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## A case study approach to evaluate a vocationally focused virtual environment.

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### Abstract

This small-scale research project formatively evaluates Shareville, a bespoke virtual environment developed by a UK University. The literature review focused on the development of vocational higher education and the historical development of virtual environments. Desk-based research evaluated various frameworks used for the evaluation of technology enhanced learning. Primary research was carried out in the form of semi-structured interviews with three independent users of Shareville.

A number of aspects in the development and use of Shareville were identified which may be of benefit to others who are developing virtual environments. The specific aspect of the cost of developing virtual environments is also explored – concerns by the developer and content providers of the time and cost taken to develop rich video resources may be mitigated by considering the project over the longer time period which the resources are going to exist.

Keywords: Virtual Learning, Virtual Environment, Higher Education, Technology-Enhanced Learning, TEL

### Introduction

Birmingham City University is a large English metropolitan university with approximately twenty-five thousand students (Anon, 2010), usually studying vocationally relevant courses.

One of the key strategic drivers for the university is "...innovative use of technology to promote effective student learning and efficient business delivery." (Tidmarsh, 2010). To facilitate this, a bespoke learning

environment – ‘Shareville’<sup>1</sup> has been developed to provide vocational training across the university.

### About Shareville

Shareville is a backronym<sup>2</sup> for Shareable, Holistic Assets and Resources, Existing in a Virtual Interactive Lifelong Learning Environment (Staley & Faniglione, 2010). The hardware specification required to run the environment is minimal, and being web-based works on a variety of computer platforms. Shareville provides an approximation of the socially and ethnically diverse city of Birmingham, England, and many of the different areas and landmarks within the city are parodied in the names used within Shareville.



Figure 1 – Shareville as of November 2010

Whilst most of Shareville is open to the public, some areas within the domain of social work training have a simple password protection, as they contain upsetting scenes that may not be suitable for minors.

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<sup>1</sup> Shareville is available via the link <http://shareville.bcu.ac.uk/>

<sup>2</sup> ‘back acronym’



**Figure 2 – Welcome to Green Moor Primary School**

Navigation within the environment through ‘point and click’ is possible, and in order to improve accessibility there is a breadcrumb trail at the top of each page, alongside quick navigation to the locations. There is no ‘full screen’ mode or fully immersive environment. The perspective of the student is always ‘first person’, so there is no requirement for an avataristic representation on screen. Whilst not a JISC-sponsored project, the Joint Information Systems Committee has demonstrated interest in Shareville, including presentations at online conferences (Staley, Mackenzie, Hetherington & Faniglione, 2009).

## **Background – Vocational Higher Education and the development of virtual environments**

### **Vocational Higher Education**

Though this research is grounded within a UK Higher Educational Institution (HEI), the term ‘vocational higher education’ is not widely used within the UK. This is not so within the rest of the EU, as noted by Palfreyman & Tapper (2005), who note that France, Poland and Denmark are proud of their ‘Polytechnic’ Higher Education Institutions.

Within the UK however, a perception remains of a difference between ‘Post-92’ universities (i.e. former Polytechnics which changed their names to include the nomenclature University following changes to their funding model), and the research-focused ‘Russell Group’ and business-focused ‘University Alliance’. Even fifteen years after the original debate, this remains an area (Pursglove & Simpson, 2007) worthy of note by the educational press (Andalo, 2007), (Grayling, 2010).

Vocational higher education is valued by employers (Little et al., 2003). However the same article notes that there are difficulties in delivering what can be perceived as 'training' within an academic context. The usefulness of online vocational training within the commercial training sector has been long recognized (Curtain, 2002). To cross the barrier from Higher Education into the world of work, a number of 'bridging tools' are needed (Saunders, Charlier & Bonamy, 2005). Using the terminology of "Enclaves, Bridgeheads and Embedded Practice" (Saunders, Charlier & Bonamy, 2005, p. 42) the development and use of Shareville within Birmingham City University could be categorized as a bridgehead; the use of the virtual environment within courses being classified as "adopting strategies for change and were making a limited impact on the wider context." (Saunders, Charlier & Bonamy, 2005, p. 43)

Given this historical perspective, the need for vocational training for a student before entering the workplace, either as a placement or as part of their first job following graduation has been demonstrated. The utilization of virtual environments is one method that this training can be enhanced.

