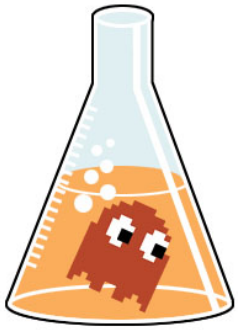

Master's Course in Digital Games Research and Design

M2: Introduction to Theories of Games and Play

Week 4: Educational game studies. An introduction.

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Table of Contents

4.1. Introduction

4.1.1. The main fields of educational game studies

Educational studies are usually concerned with 'serious learning'. But in a broader sense the term may be used for a science that is concerned with learning and teaching in general. In this sense, the term *learning* refers to every process by which experience produces a consistent or enduring change in behaviour or behaviour potential. *Behaviour* in this sense includes knowledge, feelings, attitudes, actions etc. In this perspective, man learns throughout his whole life, intentionally or unintentionally, consciously or unconsciously.

Thus, linking learning with playing and gaming suggests itself. Animals, especially mammals and primates, play to practice skills and gain experience in different areas of life without the dangerous consequences of real life. What is involved in the experience of 'getting better' while playing or gaming is the process of learning and it was already Plato who recommended teaching children by play. Thus, it is no surprise that there is a tradition of analysing the learning processes involved in playing and gaming in educational science. This is true for digital games as well.

Since their beginnings more than thirty years ago, there have been *tree main fields* of educational game studies that focus on learning processes in digital games.

In the 1990s there was a Nintendo commercial in the United States in which a kid on vacation with his Game Boy starts seeing everything as *Tetris* blocks. Mount Rushmore, the Rocky Mountains and the Grand Canyon all morph into rows of squares, just waiting to drop, rotate, and slide into place. This commercial captures one of the most fascinating and frightening aspects of digital games: they seem to restructure perception, so that even after you have stopped playing, you continue to look at the world a little differently. The first two fields of educational game studies are concerned with this *transfer* of learning from games to 'real life'. The question of whether there is any desired or undesired transfer of learning from digital games to other areas of behaviour is considered in them.

Desired transfer effects are usually expected in areas of cognitive thinking, i.e. problem solving and social skills such as teamwork (see chapter 4). Of course, what is to be desired varies within pluralistic societies. For example, in the early 1980s Ronald Reagan praised the virtues of digital games for creating a generation of highly skilled cold war warriors.

The *undesired* effects of digital gaming are mainly suspected to be a possible increase of violent behaviour, fear,

desensitisation, warped sexual values, racism, health risks and addiction.

What effects digital games have is a highly controversial issue. As Squire (2002) points out, statements about the educational relevance of digital games look a bit like a Rorschach test of educators' attitudes toward modern social, technological, and media change. Thus, any statement about gaming effects must be carefully considered (see chapter 2).

A third field of educational game studies is concerned with the well-known power of digital games to *motivate* the player intrinsically (the "*Tetris* Trance"). Since the appearance of digital games as a popular phenomenon, educational scientists have marvelled at this phenomenon and some advocates of digital game-based learning have stated that developing educational games is an imperative, as kids of the "rewired videogame generation" do not respond to traditional instruction (Prensky, 2001). Chapter 4 will be concerned with hopes of using aspects of digital game design to enhance *games with educational purposes (edutainment)*.

Beside these traditional fields of educational game studies, there is a fourth and quite a new one. It is not focused on the relevance of learning through games for other areas of life, but on the significance of learning for the gaming process itself. In this perspective, learning is a core element of gameplay, and successful game design has specific methods that support this learning. Thus games can be seen and analysed as *self-referential arranged learning environments*. Comparably to the analysis and planning of learning environments for formal education, an approach to analysing games as arranged learning environments may be called *didactic analysis* of digital games. Such analysis may serve as a basis for the other fields of educational game studies, especially for the design of edutainment software digital games in general. Week 3 in module 3 will deal with the didactic analysis of digital games in detail.

The focus of this text will be the three traditional fields of educational game studies. As all of the above-mentioned fields deal with the export of knowledge from games to 'real life', the next chapter (chapter 2) deals with basic theories of the *transfer of learning* from the gaming situation to the real world in general. Chapter 5 deals with the relevance of educational game studies for the field of game studies in general.

4.1.2. Basic research methods in educational game studies

There are two main methodical paradigms (see Husén 1985; Medley 1985) employed in current educational game studies: quantitative and qualitative ones.

