Interactive media - a tool to enhance human communication

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Declaration

I certify that except where due acknowledgement has been made, the work is that of the author alone; the work has not been submitted previously, in whole or in part, to qualify for any other academic award; the content of the exegesis is the result of work which has been carried out since the official commencement date of the approved research program; and, any editorial work, paid or unpaid, carried out by a third party is acknowledged.

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Abstract

This exegesis investigates the use of interactive online media to support the development of communication and problem solving skills amongst learners in a Vocational Education and Training (VET) context. It describes the development of the Maelstrom website as a response to the identified need for a collaborative, interactive online space where learners can explore and experiment within the safe and anonymous environment provided. The user interaction within the Maelstrom and user responses to their experiences are discussed and analysed to not only inform the role of the Maelstrom within the broader context on interactive online communication and collaboration, but also to guide future research.
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Introduction

What is the project about?

The idea for the project arose from an identified need for soft skills in the Australian workforce. The project is designed to play a part in the development of these skills, as it will provide an opportunity for learners to develop problem solving skills and practice communication skills in an online environment.

Traditionally, communication skills are taught in a face-to-face classroom situation. Vocational Education and Training (VET) is moving strongly in the direction of a more “flexible” approach. This means that learners are able to draw from a wider range of delivery strategies.

Some teachers of communication feel that there is an inherent paradox in interpersonal skills being taught through impersonal teaching as flexible delivery approaches are sometimes perceived to be (McInnerney & Roberts, 2002). The project aimed to address these concerns through an effective use of human-computer interaction.

One of the accepted truisms in both information and communications technology (ICT) and in education is that the use of the computer as a learning tool has its limitations. My project aimed to investigate this notion. In particular, the project explored the potential for online interaction to overcome some of the perceived shortcomings of online communication as an important part of teaching and learning (See McInnerney & Roberts (2002), Priest (2000), Kemshal-Bell (2000) for a discussion of the perceived differences between face to face and online teaching).

One of the areas of greatest challenge in using computers to assist learning is in the area of human communications. This area of study is significant, in part, because it is often viewed by specialist VET
practitioners as an area of study outside of the principal focus. In my area of ICT this is particularly the case.

Human communications are normally considered to be in one of three domains: \textit{Verbal}, concerned primarily with words, whether spoken or written, \textit{non-verbal} concerned with things like eye contact, body posture, and gestures, etc and \textit{graphic}, which relates to images, graphs, icons etc (Dwyer, 2006:4).

When you analyse these different forms of communication, much of this can be accomplished using ICT in an online environment. Nevertheless, the complex nature of human communications presents some unique challenges for the implementation of interactive media to create learning experiences that facilitate the development of communication skills.

The biggest issue lies with the traditional view that communication skills must, by their very nature, be taught in a traditional face to face learning situation. Can this perception be altered by the development of a resource that overcomes the apprehension that many communication professionals feel about the loss of personal contact?

\textbf{What has the project been trying to do?}

This project investigated methods for using interactive online technologies for teaching soft skills or interpersonal communication skills, with a particular focus on decision-making skills. The project developed a series of scenarios that utilise characteristics of learning applications that are presented using different media enhancements to determine those that users feel are effective.

The project followed an ethnographic action research approach as identified by Tacchi \textit{et al} (2003:8), which is explained in more detail in the next section. The result of this process was that the research
questions evolved over the life of the project. In the end the project focuses on the following research questions:

1. To what extent is there a role for interactive media in promoting the development of communication skills?
2. In what ways can interactivity and digital media be used to enhance a learning experience?
3. How do interactivity and multimedia complement other forms of teaching and learning in the development of communication skills?
4. What types of interactive media are more effective for the learner in an online environment?

The investigation of these questions led to the implementation of the project website, The Maelstrom (http://maelstrom.newlearningmedia.com). The Maelstrom is an online space that allows users to work through scenarios relating to interpersonal communication, particularly problem solving and decision making. The site is divided into a number of areas, each of which will be explained in the methodology section of this document.

The Maelstrom allows users to personalise their space, and to be part of a collaborative story building process if they choose. However, it is in the presentation of the multiform scenarios and the reaction of the user to their experience with the scenarios that the research questions are most clearly addressed.

**The Exegesis**

This exegesis, which accompanies the Maelstrom project, will outline the theoretical underpinnings that have influenced the development of the site and will describe the methodologies behind the development processes. The exegesis will then examine the implementation of the Maelstrom by analysing user interaction and feedback. Finally, conclusions will be presented based on this analysis.
Theoretical and technical contexts

The Ecology – what is the context for the Project?

The project method used is an ethnographic action research approach adapted from Tacchi et al (2003:8). In essence, the research contextualises the project in examining online teaching and learning material when teaching soft skills or interpersonal communication.

The project reflects the big picture and the “communicative ecology” which is dynamic, adaptive and diverse. Communicative ecology is a useful concept to examine how interactive media can be used to enhance human communication and support the learning of interpersonal skills. It is vital that the research reflects the organic state of the complex and changing relations between education and new media. It needs to avoid just looking at one communication technology in one context. So the project will look what skills and resources people use in online interactivity and how they use these to make meaningful communications.

Peter Reason (2006:6) identifies the importance of relationships in action research. He sees action research as

an emergent process of engagement with worthwhile practice purposes, through many ways of knowing, in participative and democratic relationships

A community of practice (stakeholders as outlined in Figure 1) helped inform the project aims, methods and analysis. The important stakeholders in this project and the communicative ecology are:

- Online VET practitioners
- Communication practitioners
- New media practitioners
- Storytellers
- Trainers in soft skill areas such as problem solving and decision making
- Online learners

![Diagram of communicative ecology and project stakeholders]

**Figure 1: Project stakeholders**

As you can see from the Figure 1 above, the stakeholders in this project are from a wide range of sources and have been involved in all stages of the project. The project methodology reflects ethnographic action research practice. A system of continuous improvement is woven throughout the project from its inception, concept formation, its life cycle to date and into the future.

Further to consideration of continuous improvement, Reason (2006:32) discusses choice and quality in action research. He states that:

*Quality comes from asking, with others, what is important in this situation? How well are we doing? How can we show others how well we have done? I would also suggest that it is not necessarily a question of whether you have done well, but of how well you have done, and whether you have done well enough for the claims you may wish to make. It is through understanding the choices that have been made that judgements can be made about the nature of the knowledge and practice that has been generated.*
Tacchi et al (2003:6) also identify questions to guide the ethnographic action research. They identify:

“four key questions that need to be addressed throughout the life of projects (from inception through to implementation, and beyond). These questions are:

1. What are we trying to do?
2. How are we trying to do it?
3. How well are we doing?
4. How can we do it differently/better?”

Figure 2 shows the process used in implementing ethnographic action research during the life of the project. The cyclical approach of Plan-Do-Observe-Reflect informs the following phases of the project development.

Using the work/wisdom of Reason (2006) and Tacchi et al (2003) the project will be guided by the following questions.
1. What are we trying to do? (what is the project about, what are its goals)

2. Why is it important to address this issue? (rationale, background)

3. How are we trying to do it? (specific tasks to be achieved, trialled, reflected upon)

4. What are we doing well? What have we learnt? (evaluation of the project - learners/users, practitioners, key consultations, self reflection, 360° evaluation)

5. What would we do differently next time? (Informed by the research findings and evaluations and reflections)

**Inspirations – some personal background to the project**

Figure 3 (below) shows some of the personal and work-related inspirations for my involvement with this project.

**Figure 3: Concept inspirations for the Maelstrom**

**Teaching and learning online**

In 1999 I was engaged as a consultant to carry out research on behalf of TAFENSW to investigate the competencies required to be an...
effective online teacher. This research, published as The Online Teacher (http://cyberteacher.onestop.net) (Kemshal-Bell, 2000) sparked my interest in some of the issues that arose. In particular, the idea that while online technologies have their uses, they are limited in terms of teaching soft skills.

My subsequent involvement in online teaching and learning in the VET sector allowed me the opportunity to work with some of the significant people in the field, such as Sivasailam Thiagarajan (Thiagi) (http://www.thiagi.com), Marie Jasinski (http://www.designplanet.com.au) Gilly Salmon (http://www.atimod.com/) Nancy White (http://www.fullcirc.com/) and Curtis Bonk (http://php.indiana.edu/~cjb/)..

My research and my interactions with people such as those mentioned above and others highlighted the importance of constructivist principles in teaching and learning online. I was part of an award-winning team that produced a teaching and learning program VITAL for initial teacher education. This product was acknowledged at the time for its innovative online approach. It was said to be ‘engaging, enlivening and exciting’.

*The Online Teacher* formed the underpinning framework for the implementation of professional development for teaching online in TAFENSW. I was instrumental in developing the Graduate Certificate in Facilitating and Managing e-Learning (FAMe). At that time FAMe was a unique course in that it was content-free and based entirely on knowledge construction and collaborative online learning. I facilitated on the program for 5 years particularly in relation to engaging online learners and communicating online. This provided a rich environment that tied in closely with the development of my project.
Context and environment

As a teacher in the VET sector involved in teaching ICT skills, the concept of digital natives and digital immigrants as outlined by Prensky (2001) is something that I come face to face with on a daily basis. Strategies to meet the needs of young learners form an important part of effective teaching practice. Conventional teaching of soft skills falls short of meeting the preferred paradigm of the archetype digital native. This concept is discussed in more depth later.