### **The development of virtual environments**

The high-bandwidth, high-graphics virtual environments which are now used for commercial, educational, and leisure purposes can trace their origins back to the original Multi User Dungeon (MUD) implementations of the late seventies (Bartle, 1990). Though text-only, and limited by the phone line and memory capacity, these systems demonstrated some of the functions that we recognize as important elements within virtual environments including the ability to interact with other inhabitants online synchronously, and rich descriptions of locations. The first commercial, graphical virtual environment that gained recognition was Lucasfilm's 'Habitat' (Benedikt, 1991). By 1997, a plethora of virtual environments were available for internet-connected and technically aware individuals (Tang, 1997). 'Niche' virtual environments were now developing, with many aimed at games enthusiasts and disparate age groups. For educational purposes however, there is one leader in the area of virtual environments for Higher Education purposes. As noted by Kirriemuir (2010) –

"As with all the previous snapshots, Second Life remains the virtual world 'of choice' for UK academics who responded to the survey. However, also as with previous snapshots, other virtual worlds are in use..." (Kirriemuir, 2010, p. 2)

Alternatives to Second Life, driven in particularly by the Open Source movement (Raymond, 2001) include OpenSim, Vastpark, and Open Wonderland (Burden, 2010).

## Virtual Environment or Virtual World?

Throughout this study, the term Virtual Environment has been used to describe Shareville. For the purposes of this paper, it has been decided not to define Shareville to be a Virtual *World* (Savin-Baden, 2010), as it does not demonstrate two of the key requirements for a virtual world, namely an avataristic presentation of the individual, and the ability to interact with other members online.

Similarly, despite the intention behind the name *Shareville*, it is not possible to see Shareville as a Community of Practice, as proposed by Wenger (2006). Whilst discussion *about* Shareville in tutorials or online in forums in modules using Shareville as a resource may create a Community of Practice, the website itself provides no opportunities for interactions, it is a solitary learning activity. Therefore whilst the environment can create a sense of 'practice', it cannot be seen as developing a 'community' within this context (Lave, 1996), (Wenger, 1999).

## Summary

The literature review above as part of this research demonstrates that there is a perceived demand by students for vocational training prior to graduation and their transition from Higher Education into the workplace. The establishment of Shareville is an evolution of the more traditional methods of delivering this vocational training. Virtual environments have also evolved and users now expect a much higher level of 'reality' in their interactions. Shareville cannot be classified as a Virtual World however, as some features expected of a Virtual *World* are not present.

## Research Aims

The aims of this small-scale research project were two fold;

1. To identify appropriate frameworks to facilitate the evaluation of vocational virtual environments.
2. To evaluate the vocational virtual environment 'Shareville' and discover what aspects of its development and use would be beneficial for the future development of other virtual environments.

The first aim was achieved through desk-based research, critically evaluating a number of TEL frameworks and their appropriateness for the evaluation of Shareville. The second aim, based upon primary research activities, developed a case study for Shareville through face-to-face interviews with three individuals who have experience of the virtual environment.

## Epistemology and Ontology

The approach taken throughout this research is constructivist in nature. The desk-based research below takes a non-empirical view to evaluate TEL



frameworks, and whilst the findings from the primary research could be perceived as being positivistic in approach, as discrete factors are sought to be identified, the use of the case study approach, and the formative evaluation of Shareville (see Evaluative method below) discussed below precludes this description.

The findings presented through case records are noted by Denzin (2003) as being ontologically relativistic in nature – specifically the same situation (Shareville) is examined from multiple realities (the perceptions of the three ‘actors’ within the environment, plus the author’s own experience of using Shareville).

### Evaluating TEL Frameworks

Within this research existing frameworks for the evaluation of TEL were considered as part of a desk-based research exercise. This will inform the primary research and these frameworks will necessarily influence this case study. The domain of TEL evaluation is large, and the literature review here is constrained to four areas –

1. Affordances
2. SECTIONS/ACTIONS
3. ‘Six Learnings’ of Second Life
4. Pedagogical categories for classifying TEL.

### Affordances

The concept of affordances as suggested by Conole & Dyke (2004), is an idea that has transferred from the field of psychology and was first suggested by Gibson (1977) in Shaw (1977). The original concept of affordances was that they were enablers of activity within a physiological/psychological context. Conole & Dyke (2004) suggested the development of affordances was a useful construct to evaluate TEL.

