

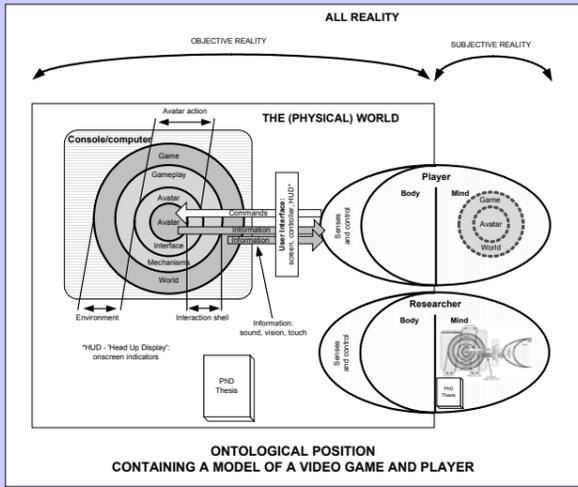
# THE APPLICABILITY OF COMPUTER ROLE-PLAYING GAMES IN A UBIQUITOUS COMPUTER SPACE

## ~ ONTOLOGY, METHODOLOGY, DEFINITIONS AND PILOT STUDY DESIGN ~

Most game industry research is constrained by market forces to anticipate a future that extends only as far out as next Christmas. But academic researchers have the luxury of both studying the past and imagining the future five, ten, twenty years out.

(Celia Pearce (2003) International Game Developers Association Retrieved 17<sup>th</sup> May 2005 from [http://www.igda.org/columns/ivorytower/ivory\\_May03.php](http://www.igda.org/columns/ivorytower/ivory_May03.php))

### 1 – Establish position



#### What is this?

There are things that are measurable, that we can know about. There are other things (quantum events, for example) that we can only partially know (position or velocity, not both, for example). Human consciousness is another thing that, according to Roger Penrose, is not something likely to just be 'conjured up by a complicated computation'. (1989. *The Emperor's New Mind*. Oxford University Press.)

A key question when considering computer games is to ask how much fun they are. We may be able to measure things (smiles for example) caused by having fun, but can we measure 'fun' itself?

### 2 – Define the methodology

#### Design Research Methodology

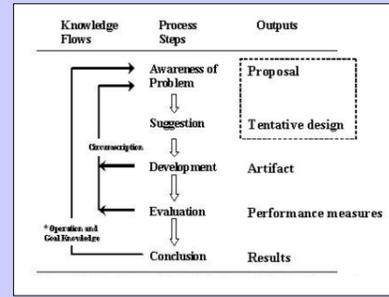
Design: 'A plan or scheme conceived in the mind and intended for subsequent execution; the preliminary conception of an idea that is to be carried into effect by action; a project.'

Research: 'A search or investigation directed to the discovery of some fact by careful consideration or study of a subject; a course of critical or scientific inquiry.'

(Oxford English Dictionary Second Edition (1989). Oxford: Oxford University Press)

Established since 1967 when the Design Research Society was founded: 'the multi-disciplinary international learned society for the design research community.'

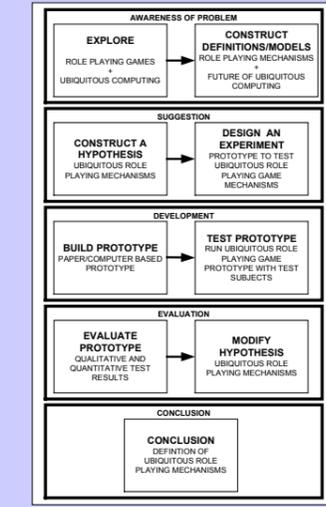
Retrieved 28th April 2005 from the Design Research Society: <http://www.dms.ac.uk/In4ddr.htm>



#### Design Research in Information Systems

Figure taken from the Association for Information Systems website:  
'Design research involves the analysis of the use and performance of designed artifacts to understand, explain and very frequently to improve on the behavior of aspects of Information Systems'

(Retrieved 4<sup>th</sup> April 2005 from <http://www.isworld.org/Researchdesign/dris/ISworld.htm> Edited by Vijay Vaishnavi and Bill Kuechler)



#### Design Research in Video Games

Proposed research methodology adapted from Design Research in Information Systems.  
In this instance the research is on computer role-playing games.  
The hope is that once this methodology has been tested out in this area then it may be applied to other genres of computer games.