Another important shift that has happened since 1998 has been the development of new training packages that have seen the integration of soft skills into ICT competencies (Dawe, 2002:18). Previously these competencies were external to (but included in) IT training packages. The new direction has seen soft skills become an integral part of ICT teaching and has provided additional challenges for ICT teachers in the VET sector.

The rise of digital storytelling in an online context has also occurred over the period of my project. I have had the opportunity to be involved in a number of storytelling-related projects, including through the Riverina’s engagement with Maricopa Community Colleges (http://www.rit.tafensw.edu.au/about/default.asp#5), and because of my involvement with the Australian Flexible Learning Framework, particularly the LearnScope project (http://learnscope.flexiblelearning.net.au/) and associated projects such as Interactive Ochre (http://www.flexiblelearning.net.au/projects/interactiveochre.htm).

Throughout all of the design and development of online teaching and learning resources that I have been involved with, some of which are described above, it has been paramount that they have reflected diversity and accommodated individual differences in learning styles. This, together with my involvement in digital storytelling and online
‘edutainment’ (Silverman, 2003) has reinforced my belief that all modalities need to be catered for in the teaching of soft skills.

Technical influences

Technical developments informed the initial stages of the project and have shaped its development at every turn. A particular influence has been the increasing importance of CSS and the separation of content from structure and style. This has become known as the semantic web (http://www.w3.org/2001/sw/), and provides a blueprint for web development over coming years. Websites such as the CSS Zen Garden (http://www.csszengarden.com/) and the somewhat bizarre Strange Banana (http://www.strangebanana.com/generator.aspx) had a significant role in shaping my project.

Another key technical consideration is the use of dynamic content. The bulk of the content for the project website is produced dynamically using ASP. This allows the content to be updated, augmented and deleted dynamically and will provide a sound basis for future deployment. It also allows for easy user input - this in turn enables learners to become co producers of knowledge and this is in line with constructivist learning principles.

Key concepts

Throughout this document there are a number of key concepts that are used to describe the process of development and analysis of the project. These are briefly discussed below.

Constructivism

Constructivism is both a philosophy and a theory of learning. The key concept of constructivism is that learning is an active process of creating, rather than acquiring, knowledge. That is, the learner interacts with the environment and constructs meaning for themselves by experiencing things and reflecting on experiences (Gagnon, 2003; Jonassen, 2001; Jonassen, 2003).
Communication

Communication is the process of exchanging ideas, feelings and information (Dwyer, 2006; Cole, 2005). The most common forms of communications include:

- Verbal - both oral and written
- Nonverbal - listening, body language, paralinguistic cues, facial expressions, gestures, appearance, phatics, silence, posture, senses such as smell to mention a few
- Graphics- icons, symbols, illustrations, graphs, numbers, etc

Soft skills

Soft skills are those personal values and interpersonal skills that facilitate a person fitting into a workplace, team or social context. This includes the skills of interaction (eg conflict management, inclusive practice, team skills, cooperation), communication (eg oral, listening, seeking and giving feedback, presentation) and self management (organising, problem solving, decision making, timing etc) (Costin, 2002; Clark, 2006).

The main soft skills addressed in the project are communication, problem solving and decision making.

Online and e-learning

Online learning:

As a technical term, online learning encompasses a range of technologies such as the world-wide-web, email, chat, newsgroups, and text, audio and video conferencing delivered over computer networks (local area networks, intranets or the public Internet) to deliver education and training, both remotely and in the classroom (ANTA, 2003).
E-learning:

“e-learning is a broader concept [than online learning], encompassing a wide set of applications and processes which use all available electronic media to deliver vocational education and training more flexibly. The term “e-learning” is now used in the Framework to capture the general intent to support a broad range of electronic media (Internet, intranets, extranets, satellite broadcast, audio/video tape, interactive TV and CD-ROM) to make vocational learning more flexible for clients.”

ANTA (2003:5)

For the purposes of this report the terms will be used interchangeably meaning teaching and learning facilitated by interacting with the computer.

Interactive narrative

An interactive narrative is a time-based representation of character and action in which a reader can affect, choose, or change the plot. Meadows (2002:62). The narrative is series of events conveyed from a certain perspective with the interaction being the reciprocal communication between a system and a learner/user (Tomaszewski, 2004). The interaction can come from the learner/user helping create the plot, learner/user deciding which character/s to identify with and engage from their point of view or user/learner deciding which direction to take based on choices given. In this document, the terms learner and user will be both be used to represent the person interacting with the narrative.

Multiform stories

A multiform story is a story containing more than one version. Murray defines the multiform story as "a written or dramatic narrative that presents a single situation or plotline in multiple versions, versions
that would be mutually exclusive in our ordinary experience” (Murray 1997: 30). The multiform stories in this project all link back on themselves and actively involve the user/learner in making choices.

**Exquisite Corpse/Sequential Stories**

These are collaborative narrative in the form of sequential stories compiled by multiple users. This was originally a parlour game and can be found as a digital version where a story grows from contributions.

Stories are comprised of sections that grow from previous contributions. In an online environment the stories can progress with multiple variations rather than just a linear continuation. Users are able to continue a story or to take it in a new direction. In this collaborative environment users can develop a peer group that works together to create a story or develop an online community to do the same.

**Scenarios**

Scenarios are realistic portrayals that unfold as a series of episodes in a distributed, asynchronous web format. Episodes update the scenario by introducing new issues and characters that progress the plot. The scenarios in this project are authentic learning experiences based on events that facilitate careful analysis/interaction by learners.

**Human Computer Interface**

The Human Computer Interface (or HCI) describes the process by which humans access the computer system. In general terms it refers to the software that allows the user to interact with the computer (for example the operating system). In this project the HCI will refer to the considerations that informed the development of the project website.
CSS

Cascading Style Sheets. This is a language used to describe how an HTML document should be formatted. It allows the content to be contained in the HTML document and the layout and formatting description to be contained in the CSS definition. This allows for the separation of content and style.

ASP

ASP refers to the server-side scripting technology Active Server Pages. ASP allows for the generation of dynamic content at the server-side of the Internet transaction, so the users only see the result of the transaction (i.e., the content they have requested). It is particularly useful for working with content kept in databases.

ICT

Information and Communications Technology. A commonly used term to describe a field of study or an industrial classification.

Semantic web

The Semantic Web is primarily concerned with the separation of style from content on the World Wide Web. Tim Berners-Lee et al (2001:1) describe the Semantic Web as

\[
\text{an extension of the current web in which information is given well-defined meaning, better enabling computers and people to work in cooperation.}
\]

Theoretical and technical contexts

It is paramount to this project that it is set within a theoretical context so that inspirations, research directions and wisdom or ways of knowing can be traced. Figure 4 maps the general flow of literature reviewed in conceptualising, refining and defining the project.
Changes in the Web

The World Wide Web is a rich environment for effective learning. However it is said that the Web is changing. The rise of social software and Web 2.0 technologies are shaping the Web into something new. But what do we mean by Web 2.0 and what impact does it have on online teaching and learning?

Basically the Web has shifted from a medium where information is transmitted and consumed (as described by Web 1.0) into a platform in which content is created, shared, reshaped, and passed on through social networking tools (as described by Web 2.0). Through social networking, many different and varied conversations take place using words, images, audio, and video.

The typical user is also said to have changed. Marc Prensky (2001) describes people who grew up with ubiquitous access to digital media as users who approach work, learning and play in new way. He terms them “digital natives”.

Stephen Downes (2005) summarises some important characteristics of the digital natives or n-gen

They absorb information quickly, in images and video as well as text, from multiple sources simultaneously. They operate at “twitch speed,” expecting instant responses and feedback. They prefer random “on-demand” access to media, expect to
be in constant communication with their friends (who may be
next door or around the world), and they are as likely to
create their own media (or download someone else's) as to
purchase a book or a CD.

Downes (2005:1) in relation to e-learning 2.0 says that

*What happens when online learning ceases to be like a
medium, and becomes more like a platform? What happens
when online learning software ceases to be a type of content-
consumption tool, where learning is “delivered,” and becomes
more like a content-authoring tool, where learning is created?
The model of e-learning as being a type of content, produced
by publishers, organized and structured into courses, and
consumed by students, is turned on its head. Insofar as there
is content, it is used rather than read— and is, in any case,
more likely to be produced by students than courseware
authors. And insofar as there is structure, it is more likely to
resemble a language or a conversation rather than a book or a
manual.*

Given the changing nature of the web and the increase of digital
natives, the VET sector has some interesting challenges ahead. How
can it accommodate and meet the needs of digital natives and the
changing web? Web 2.0 has the potential to facilitate the shift of the
learning paradigm towards constructivist principles including
developing communication competencies.