## Affordances of Technology Enhanced Learning

- Accessibility
- Speed of Change
- Diversity
- Communication and collaboration
- Reflection
- Multimodal and non-linear
- Risk, fragility and uncertainty
- Immediacy
- Monopolization
- Surveillance

Figure 3 – Affordances (Conole & Dyke (2004))

The validity of affordances has, however, been open to question. An initial critique (Boyle & Cook, 2004) was effectively responded to (Conole & Dyke, 2004a). Criticism of using affordances stems from the large areas defined within each criterion, though the original critique by Boyle & Cook (2004) focused more on the semantic definition of affordances. Other critiques (Oliver, 2005) go further to discredit the concept of the taxonomy of affordances within a TEL context, noting –

“...there seems to be no unifying concept behind the list; elements may emerge from the literature, but the notion of ‘affordance’ seems ill-suited to legitimating this conglomeration of claims about perceptions, actions and characteristics.” (Oliver, 2005, p. 409)

These difficulties, alongside the difficulties of defining ‘Affordances’, mean that other frameworks have been developed to evaluate TEL.

### *ACTIONS and SECTIONS frameworks*

The ACTIONS (Bates, 2005) and SECTIONS (Bates, 2003) frameworks were developed to specifically evaluate a wide range of TEL initiatives.



ACTIONS	SECTIONS
<ul style="list-style-type: none"> <li>• A – access</li> <li>• C – costs</li> <li>• T – teaching and learning</li> <li>• I – interactivity</li> <li>• O – organizational issues</li> <li>• N – novelty</li> <li>• S – speed</li> </ul>	<ul style="list-style-type: none"> <li>• S – students</li> <li>• E – ease of use</li> <li>• C – costs</li> <li>• T – teaching and learning</li> <li>• I – interactivity</li> <li>• O – organizational issues</li> <li>• N – novelty</li> <li>• S – speed</li> </ul>

**Figure 4 – ACTIONS and SECTIONS Frameworks (Bates 2003 & 2005)**

The ACTIONS framework has been widely used across a range of different technologies, (Cunningham et al., 1997), (Angeli, Valanides & Bonk, 2003). However there appears to be some duplication in the criteria when looking at the SECTIONS framework. Whilst Bates deems it necessary to identify ‘Ease of Use’ as enabling criteria for the SECTIONS framework, it is unclear how this is different from the Interactivity criteria, defined by Bates himself when discussing the ‘Quality of Interaction’. Bates concludes his discussion of the criteria by stating that simply taking these criteria as ‘headlines’ for evaluating technology notes the limitations of such an approach –

“One then should have no illusions that there are simple solutions to selecting and using technology in either conventional or distance education.” (Bates, 2005, p. 66)

### *The ‘Six Learnings of Second Life’*

Specifically developed to prompt debate within the second life community, Lim (2009) identified six factors which should be considered when evaluating the learning opportunities available using the virtual environment.

## The 'six learnings' of Second Life

- Learning by exploring
- Learning by collaborating
- Learning by being
- Learning by building
- Learning by championing
- Learning by expressing

Figure 5 – The 'Six Learnings' of Second Life (Kim 2009)

These 'learnings' were defined as the minimum requirements for the successful implementation of any virtual environment. These can be separated into three different categories of learning.

By the presence of actually participating in a virtual environment, all students will, by default, experience 'learning by exploring' and navigating the virtual environment and 'learning by being' – the concept of awareness of self within the environment. Collaboration and building (including scripting) tools will depend to an extent upon the facilities available within the virtual environment, though the learning curve for these activities has been acknowledged as being steep (Sanchez, 2009), (Ward, 2010). The final two learnings, championing and expressing are evangelical activities and are possible both within and outside the virtual environment.

Lim (2009) recognized that whilst the framework was developed for Second Life, there is the opportunity for 'compatibility' with other virtual environments.

"The Six Learnings framework can be applied to virtual environments other than Second Life. The success to which it is able to be thusly transposed would depend on several factors, such as the maturity and extent of the building tools, [and] the affordances for collaboration." (Lim, 2009, p. 9)

### *Pedagogical Categories for Classifying TEL*

Rather than developing a framework for the evaluation of learning environments, Laurillard (2002) developed twelve criteria for evaluating a wide range of learning technologies. The criteria describe the interactions between Teachers and Students within a variety of pedagogical activities, for example "T can set task goal, S can act to achieve task goal" (Laurillard, 2002, p. 160).

