Using computer games to tackle health inequalities

'…the best educational games teach students … to understand a set of processes rather than a set of facts. As more students, young people and old, learn to ask why the world works the way it does, we'll build a more engaged and successful population.'

Dr. Ian Bogost, academic in computer game research [1]

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Computer games: Toys or educational tools?

James Paul Gee in his book '*What Video Games have to Teach us about Learning and Literacy'* makes a strong general case for the educational benefits of games.[2] He 'argues that thirty-six important learning principles are built into good video games, principles that are strongly supported by current research on human learning in cognitive science such as:

- How one forms an identify...
- How one chooses between different ways of solving a problem...
- How one transfers abilities learnt while doing one task to doing another…'

> **'The future of entertainment is games'**

Roger Bennett, director general of the games trade body, Elspa [3]

Computer games aren't just for kids

Computer games are not just for the young. Two thirds of gamers are over 18.[4] The average age of people who played computer games in the USA in 2004 was 29. Over 40 percent of them were female. The mass market audience for games aimed at men is 21 to 35. The average age is also going up, as generations brought up on computer games continue to play them as they get older. (The games they play however will not stay the same as they mature, any more than they would still be reading Enid Blyton at 60.) A Screen Digest study also shows that spending on games grew much faster in the UK than on other forms of entertainment such as music or movies. Between 1997 and 2003 games spending increased by 100%, compared with a 30% rise in film spending and a 4.5% drop in music sales.[5]

Computer games aren't just for kids but…

UK public health workers therefore need to be aware of the potential of computer games in the future to reach a wide swathe of the population. However at the present time games are still mainly played by specific groups of people. For example in Sunderland, only one of the subgroups that make up 50% of the population listed computer games as a major interest. [6] This was young families with limited incomes living in cheap terraced housing. Another much a smaller subgroup of childless couples and singles renting in city centres from private or public landlords also listed them. (See appendices for more details.) Both groups have specific health problems and perhaps could be targeted via games. Young people at school and the training public health workers are other audiences this chapter will cover.

However, first there is the issue of 'platform', whether games be produced for specific consoles such as Xbox and PlayStation and if so which. It is probably easier to produce games that can be downloaded straight on to the PC and played there. In terms of the two groups mentioned, around a quarter of their populations had access to the internet. Broadband access is low but this is expected to rise.

The figures quoted from America suggest that a percentage of people who play computer games as children will continue to play them as they get older. So, what is the interest in games amongst UK youngsters? One piece of research found that 82% of 11-16 old pupils in the sample played games outside lessons at least once a fortnight. Boys were more likely to play them than girls.[7] 62% of 11-16 olds would also like to use computer games as learning aids in school.[8]

Some research claims that a serious game can keep students engaged to 2 to 4 hours compared to 15 minutes with a traditional lesson.[9] However, other educationalists would still say that more research is needed to confirm the benefits of computer games in schools and colleges.[10]

'… a study from the NTL Institute for Applied Behavioral Sciences in Alexandra, Virginia found that the learning retention rates go up to 75 to 80 percent when catering to the learning style of gamers, compared to the 5 percent learning retention rate of lecture-based instruction.' [11]

John Beck and Mitchell Wade in 'Got Game: How The Gamer Generation Is Reshaping Business Forever' say gaming has created a new learning style. This downplays formal instruction and instead emphasises trial and error, learning from peers and 'just in time' learning [12]

However, there is a potential problem if health workers produce games for youngsters to download to play on PCs. Once they have left school youngsters face the problem of the 'digital divide'. Put simply the neediest groups have less access to the internet. The Mosaic figures show that only 1-2% of most groups in Sunderland have broadband. [13]

Computer games as public health training tools

A whole part of the games industry has grown up dedicated to serious games. They are often for commercial or military training purposes. However, they also include games on health, third world development and other issues for schools, medical staff etc. To check out what they have to offer in more detail go to www.seriousgamessource.com/ or try http://www.socialimpactgames.com/modules.php

What makes a good health education game?

(For what makes a good game full stop try '*A Theory of Fun for Game Design*' by Raph Koster.) [14]

Ideally games need to tie in with AIDA. That is they need to **attract** players and keep them **interested**. They also need to create a **desire** in them for change and enable them to put this into **action**. In terms of content they need to focus on giving information, exploring and challenging attitudes and teaching new skills. In practice games can probably not do all this. However, they may be part of a package that could. They may be useful in attracting people to the rest of the package, e.g. a site saying where to get help.

