this context means the development of virtual reality objects that overlay data upon real physical objects and contexts, and can seem to blend within the reality that a user is aware of around his or her body.

5 For information on Hololens, see http://www.pearsoned.com/education-blog/hololens-making-impossible-possible/.

As Pearson's press release points out, AR can be used in educational interventions such as standardised or simulated patients in medical education. Pearson envisages that it can be used to 'explore 3D content and concepts in a number of academic disciplines, including physics, biology, and archaeology'. In all these disciplines AR could be combined with simulation. In legal education for instance, simulated clients could be developed with AR, based on the work already done by Barton et al (2006) and others such as Chow and Ng (2015). This may extend the educational potential of the heuristic – there is certainly potential to begin to develop skills and ethical learning into mixed reality digital dimensions that may succeed where purely virtual environments (such as *Second Life*) proved less successful.

V. Final words

These are clearly two futures that could be compatible but which are at present significantly different from each other. But to limit simulation to these projects is to limit our vision of what might become a much more powerful educative potential. In the future, collaboration is the critical success factor – we can learn that from the joint nature of the GGSL itself, which enabled significant resources to be given to sustaining innovation for over a decade, something that single law schools struggle to do. In the future institutions (indeed entire jurisdictions – the Dutch government initiative described above is an excellent example) will need to collaborate with each other to create the multiverse platform that could sustain vast narrative sims and games that incorporate but go well beyond the bounds of transactional learning (Harrigan and Wardrip-Fruin 2009).[6] Simulations, after all, are highly protean – there is spectatorship in them, but there is also multiplayer collaboration and competition within communities, where participants in the sim are by no means readers, yet not enactors only, but performers too. The idea takes us back to Dewey's aesthetic of transaction, an opening to experiential change in the moment, and at its best a thrilling becoming. But the becoming that lies at the heart of a simulation as an educative event leads us to Deleuzean concept of difference that is not dualist, polar either/or, is not imitation or analogy, but generative of a way of understanding and being that is both a history of our selves and their narratives, within a social and technological assemblage that forms and re-forms endlessly, and a critique of that understanding (Deleuze 1993). The Deweyan transaction, the Deleuzean becoming, as Semetsky points out (2006) are closer than we think, and never more so than in the educative moment of simulation.

6 The final section of the Conclusion in Maharg (2007) envisages a future law in 2047 degree built entirely around simulation.

There are significances here not just for professional education and its regulation, but for any wider consideration of legal education. As we have seen, simulation challenges almost every aspect of conventional legal education: curriculum forms, administration, teaching, learning, assessment, resources, forms of texts, categories of law school employment, the relationship between academic and professional forms of learning. It also challenges regulators to support such educational innovation with forms of regulation that will encourage educators to innovate and enable such innovation to be sustained. As we saw with regard to the inter-jurisdictional sims described above, it is possible to use varieties of interjurisdictional simulation as forms of positive globalisation, or 'glocal' learning – that is to say, global practices that are adapted for local circumstances. But this requires regulatory vision and innovation; and a community of practice between simulation practitioners and designers and regulators to bring it about.

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Abstract

This article first traces some of the early history of simulations in legal education that use digital technologies. It thereby describes how sims have developed through two broad phases as a consequence of the influence of technology, educational theory and other pressures, i. e. Phase 1. Simulation and instructivism: the legal mind as computer, Phase 2: Simulation and constructivism – the legal mind as Periclean plumber.

It then considers a use-case of simulation in the UK, namely the work of the Glasgow Graduate School of Law (GGSL) at the University of Strathclyde, in the first decade of the new millennium (developing a simulation environment called SIMPLE), and it outlines some ways in which simulations as an educational approach could be made more effective within jurisdictions and globally.

Finally, it addresses the future of simulation in legal education, and directions it may take more generally, and illustrates this through two technological perspectives: Machine learning and augmented reality.

Overall, simulation can help to take a creative swerve around one of the most problematic cultural and jurisprudential issues in common law legal education, namely the division between academic and professional legal education. Instead of educating the lawyer to be either a Pericles or a plumber, Marg argues that we should adopt constructivist approaches to the whole educational process in order to educate Periclean plumbers.