Laurillard is a strong advocate of the concept that TEL extends beyond the Internet (Ashwin, 2006), (Laurillard, 2008), and as such the criteria are

relevant for a range of media. As such, whilst the criteria are unique in the literature examined in that they are entirely focused on the pedagogical needs of the students and teachers, they are too generic for the detailed examination of a virtual environment.

### Fit for Purpose?

The evaluation frameworks examined focus on two specific areas, the pedagogic approach taken by developers and content providers and the experiential learning of students who engage in the activity.

Each of the frameworks evaluated have their own unique criteria for evaluating TEL. The desk-based research has not however identified a specific framework for the evaluation of a virtual environment such as Shareville. An amalgamative approach is therefore carried forward into the primary research, using the evaluation criteria that are most directly relevant to Shareville in its current state of development.

### Methodology

A quantitative methodology could have been considered as an approach to evaluate Shareville, using quantitative questionnaires of those exposed to the virtual environment. However, the number of students who have been exposed to Shareville remains relatively small. Given the small original population, the timing that the survey would be carried out (over the Christmas period), and the subsequent risk of a poor response rate (Cohen, Manion & Morrison, 2007), a richer data-gathering technique, using qualitative methods and a small sample size can still deliver valid results through 'thick description' (Geertz, 1973). This also supports the research questions asked from this small-scale research, namely qualitative factors are sought to identify functionality within Shareville that can be of benefit for other educators.

### Evaluative method

The evaluative method used within this research is constructivist in nature, and predominantly based on primary research, which places it towards the formative spectrum of evaluative methodologies.

Specifically, a 'Goal-free' (Gray 2009) formative evaluative approach is used within this study. In a Goal-free evaluation, the subjective views of the participants are all valid, and there are no pre-existing hypotheses to be tested. This more open structured evaluation does have difficulties however

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"The results of this approach to evaluation may reveal illuminating insights, but may not produce results that can be easily implemented." (Gray, 2009, p. 291)

## Use of Case Studies

The use of the case study approach to present the data gathered during the primary and secondary research phases is well established (Denscombe, 2003). Gray (2009) reminds us that case studies do not simply “describe a situation” but are also “trying to attribute *causal* relationships” (Gray, 2009, p. 247).

There are also many types of case study design, and from the outset of primary research it is imperative that the appropriate design is considered. Whilst Cohen et al. (2007) attempt to differentiate between six different types of case study, Gray (2009) stipulates a simplistic framework.

	Single case designs	Multiple case designs
Holistic (single unit of analysis)	<b>Type 1</b> Single/holistic	<b>Type 2</b> Multiple/holistic
Embedded (multiple units of analysis)	<b>Type 3</b> Single/embedded	<b>Type 4</b> Multiple/embedded

Figure 6 – Main types of case study design (Gray 2009, p.256)

Given the criteria above, the research undertaken here can be classified as a ‘Type 3’ case design. A single case design (Shareville) is being examined, but there are number of different units of analysis, with three perspectives to be examined, those of developer, content provider (tutor), and user (student).

Each of these perspectives, which relates to an individual interview will be written up as a case record. These records when analysed will provide a case study that will subsequently be used to answer the research questions identified at the start of the study.

## Data gathering technique – semi-structured interviews

Semi-structured interviews (Gray, 2009) (Lancaster, 2005), sometimes also known as an ‘interview guide approach’ (Cohen, Manion & Morrison, 2007) is placed in the centre of a sliding scale of interview techniques from completely ‘open’ informal and conversational interviews to the survey-like ‘closed’ quantitative interviews. The structure offered by this form of interview technique is advantageous as it allows for a systematic method of response, but also allows for the exploration of concerns by an individual within the context of the interview. However, it is also possible that important issues by a particular respondent may not be fully explored if they

fall significantly off-topic within the interview. For this reason it is recommended that semi-structured interviews are first trialed with a respondent to act as a 'pilot' for the interview (Burgess, Sieminski & Arthur, 2006), within this study the trial was carried out informally, using a colleague who had experience of using Shareville, but did not take part in this study.