They may also be useful for promoting a positive, relevant image of the organisation that has produced them. In other words, generally fulfilling one of the main functions

of Primary Care Trusts, of 'engaging with the local population to improve health'.

In serious games, the intention is education rather than entertainment. (The term edutainment is often used, but in the serious games context usually means games with cartoon characters aimed at young children.) [15] Although the word 'serious' is used, there is debate about the role of fun in them. The annual Hidden Agenda competition for serious games aimed at 12-15 year olds emphasises fun. Indeed 70% of the marks are for entertainment value and only 30% for education.[16] This is based on the idea that if games are too worthy, young people simply will not stick with them. Others would downplay this and say that sometimes it is enough to get people immersed in the world of the game.[17] Both views may be right depending on the target group. Serious games used as a training tool with staff may get away with being less fun, than those aimed at disengaged youngsters. Good initial research and pre-testing/piloting is important however to answer this question in practice.

> **'Constructivists believe that a person learns best when he or she actively "constructs" ideas and relationships in their own minds based on experiments that they do, rather than being told.'**

Some educationalists are keen on games because they offer an interactive rather than passive way of learning. [18]

How to use computer games to give out information
The three legged stool model of health education can be used with computer games. One of the things needed to help someone change their health behaviour is information. For an example of an expensively produced commercially game, go to www.commonsensemedia.org/game-reviews/Hungry-Red-Planet.html This describes a nutrition game set on Mars. An example of a much cheaper game produced by a public health department for under a thousand pounds is at www.justshowt.com/funstuff/stiattack/default.htm . This is a simple chase game that gives people information about sexually transmitted infections (STIs). The first screen shows the couple being chased by a sexually transmitted infection. The second screen gives information about the infection if they are caught.[19]

If budgets are limited it may not be possible to have a game that immerses the player in a new way of learning. However it may still make sense to focus on producing something cheaply on the internet that fills a particular niche and meets a particular need. On the Showt-ed website, as well as the *STIs Attack* game there is a quiz that tests young people knowledge of sexual health matters. The problem with this format is that the number of questions that can be asked is limited and therefore it may not get many return visits.

Although not strictly a game the BBC website includes an interactive test on alcohol. Go to http://www.bbc.co.uk/science/hottopics/alcohol/game.shtml. The BBC is keen for other organisations to make use of their website. It is worthwhile keeping an eye on their interactive section on the human body at http://www.bbc.co.uk/science/humanbody/body/index_interactivebody.shtml.

How to use computer games to change attitudes and values

> **'I'm less interested in the future of pedagogy and corporate training …and more interested in the expressive power of video games, their ability to make people ask difficult questions, to change their views, to inspire and impel them to make the world a better place.'**

Dr.Ian Bogost, academic game researcher [20]

Another leg of the three legged stool model of health education is attitudes and values. *SimHealth* was a commercially produced policy simulation game. [21] It was produced to tie in with the 1994 debate over what kind of health care system the United States should have. The players begin by clarify their values, for example balancing liberty against quality and community against efficiency. They then create new policies and change existing ones. More info at www.mcli.dist.maricopa.edu/proj/sw/games/simhealth.html

Not everybody has the budget to produce something so lavish. This does not mean that public health workers cannot produce something worthwhile. When Sunderland Teaching Primary Care Trust produced the *Show-ed* website their budget did not stretch to a *SimHealth* simulation. As a member of the team involved in this project I know we did think about how to change attitudes and values however. We considered adding some questions to a simple knowledge quiz already on the site (This is presented like a board game to be user-friendly; www.justshowt.com/funstuff/boardgame/boardgame.html) Although the new questions still had right or wrong answers they might get young people to question their attitudes. (Particularly if a worker or peer educator followed this up. Although there is always a danger of being heavy handed about this and taking the fun out of the game.)

The questions were taken from books on different attitudes and beliefs around sex in different parts of the world and at different times in history. Below are some hypothetical examples to give a flavour of what another organisation might want to produce.

- **It's 1660. You are a 25 year-old English woman and haven't had sex. Are you normal?** [22]
  Yes. Women tended to get married and have sex at a later age at this time.
  Most of us sometimes wonder if we are normal. At different times and places, this has meant different things. Perhaps, a better question is am I happy or am I hurting myself or other people? (This statement would appear after each answer.)