**Online teaching of Soft skills**

This would appear to be a great time for the teaching of soft skills
online to flourish. Using the new social software tools to foster
conversations in soft skill areas such as

- effective communication
- conflict management
problem solving and
decision making

appears to be a relevant application. However this area has typically been slow to adopt the online context let alone the new emerging tools. Many practitioners in the area still hold the belief that teaching in the soft skills area needs to be delivered in a face to face context to be effective.

In the NET*Working 2000 (http://nw2000.flexiblelearning.net.au/) conference a common thread that emerged throughout the conference was the concern about the effectiveness of teaching soft skills online. Felicity Mildon (2000) a key note speaker, discussed Qantas’ web-based training system, ‘Qantas College Online’ (QCO) and how overcoming resistance to teaching "soft skills" online was something Qantas had to address.

It is a difficult to change this mind set when even IT professionals echo the above sentiments

“Soft skills through e-learning could be okay at the concept level...they could be made more effective by the inclusion of simulated exercises, and some of them could be done by way of videoconferencing. But the real impact would be seen only in face-to-face dealing, role playing, etc.” Gautam Sinha, CEO TVA Infotech
(http://www.expressitpeople.com/20030203/cover.shtml)

From my research, many soft skills programs use case studies and ask learners to work through the case study and either discuss the case in a group context face-to-face or online or get the individual to self-reflect on the case.
Alternatively, they have much of the content about the topic presented in an online context then guide the learner through a set of offline activities to consolidate their learning.

In a 2006 report on soft skills and e-learning Donald Clark of Epic looks at this area in detail. He looks at what soft skills are, how they are best taught, and the theories impacting on this area. He provides some case studies including games, scenarios and simulations.

It is not the place of this document to have a definitive statement about soft skills training online. There is much dialogue about the importance of soft skills to Australia in being competitive in the new knowledge economy. It is essential that VET practitioners and learners value this skills area. Therefore, it is crucial that any online soft skills training is seen as engaging.

Constructivism and e-learning

Constructivist principles of learning design can provide a framework for good practice when looking at soft skills online.

Jonassen (2001) states that a constructivist learning environment (CLE) for e-learning should address the critical features of constructivist pedagogy. That is, technologies

\[\textit{should facilitate learners/users being active, constructive, collaborative, intentional, complex, contextual, conversational, and reflective}\]

Wilson (1996) defines it as

\[\textit{a place where people can draw upon resources to make sense out of things and construct meaningful solutions to problems}\]

It would appear that by following constructivist principles, soft skills teaching and learning can be engaging, enlivening and exciting and
provide a stimulating environment for the digital native to actively construct meaning in a rich ICT context.

What sort of online teaching and learning activity would facilitate constructivist principles? As Clarke (2006) pointed out in his white paper on soft skills and e-learning, learners need

- Anonymity - so they can do well (succeed) or less well (fail) in private and learn by making mistakes and reflect on their learning
- Meaningful stories similar to those proposed by Roger Shank (2001:11)

> Simulations that evoke real emotions become real memories. A failure is a failure, and whether in a simulation or a work experience, if it feels real, it helps us learn.

- Input into their learning as in real life people have a range of possible outcomes
- Authentic contexts to learn by doing

Do interactive narratives satisfy these requirements?

**Interactive narratives**

Simply stated, an interactive narrative is a story in which the audience can influence events in the story world they are experiencing (Murray, 1997; Meadows, 2002).

The Narrative and Interactive Learning Environments 2006 conference website states

> In the last ten years there has been a noticeable increase in the application of narrative and drama to a variety of contexts broadly in the area of education. These applications have drawn on theories that are both relevant to the design and generation of learning environments and to the ways in which
learners construct their own understanding of their experience.

Murray (1997:161) says

The kaleidoscopic power of the computer allows us to tell stories that more truly reflect our turn-of-the-century sensibility. We no longer believe in a single reality, a single integrating view of the world, or even the reliability of a single angle of perception. Yet we retain the core human desire to fix reality to one canvas, to express all of what we see in an integrated and shapely manner. The solution is the kaleidoscopic canvas that can capture the world as it looks from many perspectives - complex and perhaps ultimately unknowable but still coherent.

Can this be done in the teaching of soft skills? Can scenarios or stories come to life as learners interact with them? Can we carefully craft authentic portrayals into dilemmas where the script has multiple paths so that the way the story progresses depends on the choices the learner or user makes? Janet Murray’s seminal work Hamlet on the Holodeck (Murray, 1997) discusses the types of interactivity that narrative can use.

Murray talks of multiform stories. Citing the example of Harold Ramis’ Ground Hog Day, she identifies one type of multiform story as being based on the theory of alternate universes. This theory holds that decisions made by intelligent beings have multiple possible outcomes, each with consequences of their own.

There are other forms of multiform stories such as hypertext stories or participatory tales that can develop in different ways based on user/learner choices. In fact there is a plethora of exciting narratives.
around that are all very engaging. A site that offers a good selection of resources is at elasticspace
(http://www.elasticspace.com/interaction/narrative/jumpoff.html)

Design

A number of factors need to be built into the interactive narrative paradigm. These concern design and structure.

Information design is an essential component of the development process. This was noted by a number of references reviewed. Shedroff (1994) identifies an important concept:


Shedroff defines these disciplines as follows:

*Information Design addresses the organization and presentation of data: its transformation into valuable, meaningful information.*

*Interaction Design, which is essentially story-creating and telling, is at once both an ancient art and a new technology.*

*Sensorial Design is simply the employment of all techniques with which we communicate to others through our senses.*

Shedroff cites Brenda Laurel, a renowned interface designer who says that interactive media

*is not about information, it is about experience.* (Laurel, cited in Shedroff, 1994:3)

The common theme is that it is essential that information is well designed to ensure the user interaction is a positive experience.
Structure

Structure is important especially in writing narrative. In his book Pause and Effect Meadows (2002) looks at narrative specifically from an interactive context. He discusses the Freytag triangle. Freytag triangles plot the story development over time. Meadows talks about the components of narrative: the introduction, rising action, climax and denouement. He says stories are about problems. The different ways to solve the problem determines the interactivity. As we get close to solving the problem the story closes - this is called denouement.

Meadows goes on to describe plot structures, making the point that in interactive narrative

The first, second and third character may actually be the reader. Opinion and perspective are inherent. Image is not necessary, but likely. Meadows (2002:62)

Meadows comments that interactive narrative usually follows four steps of interaction:

- Observe - the reader makes an assessment
- Explore - the reader does something
- Modify - the reader changes the system
- Change - the system tries to change the reader

Shedroff (1994) talks about a continuum of interactivity. He says

One way to consider the meaning of interactivity is to envision all experiences (and products) as inhabiting a continuum of interactivity. ... The difference that defines interactivity can include the amount of control the audience has over the tools, pace, or content; the amount of choice this control offers; and the ability to use the tool or content to be productive or to create.
Shedroff (1994:9)

So given the potential for interactivity in a narrative the user/learner can become immersed in the story - when they need to perform actions to progress and/or complete the story. The audience is active in reading, assimilating information, forming perceptions and multiple viewpoints, responding to narrative words, images and sounds and anticipating, cogitating and problem solving.

Another interesting dimension to look at is at the concept of having multiple authors or co-creating.

People are naturally creative and are almost always more interested in experiences that allow them to create instead of merely participate. ...

Another attribute of these experiences is the capability of adding content or tools to a predefined set, resulting in a “living” product, toolset, or database. Few products are designed to grow or become more valuable over time with participation from the audience. Yet, products that help users structure their experiences and share their knowledge are inherently more valuable than those which do not.

Shedroff (1994: 11)

Exquisite Corpse (described earlier) is one technique that reflects the design elements reflected above.

In order for interactive narrative to be useful for soft skills training it must harness learner activity and enable the immersive effects of the story. Authentic context is a critical factor in this. There are different views on what constitutes authenticity. Carlson describes the pedagogy of authentic learning as one which
values learner-centeredness, active learning, and authentic tasks in which the learning experience takes place around real-world situations.

Carlson (2002:2)

So it would appear that interactive narrative using multiform stories and exquisite corpse techniques embed constructivist principles and reflect the learner centred approach needed for soft skills teaching and learning. Given the collective wisdom discussed, it appears to be a rich environment for change and innovation and for planning and designing how to produce a quality product to meet the twitching thumbs and multiple receptors of the digital native.
Methodology and design

The research process was implemented using a three-phase approach following ethnographic action research principles (Tacchi et al:2003):

1. Investigation and Analysis
2. Design, development and testing
3. Implementation and evaluation

Phase One - Investigation and Analysis

A preliminary investigation of soft skills and communication studies helped to determine appropriate subject matter and interactive methodology. Tasks included:

- Literature search and review of existing research in this area
- Analysis of communication curriculum, identifying aspects that relate to decision-making
- Consultation with key stakeholders to identify any issues and concerns with the use of interactive media within the context of this project
- Assessment of issues identified by stakeholders and identification of appropriate interactive media solutions
- Development and testing of initial interactivity prototypes to determine the most effective method/s for developing communication skills

An important finding of the literature review was that for interactive narrative to be successful, the design process needs to be user centred. As listed above, a key part of the Investigation and Analysis phase involved identifying and consulting with stakeholders.