### Selection of questions for semi-structured interview

Whilst for a semi-structured interview it is preferable to ask the same questions of all of the interviewees, as three different categories of respondents were being interviewed, each with their own experiences of Shareville, this was not always appropriate.

From the main frameworks identified in the literature review, the applicability of the item was considered with what was already known by the author about Shareville, and a question formulated to elicit information about that particular aspect, and their applicability of that question to each of the respondents. This is summarized below, and formed the basis of the semi-structured interviews (Table 1 – Interviewee Questions).

It is recognized that for qualitative data gathering, there is a possibility of bias and concerns about the reliability of the data presented (Gray, 2009). By the use of 'open' questions prepared in advance, the possibility of bias is reduced, and the consideration of consistency and neutrality is attempted –

“The study must attempt to demonstrate *neutrality*, showing that the researcher is aware of the possible confounding effects of their own actions and perceptions and these, as far as possible, have been accounted for.” (Gray, 2009, p. 378)

**Table 1 – Interviewee Questions**

Framework	Item	Respondent	Question
Affordances (Conole & Dyke, 2004b)	Accessibility	Developer Tutor Student	What issues surrounding accessibility have you experienced and overcome whilst working in/developing Shareville?
	Reflection	Student	In which ways have you found that working with Shareville has helped improve your 'real life' interactions
	Surveillance	Tutor Developer	In what ways do you monitor usage of Shareville? Do you wish to develop this aspect further?

Framework	Item	Respondent	Question
S E C T I O N S (Bates, 2003)	S – Students	Tutor Student	How has the student/your experience changed by using Shareville within your course?
	E – Ease of Use	Student	What difficulties (if any) have you experienced in using Shareville? Have you experience of other virtual environments?
	C – Costs	Developer Tutor	How have the costs of developing Shareville (in terms of time/cost/resources) been realized in terms of benefits for students?
	T – Teaching and Learning	Developer Tutor	What are the pedagogical underpinnings for the development of Shareville?
	N – Novelty	Developer Tutor Student	How does Shareville deliver learning material in a new way?
Six Learnings (Lim, 2009)	Learning by Exploring	Student Tutor	Which areas of Shareville have you explored beyond those required by your course/faculty?
	Learning by Championing	Developer Tutor Student	How enthusiastic have you been in sharing your experience in Shareville with other people?

The interviews were carried out in January 2011, and transcribed to a series of mind maps. These were subsequently analyzed to create ‘case records’.

## Discussion of Findings

The three case records from each of the semi-structured interviews are described below.

### Case Record One – Developer

Interviewee A was the principle advocate behind the development of the Shareville virtual environment. Originally Shareville was developed as a single ‘entity’ with all of the flash downloaded at once. However the development of Shareville 2.0 in 2010 allowed a content management system

to be installed, allowing for smaller downloads, and easier ongoing management of the virtual environment. Interviewee A was keen to stress how Shareville had developed holistically, bringing together both existing and new resources together, triggered specifically by the 'Baby P' case (Laming, 2009). Shareville attempts to ameliorate against that by showcasing a multi-agency approach, particularly in the areas of Health and Social Work. The initial philosophy behind the development of the environment was that of seeing resources that already existed online in a number of areas within the university, in a more realistic context – “we wanted to see the video clip in the environment that it occurs”. Interviewee A noted that all of the content within Shareville was video based (using green screen techniques), and not avatars (as in ‘true’ virtual worlds). The pedagogic underpinnings of the development of the resource came from the interviewee’s strong belief in Problem Based Learning (Savin-Baden, 2006). This is followed through within Shareville by the deliberate lack of instructions on how to use and explore the virtual environment. Interviewee A was also keen to stress that Shareville cannot stand-alone, and needs support by either a Virtual Learning Environment, or traditional teaching methods. With regard to issues of accessibility, it was noted that there had been some comments from visually impaired academics that they could not use, or recommend the use of the resource. Whilst there have been some changes (such as the use of traditional hyperlinks below the main presentation of the virtual environment and a breadcrumb trail to track progress), it was acknowledged by Interviewee A that much of the benefit of Shareville comes from the rich visual environment as presented. Interviewee A noted that there are no statistics of usage of Shareville, with no record kept of numbers of people who have accessed the virtual environment. Technically this should be possible, but there has been no demand by people involved within the project for usage figures, and “tutors are certainly getting together to collaborate to create materials”. With regards to the costs of developing Shareville, it was acknowledged that a cost-benefit analysis would probably show a large deficit. However Interviewee A was keen to mention that the environment acts as a very public ‘shop window’ for the university and that “people outside the University do want to pay us to develop Shareville for their use”. Finally, throughout the interview many examples were discussed showing how the enthusiasm of Shareville has been disseminated both within the university, and to other academic institutions.