- **You are a Choroti man from South America. When you make love, you spit in your partner's face. Are you normal?** [23]
  No, it's the woman who does this.
  Most of us sometimes wonder if we are normal. At different times and places, this has meant different things. Perhaps, a better question is am I happy or am I hurting myself or other people?

- **You are a man of the Toda tribe in India. Your wife has married several other men. She has sex openly with others as well. You are OK with this. Are you normal?** [24]
  Yes, you would be considered a bad person if you tried to stop her.
  Most of us sometimes wonder if we are normal. At different times and places, this has meant different things. Perhaps, a better question is am I happy or am I hurting myself or other people

- **You are an unmarried young man of the Keraki tribe in the Pacific. You have gay sex. To stop having a baby you eat limes. Are you normal?** [25]
  Yes. All young men of the Keraki had gay sex until they got married.
  Most of us sometimes wonder if we are normal. At different times and places, this has meant different things. Perhaps, a better question is am I happy or am I hurting myself or other people?

How to use computer games to improve health skills

> **'For every choice a consequence'**

This was the advertising slogan for a game called 'Fable' on the Xbox. However, it also illustrates well the mindset needed to live a healthy live. Interactivity allows games to mimic life safely and perhaps be powerful educational tools. [26]

The third leg of the three legged stool model of health education is skills. Members of the public need these to put health information into action e.g. the thinking skills to make health choices. However, computer games can also be used to help public workers develop their own professional skills.

The www.gamesforhealth.org site highlighted two games being developed on public health themes [27] On the site, Russel Shilling, a US Naval Officer, described how the American navy is using games to prepare for and predict the effects of pandemic flu. They are interested because an outbreak would affect the military in the same way as it would the civilian population.

Also on the site Yasmin B. Kafai, a Visiting Associate Professor at the Harvard Graduate School of Education, discussed *Whyville*. This is a virtual world in which an epidemic of Whypocks breaks out. The child inhabitants of Whyville must use science to learn how to stop the epidemic.

For other games that may be of interest to public health workers go to www.educationarcade.org and www.simulearn.net (This last site is on leadership)

One alternative to spending millions on developing serious games is to use off the shelf 'entertainment' games. Future Lab produced a report on using three commercially available games in secondary schools. See http://www.futurelab.org.uk/research/teachingwithgames.htm The games are all about choices. [28] The three were *Sims 2, Knights of Honor* and *RollerCoaster Tycoon 3. The Sims* offers possibilities for learning within a personal, social and health education framework. [29, 30, 31]

Similarly the *New Scientist* reports how popular games *Unreal Tournament* and *Half-Life* have been adapted to treat common phobias. This cost only a few hundred dollars [32]

The other option might be for public health workers to produce simple games themselves. One possibility is to borrow a popular game format from elsewhere. In Japan dating games have been popular with both boys and girls. They try to date beautiful partners and keep a relationship going with them. How successful they are depends on how they interact with potential partners. [33]

Social marketing might show that something similar would work here. If so it would be possible to produce a simple dating game. Players would select a partner and their decisions would effect whether they got dumped or not. Decisions would be made on simple questions about what to do in different circumstances. The questions could be based on theories from relationship experts about good communication etc. Relationships skills are important for both good mental and sexual health. In addition the skills might be transferable to other settings e.g. child rearing, dealing with peer pressure etc. Such a game could therefore tie in with several public health goals. However, Marc Prensky in *Digital Game-Based Learning* warns about making serious games too obvious. He suggests that setting up a scenario, with questions for players and answers from an expert is rarely satisfactory. [34] So some sophistication would need to be shown in producing a relationship game.

Despite the reservation mentioned above, it might be possible to produce decision-making games on issues such as the consequences of taking drugs etc. To encourage people to also play them in their own time, they could be built round another interest such as becoming a famous pop or football star. Then as well as all the fun stuff involved in this lifestyle, there could also be information on decisions around smoking, diet, drugs, sex etc. Who knows one day 'Public Health: Judgement Day' may have everyone queuing in the arcades. (a)

It is also worthwhile keeping an eye on online worlds like *Second Life*. These are places where people can create their own character and interact with other people. Currently as of 2007 *Second Life* has a population of around 2.5 million worldwide.*35* However, if market research shows that it becomes popular with particular local target groups it may be worth having an online health education presence. Businesses already offer advice and services in this alternative universe, both to reach customers and for in-house training. For more information go to http://secondlife.com/businesseducation/