The questions asked of these stakeholders informed the design phase of the project. These included:
What role do you see for interactive media in developing communication skills?

What might be included in a tool that teaches communication skills in an online environment?

How would you use such a tool?

What design considerations are important for the effective use of an online tool?

The following table summarises the input from the key stakeholders. It details the type of data sought and a snapshot of the responses provided. This information has been included at this point in the document rather than in the analysis section, because the responses had an important role to play in informing the design of the project.

<table>
<thead>
<tr>
<th>Who</th>
<th>How?</th>
<th>Type of data</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICT Practitioners (6)</td>
<td>Phone consultations, face-to-face interviews</td>
<td>Information about curriculum - soft skills embedded, perception of good practice with interactive media, development of communication skills, experiences in relation to teachers and learners using interactive media</td>
<td>Essential to integrate online technologies to motivate young learners</td>
</tr>
<tr>
<td>1 Curriculum Manager</td>
<td></td>
<td></td>
<td>Communication skills built in to new training packages, so critical to teach appropriately</td>
</tr>
<tr>
<td>2 Head Teachers</td>
<td></td>
<td></td>
<td>Lots of application in the workplace for large industries and small business operators</td>
</tr>
<tr>
<td>3 teachers</td>
<td></td>
<td></td>
<td>Important for learners to be immersed in the experience</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Not done well in ICT teaching at the moment</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Should reflect cutting-edge design</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Must be engaging, dynamic</td>
</tr>
<tr>
<td>Communicatio n teachers/ practitioners (5)</td>
<td>Phone consultations, face-to-face interviews</td>
<td>Information about curriculum - soft skills, perception of good practice with development of communication skills, experiences in relation to teachers and learners using interactive media</td>
<td>Very interested in the idea - keen to have communication teachers involved (CM)</td>
</tr>
<tr>
<td>1 Curriculum Manager</td>
<td></td>
<td></td>
<td>Interesting idea, but still dubious about effective implementation</td>
</tr>
<tr>
<td>4 teachers</td>
<td></td>
<td></td>
<td>Traditionally communication skills taught without use of computers</td>
</tr>
<tr>
<td>It is important to note that storytelling</td>
<td></td>
<td></td>
<td>Worried about IT literacy of</td>
</tr>
</tbody>
</table>

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comes under this discipline area.

<table>
<thead>
<tr>
<th>learners using interactive media</th>
<th>learners and their role in the process</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Design would have to be inclusive and accessible and easy to use</td>
<td></td>
</tr>
<tr>
<td>- Would need to accommodate different learning styles</td>
<td></td>
</tr>
</tbody>
</table>

- **Learners (49)**
  - 15 ICT learners
  - 13 Business Management learners
  - 12 Teachers learning online teaching skills

- **Experiences of teaching and learning activities that are appropriate for teaching soft skills, what has or would engage them in using an online tool, any examples**
  - Very positive response
  - ICT learners said “about time”
  - Want to be involved in prototypes, keen to critique and have input
  - Business Mgt learners said “anything would be better than the way we get it now”
  - Dislike of face-to-face role play
  - Any online tool must be fun, not boring
  - Teachers learning online were excited about the prospects and felt that constructivist principles would need to be included to engage the learners
  - Would need some up-skilling on how to communicate online.

- **Critical feedback on the research process, thoughts on use of interactive media for soft skills, examples/leads**
  - Very enthusiastic – global response
  - Could immediately see links to other initiatives
  - Felt that is has a role in a broader framework
  - Provided feedback which focussed the research questions
  - Also indicated any such tool would need to have an authentic context
  - Need to build in social context as reflected in Web 2.0 and social software.

- **Very positive response**
  - ICT learners said “about time”
  - Want to be involved in prototypes, keen to critique and have input
  - Business Mgt learners said “anything would be better than the way we get it now”
  - Dislike of face-to-face role play
  - Any online tool must be fun, not boring
  - Teachers learning online were excited about the prospects and felt that constructivist principles would need to be included to engage the learners
  - Would need some up-skilling on how to communicate online.

- **Email consultations**
  - Critical feedback on the research process, thoughts on use of interactive media for soft skills, examples/leads
  - Very enthusiastic – global response
  - Could immediately see links to other initiatives
  - Felt that is has a role in a broader framework
  - Provided feedback which focussed the research questions
  - Also indicated any such tool would need to have an authentic context
  - Need to build in social context as reflected in Web 2.0 and social software.

Appendix 1 has an interview outline.
Phase Two - Design, development and testing

The second phase of the project involved the development of the interactive media learning/teaching application. Tasks included:

- Selection of appropriate software and hardware
- Research and development of content matter - i.e. what are the learning objectives and support material that need to be covered using the interactive media learning tool
- Development of user interface, including testing, feedback and iterative development
- Development and testing of interactivity
- Useability testing
- Peer review
- Testing of learning effectiveness, review and redevelopment of the website

This phase very much grew from the primary and secondary research. Following from the literature reviewed and the consultative feedback, a number of key features were embedded in the project to engage the user in interaction:

- Immersion in the context - allowing users to feel comfortable through a customisable interface
- Authentic, engaging content
- Multiform plots that branch and allow the user to make decisions
- Active audience
- Exquisite corpse/sequential stories where the story is produced by multiple authors
- Use of different communication cues - verbal, written/oral and graphic

Phase Three - Implementation and evaluation

The final phase involved the project being implemented and evaluated. This phase included:
- Release of the product live to all stakeholders
- Analysis and feedback from learners on teaching and learning methods used - interactivity and multimedia compared with traditional delivery methods, looking at learner characteristics and subject type
- Evaluation of feedback from teachers and other stakeholders
- Identification of future issues for consideration

This phase will be discussed in more detail in the Analysis section of this document.

Response to the research – the design and development of the Maelstrom

The project, which aimed to create an online resource to support the learning of soft skills in interpersonal communication, began to take form around the development of the project website - the Maelstrom.

Why the Maelstrom?

The concept of the Maelstrom was chosen because it represents the challenging, tumultuous environment that can be reflected in critical decision-making situations. It also lent itself to a metaphor for the site.

The idea behind the implementation of the Maelstrom was that it supports online delivery of content, it allows for dynamic content generation and a customisable interface. It was designed to provide the user with an immersive experience where they can explore and interact with scenarios and stories relating to interpersonal communication. The key features of the Maelstrom will be identified and then explained in more detail in the following sections.
The Maelstrom concept

Figure 5: a concept map of the Maelstrom

The Maelstrom can be divided into three main areas - Interactive, Collaborative and Administrative. This taxonomy has been used to provide a framework for discussing the various parts of the Maelstrom. It is important to note that the parts classified as ‘collaborative’ also provide for interactivity.

Each of these areas will be discussed below in terms of their importance to the project and the overall methodology of the project.

Key features of the Maelstrom

Key features:

- Users have their own, password protected, access to the Maelstrom. Access to the site is by account/password only.
- Users can change the look and feel of the interface by choosing from one of four ‘skins’ provided.
There are three interactive scenarios where users can work through a given situation and reach an outcome. These scenarios - The Abyss, The Deluge and The Whirlpool - are all multiform stories where users choose from different options presented which lead down different pathways.

- Scenarios are enhanced with the use of voice or graphics to complement text.
- A collaborative area of the Maelstrom that provides scenario (or story) based interaction. The two collaborative tools are called Icons and Words. They allow stories and scenarios to be created and built upon.
- Users are surveyed about their reactions to the scenarios that they have worked through.
- Users can monitor their progress and change their details (such as skin, password, name, email address etc).

**The Maelstrom opening screen**

When users first enter the Maelstrom site they are greeted with a welcome screen (see Figure 6). This screen has a number of features designed to provide visual appeal and set the scene for the Maelstrom metaphor.

The first feature is the welcome message itself. The text of “THE MAELSTROM” is inside a small Flash movie that provides 25 different visual effects that are produced randomly, so that refreshing the page will show a different effect. There is also another small flash movie showing an image of the Maelstrom Galaxy.

![Figure 6: The Maelstrom welcome screen](image)
At this stage users can choose to enter the site or to take a tour (some pages designed as an introduction to the site). Users taking the tour can also download a pdf version of the Guide to the Maelstrom.

**Secure access**

Secure access has been implemented for a number of reasons:

- It provides users access to a customised view of the Maelstrom (via ‘skins’)
- It allows users to track their progress through the Maelstrom
- It allows tracking of user contributions to identify any inappropriate contributions
- It allows survey feedback to be matched against user data, particularly in relation to response to the scenarios
- It allows users to make contributions to the forum

**Logging in**

Users need to have a valid account to proceed beyond this point. Users with a valid account can log in with their username and password, or can elect to have a password reminder sent to them.
Registering

First-time users need to register for an account to allow access to the site. The registration process was designed to be as simple as possible to prevent an artificial barrier being created.

Registration is an automatic process, meaning that users identify a username and password and provide some personal details and choose a ‘style’ for their skin for the Maelstrom. Usernames and email addresses must be unique, so if someone else has already taken the username or email that the user has chosen they are asked to enter another one.

An example of the registration screen is shown in Figure 7.

