



Making the Mainstream Accessible

Simplified Structured Information
for the Blind and Sighted

Matthew T. Atkinson

<M.T.Atkinson@lboro.ac.uk>

Research School of Informatics
Department of Computer Science
Loughborough University

The AGRIP website can be found at <http://www.agrip.org.uk/>

Accessible Gaming

Why

Then

Now

Future

Education

Further Research

Ideas

More 3D Work

Serialisation

Generalisation and Reason

Motivation

Benefits

Conclusions

Why Care about Accessible Gaming?

- ▶ Represents a number of “classic” accessibility problems
 - ▶ Serialisation
 - ▶ Conveying Structure
 - ▶ Audio-based User Interfaces
 - ▶ Navigation
 - ▶ Accessible Documentation
 - ▶ **Inclusion**

The Past of Accessible Gaming

- ▶ This talk concentrates on sight loss but could be applied to other disabilities
- ▶ Many individuals and some small companies started developing accessible games for disabled people
- ▶ Suddenly blind people were no longer limited to one genre (Interactive Fiction)
- ▶ Most of the games were conversions of puzzles or classic arcade games
- ▶ Some developers have been more original
- ▶ **Drawback:** Segregation

Ethos of the AGRIP Project

- ▶ Provide access to not only mainstream games, but their surrounding online community and development tools
- ▶ Give people Freedom to use and modify the game, support infrastructure and tools

- ▶ AudioQuake
 - ▶ An “Accessibility Layer” for Quake (id Software)
 - ▶ A system for playing Internet multiplayer games
 - ▶ A platform for programming modifications
 - ▶ Only possible due to Open Source nature
 - ▶ **Provides and promotes inclusion**
- ▶ AGDev and other developments

The Future of Accessible Gaming

- ▶ AGRIP Developments
 - ▶ “Implicit Accessibility”
 - ▶ Level design
- ▶ Mainstream game developers begin to notice
 - ▶ Work of IGDA, AudioGames.net, AGDev and others
- ▶ Audiogames and Accessible games gain weight in industry
 - ▶ **Definition:** “accessible games” vs. “audiogames”
 - ▶ John Carmack’s Keynote point
 - ▶ Potential mobile market

- ▶ EA and NESTA study on games in education
- ▶ Potential to augment existing practices and assist in teaching
 - ▶ Spatial awareness
 - ▶ Basic programming principles
 - ▶ Maths? Logic?
 - ▶ Study aims to answer these questions
- ▶ But what about disabled students?
 - ▶ Technology exists to make game-based lessons accessible
 - ▶ Possible that it could prove even more useful for disabled than “normal” students
 - ▶ **Inclusion** is imperative
 - ▶ An AudioQuake-derivative could fit in – Open Source
 - ▶ ICC 2005 Brno as an example

Further Research Ideas

- ▶ Research just begun; these are “blue sky” directions that could be taken
- ▶ Logical extensions of the current work
- ▶ Making 3D Engines/Applications Accessible
- ▶ 3D Audio & Effects Conveying Structured Information
- ▶ Other ways to Serialise data such as Equations
- ▶ **Generalisation** and **Reason**

Making 3D Engines/Games Accessible

- ▶ Quake engine started many modern engine design trends
- ▶ Techniques for making it accessible are quite generic
- ▶ Could be layered on top of other game engines or similar 3D applications
- ▶ Examples:
 - ▶ Inclusion in more contemporary games
 - ▶ Accessibility of buildings
 - ▶ Equal access to projects such as the virtual ISS
 - ▶ Mobility, Spatial awareness?
 - ▶ Level-editing/3D design applications?
- ▶ **Not just applicable to games**

- ▶ Stereo has enabled the severity of serialisation to be reduced
 - ▶ Would this extend to 3D sound?
- ▶ Would “Implicit Accessibility” actually work or even be possible?
- ▶ Which sounds provide the most accessibility per unit time?
- ▶ Can any 3D model be described in audio?
- ▶ Can nominally 2D data be described in a more accessible way using 3D audio?
 - ▶ e.g. Mathematical equations, flow diagrams
 - ▶ What about other output formats?

Serialising Structured Data

- ▶ Diagrams, tables, lecture notes, web pages...
- ▶ Maybe it is possible to preserve some aspects of the structure
- ▶ Need to avoid the “wood for the trees” situation
- ▶ One general technique:
 - ▶ Render data at low resolution
 - ▶ Provide the ability to alter “viewing distance”
- ▶ Different output styles suit different people
- ▶ More advanced navigation and overview techniques in development

Reasons for Generalisation

- ▶ So far a number of potentially useful techniques have been proposed
- ▶ AudioQuake is an example of a domain-specific solution
 - ▶ Access and inclusion for a few types of structured information
- ▶ My research is into **generalisation** of the principles
- ▶ A way to come up with valid **reasons** for using certain technologies is needed
 - ▶ e.g. Why decide to use audio, tactile or Braille feedback?
- ▶ Output should be tailored to the individual
- ▶ A model of how disabled people access information is needed

- ▶ Tailoring of information and presentation would benefit everyone
 - ▶ DRC report shows websites are 35% easier for everyone to use if accessible
 - ▶ Forrester: 60% of US adults would benefit from some form of assistive technology
 - ▶ Mobile games would be easier to use with added sound cues
 - ▶ Applications are easier to use if interface more logically structured
 - ▶ . . .
- ▶ Research is based on idea of “Accessibility \subset Usability”
 - ▶ Domain specific techniques \Rightarrow General principles
 - ▶ Accessibility layers \Rightarrow Different rendering styles
 - ▶ Inclusion \Rightarrow Same model; different parameters

- ▶ Mainstream accessibility, even in unlikely places, is possible
- ▶ Much further work needs to be done to make this practical on a large scale
- ▶ Links into many areas, especially those relating to accessible rendering of structured information
- ▶ Potential to help disabled and non-disabled people
- ▶ Great opportunity for future research

Thanks for listening!
Any Questions?

<M.T.Atkinson@lboro.ac.uk>
<http://www.agrip.org.uk/>

