

# The development of the Virtual City: A user centred approach

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## ABSTRACT

This paper will develop the theme of the importance of community based involvement in the development of virtual learning environments (VLEs) for people with a learning disability. It is being presented alongside two other papers, one by the User Group, the other by the Testing Group, describing the design, testing and distribution of the Virtual City. This set of VLEs comprise a computer aided learning (CAL) tool to teach independent living skills to people with a learning disability. Our presentation will demonstrate the involvement of users in each of the stages of development of the Virtual City, and the benefits of this partnership, as opposed to a more tokenistic involvement.

Along side the development of this methodology, the presentation will concentrate on the demonstration of the Virtual City to show how users can learn skills such as the use of public transport, road safety skills, safety within a home environment, the use of public facilities within a cafe and the development of shopping skills within a large supermarket. Video will also be shown demonstrating users involving themselves in the various stages of production of this CAL tool.

## 1. BACKGROUND

VIRART have enjoyed a long association with community groups and national organisations developing the role of VLEs for special education (Cromby et al, 1996, Brown et al, 1997, Cobb and Brown, 1997). Some of the outcomes of these collaborations have included:

- *Lifestyles* and *Makaton* distributed by Rompa (UK, with International Distributors).
- The *Virtual Factory* for the UK Health Education Authority.
- The *Virtual Tenancy*, produced for Metropolitan Housing Trust and distributed by Pavilion (UK).

This development has been accompanied by a continual evaluation programme to determine the usability of these VLEs and the degree of transfer of this experience into real life skills (Brown, et al, 1998, Standen, et al, 1998).

In March 1997 the National Lotteries Charities Board (NLCB) funded the first stage of the production of the Virtual City in which people with learning difficulties could practice independent living skills. On a National and European level it is recognised that the development of such skills is important not only for the self-esteem of users, but also to off-set the rising cost of social care.

The NLCB commissioned a project to build the Virtual City in which the skills required by people with a learning disability for some degree of independent living could be learnt and practised. The commissioning partners for the project were the Metropolitan Housing Trust ( a housing association for people with learning difficulties), The Shepherd School (a school for some 170 students with severe learning difficulties) and VIRART (The Virtual Reality Applications Research Team). This was to be a user centred project, with an emphasis on members of the learning disabled community being involved in all stages of the project.

The importance of a user centred approach in project development for people with learning difficulties is well understood and documented in the special needs community. This is exemplified by the activities of such groups as People First and the Acting Up Team. In a recent public address Gordon Grant, Professor of

Cognitive Disability, University of Sheffield (Grant, 1998) expounded models of care and how these can be adapted so that university based research for people with disabilities is carried out in partnership with relevant community groups. Indeed he went further, and suggested that money from sponsoring organisations should be given to community groups and that they should decide how to spend these on research and development. Universities and other research groups could then be held totally accountable for their research and development in the disabled and rehabilitative fields. This approach is central to the development of the Virtual City to teach independent living skills, where research, development and distribution is directed by a consortium representing community based groups, schools and research institutions.

## 2. DEVELOPMENT METHODOLOGY

During the early stages of this project a development methodology was established to guide the production of these virtual learning environments (VLE's). This process placed the user at the centre of each of the decisions made regarding the project development.

The framework for development is in brief:

**User Group** to determine the components developed (transport system, recreation centre, house, supermarket, cafe, etc.), the learning objectives for each component (safety, communication, financial skills, etc.), the types of interaction that are possible and the dialogue that will occur.

**Steering Group** to incorporate the input from experts in the learning disabilities field in the components and learning objectives of the Virtual City.

**Story-boards** developed from the User and Steering Group input.

**Building programme** for the Virtual City based on these story-boards.

**Expert Review** of the Virtual City whilst under construction to ensure that they fit the original vision of the User and Steering Groups.

**Evaluation phase** in which users and experts combine to determine the nature of testing that will help to establish whether the use of the Virtual City delivers the original learning objectives.

**Refinement phase** in which the results from the evaluation phase are used to edit the Virtual City to ensure that the design best fits the original vision of the User and Steering Groups.

**Dissemination phase** the User and Steering Groups decide how to best market and publicise the Virtual City.

Each of these processes involved in this developmental methodology will now be discussed in further detail.

## 3. USER GROUP

The User Group consists of fifteen people with a learning disability, together with a facilitator to provide effective advocacy. The age range of the group varies from fifteen to sixty, representing Nottinghamshire special schools, housing associations and colleges. The group acts as the voice for users contributing their ideas to the project and every step is taken to ensure their continued and enjoyable participation. To this end all attendance costs are met, including travel, a communal meal and carer expenses should they wish to be accompanied by a mentor.

In initial meetings the User Group considered their ideal city, including the types of places they would like to visit but perhaps were restricted from doing so. They then produced a list of thirty-eight components to such a city, but were persuaded to choose their favourite twelve, in a prioritised building list. The facilitator then worked out with the group what was important to them in each of these components and what they would like to be able to do within them. These activities are called learning objectives and it is interesting to note that one of their overriding concerns was personal safety. Whilst this process was going on rough story boards were drawn up by the Project Manager so that the Users had a visual interpretation of their ideas as they made them, supported by the facilitator providing a language based interpretation.

#### **4. STEERING GROUP**

The Steering Group for the project is made up from around fifteen professionals working in the learning disabled community around Nottinghamshire. Their input provides further ideas on components for the Virtual City and learning objectives, as well as providing overall guidance for the project, on areas such as ethics and testing. This group meets at around the same regularity as the User Group; once per month, with more meetings scheduled at periods of high activity.

