

## Chapter 2

### Cyberdam and SIMPLE: a study in divergent development and convergent aims

*Paul Maharg and Emma Nicol*

#### 2.1 Introduction

It is a design truism that form affects function, and in education it is also generally accepted that functionality affects learning. In truth, all technology both constrains *and* liberates. In the thirteenth century, for example, the massive information overload represented by texts such as Justinian's *Digest* and the proliferation of Church law required scholars and users to create the symbolic tools that would help them to cope with problems of understanding and memorizing the legal information overload (Maharg, 2007). Those tools both enabled legal scholarship to flourish, but also constrained that scholarship by limiting the conditions under which it was produced, for whom, and how. It could be argued that the introduction of moveable type in the fifteenth-century had the same effect (Rhodes & Sawday, 2000).

The same is true of our use of technology in schools, universities and workplaces. Currently, many virtual learning environments (VLEs) used in universities mimic the administrative structures of departments, faculties and institutions. They "push" information at the user. There are few spaces where the user, particularly students, can claim ownership of information, and share that information freely with others. Indeed some would claim that VLEs are constructed and used in such a way as to minimize the amount of disruption that technology adoption causes within an organization (Boys, 2002). ICT thus legitimizes standard, traditional practices and is prevented from challenging the dominant paradigm. It can then be assimilated and becomes institutionalized. For real change to happen, Boys concludes, higher education needs to implement, *inter alia*,

- a problem-seeking, not a solution-driven, approach to ICT
- an explicit model for managing change
- explicit goals, both organizational and educational
- development methodologies centered on quality of content and processes, not technical compatibilities
- involvement of students
- alternative "visualizations" of the functions of a Managed Learning Environment, or MLE.

Simulation environments such as Cyberdam and SIMPLE, it could be argued, are implementations that seek to change disciplinary teaching, learning and assessment in significant ways. One view is that they are containers filled not with institutional information but with student work. Students also have the potential to direct their own work, to shape and control the direction of the game or simulation and the part that they play in it. However to do this requires academic staff to rethink their organization of teaching at a deep level. VLEs such as Blackboard can easily support the status quo for staff, in so doing encouraging shallow learning and a transmission model of learning. Simulation environments such as Cyberdam and SIMPLE can be disruptive to conventional teaching – indeed the very process of thinking how to develop a simulation requires staff to rethink teaching structures as well as the learning resources that will be the context of the game or simulation. In the following sections we shall see how in their different ways both Cyberdam and SIMPLE support students in their learning, and how they are tools with which staff can bridge to new ways of conceptualizing learning and teaching.

## 2.2 Cyberdam

### Cyberdam [en] Map

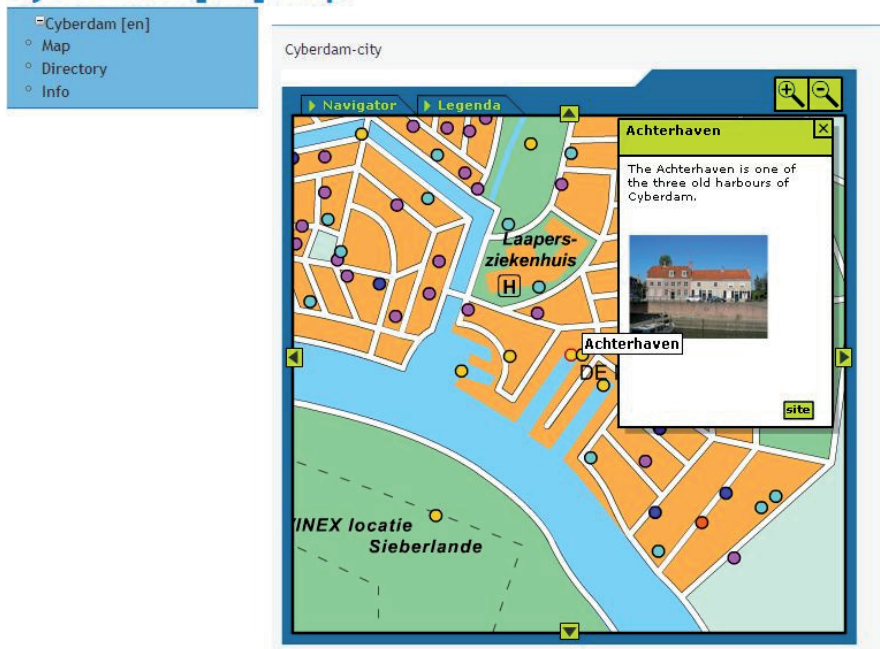


Figure 2.1 – The Cyberdam user-interface

Cyberdam began life in late 2004 as Sieberdam, a virtual Dutch town inspired by the Scottish virtual town of Ardcalloch (Maharg, 2003) as used at Glasgow Graduate School

of Law in the University of Strathclyde. Sieberdam consisted of a virtual town, and an e-learning suite called ROCS. The role of ROCS was to facilitate the building of web-based role-playing simulation games. These games would be of a type described as “asynchronous workflow-based group games” (Van der Hijden, 2005). The software for both the virtual town and the e-learning suite was, unlike the first instantiation of Ardcalloch, open-source. During the two years that followed its initial release, three major e-learning projects were undertaken with Sieberdam at their core. These projects ran in the Sieberdam environment at around 15 educational institutions throughout the Netherlands, providing learning experiences in several subject disciplines at various levels of education. One of these projects was KODOS (CPS – Delft Centre for Serious Gaming, 2009) (translating as “Knowledge Development About and Through Online Simulations”), which was funded by the Dutch Organization for Higher Education, SURF, and managed by the Erasmus University of Rotterdam.