The *quantitative* paradigm is modelled on natural science with its emphasis on empirical, quantifiable observations, for

the attainment of which mathematical tools of analysis are used. The aim of research in this paradigm is to establish causal relationships, to explain. Knowledge in this paradigm has the form of a theory as a set of related principles used to explain or predict a phenomenon. The value of a theory can be measured in terms of any new idea or hypothesis it generates. A hypothesis is a testable explanation of the relationship between two or more events or variables being studied.

Let us assume one wants to know what the most effective method of designing a game tutorial is. In a typical quantitative, empirical approach one may present certain elements of knowledge that are relevant for gameplay to a representative group of players, using a tutorial with written text insertions. Then the same knowledge is presented to another representative group with a speaking NPC used as a tutor in the tutorial. After this the average performance of each group is tested and compared in a 'boss fight' that requires the knowledge presented in the tutorial. In addition, a questionnaire about the subjective amount of fun or motivation during the tutorials may be used. Little knowledge of this kind about educational aspects of computer games is available today and it is mainly related to the questions of violent effects of gaming (see chapter 3.3 for details on methodology) and to questions concerning the distribution of games.

Quantitative research in educational studies often is problematic. Learning and teaching outside the laboratory usually depend on a huge amount of variables that are difficult to take into account inside the laboratory. Hence, for example, studies about the negative effects of digital games (increase of violence) are often not very sound. The same goes with positive effects: the research on learning processes with educational software seldom leads to theories with far-reaching predictions (see chapter 4). The rise and fall of programmed learning based on behaviouristic theories of learning illustrate these problems. Thus, good quantitative research on learning with digital games is a difficult challenge.

The *qualitative* paradigm is modelled on the humanities. The approach used in it is designed to increase understanding (not explaining or predicting). The goal is to produce knowledge using interpretative, especially *hermeneutic* methods (see Ödman 1985). Whereas quantitative research on gaming can be applied even to animals, in a qualitative method designing and playing a digital game are regarded to be actions the meaning and significance of which are both rooted in a specific culture. Meaning and significance, in turn, cannot be understood the same way nature can be explained.

When it is applied to the question of effective tutorial methods, someone using this approach may, for example, play many different game tutorials and analyse his or her own reactions throughout the gaming process, using his or her experience in teaching, knowledge of practical advice concerning effective training, of learning theories etc. He or she might watch other players and talk to them about their experiences. Then he or she could come to some suggestions about effective design principles for game tutorials.

The advantage of a qualitative approach (besides its low cost in the face of limited economic resources) is that it broadens the field of knowledge about games. A lot of knowledge in use, especially about teaching methods, is the result of practical expert experience, not of empirical research. To ignore this kind of knowledge may narrow the focus on computer games as arranged learning environments significantly. Nevertheless, the limitation of this method is its lack of empirical 'proof', and ignoring empirical findings may transform personal experience into dogma. Most of the current knowledge about computer games as learning environments is of a quantitative nature.

Traditionally, in educational science, the quantitative paradigm has been dominant in Anglo-Saxon countries, whereas the qualitative paradigm has been stronger on the European continent. Currently no such tendencies can be observed concerning educational game studies. Furthermore, most scientists, at least in social sciences, agree that all research methods have their advantages and their limitations. Hence, it makes sense to combine several methods in a single piece of research (for example, qualitative empirical research). This process is known as *triangulation* (see Denzin 1984).

Further Reading …

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Giddons, A. (1993) *Sociology*, (2nd ed.). Oxford: Polity Press, 675-704.

Zimbardo, P. G. & Weber, A. L. (1997) *Psychology* (2nd ed.). New York: Longman, 14-34.

4.2. Games, theories of learning and learning transfer

Educational game studies are mainly concerned with the potential impact of games on human behaviour outside the gaming situation. This impact is usually seen as a *transfer of knowledge* from one context to another. To access the kind of knowledge that is transferred it is necessary to know what is actually learned in gaming situations themselves. For this purpose, *theories of learning* can be useful (see chapter 2.1). In addition, theories of *learning transfer* can be used to find out which portion of this knowledge actually gets transferred in non-gaming situations (see chapter 2.2). This chapter will deal with these theories in general. By doing this, it serves as a theoretical basis for the chapters on specific forms of learning transfer (violent, educational learning).