(Image from BioWare's *Neverwinter Nights*. Retrieved 28th April 2005 from: <http://www.bioware.com/downloads/wallpaper.html?galleryID=7>)

### 3 – Describe game-play mechanisms

#### Computer Role-Playing Game Mechanisms

Mechanism: 'An instrument or a process, physical or mental, by which something is done or comes into being.'

(The American Heritage Dictionary of the English Language, Third Edition is licensed from Houghton Mifflin Company. Copyright © 1992 by Houghton Mifflin Company.)

- Player representation in the game world**
  - Single player character using a first person camera (Deus Ex)
  - Single player character, seen with a 3<sup>rd</sup> person camera (Vagrant Story)
  - Single player character, seen with a 1<sup>st</sup> or 3<sup>rd</sup> person camera (Morrowind)
  - Party of player characters, seen with a 3<sup>rd</sup> person camera (Baldur's Gate)
  - Party of player characters, represented during exploration as a single character, seen with a 3<sup>rd</sup> person camera character (Final Fantasy VII)
  - The 3<sup>rd</sup> person camera may be locked to a single character or groups of characters moving through an environment (2D or 3D) or may be static, flipping to new views to keep the player character(s) in view
  - The environment may consist of both moving backgrounds and locations with fixed backgrounds (i.e. interior rooms)
- Character races**
  - Sentient species found in the game world
  - For example:
    - Breton (Morrowind)
    - Dark Elf (Morrowind)
    - Human (Baldur's Gate)
    - Gnome (Baldur's Gate)
- Character classes**
  - Types of character in the game
  - For example:
    - Warrior (Baldur's Gate)
    - Wizard (Baldur's Gate)
    - Scoundrel (Knights of the Old Republic)
    - Combat Droid (Knights of the Old Republic)
- Character attributes**
  - Basic set of character class defining statistics
  - For example (from Fallout):
    - Strength Perception
    - Endurance Charisma
    - Intelligence Agility
    - Luck
- Skills system**
  - Learned abilities that improve through use
  - For example (from Deus Ex):
    - Computer Electronics
    - Environmental Training Lockpicking
    - Medicine Swimming
    - Weapons: Demolition Weapons: Heavy
    - Weapons: Low-Tech Weapons: Pistol
    - Weapons: Rifle
- Experience points**
  - Experience points are earned by completing game objectives
  - When target numbers of experience points are achieved then characters are 'levelled up', moving to higher experience levels
- Experience levels**
  - Measures the development of the player's character(s)
  - Additional character abilities are unlocked as new levels are achieved, for example character attributes and skills may be increased
  - Indicates the progress of the player through the game and hence the process of 'levelling up' offers a very powerful reward to the player
- Combat**
  - Types of combat:
    - Real time, action (twich) (Deus Ex)
    - Real time, strategic (Morrowind, Knights of the Old Republic)
    - Turn based, strategic (Baldur's Gate, Final Fantasy VII)
  - Styles of combat:
    - Melee (hand to hand)
    - Range (projectile weapons, magic)
    - Remote (traps)
- Puzzle solving**
  - Solve puzzles to:
    - Unlock locations
    - Reveal plot
    - Gain items
    - Defeat enemies
    - Help 'friends'
  - Puzzle mechanism components:
    - Action: use and/or combine
    - Inventory item(s)
    - Environmental item(s), includes switches
    - Pre-requisite conditions
      - Location
      - Time
      - Non-player character presence
      - Events (in the game)
      - Player actions
      - Conversations
      - Player character experience level
      - Player character skills
      - Player character attributes
    - Puzzle complexity - simple
      - Single player action (in the same time and place)
    - Puzzle complexity - complex
      - Multiple actions in the same time (continuous, not simultaneous) and place
      - Multiple actions in the same place over different times (discontinuous)
      - Multiple actions in many places over different times
      - Multiple actions at the same time in different places (multiplayer puzzle)
- Exploration**
  - Role-playing games are typified by rich, complex worlds
  - Results of exploration:
    - Visual ('eye candy') and auditory rewards
    - Story telling: reveals plot events
    - Story telling: reveals back-story elements
    - Find items and puzzles
    - Find non-player character (including enemies)
- Story telling**
  - Stories are told through a series of missions
  - Linear game structures:
    - Linear plots consist of a linear sequence of missions
  - Interactive game structures:
    - Interactive plots require some non-sequential missions
    - The main plot comprises compulsory missions
    - Compulsory sub-missions, not part of the main plot
    - Voluntary submissions, not required for the main plot
  - Types of mission
    - Deliver the plot (includes defeating enemies)
    - Produce resources
    - Both deliver the plot and produce resources
  - Role-playing games can live or die by the strength of the stories they tell
- Inventory management**
  - Weight limit
    - Each item is assigned a weight, amount carried is limited, dependent on the character's strength attribute
  - Item limit
    - Limited number of universal 'slots'
  - Area limit
    - 2D images of items are used in conjunction with a 2D grid to restrict the number of items that may be carried