By developing and running online simulation games in the Sieberdam environment the KODOS project’s investigators were able to conduct systematic technological and user evaluations of the environment with a view to providing data to feed into the development of later iterations of the platform. The evaluations had several key findings regarding the experience and preferences of users of the system. Contrary to expectations, students were largely unfamiliar with online gaming outside of Sieberdam (Bekebrede, 2007). However recent research on the depth of games literacy and other related issues such as digital natives shows that this result is by no means an outlier (Bennett, Maton & Kervin 2008). Most respondents appeared to like using learning games and pointed to the improved student-tutor interaction that the platform allowed, particularly where face-to-face interaction was concerned. Students were on the whole satisfied with their experience of using the platform but pointed to several areas that were in need of improvement. Regarding the tutors’ experience, it emerged that the first generation online games they produced for Sieberdam were developed using only a limited set of the available functions. At the same time, it emerged that tutors would require more flexibility and functionality from the platform in order to develop more sophisticated simulations.

Thus it was clear that Sieberdam, while a promising concept, would need to undergo a substantial critical review and significant reconstruction were it to be used successfully in the future (Van der Hijden, 2007). Accordingly, “Cyberdam”, a new version of the platform was planned. It would improve on the Sieberdam software and allow the development of a substantial range of new games to be developed and played using the platform. The development was part of an initiative called “Learning in a Virtual World” (LIEVW), funded by the M & ICT Program.

### **2.2.1 Functionality**

Cyberdam provides a suite of tools that allows academics to construct simulations. There are four basic modes in which you can work with games in the Cyberdam environment:

1. *developing* a Cyberdam game from scratch. Given the complexity of development, it is advisable that this activity be done by a team rather than someone working alone.
2. *adapting* an existing game
3. *running* a Cyberdam game (starting game sessions, acting as a game master, etc.)

4. *playing* a role in a game session (Van der Hijden, 2007).

The most complex of these four modes is mode 1: developing a new Cyberdam game. Given the complexity, in order to make game creation manageable the developers recommend dividing this mode into four phases. Thus:

- *definition* phase: analyzing the game's objectives and defining the requirements that the game must meet
- *design* phase: specification of the details of the game
- *realization* phase: preparation of all the materials/resources required for the game; then the game and all its attributes and resources are entered into the Cyberdam system
- *implementation* phase: transferal of the game to the organization that will use it (Van der Hijden, 2007).

A set of tools and techniques has been developed by the Cyberdam project to support the game creator in each mode of operation and in one of the four phases of the development process. Much of the work in the design phase involves the educator defining the various roles that are required for the game, the steps of play, and the instructions for the participants. The support application allows educators to start parallel game sessions, provides a means of monitoring these and allows the educator to intervene in the game when it becomes necessary (Van der Hijden, 2007).

The application consists of three modules: *Playgrounds*, *Models* and *Manifests* (Van der Hijden, 2009):

- Each of the *Playgrounds* contains an interactive 2D city map with realistically named city areas, roads, canals, public buildings, private residences and businesses. These entities are listed in a directory that may be accessed in the *Playground* with links to websites containing background information on the town, its institutions and inhabitants.
- *Models* contain the specifications for the roles, stages and variables, and activities defined by the role. These are known as "scripts".
- *Manifests* relate the roles in each *Model* to the objects in the corresponding *Playground*. Roles from one *Model* may be used in multiple *Playgrounds*.

A session facilitator, for instance a tutor, creates a session by combining instances from each of the three modules. The facilitator assigns the roles contained in the module to one or more participants, either students, other tutors or themselves. The roles include burgomaster, shopkeeper, nurse, lawyer, or one of the city's other inhabitants. Each participant is briefed on the goal they must achieve. It is then up to the participant to decide on what they will do next (Van der Hijden, 2009). Following the briefing, each participant is given online access to a "dashboard" (Van der Hijden, 2007), which has a number of functions. The dashboard stores the participant's instructions for a given scenario. It also allows the player to exchange messages with the people playing the other roles in the virtual city, either their peers and teachers or in some cases external experts.

Once a session is up and running, each participant has access to a home page for the role they are playing. Participants can adapt this page according to their preferences and may add documents to supplement the information contained there. The facilitator running the session has access to all of the home pages, which allows them to keep track of activities and the exact times and dates of their occurrence. This transparency allows the facilitator to make appropriate interventions if and when necessary. All the activities

are viewable in the form of an historical log of the entire session from start to finish. The log remains available for viewing after the conclusion of the game (Van der Hijden, 2009).

Sessions are conducted in stages, and often sub-stages as well, to make them more manageable. The following general example shows how the game works. It commences with the Briefing stage. Then it proceeds to a stage involving several micro-cycles of consecutive processes, including Events Handling, Producing, Tax Collection and Trading. At the end the final micro-cycle, the game concludes with a stage called Debriefing. Movement between the stages can be prescribed either by a script, or can be expedited by one of the roles played being played by a tutor or other facilitator (Van der Hijden, 2009).

On the participants' home page is a hyperlink called "Contacts" which links to each of the other roles involved in the session. Participants can also see a summary of the messages they have received and the files that have been uploaded to date. Messages are sent in a manner very similar to email. The participants' home pages remain available for viewing long after the conclusion of a particular game. For the person or persons facilitating the session there is an additional feature, a list of activities that have been carried out. Facilitators also have a table on their home page that specifies the stages and sub-stages of the session and the progress made on these. Some activities in the sessions are described as "optional" and the number of these varies from session to session.