4.2.1. Learning theories and digital games

> "The only thing that everyone agrees on is that playing videogames makes you better at playing videogames."
> (Steven Poole)

As almost every form of thinking can lead to learning it is not surprising that the field of learning theories is large and controversial. It can be systematized in various ways. A common way divides learning theories into three main psychological schools: the behaviourist, the cognitive and the constructivist approach. These schools are affiliated to the three main currencies that dominated in psychology during the last century.

In the history of educational game studies, it is a common feature to see digital games as a kind of embodiment of the learning theory that is in vogue at any given time (currently this is the constructivist approach). This is problematic, as new learning theories frequently do not describe or explain the complex processes of learning any more extensively, differentiatedly and, hence, more validly than older ones. They often just shift the emphasis and replace an old one-sidedness with a new one. There is not just one way of learning and hence different theories are needed to describe and explain the different ways of learning that occur in digital games.

Behaviourism

For example, if one considers common single player game tutorials, the didactic and learning methods show great similarities with the recommendations of *behaviourism* promoted by F. B. Skinner's idea of "programmed learning"

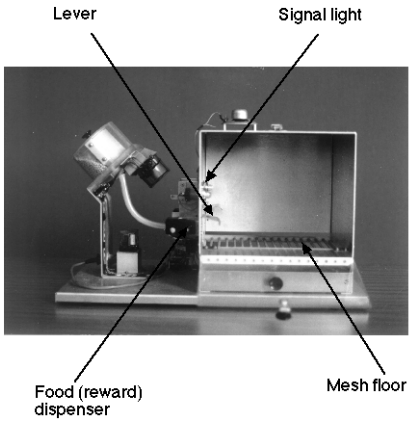

Image 1: A Skinner-Box with a video camera (http://www.nickyhayes.co.uk/nicky/OHP/ch18ohp.html).

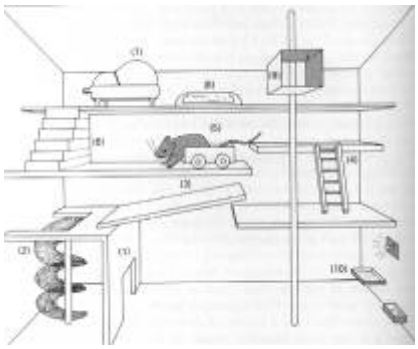

Image 2: The ten-link operant behaviour chain performed by a rat named Robert E. Lee. © Robert L Karen (Karen 1974, 130).

Image 3: *Donkey Kong*, a gameplay sreenshot. © Nintendo/Nintendo.

and "teaching machines" back in the 1950s and 1960s (see Skinner 1954 and Eraut 1985). Skinner's teaching machines (and traditional tell-test-learning software in general) follow a linear sequence of steps of instruction:

- A fact, a rule or whatsoever gets explained (usually with a very short text).
- This is followed by instructions to do something that requires an understanding of the fact or rule, etc. just given.
- Then the learner does something.
- The program analyses this response and gives feedback (usually right or wrong).
- A wrong response is followed by a repetition, a correct response by a new explanation.

Traditional game tutorials follow the same pattern.

Similarities between digital games and behaviouristic learning environments can also be found by comparing learning in a so-called "Skinner-Box" (see image 1) and in games. Apart from their immersive character, both learning environments have similarities regarding the *content* of learning. See image 2, a drawing of a typical Skinner-Box-arrangement for a rat and image 3, a screenshot from *Donkey Kong* (Nintendo/Nintendo 1981), for example. Here complex patterns of movement are trained. In the genre of action games, such similarities can be traced back to Skinner's famous WW II "Project pigeon", where he tried to train pigeons, placed in the head of a missile, to pick at a moving image of a Japanese warship that is displayed on a screen in front of them. The screen receives its images from a camera at the head of the missile, it records the location that the pigeon picks at and it is connected to the guidance system of the missile. This is how the missile is guided to hit the ship (see image 4).

But it is especially Skinner's concepts of "on-the-spot consequences" and "reinforcement plans" (see Skinner 1954; Skinner 1958) that can be useful in analysing learning processes in digital games. In simplified terms, Skinner states that behaviour, which always has on-the-spot-rewarding consequences will occur more frequently in the future. And "stretching the ratio" of the given rewards will lead to behaviour which lasts longer, even if every single instance of that behaviour is not rewarded. In this way, the environment shapes behaviour (learning) and someone's behaviour can be shaped by shaping someone's rewarding environment using specific reinforcement plans.