### 4 – Define the computer role-playing game genre

Computer role-playing games are games in which players control one or more characters that gain 'experience' through the completion of game objectives. The 'experience' is manifested as player moderated changes in player character attributes ('strength', 'intelligence' and 'luck' for example) which allow the player character to evolve over the duration of the game.

Additional player character customization is facilitated through modification of character differentia such as race and class when initiating a player character ready for play and by game-play educed character modification during play, such as development and improvement of a skill by repeated use of that skill.

The player character descriptors (attributes, differentia and game-play educed modifications) affect the in-game interactions between the player character, non-player characters and items in the game environment.

### 5 – Describe ubiquitous computing

#### Ubiquitous

Present or appearing everywhere; omnipresent  
(Oxford English Dictionary Second Edition (1989). Oxford: Oxford University Press)

#### Computing

The activity or operation of a computer; the action or practice of using a computer  
(Oxford English Dictionary Second Edition (1989). Oxford: Oxford University Press)

Cf. 'pervasive', 'transparent', 'next wave' and 'ambient intelligence'.  
(Retrieved from <http://www.nextwave.org.uk/docs/summary.htm> The Department of Trade and Industry 23<sup>rd</sup> March 2005)

#### Ubiquitous Computing

'For thirty years most interface design, and most computer design, has been headed down the path of the "dramatic" machine. Its highest ideal is to make a computer so exciting, so wonderful, so interesting, that we never want to be without it. A less-traveled path I call the "invisible"; its highest ideal is to make a computer so imbedded, so fitting, so natural, that we use it without even thinking about it. (I have also called this notion "Ubiquitous Computing", and have placed its origins in post-modernism.) I believe that in the next twenty years the second path will come to dominate.' Mark Weiser (1996) *Ubiquitous Computing - 03/17/96 8:00:04 PM*  
(Retrieved 17th April 2005 from <http://www.ubiq.com/hypertext/weiser/UbilHome.html>)

Cf. 'pervasive', 'transparent', 'next wave' and 'ambient intelligence'.  
(Retrieved from <http://www.nextwave.org.uk/docs/summary.htm> The Department of Trade and Industry 23<sup>rd</sup> March 2005)

#### Locative

The location of the player is known by local devices. The devices also know their own location in relation to each other and the player.