Participants may encounter five key types of activity (Van der Hijden, 2009):

- *Input*: where the role player is asked to complete a form. The information provided is then input to the prescribed scripts in the model of the session
- *Output*: where certain information is displayed to the role player
- *Upload*: where the role player must upload a file
- *Message*: where the role player must send a message to one or more other role players in the session
- *Move*: where the role player is invited to move the session on to another stage.

As the game session proceeds, the instructions may change from those outlined initially. A game session ends when either the permitted duration of the game as defined at the outset is finished, or the goal(s) specified in the instructions have been reached. As participants in Cyberdam do not have to be online simultaneously in order to participate in the game, a typical session with a Cyberdam game may take a whole week to complete, while the actual playing time for each participant in the game may be a couple of hours at most. Evaluation of typical games in Sieberdam/Cyberdam has revealed that the average game takes around 5-7 weeks to complete (Van der Hijden, 2005). However not all interaction takes place online. In addition to the online interaction, there are often timetabled face-to-face meetings between participants in the game. Participants take part in the meetings in-role to carry out synchronous activities, that is, those activities that require the presence of each participant in the same place at the same time. Any activity occurring in the game during the rest of the time is "asynchronous" (Van der Hijden, 2005).

### **2.2.2 Learning outcomes**

The overriding aim of the Sieberdam/Cyberdam projects was to teach complex decision-making through the use of gaming and to attain learning outcomes through both active

and authentic experiential learning (Bekebrede et al., 2007). To better understand the possible learning outcomes that might be produced on a system such as Cyberdam it makes sense to look first at one of the simulations already carried out on it. It is important to understand the context in which the students and their tutors might find themselves, the types of activities they might be involved in undertaking and the main tasks that have to be completed during the game. What follows is an outline of the main elements of the *Spoorzone* simulation that first took place in Sieberdam in 2005.

### 2.2.3 Example: Spoorzone

The scenario revolves around the administrative restructuring of a problem area of ground near a railway track. Besides ownership, there are professional and ethical issues of urban planning and poverty. The municipal authority needs to write a plan for the area using participatory decision-making. The game events and resources include a briefing, a concept plan, an appeals procedure, the formulation of final plans, and at a certain point during the game a crisis involving loss of electrical power due to heavy winter snowfalls.

The simulation involves such actors as municipal officials, residents, housing associations, representatives of the railway organization, and SMEs (small to medium-sized enterprises). The job description for each role includes the goals to pursue and the interests they represent. Tutors play the role of council officials in order to monitor progress, the quantity and quality of interaction and the quality of task completion by students. The students' tasks include organizing meetings, undertaking study (e.g. a cost-benefit analysis of moving the track), and formulating new development plans for the area (Bekebrede, 2007).

Participation in a simulation of this type can facilitate many potential learning outcomes. A key aspect is consolidation of knowledge – making disciplinary theory encountered in texts or in lectures more comprehensible for the student. Added to this, the game gives students the opportunity to generate new subject-related knowledge. Students can also be encouraged to learn to think beyond disciplinary boundaries and see the links between different subject areas that they might previously have regarded as discrete because of the academic boundaries of the program, module or topic.

Beyond disciplinary knowledge generation and consolidation, participation in a simulation such as *Spoorzone* can encourage learning of team-working skills, improve communication skills, improve discussion and reasoning skills and lead to improved negotiation skills. There is a particular focus on skills related to professional life beyond college or university (Bekebrede et al., 2007). The integration of such skills with disciplinary knowledge is a powerful motivator for students, for the disciplinary knowledge can then be perceived as being used in much the same way as professionals would use it. The issue is of course a highly complex one; and one would not want to draw close analogies without further research. Nevertheless it is undeniable that an environment such as Cyberdam, with a well-designed scenario such as *Spoorzone*, affords the opportunity not just for the close integration of skills with disciplinary knowledge, but the practice and analysis of professional thinking and action.

Experiential learning that takes place through such games as Sieberdam/Cyberdam is of course a moderated and evaluated process (Bekebrede et al., 2007). The need for moderation and evaluation in learning using simulation is motivated by a number of factors:

- lack of clarity as to what drives the experiential cycle and what ensures that it continues
- lack of clarity as to the role of knowledge transfer and formal instruction in the cycle
- the need for outside intervention to prevent decisions based on “negotiated nonsense”
- issues of time. Experiential learning tends to be slow and therefore needs to be “moved on” by a facilitator.

One of the most important outcomes of using Cyberdam to create a simulation such as *Spoorzone* was its effect on the quality of learning and teaching interactions. There are two key elements to this interaction, namely quality of student-student interaction and quality of student-tutor interaction. Students indicated that theory became more comprehensible and they learned much more about the subject. In evaluations of Cyberdam simulations it is plain that the interventionist role of the tutor in learning through simulation is critical. Students had varying experiences of performing the same simulations compared to others in their cohort and this was often due to the quality and nature of interaction with the tutor to whom they had been assigned for the duration of the game (Bekebrede et al., 2007). Again, this is not new: as McKellar & Maharg report with regard to implementation of multimedia webcasts, the integration of e-learning within the more conventional affordances of seminars, books, etc. is often critical to the success of an e-learning initiative (2005).