Users views are further represented on this group by one or two users selected from the User Group, who attend the Steering Group meetings supported by the facilitator. The Facilitator and user representatives plan this input, having received an agenda before the meeting.

In the second stage of development of the Virtual City, the Steering Group review the 'rough' story boards generated by the User Group. They may add extra learning objectives to some of the components, or even suggest alterations to the components. In this way the Steering Group suggested that the house designed by the User Group be altered to a single story dwelling to ensure wheelchair access, and added extra learning objectives such as the chance to practice dressing skills depending on the weather conditions outside the bedroom window.

#### **5. STORY-BOARDS**

The story boards are produced in much the same way as film story boards are produced. These detail the components (house, supermarket, café, etc.) and the learning objectives. They also detail the ways in which the Virtual City will 'scaffold' the user so that as each outcome (as a result of an interaction with the Virtual City) is introduced the user is encouraged to choose the correct one. The user can experience other outcomes and learn the risks, or dangers, associated with these lines of action. The ability to experience different outcomes from a range of actions is particularly pertinent and powerful in learning objectives such as road safety.

Dialogue within the Virtual City will also be shown on the story boards, usually associated with the learning objectives. This ensures that dialogue will be appropriate by giving language and speech therapists the opportunity to input their ideas on how language can best help to interpret what is happening in the Virtual City.

Because these story boards are visual and easy to understand they can serve as a means by which users can check the building progress of the Virtual City, to ensure that it is developing within their vision. Some of these story boards will be shown as PowerPoint overheads during this presentation.

#### **6. BUILDING PROGRAMME**

The story boards are then examined by the Project Manager and Builders and a building programme is devised. The platform used is Superscape for dual reasons. The first is that the associated hardware and Visualiser are cheap, especially important for a product that will be distributed to the resources starved special needs community. The second is that there are still too many unresolved health questions associated with head mounted displays to risk exposure on a group with such specialised needs (Wilson, 1995).

There are moves afoot concerning the possibility of delivering the Virtual City on the Internet, possibly via Viscap. Other programming implications concern the possibility of using distributed virtual environments, and the learning implications that could ensue from users interacting in the Virtual City from different locations.

#### **7. EXPERT REVIEW**

Selected members from the User and Steering Groups attend review meetings whilst the building of the components of the Virtual City is taking place. This allows users and their representatives to check the building progress. Users can compare the developing Virtual City with the original story boards, using the latter as their metric.

## 8. EVALUATION PHASE

The design, execution and results of the evaluation phase are being presented by our co-researchers and will not be detailed here. The purpose of this phase is to provide information from the users on the usability of the Virtual City and whether they can use it to learn independent living skills. Other benefits may accrue from its use, including increased confidence in the use of computers, and increased confidence generally, such as autonomous moves to use services such as a supermarket or café. One of the members of the User Group was encouraged to join a computing course at a local college in response to working on the Virtual City.

## 9. REFINEMENT PHASE

Again the refinement process is fully described in our colleagues' paper. However, we can say that testing results have been used to heavily improve the design of the transport system, café, house and supermarket. It is this process of users' ethical inclusion in the testing process that further underlines the importance of representing user views in all stages of the development of the Virtual City.

## 10. DISSEMINATION PHASE

The most ideal method of dissemination of news on the development, testing and distribution of the Virtual City would be one involving the users. We do, however, recognise that users would not want to be involved in the production of some of the academic papers describing the development and testing methodologies, although their contribution to these is certainly acknowledged. The dissemination strategy at the end of year one of this project is:

- *Newsletter*: The User Group have produced a newsletter describing the project in accessible language and Makaton Symbols. Topics include the User Group meetings, the testing programme, profiles of people involved in the User Group and a description of the Virtual City.
- *Web-site*: This is based on the newsletter, and linked to the Shepherd School site @ <http://www.campus.bt.com/campusworld/orgs/org1573/index.htm>.
- *Conference papers*: These include the presentations made at ECDVRAT'98 by the User Group, Testing Group and ourselves.
- *Disabilities Press*: The User Group have written an article entitled 'The Virtual City' for the Way Ahead Magazine, distributed through the Children's Disability Register.
- *Open day*: This was held at the Notts. County Ground on 18<sup>th</sup> July, where over 300 service providers and users attended, and over 200 more expressed an interest in the project. Attendees were asked if they wanted to contribute ideas to the project and these replies are currently being processed. Within the next stage of the project, a nation-wide testing programme is planned based around those who wish to join the project.
- *Journal papers*: Several Journal papers are planned, the first of which is currently in publication discussing the proposed testing methodology (Brown, et al, 1998).
- *Distribution*: We are negotiating with national (Pavilion) and International (Rompa) distribution companies to distribute the Virtual City. In the next stage of the project we are planning to develop a production company formed of users from the project to handle the burning of CDs, manual production and packaging. We also want to extend user involvement into distribution, with users demonstrating and marketing the Virtual City at special needs exhibitions and conferences.

## 11. CONCLUSION

The first stage of the Virtual City project has produced:

- A User and Steering Group to guide all stages of development of the Virtual City, and providing ideas for future development far out-stripping current funding levels.

- A Development Methodology to guide the collaboration of service providers and people with a learning disability working with research groups to produce effective virtual learning environments.
- A Virtual City, running on desktop PCs under the Superscape platform and at the moment consisting of a transport system, house, café, supermarket and housing advice centre in which people with a learning disability can learn independent living skills.
- A Testing Methodology to ensure that the design of the Virtual City is suited to the abilities of people with a learning disability, and can be used to develop independent living skills.
- A Dissemination Strategy which will result in the first stage of the Virtual City being distributed to the special needs market by Summer 1999.

## 12. REFERENCES

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