Once a user has entered his or her details, provided that they have entered unique username and email address, an account is created automatically. Users are sent an email to confirm their details.

The interactive Maelstrom

As discussed in the literature review in Section 2 of this document, an important part of the development of soft skills is that learners are able to learn from their own experiences and to explore different pathways. This allows the learner to consider available options and to make decisions based on experience and an understanding of the consequences of those decisions.
The interactive Maelstrom has been designed as a response to that need. It provides a safe environment in which learners can explore their ideas, take options and understand ramifications, all in an environment that protects them from any real impact.

**The scenarios**

Three scenarios have been developed that provide content/issues relating to problem solving and decision making. Each scenario hones in on a particular area of soft skills development. The three areas covered are recruitment and selection, staff management and work team communication. Each of them provides a single entry point with multiple pathways and multiple possible endings. As a learner (user) works through the scenario they are provided with choices. Sometimes there is only one choice - to go forward or to go back, but in most cases the learner must choose between 3 or more options. Each of these options leads to a new instalment in the scenario and further choices.
The scenarios are complete - that is, all possible pathways have already been encoded. They cannot be added to the way that the scenarios and stories in *Icons* and *Words* can be (described later).

The pathways that a user takes through the scenarios are tracked. The different paths that users take are described in the Analysis part of the document.

---

**The Abyss**

The Abyss is the first of the three scenarios that users can work through. The image to the left shows the opening screen of the Abyss (using the ‘wild’ skin).

In *The Abyss* users are working through a scenario based on a new product launch.

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**The Deluge**

The Deluge is the second of the scenarios and follows a staff management issue concerning Harry Benson.

Users are given the chance to decide Harry’s future, but there are lots of decisions to make along the way.
The Whirlpool

The Whirlpool is the third of the interactive scenarios. In this scenario, users are presented with a complex issue relating to recruitment and selection.

Media enhancements

For each of the interactive scenarios text, images and audio narration have been developed. In order to gauge user reactions to these different enhancements each user is allocated to view a particular scenario either with text only, or with text and graphics or with text and audio narration.

When a user first chooses one of the scenarios, they are randomly allocated a level of enhancement. For example, if a user were to select The Whirlpool scenario, the Maelstrom might allocate them to view that scenario with text only. Another user alongside them might see the same scenario with text and graphics. When a user enters another scenario, they will randomly be allocated one of the two remaining levels of enhancement that they haven’t already experienced. In the case of the first user discussed, they would be allocated either text and graphics or text and audio when they entered the second scenario. This process is shown in Figure 12 below.

![Figure 12: allocation of scenario 'modes']
Because an ordinary user registering will only see the graphics for one scenario and the sound for one scenario, three test accounts have been created that will access the scenarios with specific media enhancements.

To view all scenarios with their associated graphics:

Username: graphic
Password: password

To view all scenarios with their associated audio:

Username: audio
Password: password

And to view all scenarios with text only:

Username: text
Password: password

Graphics

Each of the scenarios employs a different style of graphics. The purpose of this is to gauge user reactions to different graphic styles, and also to enhance visual interest/appeal with the site. The graphics for the Abyss use a stylised form that takes public domain images and using a Photoshop filter renders them in an abstract manner to allude to the storyline of the scenario. A sample of these images is shown in Figure 13 below.
In The Deluge, a different approach to the graphics was taken. Models were constructed in the 3D character animation program Poser, and positioned in scenes and in poses relevant to the subject matter of each of the scenes in the scenario. A sample of these images is provided in Figure 14.

A third approach was taken in developing the graphics for The Whirlpool. Here, photographs were taken of a real set of characters in a real office environment. Although they were cropped and
enhanced in Photoshop, they basically represent the images as they were captured. A sample of these is shown in Figure 15.

![Images from the Whirlpool](image1)

**Figure 15: Images from the Whirlpool**

**Audio**

A storytelling narrative style was chosen for the audio narration. Rather than using a full set of cast members and recording something like a radio play, the narration used was considered more appropriate for the context of the Maelstrom. Different narrators were used, including male and female voices to provide gender balance.

**User feedback**

When users reach the end of the scenario they are presented with a short survey, which focuses on their reactions to the scenarios they viewed. It also asks about the presentation of the material, whether they noticed the graphics, etc and what their reaction to the media enhancements was.

Users are asked to rate how interesting they found the scenario to be, and this rating can then be cross-referenced against the mode with which they viewed the scenario. The idea behind this is to gauge
what influence including sound or graphics has on the perceived level of interest in the scenario.

Users are also asked a series of reflective questions such as ‘what did you learn’ what would you differently’ and ‘what changes would you like to see’.

The results of the survey are discussed in the next section of this document - the Analysis.

The collaborative Maelstrom

The preliminary research conducted in the early stages of the project (discussed in the previous part of this document) provided the catalyst for the collaborative aspects of the Maelstrom.

Icons

This part of the project was very much one that developed over a series of iterative refinements. In the first instance Icons was created with the intention of being a multiform story with random pathways. A story was commenced, and a number of pathways developed. Early user testing showed, though, that it would not be sufficient to simply have a completed story that did not allow for user input. A typical user comment about this

I like this, but I’d like to create my own end, or make it grow so that next time someone else might have added to my bit - like Chinese Whispers - then I can see what other people made of the bit that I added

Another user said

I think you could make this more like a wiki - where everyone can have a go
The next phase of development of *Icons* added the ability for users to contribute to the story. In this way the story has to potential to grow exponentially.

In the third phase of development it became clear that one story or even an identified limited number of stories would not do justice to the potential for user input. To meet this potential, the capacity to create new stories was added. Any user can now create a story.

*How Icons works*

*Icons* is an area where users can be part of a collaborative storytelling process. The contributions of users allow stories to grow in an “organic” manner - unstructured and with a life of their own.

When users first enter the *Icons* area they see a listing of all of the stories that have been started. Here users either select one of these stories, or choose to create a new story.

Choosing an existing story to journey through takes users to the opening screen of that story (see Figure 16). It has the opening part of the story presented and three icons you can click on.

The icons themselves are randomly generated from a pool of 15-20 for each Maelstrom skin. Samples of the icons from the different skins are shown in Figure 17 below.

The icons themselves bear no relation to the story and are used to provide visual interest and also as a way of emphasising the random nature of the pathways that *Icons* provides. Users do not know what the icons mean, nor where clicking them will take them. This design decision was taken to emphasise the random nature of the storyline and also adds a chance element that appeals to some users.
At each stage of the story, users are shown 3 icons. Each icon leads to a different episode of the story. At some stage the story line that the user is on will ‘run out’. At that time the user is taken to a screen where they are invited to add a contribution.

All episodes in the story are kept in a database. When a user adds a new contribution this automatically generates three new possible leads from that point. This process is represented in Figure 18.

In Figure 18, some nodes have been created while others have not. For example a user who chooses Node 1 at the first part of the story will be taken to a node that has three defined nodes leading from it. However, a user choosing node 2 would be taken to a part of the story that only has one defined node, with two yet to be written. If at that point the user clicked on one of the nodes yet to be written, they would be taken to a screen that would invite them to write that missing node (see Figure 19), which would establish a new pathway for the story and automatically set up three new (undefined) nodes.
This process is somewhat akin to the Nodal Plot Structure outlined by Meadows (2003).

**Adding a new part to an existing story**

As described above, the strength of the *Icons* area of the Maelstrom lies in its ability to capture user contributions. Before a user can contribute they must reach the end of the storyline (i.e., reach an undefined node). Each node has three possible paths leading from it. These are all initially undefined and then as a user tries to explore each pathway they must make a contribution or the pathway will remain undefined.

![Figure 18: Creation of stories in Icons](image)

![Figure 19: – adding a part to the story](image)
Users are prompted by the last part of the story (i.e. the node they arrived from) and asked to type in a new contribution. To ensure that the nodes remain relatively small, users are limited to 256 characters.

Creating a new story

In terms of the development of the story structure, creating a new story is a relatively simple process. Users create a title for their story, and an opening part. This sets up a new story in the database and creates three undefined (or blank) nodes. In the guide to the Maelstrom users are advised to create something that others will want to add to.

Words

In a technical (programming) sense, Words operates in a very similar manner to Icons. It differs more in the delivery and the anticipated content. Whereas Icons encourages users to add to a story (which is a work of fiction), Words establishes a collaborative space for developing scenarios. In this context, scenarios differ from stories in that they provide a more authentic setting and are designed to establish a problem-solving paradigm.

Apart from the nature of the content, Words differs from Icons in two important respects:

1. In Words, users are able to select the pathway they will follow (from a drop-down list of possible options - see Figure 20), rather than the random pathways provided in Icons.
2. If at any stage a user is not satisfied with the possible options, they can add their own. In *Icons* there can only ever be three nodes to choose from whereas in *Words* the number of possible nodes is not limited. This means that the number of possible options for a given episode in the scenario is limitless. In practice it is unlikely that users will not find a suitable option from those supplied once the number grows to a critical level (perhaps 6 or 7). Figure 21 depicts a possible flow of user response to a given episode in the scenario.