## Case Record Two – Content Provider

Interviewee B is a senior lecturer who had developed the 'House Survey' part of Shareville along with the content developers employed by Interviewee A. This part of Shareville simulates a property survey for over fifty students per year. This would not be possible in a real-world situation, where the same consistency of experience could not be repeated – “you can't put them all in one place, and if you split them you are quadrupling the effort”. Different cohorts of students use the house survey for both formative and summative assessment. A common theme throughout the discussion with Interviewee B is the lack of time to develop new material, there being no shortage of ideas for new content, but a lack of resources to implement these. Shareville itself is introduced to students both in face-to-face lectures along with instructions on how to navigate through the virtual environment. Despite this instruction, Interviewee B wished to emphasize that the experience for the students is mostly a self-teaching exercise, and that it should be used as an enquiry tool. Whilst Interviewee B did not explicitly say, this description closely describes a definition of inquiry-based learning (Conole et al., 2008) – “it is basically a self-teaching exercise”.

Interviewee B noted that the only accessibility issues encountered involved a student who was unable to use the immersive environment presented within this area of Shareville, as they caused migraines “due to the swirling”. This symptom was not unique to Shareville, and the student affected could not use any video games that employed a 3D perspective. Interviewee B circumvented this issue by providing printouts of the environments that were causing issues.

As has been noted by Interviewee A, electronic monitoring of the number of visitors to parts of Shareville is not possible. In 2009 however, Interviewee B has asked students as part of the normal module evaluation process to identify how frequently they accessed Shareville. This was not repeated in 2010, as the virtual environment had not been used as extensively.

Whilst discussing costs and other resource issues surrounding Shareville, Interviewee B was confident that with appropriate levels of investment – “if we put the investment into it we could be world leaders”. However resources in terms of time to develop the environment and film the video interactions were sorely needed, and the time provided to academics also had to coincide with the available time of the developers.

When considering any problems which the students had encountered in using Shareville, it was noted that sometimes the environment, and navigating around the 'houses' as presented is not as quick as the students sometimes expect, and that initial navigation around Shareville can be troublesome.

Interviewee B has explored other areas of Shareville, and would like to share these resources with students (Poplar Housing Development and BCU Solicitors LLB), but time is needed to develop the supporting materials to effectively use these.

Finally, Interviewee B was happy to be labeled an 'enthusiast' of Shareville, and the possibilities it can offer for teaching. Interviewee B noted however that enthusiasm can only take a project so far, and that commitment from the top down to the resource is needed to further develop and nurture Shareville.

### Case Record Three – Student

Interviewee C is a student on a legal practice course, and as such has extensively used the BCU Solicitors LLB environment within Shareville. This is, compared to other parts of the Shareville, well developed, with a high level of interactions and a number of 'decision points' available in many parts of the virtual office. The virtual environment was linked from the virtual learning environment (in this instance moodle), and took the students directly to the 'reception' of the virtual environment. Interviewee C had no experience of other virtual worlds, but was aware of environments such as Second Life, and particularly liked the video clips using 'real people' – stating that the video (and knowing the people who were acting in the video) – "made it feel more true-to-life, and less like a video game".

In particular, Interviewee C noted that the need to make decisions, which do not always have positive outcomes, is particularly useful for professional practice, and noted that making errors in a virtual environment such as this is preferable to making the error in the real world.

Regarding accessibility issues, Interviewee C noted that sometimes whilst accessing the material on-campus, the environment can feel sluggish in response, though this was blamed upon "everyone was accessing the material at the same time after classes... you need a pretty good internet connection". At home, through a broadband connection Interviewee C had no issues either accessing or navigating her way through the environment. When asked how using Shareville had affected her real-life interactions, Interviewee C did want to note that the activities online are also offered as part of the course, but the ability to 'make mistakes' in the virtual environment beforehand was invaluable, and stated that it would be really useful for younger students who are on the first year of their course at University – "it gets you straight into it".