Current technology: GPS – Global Positioning System.

#### Identity

The player, player's equipment and items in the environment are all uniquely identifiable.

Current technology: RFID Tags.

#### Wireless Communication

Devices communicate with each other wirelessly.

Current technology: GPRS, general packet radio system. UMTS, Universal Mobile Telecommunications System.

#### Gesture and Speech Interfaces

The player is able to communicate with the game through speech and gestures of both the hands and body.

#### NOT Virtual Reality or Augmented Reality

Immersed in the world – not in an artificial world. The game world is coexistent with the real world. The ubiquitous gaming reality is beyond virtual or augmented reality.

This form of gaming is also known as 'pervasive gaming' or 'alternate reality gaming'.

### 6 – Framework to predict future technologies

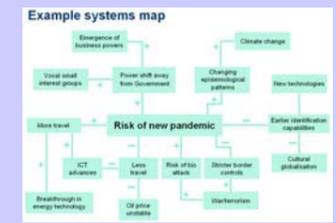
#### Horizon Scanning

A way of predicting future technologies is required in order to be able to design game-play that will take advantage of future advances. The horizon scanning framework developed by the United Kingdom government's Office of Science and Technology offers a powerful set of tools for investigating the future.

'Horizon scanning is defined as the systematic examination of potential threats, opportunities and likely future developments, including (but not restricted to) those at the margins of current thinking and planning. Horizon scanning may explore novel and unexpected issues as well as persistent problems or trends.'

Definition of Chief Scientific Adviser's Committee, September 2004  
(Retrieved from [http://www.foresight.gov.uk/horizon\\_scanning\\_centre/launch\\_article.html](http://www.foresight.gov.uk/horizon_scanning_centre/launch_article.html) Foresight - The Department of Trade and Industry 23<sup>rd</sup> March 2005)

(Figure taken from the Office of Science and Technology 'Futures Toolkit' downloaded 29<sup>th</sup> April 2005 from: [http://www.foresight.gov.uk/HORIZON\\_SCANNING\\_CENTRE/Toolkit.html](http://www.foresight.gov.uk/HORIZON_SCANNING_CENTRE/Toolkit.html))



### 7 – Design pilot study to test methodology

#### Plan

- Predict future technology
- Select game-play mechanism for test
- Design new game-play mechanism
- Design a prototype to test the new game-play mechanism
- Build a prototype to test the new game-play mechanism
- Test the prototype with users
- Quantitatively and qualitatively evaluate the prototype
- Update the new game-play mechanism design based on the evaluation

#### Game pitch: Hot, Cold, Dead!

**High concept**  
Explore a real environment while avoiding imaginary, lethal extremes of temperature.

**Platform**  
Prototype: paper 'thermo-sprites' pinned up around a building, player score sheets.  
Future version (circa 2015): ubiquitous technologies of locative, wireless computing devices situated in the environment and communicating with the player.

**Overview**  
The building has been invaded by mischievous thermo-sprites who have created fluctuating pools of heat and cold. The player must safely explore this environment without over- or under-heating.

#### Game-play mechanism

**Exploration.**  
This is similar to a combination of Staffan Björk and Jussi Holopainen's 'Game World Navigation', 'Evade' and 'Exploration' game design patterns. (2005 *Patterns in Game Design* Published by Charles River Media, Inc., Massachusetts, USA.)

**Existing version:**  
As on the left of this poster under 'Computer Role-Playing Game Mechanisms'.

**Ubiquitous version:**  
Rewards from progressing through a familiar environment made fantastic by the story of the game  
Story telling: reveals plot events  
Story telling: reveals back-story elements  
Find virtual items and puzzles embedded (not overlaid) in the real world.  
Find player characters (including enemies) in the real world.



### 8 – Develop hypothesis

Create and describe a set of of ubiquitous game-play mechanisms...