![Flow of user response](image)

**Figure 21: Flow of user response**

**Adding a response to Words**

As mentioned above, users can, at any time, add a new response. This allows free-form scenario building and provides users with ultimate control over the direction that the scenario takes.

Adding a response involves naming the link to the response (this is what will appear as one of the options in the drop-down list) and then writing a brief statement saying what happens when someone chooses this response. Figure 22 shows a sample screen.

![Adding a response](image)

**Figure 22: Words – adding a response**
Users are given the last part of the scenario again as a reminder.

*Creating a new scenario*

Users can use the *Words* area of the Maelstrom to create their own scenario. Choosing ‘Create a new scenario’ from the menu provides users with a screen similar to the one shown in Figure 23.

It’s quite similar to creating a new response (described above). Users type in a name for their scenario, and an initial episode or issue that they want to base their scenario on. Once again, it’s important that users type in enough information to make people want to respond, but are limited to 256 characters.

*The administrative Maelstrom*

The third part of the Maelstrom relates to the administrative functions that are provided. These form a critical aspect of the operation of the site and the user acceptance and adoption of the Maelstrom. Some of the administrative strategies that have been included to encourage user acceptance and adoption include:

- Customisable interface
- User-managed account
- Progress monitoring
- Bookmark

*Customisable interface*

Changing the look and feel of the Maelstrom is designed to allow users to feel more comfortable with the site, choosing a skin that matches their preference, mood or special requirements (see Figure 24).
This provides particular benefits from a usability point of view. For example users are able to choose from skins that have darker text on lighter backgrounds and *vice versa*. They can also choose options that provide better support for scalable text (choosing larger font sizes through the browser menu).

Because the site is fully based on CSS it also allows additional skins to be developed and plugged in to the Maelstrom.

**User-managed account**

The Maelstrom allows users to view and/or change their profile, and change their password. This puts the user in control of their space, and is designed to encourage acceptance and adoption of the site.

**Progress monitoring**

The website tracks the parts of the website that users visited, and whether they have been completed. Figure 25 shows details for a user who has started *The Abyss* and not yet started any of the other sections of the website.

**Bookmark**

Throughout the website users have the ability to leave a ‘bookmark’. This stores their current page in their user account and when they log back on, a *bookmark* icon will be showing on the Main menu screen. Clicking the bookmark icon takes the user back to the bookmarked page.
Useability considerations

Useability was one of the paramount design considerations. Consideration of useability was informed by a large body of work on this topic available on the web, but particularly by the work of Jakob Nielsen (http://www.useit.com/) Nielsen’s guidelines for useability continue to provide a reliable source of advice for web developers.

Useability testing was built in as a fundamental design test at all stages of the design of the Maelstrom. Standard useability tests were used to inform subsequent stages of development. These included:

- Ease of use
- Retention or recall of the information
- Time taken to complete tasks
- The accuracy or error rate - did users click the right buttons etc
- Emotional Response or ‘user satisfaction’

Accessibility

During the preparation of the Maelstrom, pages were validated to ensure that they comply with World Wide Web Consortium (W3C) guidelines (http://validator.w3.org/). As much of the content is dynamically generated it was necessary to generate the pages first, then save them as HTML pages so that they could be assessed for validity by the W3C validation tool. These pages are saved in a folder on the Maelstrom site http://maelstrom.newlearningmedia.com/validation. The Maelstrom conforms to W3C guidelines for HTML Transitional 4.01.

Care was also taken to ensure that the CSS files that define the four different skins and the base CSS files are all valid against the W3C guidelines for valid CSS. Once again the W3C validation tool was used.
As a result of these checks, the site displays the following ‘badges’ so that viewers of the site will know that care has been taken to ensure they conform to web standards.

A critical feature of the Maelstrom is that it is accessible to everyone. Care has been taken to provide a range of features to enhance accessibility. Users who have any questions or suggestions regarding the accessibility of the site are invited to contact the developer. It is important that every opportunity is taken to improve the experience for all users.

**Compliance**

This Maelstrom has been passed for compliance with Web Content Accessibility Guidelines Level 1, 2 and 3, including automated testing using Cynthia and Watchfire (Bobby) and manual testing. It includes a number of accessible features as detailed below.

**Features**

A range of features has been incorporated into the Maelstrom in an effort to enhance the experience for all. These include:

- There are different ‘skins’ available so that users can customise the look and feel of the website to suit their specific needs and/or personal preference.
- There is only one (accessible) version of the website.
- The site structure is clear and consistent.
- A site map has been included so that users can see how the site is organised and provides access to pages within the site.
- Text alternatives for all images have been provided, except where the graphics provide purely decorative functions (such as some menu items).
- In some places audio has been included as well as text and images.
- All elements that respond to mouse events also have keyboard equivalents.
- All fonts used are proportional and so support font scaling and larger font sizes in general through browser-based controls.
- All code is HTML 4.01 and CSS standards compliant.
- The content of the site is separate from the format, so will work well with screen readers and with the style sheet missing.
- An effort has been made to ensure that forms are easy to use and uncomplicated.
- The site has been tested on a number of commonly-used browsers and should work appropriately on all standards-compliant browsers.

As a result of these features and the compliance checks implemented, the site displays the following ‘badges’.

![Cynthia Tested](image1.png) ![W3C WAI-AAA WCAG 1.0](image2.png)

**Ethical considerations**

The Maelstrom involves the survey of human subjects as part of the evaluation process, and also as a key part of the analytical phase of the project. Because of this, RMIT Ethics Committee approval to conduct the research was sought and obtained.

**Privacy**

Privacy is an important consideration for many users and for that reason a Privacy Statement has been developed and incorporated into the Maelstrom to advise users of the care taken over privacy.

The Maelstrom privacy measures include:
General

The Maelstrom complies with all applicable legislation in relation to the collection and retention of user information. Any information that users provide, including information that may identify them, will be used only for the purpose/s intended and is confidential at all times.

Collection of information

The personal information collected via this website includes:

- User’s name and email address as supplied in their registration form;
- User responses to surveys completed as part of the scenario response;
- Any additions to scenarios or stories that users make in the collaborative sections of the website; and
- Any messages or comments users submit in the forum section of the website.

Email addresses provided via the Maelstrom will only be used to respond to specific user queries and to identify users as part of the registration process. Email addresses are not added to any mailing lists, nor disclosed to any other party.

Security

Precautions have been included to protect against the loss, misuse, and alteration of user information. These include:

- Password protected access to the site
- Non-disclosure of personal information
- Regular backup of user data
- Warnings to users regarding posting to the Maelstrom forum
- Warning to users regarding the use of cookies and Flash sharable objects
- Provision of contact information in case users wish to raise specific queries

**Maelstrom metamorphosis**

As a metaphor, the Maelstrom has proven an apt one. The Maelstrom is a swirling ever-changing concept. The Maelstrom website underwent a number of changes over the period of its development. In the first instance changes were implemented as a result of the literature review and the key consultations described earlier in this document. Changes also resulted from a number of prototypes that were implemented during the design and development of the website and from usability tests conducted. After the Maelstrom moved into a more formal pilot stage, further refinements and enhancements were identified and implemented.

Some of these changes were:

- A stronger concept and wording regarding the difference between the **collaborative** parts of the Maelstrom and the **interactive** parts.
- Initial trials showed clearly that a **user guide** would assist familiarisation with the site. This was duly implemented both as a series of web pages (tagged as a ‘tour of the Maelstrom’) and as a downloadable pdf document.
- In an early version of the Maelstrom no tracking of user interaction was included. It became clear that tracking of **user movement** through the interactive scenarios would give a better understanding of how they were being used and whether there was any difference for those viewing the scenarios with different levels of media enhancement.
- The prototype version of the Maelstrom included only one interactive scenario. User testing pointed clearly to the fact that development of **additional scenarios** would enhance the website and allow for user analysis over a wider range of sources.
- The Icons part of the Maelstrom originally only had the one story that was designed to grow as a collaborative narrative. Initial feedback from users clearly indicated that the ability for users to add stories would give a stronger level of acceptance and adoption.
- The Words section was initially not part of the full development of the Maelstrom but was there merely as a placeholder. User interest in its potential led to full development so that users can now develop their own scenarios.
- An additional skin - ‘Bright’ was added to provide a more whimsical interface. This was also in response to user feedback.
- A forum component was added to facilitate user interaction outside of the collaborative storytelling/scenario building sections.
Analysis

This section will focus on the outcomes of the project - in ethnographic action research terms it will address the key questions

- What happened?
- What does the project do well?
- What has been learnt?
- What should be done differently next time?

Within these questions, this section will examine the effectiveness of the methodology described in the previous section in addressing the research questions outlined in the introduction. Specifically, the role of The Maelstrom in supporting the development of soft skills will be addressed.

What happened

The Maelstrom is released

After much tweaking of the Maelstrom through the iterative prototype development the current version of Maelstrom was released live. It was important to raise awareness about the website and distribute information about its availability and rationale to a wide audience. This was done through the stakeholders that were originally consulted and via online networks.

The release schedule involved primarily online networks, because experience has shown that this group are more likely to explore and experiment with new technologies. They are also ‘well connected’ groups of practitioners and so the availability of the Maelstrom would get a wider circulation.