## 2.3 SIMPLE

SIMPLE (SIMulated Professional Learning Environment) grew out of an approach to legal education that began with the founding in 1999 of the Glasgow Graduate School of Law (GGSL), a joint school of the universities of Glasgow and Strathclyde. The School adopted several unusual approaches to the professional education of law students on a postgraduate vocational program called the Diploma in Legal Practice. All were inspired by John Dewey’s approach to democratic education and experiential learning. Simulation was one of the key approaches. To achieve the sense of entering a learning space different from other academic and professional learning approaches, we built a fictional town on the web, called Ardcalloch – a typical west coast Scottish provincial town. It consisted of a map and directory and had over three hundred citizens, institutions, businesses and other organizations that could be used in simulation projects.

The GGSL’s educational approach was based upon the constellation of concepts summarized by the phrase “transactional learning”. The idea of learning as a form of transaction is of course not a new one. It can be traced back to Dewey’s fundamental argument that education arises from the interaction of a person’s internal life and external conditions. Experience, he held, consists of an *interaction*, a transaction between individual and environment (Dewey, 1981, p. 25). Indeed it would not be saying too much to describe it as the educative process. Others have taken up this transactional relationship and developed it in different directions.<sup>1</sup> Chen, for instance, has applied it to the concept of distance in use of the web for distance-learning (Chen & Willitts, 1998);

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<sup>1</sup> Dewey states in an albeit early article: “I believe, finally, that education must be conceived as a continuing reconstruction of experience; that the process and the goal of education are one and the same thing” (1981, p. 91).

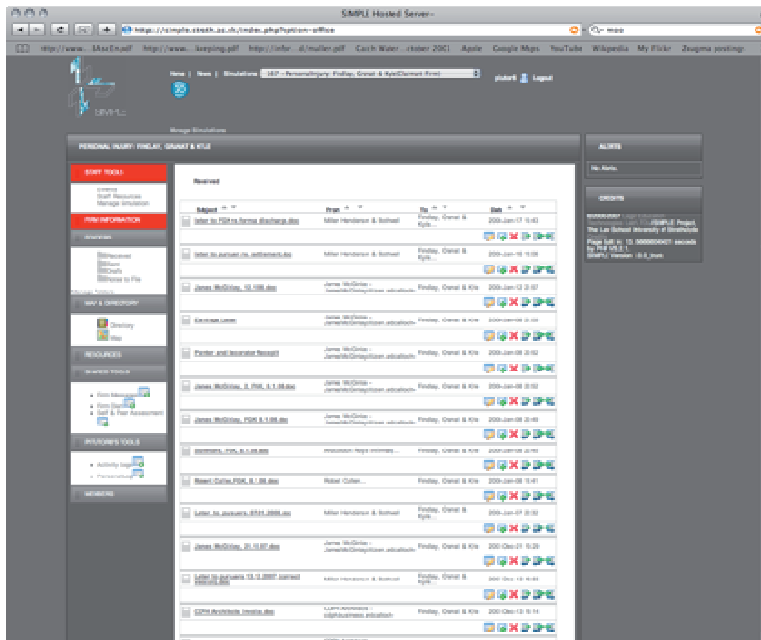


Figure 2.2 – The SIMPLE user-interface

Garrison and Anderson (2003, p. 19) note that in the construction of distance-learning theory recently there has been a shift of focus from “organizational and structural constraints” (such as those of geographical distance) to “transactional issues and assumptions” of teaching and learning. For Garrison, the shift is nothing less than a movement from industrial-era conceptions of learning at a distance to post-industrial learning where peer collaboration and dialogue lie at the heart of the educational experience (Garrison & Archer, 2000).

Peer collaboration and dialogue lie similarly at the heart of transactional learning approaches in the GGSL. Extensive student feedback was gathered every year, and the simulation approaches of the design team in the Learning Technologies Development Unit were developed iteratively in response to this feedback. The simulation project was thus a long-term design and specification project, with each stage creating a new iteration of the software and the educational approach. The approach has been refined over a number of years by Maharg and others (e.g. Maharg & Owen, 2007; Barton, McKellar & Maharg, 2007). The approach is now characterized as:

1. **active learning**
2. through **performance in authentic transactions**
3. involving **reflection in & on learning**,
4. deep **collaborative learning**, and
5. holistic or **process learning**,
6. with **relevant professional assessment**
7. that includes **ethical standards**.



Initially applied to one subject in the Diploma in Legal Practice, transactional learning now spans across five subject areas in six projects, all of which now use the SIMPLE software described below.

In the period 1999-2005 the technical implementation and design iteration of this educational simulation paradigm was complicated and, while sophisticated on an educational level, needed applications programming at almost every level to design, build and maintain the software. In the period 2006-2008, with the aid of funding from JISC (Joint Information Systems Committee) and HEA (Higher Education Academy, through the Law subject centre, the UK Centre for Legal Education at the University of Warwick), the design team at the Learning Technologies Development Unit in Strathclyde University Law School specified, designed, built, used and evaluated a new environment called SIMPLE. The environment is open-source, and was a much more stable environment than any of its predecessors.

### **2.3.1 Functionality**

Early in the design process a small but crucial series of decisions was taken about the functionality of SIMPLE. It was decided that the resultant software would be developed to sustain the pedagogy of transactional learning that we had developed. This did not rule out the application being used for other purposes, but it did mean that the pedagogy was used to direct and prioritize the potentially huge range of functionality that could be built into the environment.

At present, SIMPLE consists of a simulation authoring tool set and a simulation platform upon which simulations for professional learning can be run with users. The platform functions as a basic type of case management system. While many of the simulations were based in Strathclyde Law School or in four other law schools (Stirling, Glamorgan, University of the West of England and Warwick, user participants in the project also included Management Science, Social Work and Architecture. The simulations were used by a range of undergraduate and postgraduate programs, proving that in-depth simulations can be used throughout the student cohort, and across a range of professions.