When asked about other areas of Shareville, Interviewee C stated that she had not gone beyond the 'gates' of the solicitors, but thought that there could be links with (for example) business courses, as solicitors and

businesses frequently have to work together, and indeed company formation is already part of the BCU Solicitors part of Shareville.

Finally, Interviewee C confirmed that there was a “good feeling” about Shareville on the course, apart from the speed problems sometimes encountered, and she was very pleased through this research to be able to spread the word about Shareville as used on her course.

## Discussion of Findings

Two research aims were identified for this small-scale research:

1. To identify appropriate frameworks to facilitate the evaluation of vocational virtual environments.
2. To evaluate the vocational virtual environment ‘Shareville’ and discover what aspects of its development and use would be beneficial for the future development of other virtual environments.

As noted (see Fit for Purpose? above), via desk-based research, deficiencies were identified in each of the frameworks examined. The amalgamative approach, using the most relevant criteria from a number of frameworks was used to prepare a number of questions that formed the basis of the semi-structured interview.

For the second research aim, each of the case records has been examined to identify which aspects of Shareville’s development are ‘transferable’ to other virtual environments.

Table 2 – Key aspects

	Key Aspects
Interviewee A Developer	<ol style="list-style-type: none"><li>1. Problem Based Learning paradigm is at the heart of the Environment.</li><li>2. The Environment cannot stand alone as a resource, and requires support from other TEL or traditional classroom resources.</li><li>3. <i>Costs in developing a bespoke Environment are difficult to justify using traditional cost-benefit analysis models.</i></li><li>4. The use of video (with green screen technology) improves student engagement.</li><li>5. Accessibility issues will become more significant as Environment rolled out to a wider population.</li></ol>
Interviewee B Content Provider	<ol style="list-style-type: none"><li>1. Environment needs appropriate financial and resource investment to be assured of success.</li><li>2. Environment allows students to explore at their own</li></ol>

	<p>pace.</p> <ol style="list-style-type: none"> <li>3. Alternative experiences using 'traditional' materials (printed copy, prepared walkthrough videos) may be required to improve accessibility.</li> <li>4. Effective monitoring and gathering statistics maybe strengthen the business case for development of the Environment.</li> </ol>
Interviewee C Student	<ol style="list-style-type: none"> <li>1. Frequent and early access to the Environment is appreciated by students.</li> <li>2. Choices/Selections within the Environment are important to maintain engagement, but the environment should not feel like a game.</li> <li>3. 'Bad' as well as 'good' selections should be possible to allow participants to learn by mistakes.</li> <li>4. Vocational relevance is an important aspect, and the Environment must connect with the professional practice aspects of the course.</li> </ol>

From the rich data of the semi-structured interviews it would be possible to further evaluate many of the aspects above. Constraints on the scale of this research however only allows for a single factor to be considered in further detail.

### Creating cost-effective video scenarios

One recurring issue from the case records noted above by the developer and content provider for Shareville is the high cost of producing resources for the virtual environment. Bates (2005) devotes a whole chapter to the discussion in his book to "costs and organizational issues", noting that sometimes a pay-back period of nine years should be anticipated for an effective return on investment. It is worth noting however that Bates allocates a similar (or slightly larger) budget for ongoing maintenance of the web-based resource, compared to its initial development (over a nine year period).

Whilst the current cost per student visit of Shareville may appear high, the long-term viability of many of the resources mean that the cost will decrease over time, unlike traditional face-to-face teaching methods where the cost remains constant (though the cost per student can vary, depending upon student numbers). An earlier online resource<sup>3</sup> developed by the same

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<sup>3</sup> "Problems at Crumpton" can be found at <http://www.ssdd.uce.ac.uk/crumpton/default2.htm>

department which has deployed Shareville, has been used for fifteen years, and is still used within the university's MA Education Programme. Using teachers instead of professional actors and the re-use of learning objects within the immersive environments means that savings in the production of the video scenarios, but the 'cost' of this is a less realistic environment for the students.

### Further Work

The research presented here allows for no comparison of Shareville with alternative virtual environments, and the different pedagogic approach that drives their development. A comparative evaluation of other environments using a similar range of interviewees and the same semi-structured interview framework developed here would yield beneficial results.

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