Ironically, to tap into Communication practitioners, other methods of distribution such as newsletters, word-of-mouth etc will need to be implanted to complement those strategies already employed.
User feedback

There were two strategies used to gain user feedback. The first was the collection of data via an online survey that users are asked to complete at the end of each of the interactive scenarios. This was chosen as it related directly to the research questions and it was through the interactive scenarios that the users' responses to different forms of interactivity (i.e. text only, text with graphics and text with sound) were manifest. (Appendix 2 contains a sample of the survey). The second form of user feedback was less formal and consisted of observations and targeted critical conversations. Observations were made of learners in an online environment using the Maelstrom. Critical conversations with learners and teachers in both the ICT and communications area provided a rich source of feedback and anecdotal information.

What does the project do well?

An important part of ethnographic action research involves an identification of the strengths of the project. The two forms of user feedback identified above are both used to answer this question. Key observations are:

- Users appreciate the visual appeal and the metaphor of the Maelstrom.
- The scenarios are viewed strongly as providing authentic contexts.
- Users find the scenarios to be interesting. The average user rating of the interest value of the scenarios was 5.4 on a 7 point Lickert scale, showing an overwhelming acceptance of the tool. When asked to identify why they responded the way they did, users indicated that the authenticity of the scenarios was a large part of it. Typical comments include:

  *It was a realistic scenario and I wanted to see how it all turned out*
realistic and detailed scenario

- Users noticed the media enhancements. More than 90% of users were able to correctly identify the enhancements (or lack thereof) that accompanied the scenario that they viewed.
- Graphical enhancements tended to have a higher acceptance than audio. Sixty-seven percent of users found the graphics to be helpful, whereas users that experienced the audio were as likely to be annoyed by the audio as they were to find it interesting or helpful.
- Users appreciated the ability to change the skin of the Maelstrom, but nevertheless tended to stick to their original choice of skin.

What has been learnt?

User tracking

After initial user testing, it became apparent that it would be useful from a research point of view to be able to track the path that a user took in working their way through an interactive scenario. As a result, this functionality was added. Perhaps the most significant find using this tracking tool was the variety of paths that are taken. This is true both of the different paths and the number of nodes visited by different users.
Figure 27 shows the tracks of three different users working through the same scenario - The Abyss.

User 1 in Figure 27 took a relatively short track through the scenario, visiting 8 nodes in all. User 2 took a different route, visiting 9 nodes although ultimately arriving at the same ending as User 1. It was also interesting to note that part from the first and last nodes, the users had only three other nodes in common. User 3 brings a completely different dimension to the tracking. This user took a much more
circuitous route through the scenario, visiting 12 nodes and reaching a different ending to the other two users.

This user tracking was cross-referenced against the different media enhancements that each user had. It was interesting to note that users with audio enhancement were far less likely to abandon the scenario than those without it. It seems then that while some users report being annoyed by the audio, it still serves a valuable role in terms of improving user ‘stickability’ to a scenario.

Customisation

Feedback on this aspect of the Maelstrom was largely through the informal observation/conversation method. Users commented that they liked the ability to tailor the site to suit their personal preference. Some typical comments made during conversations include:

*I liked being able to choose the zen style - it was much easier to read for me*

*I tried a few different styles and eventually settled for the modern. It was fun trying them out though.*

One quantifiable result that can be identified is user preference for different styles. The chart in Figure 28 shows that the Zen style is the most popular, although all styles have been chosen to a greater or lesser extent, showing the value in having a range of options.

*Figure 28: Choice of skin*
Level of engagement

The Maelstrom is able to track the different parts of the website visited by users, and the level of activity they engage in. From this it is possible to infer the level of immersion or engagement that users exhibit.

Some general observations:

- Users tend to migrate to either the Collaborative Maelstrom or the Interactive Maelstrom. It is not unusual for a user to have completed all three scenarios in the Interactive Maelstrom without even reading through one of the stories in Icons, let alone create an additional part to the story.
- A number of users appear to deliberately choose alternative pathways as they track through the interactive scenarios. It would seem that they are trying out different responses - experimenting to see the ramifications of one choice over another. This was borne out during consultations with learners and during useability testing.
- Users were able to identify with a high level of accuracy whether or not the media enhancements were present. From this we can say that when sound or graphics are present the users notice them - they do not merely form part of a peripheral background.
- When asked to identify what the scenario they had just worked through was about, users were able to clearly nominate the subject matter and this matched the identified subject matter of the scenarios.

Feedback from key consultations

Part of the Analysis phase of the project involved going back to the e-learning leaders consulted earlier in the project and seeking feedback after implementation.
The feedback was extremely positive, with one Australian-based person responding:

_We’re frothing at the mouth about the Maelstrom - we can see so many uses for working with staff in the (indigenous area)_

These key consultations also gave rise to some suggested improvements to the Maelstrom, which will be discussed in the next part of the document.

**Reaction to media enhancements**

The reaction was surprisingly mixed, especially to the audio enhancements. There was a group of users who found the audio annoying, and a group who found it helpful, but not a lot of opinion in between. One request was that users were able to turn off the audio. This was not included in the current version of the Maelstrom, as a deliberate strategy to ensure that some users heard the audio in order to test the different responses to the scenario depending on whether or not audio stimulus was present. In future users will be able to choose whether they have audio, images, both or neither.

Some feedback on media enhancements that came from the survey and from interviews includes:

*I enjoyed the images - the photos helped me to identify more with what was going on.*

*The narration was good, although I wish it used different voices for the different characters.*

*Enjoyed seeing what ‘Harry’ looked like*

*Would be good if the images were animated too.*

**Usability implications**

The user survey feedback together with the observations and interviews provide a rich source of information about the useability of the Maelstrom.
The fact that users are readily able to identify what the scenario is about shows a good level of learning and recall. When asked to comment on what they would do differently next time, most users were able to nominate something that would improve their interaction with the scenario, again showing a good level of understanding of the scenario process.

The ability of users to add their own contributions (in Icons and Words) was appreciated by users, especially the younger users, who showed a clear preference for material that they could feel part of, rather than just read and react to.

**What should be done differently next time?**

This section has been informed by the research findings, the analysis of the surveys interviews, key consultations and personal reflections. Because the Maelstrom was developed over time, and because it was developed in several phases with useability testing, piloting etc implemented at every stage, much of the ‘what should be done differently’ was incorporated into the next iteration of development.

Nevertheless, there are a number of things that I would still do differently either if I were starting from scratch, or in the next iteration of the Maelstrom.

*Stronger emphasis on learning preferences*

While the Maelstrom has a number of features that appeal to different learning preferences, I feel that there is still room for improvement here. For example, as has already been flagged, it would be better if users were able to decide whether to hear audio or view images. This would enhance the ability to meet the different learner preferences according to their learning style (for example, aural learners might prefer to hear the audio and visual learners might prefer to be able to view the images). This will be built into future versions.
There are also additional features that could be incorporated to enhance the learning experience for people with different learning styles.

An interesting observation was that younger males (who tend towards being kinaesthetic learners) reported enjoying the interaction with the Maelstrom, particularly exploring different pathways. It would be interesting to explore this further, correlating learning styles through a VARK (a guide to learning styles) type analysis with feedback on Maelstrom experiences.

**Tracking return rate**

At the moment the Maelstrom does not track how many times a user returns to the site, nor what the intervals of return are. This would be an additional useful tool for determining the level of immersion/engagement in the site. This is a relatively easy item to implement, and is likely to be included in the next redevelopment of the site.

**Use in an access and equity setting**

The Maelstrom has wide applicability in the Access and Equity area. The useability and accessibility features mean that it can be used well by people with a disability, and its storytelling approach would resonate well with Indigenous learners.

Already I have had feedback from key e-learning contacts that the Maelstrom could be tailored for use in specific access and equity settings. This is something for further consideration.

**Increased use of social software**

While the Maelstrom includes a forum to allow users to interact outside of the scenarios, I feel that greater use of social software tools could extend the use of a resource such as the Maelstrom. These can be incorporated into future iterations of the site. *Words*, in the
collaborative Maelstrom, does provide an online collaboration tool, but there are other areas where tools like blogs and wikis may have been implemented.

Involvement of facilitator

At the moment the interaction with the Maelstrom occurs separate to the involvement of a facilitator. I envisage that the use of the site would occur as part of a facilitated learning experience, but this is not really spelt out. Explicit facilitator involvement would help with the debrief (discussed next).