The authoring tool set is the construction yard for simulations, where designers create simulation “blueprints” that contain not just the structure of the simulation but all necessary roles, resources, information, texts and other resources, e.g. graphics, video, etc. SIMPLE documentation advises blueprint creators to start with paper and basic flowcharts. Thereafter, authors are advised to use the Narrative Event Diagram (NED), which enables authors to set out simulation structure as a series of event nodes on a pre-set grid of lines, namely Critical Events, Player Characters (i.e. users), Non-Player Characters (all virtual roles) and Staff. Using this form of graphic notation blueprint authors can set out the structure, timing and nature of events and communications within the simulation.<sup>2</sup> They can also upload all resources to be used in the simulation. Variables can be inserted into the simulation resources, so that the same simulation can be deployed within a large group of users, while retaining unique markers for any particular single instantiation of the simulation.

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<sup>2</sup> The analogy to contemporary forms of music annotation is not entirely coincidental – for examples of fascinating analogies for simulation notation see [http://en.wikipedia.org/wiki/Graphic\\_notation](http://en.wikipedia.org/wiki/Graphic_notation).

Once a blueprint is complete, it is tested and then uploaded to the platform. Users are assigned roles, and the simulation is ready to begin. Documentation for this and many other procedures is available from the SIMPLE community of practice website at <http://simplecommunity.org>.

The platform interface is similar for both student users and staff. The only distinction is the addition of two tabs for staff that enable them to communicate with users as virtual characters, and to have access to the simulation structure. There are Received, Sent and Drafts folders that are generic to all instantiations, and by means of which users create and retrieve their work, and communicate with real and virtual characters. Users have the opportunity of adding to this list by creating and naming their own folders. They have access to a map and a directory that may be of a real or a fictional town that can be customized by blueprint authors for specific blueprints. In addition the GGSL has developed extensions of the application in the form of activity and personal logs, and self- and peer- assessment questionnaires.

### **2.3.2 Example: Personal Injury Negotiation Transaction**

We can appreciate how SIMPLE can be used if we consider briefly a sample simulation, namely the *Personal Injury Negotiation Transaction* (PI), used at the Glasgow Graduate School of Law on the postgraduate professional program, the Diploma in Legal Practice. The transaction is carried out by 68 firms each consisting of four students. Half of the firms represent an employee injured in an accident at work while the other half represent the other side in this adversarial transaction, namely the employer's insurance company. Students have 12 weeks to achieve a pre-litigation negotiated settlement of the claim. They play the part of lawyers for each side, and can contact any one of around 17 fictional characters for real-time information. During this time they need to discover what exactly happened to the injured employee in the incident, precisely what his injuries are and the medical prognosis for his quality of life in the future, as well as what effect legal regulations and case law have upon their client's case. Information is communicated to students by eight "PI mentors" – a group of postgraduate students, trainees and newly-qualified lawyers trained to answer in character and also to give feedback to the student firms.

The transaction is a high-stakes assessment for students: they must pass in order to be granted a Diploma at the end of the year. They are assessed on the quality of the case file that they keep throughout the transaction, and assessment criteria are based upon this quality. Throughout the process of case construction, therefore, students are required to produce evidence that they have completed the following to specific standards:

1. fact-finding from fictional characters and construction of the client case
2. professional legal research
3. formation of negotiation strategy
4. performance of that strategy.

The simulation has been described in detail elsewhere (Maharg, 2007). Noteworthy is the substantive legal understanding that students achieve through this form of problem-based learning, and which they frequently comment upon in feedback. Also of note is the level of commitment they bring to the project. There is also the broad range of skills they practice: legal writing to a wide variety of audiences, problem identification

and problem resolution, collaborative working and case management being amongst the more obvious skills.

## 2.4 Game or simulation?

There are many differences between Cyberdam and SIMPLE. They range from relatively minor differences in user interface (SIMPLE uses English dialogue texts while Cyberdam supports multiple dialogue languages) to broader issues of approach to game theory and educational design (SIMPLE is in essence a single-player system which can accommodate multiple groups within a single transaction, while Cyberdam is a multi-player system). There are too many to be analyzed in depth in this chapter, so we focus on a single difference and explore how it affects the two simulation environments. In doing so we compare instances of each platform – for SIMPLE, the *Personal Injury Negotiation Transaction*; and for Cyberdam, *Spoorzone* and another simulation called *Border Crossings* (BC). We also consider some feedback from Scottish students on a joint Scottish-Dutch project called *Maternity Leave* (ML), that used the Cyberdam platform. BC and ML are briefly introduced below. It may be argued that any single instance of a game or simulation scarcely does justice to the range and flexibility of either platform. This is true, but any discussion of functionality would be rather dry without examples. These examples, particularly the points raised by students in the ML discussion, also lead us to consider educational outcomes and pedagogical issues.