When this theory is applied to digital games, they can be analysed as virtual environments that "teach" the player by rewarding certain activities and punishing others. Just like the pigeon in a Skinner-Box gets a food pill after it has pushed a certain button, the player in a role playing game (RPG) gets

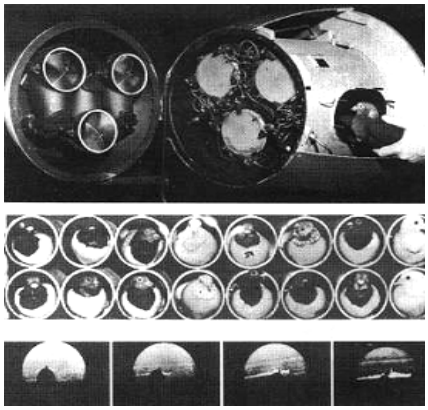

Image 4: Skinner's WW II "Project pigeon" (Pias 2001).

helpful tools (armour, heath packs etc.) after having defeated all enemies in a new room. A significant example of this method of reinforcement is the bicycle racing simulation *BMX XXX* (Z-Axis, Ltd/Acclain 2002) in which the player saves up points that enable him to see video tapes of strippers.

Considering this, the interesting question is: how do games solve the problem of reinforcement learning when it is used to train humans and not animals? Rewarding rats or pigeons is simple, as both can be deprived of food and are thus very pleased to get a pill. Skinner thought that getting a 'This answer is right'- feedback from a learning machine would serve the same function. Unfortunately for educators, this is not the case. Teaching machines and traditional learning software in general get boring quickly (see McKeachie 1974). So why are games not boring as well? What methods of *virtual* reinforcement and reinforcement plans are being used? How often are players rewarded, how soon do they get rewards? These are open questions, which call for empirical investigation.

Cognitivism and constructivism

Image 5: A conditioned rat. © Philip G. Zimbardo, Inc. (Zimbardo/Weber 1997: 226 (Zimbardo/Weber 1997, 221).

The main limitation of behaviourism is its focus on observable behaviour. Even though reinforcement can lead to amazing motorial learning (see image 5), behaviourism is a bad choice when it comes to analysing *inner* learning processes that are common, for example, in strategy games and games with puzzle elements. Here c*ognitive learning theories* are more useful, because they focus on inner processes (in critical distance to behaviourism). In addition, games and riddles are often used in them as a means of studying problem solving in a laboratory environment.

How can cognitive learning theories be applied to games? For example, there is a room with three pillars and four coloured rings around the one on the left in the "Tomb of Naga Sadow" on the planet "Korriban" in *Knights of the Old Republic* (BioWare 2003). All the rings have to be moved to the pillar on the right to unlock the doors of the rooms. You can only move the top ring on each pillar, and only one ring can be moved at a time per turn. In addition, not every colour can be placed on top of every other colour. This is a variation of the "Tower of Hanoi" problem, a classic tool of cognitive research on problem solving. The "Tower of Hanoi" problem is made up of three upright pegs (see image 6).

In cognitive psychology, several theories have been developed to describe the processes that one has to learn in order to solve this problem (and others as well). The most important one of these is the *problem-space theory*: for any given problem, there are a number of alternative paths to the goal. This is called the problem space. A problem can be seen as an initial state, many intermediate states and a goal state

(see image 6). 'Operators' can be applied to get from one state to another, e.g. moving rings from the left to the right or vice versa.

In general, the simplest method to solve a problem is to explore every state either randomly or systematically until the goal state is encountered. This can be considered an *algorithm*, as it guarantees a result. In boring puzzle games, players are forced to use this method, which is often inefficient and seldom satisfying. In the "Tomb of Naga Sadow" puzzle in *Knights of the Old Republic* the player can use this method by moving rings from the left to the right or vice versa until he eventually finds the solution more or less by accident (or reads a walkthrough). Not much learning occurs.

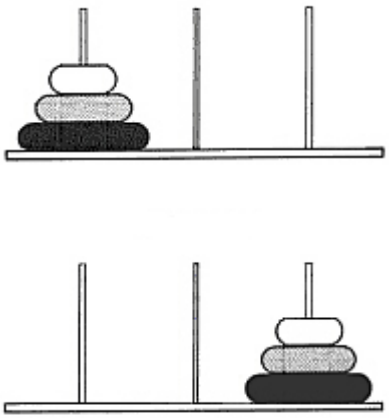

Image 6: Tower of Hanoi, drafts of the initial state and the goal state.