Build in debrief

The debrief plays a critical part in the learning experience. Allowing learners to reflect on what they have experienced and to apply it to their own context is essential. Because The Maelstrom is not necessarily a facilitated learning experience, it could be stronger in this area. If the Maelstrom was used by a learning facilitator, either in a purely online context or in a blended learning situation, the facilitator would be able to build in the debrief component to capture the learning most effectively. The forum exists to allow discussion outside of the scenario context, but users need direction in accessing and using the forum, promoting conversation about their interaction. This would allow for the emotional response (or how people felt) to be drawn out more. A facilitator could have a key role here.
Conclusions of Research

Summary

Developing the Maelstrom has been, for me, a little like what it must have been for Captain Nemo in Jules Verne’s classic 20,000 Leagues Under the Sea:

*But one word many times repeated, a dreadful word, revealed the cause of the agitation spreading on board the Nautilus. It was not we the crew were looking after!*

*“The maelstrom! The maelstrom!” Could a more dreadful word in a more dreadful situation have sounded in our ears!*

So it has been a long and at times tumultuous journey. But as the journey reaches its end, I can reflect on what the Maelstrom has achieved and where it might go from here. The input provided during the development and implementation of the Maelstrom all point to one thing. It has a valid and valued place in teaching soft skills in an online environment. The construct of the Maelstrom has provided a space where learners/users are able to immerse themselves in scenarios that teach them about decision making, problem solving and communication.

The value of the Maelstrom was borne out by the user feedback and key consultations. User feedback that included surveys, observations and interviews consistently showed a high level of acceptance and engagement. Users pointed to the authenticity of the scenarios depicted as one of its key strengths. The capacity to customise the interface and the ability for users to monitor their own progress are both features that were welcomed by users. Media enhancements such as graphics and audio were on the whole welcomed by users, but the ability for users to choose whether they see images and hear narration would improve their experience with the Maelstrom.
**Contributions to the field**

The Maelstrom has made and will continue to make a valuable contribution to the disciplinary area of teaching soft skills online and can also have a role in shaping future directions.

The Maelstrom also has wider implications for online facilitation. It provides a resource that is truly interactive - not just ‘click and do’ on the part of the user, but actually requiring the user to contribute to the generation of knowledge. It also lends itself to reflective processes.

The Maelstrom is a resource that genuinely allows learners to become involved in the development process and to have an impact on the development of the resource itself.

In this sense, the Maelstrom is not a token attempt at implementing a fixed role play model, but rather, a dynamic resource that encourages genuine ownership on the part of the learners.

The Maelstrom adds to the body of research about soft skills and e-learning. This is still an emerging area and requires more work. The findings have been and will be shared with e-learning practitioners; the site is openly accessible and will remain so for the benefit of users/learners and for practitioners exploring this area of investigation.

An interesting feature of the Maelstrom is that it brings practitioners from two different disciplines (ICT and Communication) together and allows them to work together in a collaborative setting. It is still a bit early to determine the success of this feature, but is something to be examined in the future.

There is strong evidence to suggest that the Maelstrom improves the learning experience for the learner. It allows material that might be
dull or difficult to teach in other circumstances to be brought to life in a relatively safe and non-threatening way.

The Maelstrom may also provide a spark of initiative for someone else investigating this area. It is hoped that the Maelstrom will take its place as part of the continuum of research into e-learning and soft skills development.

In a similar manner, the Maelstrom can be used as a catalyst for future development. It provides a launch pad for more work in bringing soft skills development online. Because the project has involved stakeholders from all over the world, it has tended to open up dialogue on a global scale in this area. This is something that is only germinating now, but is likely to become more widespread over the ensuing months and years.

In terms of what the project has brought to the disciplinary field of e-learning, I feel that it has a role to play in the emerging field of convergence. It allows skills and ideas to be developed in new ways and in that sense it has made a very real contribution.

Finally, at a personal level, my involvement with the Maelstrom has provided an unequalled professional development opportunity, and this is something that I can then apply to my workplace and beyond.

**Directions for future research**

For the full value of the Maelstrom to be realised, it must be seen as part of an ongoing process of development. For this reason I can identify a number of areas where further research would be useful.

A logical area for future sites like the Maelstrom is to integrate animation and video into the scenarios. This is increasingly becoming a possibility as bandwidth is increased and extended.
Speech recognition technologies are maturing all the time and may be something that can take a place in a scenario-based environment such as the Maelstrom. Further research would be required to determine what the value of such an initiative would be, and where it could be applied.

Another development that would strengthen the Maelstrom approach would be the ability for practitioners to ‘plug in’ their own scenario. Although this is technically feasible through the Words interface, it was not designed for this type of use, nor does it support any additional images or sounds to accompany the text.

As identified earlier, further research needs to occur as to what role social software and Web 2.0 technologies can have in supporting the development of soft skills in the Maelstrom or sites like it. This is an increasingly important area of web development and will be a requirement to meet the changing needs of web users.

There may be scope for some of the scenario material to be delivered by podcast. At this stage the podcast technology does not readily support the concept of the multiform story, but it may do in the future, and if and when it does, the Maelstrom should be ready for it.

The Maelstrom provides an online vortex of interactivity where users are drawn in to experience the dynamic environment which asks them to ponder, to consider and to act.


Clark, Donald (2006) Softskills and e-learning, Epic An Epic White Paper

Callan, VJ (2003) Generic skills: Understanding vocational education and training teacher and student attitudes, NCVER, Australian National Training Authority


Dawe, S (2002) Focussing on generic skills in training packages, NCVER, Adelaide last viewed 17/9/06 http://www.ncver.edu.au/research/core/cp0004.pdf#search=%22ant a%20training%20package%20integration%20of%20soft%20skills%22

Downes, S. (2005) E-Learn 2.0 in E-Learning magazine Association for Computing Machinery last viewed 12/09/06
</http://www.elearnmag.org/subpage.cfm?section=articles&article=29-1>


http://www.cdtl.nus.edu.sg/brief/V6n1/sec2.htm


http://tiger.coe.missouri.edu/~jonassen/courses/CLE/

Kemshal-Bell, G (2001), The Online Teacher, NSW Department of Education and Training, TAFE NSW, Viewed 12/09/06 Available from:
http://www.flexiblelearning.net.au/resources/1resources-s188.htm


Tomaszewski, Z (2004) Theories of Interactive Narrative, last viewed 17/9/06 <http://www2.hawaii.edu/~ztomasze/cis702/project.html>

**Web links**

_Constructivist learning_

http://www.accesswave.ca/~hgunn/special/papers/hypertext/conlearn.html


_Interactive narrative_

http://www.eastgate.com/HypertextNow/

http://www.eastgate.com/storyspace/index.html

http://web.mit.edu/21w765j/www/genres.html

http://www.storycenter.org/memvoice/pages/areasmain.html

http://www2.hawaii.edu/~ztomasze/cis702/project.html

http://commtechlab.msu.edu/publications/files/interactive_narrative_ICA.pdf

http://www.english.ucf.edu/publications/enc4932/chris.html

http://snow.sierranevada.edu/~csci/etek/Patrick/CreatingStory.pdf

http://itp.nyu.edu/thesis/detail.php?project_id=632

http://www.rephistory.org/circulation/exquisite/ec_fr.html

http://storytrain.kids-space.org/cgi-bin/storytrain/vew_list.cgi

http://alumni.media.mit.edu/~murtaugh/thesis/InteractiveNarrative/InteractiveNarrative.html

http://www.exquisitecorpse.com/definition.html

http://anexquisitecorpse.net/explanation.shtml

http://www.idtension.com/index.html

Learning styles


Soft skills


http://www.fcw.com/article90726-09-12-05-Print
Appendix 1 – Interview outline

Thank you for coming along and agreeing to answer some questions about teaching and learning soft skills

Who: (stakeholder category, eg Business Teacher)
When: Date of interview
Advise re confidentiality, anonymity etc.
Explain key terms such as soft skills, multimedia etc

Questions (mainly to practitioners):
1. What is your experience in teaching soft skills in an online environment?
2. What role do you see for interactive media in developing communication skills?
3. What might be included in a tool that teaches communication skills in an online environment?
4. How would you use such a tool?
5. What design considerations are important for the effective use of an online tool?

Specific questions to curriculum managers
6. What is the relevance of soft skills to curriculum in your area?
7. Do you have any suggestions as to how soft skills can be used effectively with interactive media?
8. Do you know any examples of good practice teaching soft skills in an online environment?

Specifically for learners
9. How have you been taught soft skills? (face to face/online)
10. Is there any particular method that you enjoyed more than others? Please comment.
11. If you were to use an online activity, what kind of activity do you think would appeal to you? Any examples?

General
12. Is there any additional you’d like to comment on?
Appendix 2 – Survey of scenario users

Feedback

We’d really appreciate your thoughts on the scenario you’ve just completed. The short survey below should only take you 4 or 5 minutes and will help our research.

What was this scenario about?

Other than the text, did the scenario have any other features that you noticed?
- No, I only saw the text
- Yes, there were scenario-related pictures too
- Yes, there was audio (sound) too

If this scenario had sound, please indicate your reaction to it:
- I found it annoying
- I found it interesting but not really helpful
- I found it helped me to understand the content
- I didn’t have an opinion about it either way

If this scenario had images, please indicate your reaction to them:
- I found them annoying
- I found them interesting but not really helpful
- I found they helped me to understand the content
- I didn’t have an opinion about them either way

Was your scenario interesting? On the following scale, with 1 being the least interesting, and 7 being the most interesting, please rate this scenario:

Least Interesting

Most Interesting
Why?

After completing the scenario what would you say you had learned?

What would you do differently next time?

What changes, if any, would you like to see made in future scenarios?

Where, if anywhere, would you think this scenario could be used effectively?