### 2.4.1 Game / simulation: student experience on Maternity Leave (ML)

This was a joint project between the University of Strathclyde and the Utrecht Hogeschool, where law students from each institution represented one of two sides in an international employment dispute. It was a pilot project for the volunteer Strathclyde students, but was a high-stakes assessment for the Utrecht students on their undergraduate law program. The simulation was a fascinating combination of SIMPLE approaches to transactional learning, matched to the program requirements of third level students on a law program at HU University of Applied Sciences Utrecht. Scottish students were postgraduate law students, most of whom had completed the Diploma in Legal Practice as well as an undergraduate LLB.<sup>3</sup>

Student feedback from eight Scottish students was obtained in a single focus group meeting at which both authors were present. The feedback gave us interesting user perspectives on the experience of taking part in an international simulation. We discussed with the students their experience of using the Cyberdam platform and of working through the simulation as legal advisors to the Dutch students. Most of the students were already familiar with the SIMPLE platform, and we asked them to bear that experience in mind when commenting on the experience of using the Cyberdam platform. The resulting conversation, which was recorded and transcribed, casts light on the differences between the two platforms.

The variation in workload surprised students. We had told our students what to expect from those to whom they were acting as legal advisors on the nature of Scots and European employment law. Nevertheless they felt it worth commenting on that they

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<sup>3</sup> See <http://www.cyberdam.nl/mod/data/view.php?id=16&mode=single&page=20>

needed to research issues that were not entirely clear to them, and had very short deadlines in which to complete the research work:

“You wouldn’t do any work for a long time and then suddenly you would have to do loads of work in one day.”

The nature of the advice-giving process was also problematic, and the reasons for this were interesting:

“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.”

Clearly the Scottish students were struggling here to play the role of client advisors, and in particular the role of advisor in helping a client to articulate concerns and issues. The problem is not quite one of communication, certainly not of substantive knowledge. It has more to do with management of the professional relationship between client and advisor. The Dutch students, for example, 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.

One student admitted,

“We didn’t know what to expect.”

Another student commented, ruefully:

“We were all over the place. If at the very beginning they had given us all the information they wanted [...] then obviously we would have been able to make inquiries about all that from the outset. But we got into the position where we, like, could almost answer everything.”

Another agreed:

“We didn’t know what to expect, everybody was all over the place. It [the agenda] was set by [our client].”

This was borne out by other comments on the nature of client communication in the project. When asked about the differences between the PI transaction and the international scenario, a number of students talked of the other side as if the Dutch students were a black box: information was going in, but nothing seemed to be coming out. Three comments are evidence of this:

“We didn’t know about their deadlines. For us, deadlines were a lot more relaxed.”

“In PI we had lots more information about our deadlines, we were clearer about when things needed to be done.”

“We didn’t know what they were doing in between their deadlines.”

Here the problems had to do with communication issues that should have been resolved. In the real workplace trainees would of course consult senior staff to learn what the culture of the workplace would treat as acceptable and capable behavior. Here, the students did nothing to resolve the difficulty, and the result was an uncertain, unnecessary distance between the Dutch clients and their Scottish advisors. If this simulation were to run again, this issue would be addressed as part of the iterative improvement, either by more communication or more social contact between the two groups (e.g. a video conference at the start of the simulation).

It was interesting to hear that the experience of many Scottish students (who had already participated in at least five SIMPLE projects that year) carried over to the Cyberdam project, and helped them to work with a very different interface.

“Everything was easy to do because of the experience of the Diploma, because of the experience of doing the Personal Injury project and the Civil [Court Action Transaction]. We were used to dealing with the environment and found it easy to do because of that.”

“Quite easy for me in the end and I did enjoy it.”

One student who had not taken part in any SIMPLE projects was much attracted to this way of learning:

“A whole new experience for me. But the whole concept of the project [...] interacting as we did, was quite new. I found it very interesting.”

Another student agreed, commenting on the use of authentic tasks against a more conventional way of teaching and learning:

“You wouldn’t have learned as much as if it [the simulation] were a course.”

When asked about what they liked in detail about the experience of working in the Cyberdam simulation as opposed to conventional teaching and learning, students were fairly unanimous:

“It’s definitely [a] much more practical way of learning. I’d never written a [professional] letter in my life [before this], unless it was a letter to complain about something. Being told how to write a letter in a lecture hall isn’t the same as sending it and someone getting back to you and saying we don’t know what you’re saying.”

Another commented on the new genres that students encountered on the simulation, and how simulation helped them to develop their capability:

"We don't know how to present a report. These [i.e. Cyberdam and SIMPLE] are very useful tools for that. I've enjoyed the projects on the Diploma and this one. I think it's a much better way of learning."

Another assented:

"I'd agree with that. I wish we'd done things like that during the [undergraduate] law degree rather than just on the Diploma because it seems like we learnt a lot more on the Diploma than we did in the four years [on the law degree] at university [by] using SIMPLE and doing practical cases like you do on a job."

Students who had worked on projects such as PI, where they were expected to work in several domains of law, commented on the scenario's complexity:

"I was surprised at the simplicity of the problem. I don't know how common that is in practice. [But] there was a lot of work involved [in discussion of issues]."

In a sense the student answered her own point about the problem. The complexity of a real-life problem is not necessarily the complexity of appeal court cases that are analyzed in academic legal programs, but is the complexity that arises from law as it plays out in social contexts, in real life.

Students noted that the simulation design broke up the employment law problem into neat stages and commented on this:

"I think it would be more helpful if it came not just in neat packages like, this is a labor issue, strictly labor, but if it cut across various aspects of life."

In part this may have been a function of our inexperience in international project development. It may also be a function of the Cyberdam authoring environment, which allows staff to set stages or phases to the game, and this was used by staff when constructing the scenario. If SIMPLE simulation blueprints are structured, it tends to be by assessment points in bounded transactions. Otherwise, like the PI transaction, they are open-textured in the sense that students conduct the transaction at their own pace. The Cyberdam simulations, by contrast, tend to be structured like turn-taking in games, or sections of game practice.