There is also others use of computer in health. One is distraction. A number of games have been devised to take children's minds off their condition or medical procedures. Visit the Make-A-Wish Foundation website to see *Ben's Game.36*

Partnership working is essential

In *Serious Games* David Michael and Sande Chen say that neither game designers nor educationalists can produce a good serious game on their own. *37* Kevin Corti from PIXELearning also suggest that game designers are better partners than e-learning companies, even though such companies have more education experience. *38* E-learning has tended to develop as a way of putting passive information giving online. This is very different from the interactive learning that a serious game can give. David Michael and Sande Chen also suggest that IT departments should be involved once a contract is agreed to iron out any problems. *39*

How much do computer games cost?

**'Not all games should have top of the line production values…
Games need to be compelling; they need to grab our
attention…'**

Gonzalo Frasca (researcher IT University of Copenhagen) 40 One way of grabbing attention is to make a game quick and topical. Panlogical did this with their Splat the MP online game: http://www.panlogicgames.com/Game.aspx?game=11

It is possible to produce a simple web based game for under a thousand pounds by using a designer just out of college. *41* However, for more sophisticated approaches the increased cost may call for regional or national partnerships. PIXELearning say that their serious games projects range from £10,000 to £100,000 *42* Alternatively it may also be possible to get commercial sponsorship. This may not always be simply money. When I produced a mental health website quiz *'Up For It'* around football the Cherry Red record label donated backing tracks for nothing. *43*

Good practice in games design

Regardless of the cost of the game being produced there are a number of issues that need to be thought about at the planning stage.

Target audience

The target group needs to be thoroughly researched. Do they like computer games and if so what sort?

The below considerations are from the excellent book *Game Design Complete* by Patrick O'Luanaigh *44*

2-4 year olds
- Children at this age cannot type or read. They can use the arrow keys and find single letters on the keyboard
- They can use the mouse to find very large hot spots on screen
- The game should be so simple it does not really need instructions
- Use simple spoken phrases to tell them what to do if they seem stuck i.e. keep making mistakes
- Congratulate them after each task
- Let your characters talk and also have funny noises
- Avoid anything frightening
- Use bright simple colours and simple shapes. Don't clutter the screen

4-6 year olds
- Most of the points above still apply with this age group
- Some children may be able to recognise words but not all can read
- Most children can make better use of the mouse but it is still a good idea for the game to work with arrows keys as well

5-8 year olds
- Many children enjoy 'bad guys' as long as they are not too scary

7-11 year olds
- By this age children tend to identify with children slightly older than themselves. This is useful to know when designing characters etc
- Most children will be able to read to a certain extent
- Generally, children need to be told how to play. Instructions need to be clear. The game needs to offer players a challenge without being too difficult

Teenagers
- Boys often prefer macho games
- Girls prefer more social activities to computer games but can be tempted by games like *'The Sims'* that involve relationships

Older people aged 55 and over
- Words may need to be in a bigger type face

Objectives
- How does the game relate to the AIDA and the three legged stool models?
- What are the players' key objectives? For example, is it to have fun? (These objectives may not be the same as the educational objectives of the game.)
- What is the goal of the game? For example, in *STIs Attack* it is to avoid being caught by a bug
- What's the hook that gets the player initially playing?
- Why should the players care about progressing?
- How is the leap made between the game and real life?
- How does the look and sound of the game support all of the above?

Rules
- Are the rules easy to understand?
- Is their minimal written instruction? Ideally the game should be self explanatory

- Will the target group understand the way the rules are explained? Are they literate enough to want to try read any writing on the screen?

Playability
- Players need to feel that they have met a challenge and mastered it
- To keep their interest needs new challenges e.g. different levels or ways of playing
- All the target group need to be able to play the game. This might mean the game has different levels that are suitable for different individuals.
- Games are multi-media. Music can be used as well as images.
- Games can benefit from a strong story to make them more interesting. (See section musicals for ideas on plot and character.)
- The content although ultimately about health issues might benefit by being superficially related to other popular topics such as football. (See chapter on football for more ideas)

How can a game be spread?
Can you email or text it? (b)

Research and evaluation
- It is vital to research the views of the target group before designing the game. This will show if a game is a good approach and how it should be focused
- Pre-testing the game before it is finally put out to the public will pick up any last minute problems
- Evaluate the game to see if the health objectives have been met. (See chapter on evaluation for more information)