### **2.4.2 Game / Simulation: pedagogical and platform differences**

One subtle but important difference between SIMPLE and Cyberdam lies in the area of design approach. This was partly the result of recently funded initiatives and the revisions that took place within those funded initiatives, as described above. Reincarnating the Ardcalloch environment as SIMPLE refined the application into a professional, case management environment. The revision of Sieberdam to Cyberdam has produced an environment that supports both games and simulations, perhaps more than was the case before. It may be argued that Cyberdam is currently more amenable to games than simulations. The Dashboard interface for instance is a communication area, but not primarily a professional simulation tool. It was noted during the design process of ML, for instance, that the Dashboard as currently instantiated did not allow for as much immersion in a professional environment as SIMPLE did. On the other hand, SIMPLE

does not have the flexibility to be used in imaginary games environments that Cyberdam currently supports.

One example of Cyberdam's flexibility in this regard is the *Border Crossings* (BC) game. This Cyberdam game is quite different to PI. Students are told they are travelling on a two-week business trip abroad, and "discover it takes more than just cunning and deceit to be a successful international manager."<sup>4</sup> The students (third and fourth year students on an undergraduate International Business & Management degree) encounter textual summaries and graphics of scenarios one is likely to find while travelling. They have to respond to situations by stating what action they would take from a set of options, and are given feedback on their responses.

Much depends, of course, on how one defines a game and a simulation. Each has a distinctive design and research pedigree. The literature is considerable (Rieber, 1992; 1996; 2003). Margaret Gredler defined the differences well. Simulation, she points out, is an "evolving case study of a particular social or physical reality in which the participants take on *bona fide* roles with well-defined responsibilities and constraints" (Gredler, 2003). By contrast, a game's action is "governed by rules of play (including penalties for illegal action) and paraphernalia to execute the play, such as tokens, cards, and computer keys" (Gredler 1992). The difference is more one of emphasis than a category difference; but it is influential in subtle ways. It affects the ways that players / users enact roles, carry out tasks, and learn from their actions in the virtual world. We can appreciate this if we analyze in more detail five aspects of game / simulation research, design and play using the examples we have briefly described above:

1. *Transaction context vs. game context*

The transaction context of PI is different than the game context of BC. The provision of real-time information broadens the scope of the transaction, introduces unforeseeable elements. In BC, the game is far more strictly controlled, through scenarios and question sets, and imaginary rules. To be sure, these are based upon real activities in the world – the ancient trope of a journey to strange lands, problems encountered on the way, etc. – but this is different than the grounded reality of the legal transaction. BC, however, fully exploits the imaginary environment of the game, and for educational purposes. Character types are drawn from mythology and history, for example – something that would sit very oddly in the SIMPLE environment. SIMPLE is therefore more focused on transactional simulations, while Cyberdam can support games with imaginary elements as well as simulations such as *Spoorzone*.

2. *Sense of place and topographical representations*

The map in Cyberdam, with its foregrounded game environment, is more essential to its projects than the maps used in SIMPLE projects. In our use of SIMPLE in the GGSL we have found that students may be interested in the map at first, but use the directory more than the map during transactions. The predominantly textual focus of most of the student work area means that this is foregrounded while the map is backgrounded as a distant and fairly minimal resource. This does not preclude projects being developed that may use the topography of a region or district in more detail in a transaction, or which require a sense of place as an essential element of the game (both *Spoorzone* and BC are good if different

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<sup>4</sup> See <http://www.cyberdam.nl/mod/data/view.php?id=16&mode=single&page=8>

examples of this; an architectural game or simulation would be another). The place of the map in the design could thus contribute to the design of games and simulations with topographical resources being used as they would normally be by the disciplinary discourse. This means that maps, in both SIMPLE and Cyberdam, need to be far more dynamic resources in their own right, with interactive functionality similar to that provided by, for example, in Google Maps and Google Earth, and a more fluent interface between topographical and textual data.

3. *Learning about personal qualities*

All games and simulations have the capacity to facilitate learning in this domain. However games in Cyberdam seem to be able to directly address personal issues. BC is a good example of this, where discussion of choices leads to wider points about one's personality and the social and relationship choices one makes in the world. Current SIMPLE functionality requires more emphasis on reflective learning, particularly during a debriefing session, to bring this to the foreground (though this is remedied by use of self- and peer-assessment questionnaires as described above). Having said that, it is clear that much personal discussion takes place between participants during a game / simulation in both Cyberdam and SIMPLE, as student feedback on the ML simulation proved.

4. *Literature and models of learning*

There are differences in the background literature that tend to be drawn upon by each platform. Generalizations are dangerous in this regard. We have only begun the process of writing about both Cyberdam and SIMPLE so there is little literature to draw upon. Interestingly, though, Cyberdam authors seem to reference classical games literature (which tends to be more available in continental Europe than in the UK), while SIMPLE literature tends to refer to constructivist sources, and the literature of professionalism and rhetoric. This is also evidenced by the language of games design used to support the creation of games and simulations in Cyberdam (described in Section 2.2).

5. *Open and bounded simulations*

Both Cyberdam and SIMPLE can accommodate what Barton and Maharg term open-textured and bounded simulations (2006). They define the characteristics of the different types of simulation, but perhaps the key distinction is the provision of complex information in real-time during a simulation. SIMPLE transactions often make use of live information fed in real-time to the participants in answer to queries. This can of course happen in Cyberdam, but it seems to happen less than in SIMPLE. Again, this may be symptomatic of the games base of Cyberdam. Live information has the advantage of making transactions more authentic and sophisticated than they would otherwise be. However the process can be dangerous and has to be carefully managed or it can easily derail a transaction. In that sense it contributes to the build-complexity of a simulation infrastructure.

## 2.5 Conclusions

In spite of the divergences of the two applications, some of which are stated above, there are many similarities in pedagogics and technologies, and we shall end by pointing out some joint convergences in research that can be achieved by the two projects.



In our conclusion to the SIMPLE Project Report, we state that our experience of the two-year project had confirmed that simulation is a powerful heuristic, capable of enhancing student learning and supporting transformative shifts in education. This is nothing new. However it was also clear from our project that to implement simulations and games, staff need to be committed to changing some of their fundamental practices. They need design support in order to create effective simulations, and this includes integrating the outcomes and methodologies of teaching and learning. They also need practice in designing innovative forms of learning, in building resources for simulation and in re-thinking feedback and assessment practices. Management at departmental, faculty and probably institutional level need to give thought to different employment practices within staff cadres in order to support such forms of learning, resource building and assessment. In addition simulation practice could (and did) facilitate forms of collaborative activity between institutions and disciplines, and internationally.

We would suggest that this may also be true of Cyberdam, and we base this not just on our separate readings of SIMPLE and Cyberdam, but on our experience in co-designing the *Maternity Leave* simulation with Utrecht Hogeschool staff, and using Cyberdam in the simulation. Above all, we would argue that much more research is needed on these and many other issues. We commonly frame our discussion of games and simulations in terms of technologies and outcomes. We need to re-frame this discussion to take account of the considerable body of research literature that already exists on influential models of learning and interaction – on writing and rhetoric (Goodfellow & Lea, 2007) for example, or on social interaction theory (Goffman, 1961), or on situated action models (Suchman, 1987). Such research should probably be carried out in collaborative projects, in order to increase the research base and general understanding of gaming and simulation in environments such as Cyberdam and SIMPLE. Below are some examples of areas requiring further research.

### **2.5.1 Simulation spaces vs. teaching interventions**

One difference between in-depth simulation and conventional teaching is the emphasis on space. Teaching is normally defined as some kind of activity. Simulation by contrast can be defined as a space designed for learning. The metaphor of the stage is apt: staff activity takes place behind the scenes, at the planning stages (as playwright) and in role play with students (as actor). The result of this is, curiously, that staff can be perceived by students to be more remote from their learning activity, precisely because they are not present in conventional roles.

The problem is not just one of new staff roles, but also the management of student expectation. In the simulation spaces, communication and feedback require new forms of intervention. In-role feedback is possible. New varieties of forms of feedback can be designed. In the GGSL PI transaction, students received feedback on issues from negotiation tutors at “surgeries” – effectively brief sessions with tutors lasting no more than 20 minutes, where students came to discuss and receive advice and feedback on specific issues relating to their transaction. Students need to know precisely how the surgery will operate before they can feel comfortable with it, precisely because the discourse at such an event is quite different from a tutorial, seminar or workshop. Staff need to know how to structure and manage the surgery. Simulation and game designers need to know how to use such innovative teaching designs.

### **2.5.2 Management of communications data**

Communication channel management becomes more critical in environments such as Cyberdam and SIMPLE, for online simulation space relies more on such communicative channels for learning and feedback to take place. It is probably true to say that both platforms require further diversity in the communication channels they offer – discussion forums, IM, mobile phones, voicemail, texting, video, Twitter are some examples – but even more essential is the toolset that enables users to manage the complexity of information streaming in through these channels. This in turn requires research into user needs, patterns of data usage and the types of tools to be developed.

### **2.5.3 Large-scale collaboration and collaborative inquiry**

Large-scale collaborative projects such as Cyberdam and SIMPLE have the capacity to challenge institutional orthodoxies. Institutions commonly organize their knowledge in LMSs, silos of knowledge behind intranet walls. Products of the teaching process include handbooks, CDs, closely-guarded downloads, and are password protected. Content is organized into programs and modules, within which there is snapshot assessment of taught substantive content in examinations and other forms of assessment. Use of simulation together with large-scale collaboration over simulation design and implementation is one way to present alternatives to the *status quo*, and we should be seeking ways to develop further collaboration and collaborative inquiry. In this way we can contribute to the understanding of how institutions affect the implementation of innovative technologies.

### **2.5.4 Simulation, gaming and institutional structures**

There are much wider implications raised by both SIMPLE and Cyberdam. Simulation frequently inverts what might seem to be the natural order of things in our teaching institutions. What if we look not just at how institutions affect the implementation of innovative technologies but instead ask how such innovations can effect change in institutions? If SIMPLE were to be in widespread use, what might its effects be? With its propensity to be a multi-user platform across a range of institutions, Cyberdam would contribute to the weakening of institutional boundaries, but paradoxically could strengthen the presence of institutions, precisely because it is capable of supporting and organizing resource-based, integrated learning networks, with open access. MIT & OU, with their open courseware initiatives, show us the way forward in this regard.

But these institutions are still acting as single institutions. What is uniquely different about platforms such as Cyberdam and SIMPLE is their potential for global take-up, and interdisciplinary collaboration across institutions, across disciplines, and across systems of higher education. In such an environment it may be more possible to focus not on static content but on web-based, aggregated content, where e-learning is integrated with other forms of teaching and learning as understanding and conversation, as just-in-time learning; and where assessment takes place as assessment of situated learning. Such an environment can be termed trans-systemic in its potential effects.

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