In contrast to this, heuristic methods are rules of thumb that do not guarantee a result, but will often work and yield quicker results. One of the most important heuristic methods described is called *means-ends analysis*. In this method, the difference between the initial state and the goal state is noted, a sub goal is created in order to reduce the difference and a path to that sub goal is chosen. Sub goals can then be considered goals and can be broken down into new sub goals. Using this method a path is constructed from the initial state to the goal state. The "Tower of Hanoi" problem can be used to illustrate this technique. Sub goals could be 'get the biggest disk on the third peg', 'get the middle disk on the large disk' and 'put the smaller disk on the middle disk'.

A small side note: plots of digital games are often constructed to follow such means-ends structures. For example, take the beginning of the RPG *Gothic 2* (Piranha Bytes/JoWooD 2002). The hero has to talk to a governor in a specific town (goal). As soon as he reaches the town gate, he learns that he first has to become a citizen before he can talk to the governor (sub goal 1). To become a citizen, he first has to get the approval of four other citizens (sub goal 1.1.). To accomplish this, he has to do a favour for each of them (sub goals 1.1.1, 1.1.2, 1.1.3…) and so on.

To get back to cognitive learning theories, the interesting digital games are those that support the player's attempts to discover heuristic methods to solve game problems. And cognitive theories are obviously a better theoretical tool to describe these processes with than behaviourism. Nevertheless, traditional cognitive theories have limitations as well, because they were used to observe learning of individuals in laboratory settings, for example. As researchers left their laboratories, it became obvious that motivations, emotions, and social aspects of learning situations had not been taken into account sufficiently and *constructivism* became popular (for an attempt to apply constructivism on digital games see Gee 2003 and 2004).

Further Reading …

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Gee, J. P. (2004) "Learning by Design: Games as Learning Machines". In: *Gamasutra,* March 24. <http://www.gamasutra.com/gdc2004/features/20040324/gee_01.shtml> (visited 7/27/2004).

Skinner, B. F. (1958) "Teaching machines". In: *Science*, October 24 (128), 969-977.

4.2.2. Theories of learning transfer

"Non vitae, sed scolae discimus"
(Seneca, Epistulae morales ad Lucilium, no. 106)

Applying learning theories to games can provide knowledge about what is actually learned in games and how it is learned. This does not mean that one would know whether or not this knowledge can be transferred to real life situations.

While advocates of games as edutainment suggest that game-playing can increase a player's critical thinking or problem-solving skills, for example (Katz 2000; Prensky 2000), empirical research indicates that learning transfer between different situations rarely occurs. In educational research, this phenomenon is commonly called the "transfer problem" (Detterman & Sternberg 1993). Related theories can be traced back to E. L. Thorndike (Thorndike 1931) who criticized the popular notions that the mind functions as a "mental muscle" and that excellence in a specific subject usually results in a better performance in others. For example, it is a common finding that higher mathematical skills, learned in school, are seldom used in everyday situations, even if this would be a great advantage (cf. Seneca's saying). Transferring this to digital games Squire (2002) points out:

> "A skilled *Half-Life* player might develop skills that are useful in playing Unreal Tournament (a very similar game), but this does not mean that players necessarily develop generalizable 'strategic thinking' or 'planning' skills. And there is good reason to believe that students may not use their understandings developed for example in the game *Civilization* III - such as the political importance of a natural resource like oil - as tools for understanding phenomena outside the game, such the economics behind The Persian Gulf War or contemporary foreign policy [...]." (Squire 2002)

Nevertheless, learning transfer occurs - even from school to real life, especially concerning contextualised or work-oriented instruction (Semb & Ellis 1994). There are several theories about what supports this transfer. Most of them suggest that transfer of learning depends upon the presence of identical elements in the original and new learning situations (for example Anderson 1987). This being the case, the amount

Image 7: *Need for Speed Underground 2*, a gameplay screenshot. © EA Games/Electronic Arts (http://cube.ign.com).

Image 8: *Colin McRae Ralley 04*, a gameplay screenshot. © Codemasters/Codemasters (http://www.gameswelt.de).

Image 9: *Autobahn Raser* IV, a gameplay screenshot. © Devilex Software/Davilex Software. (http://www.gamespot.com)

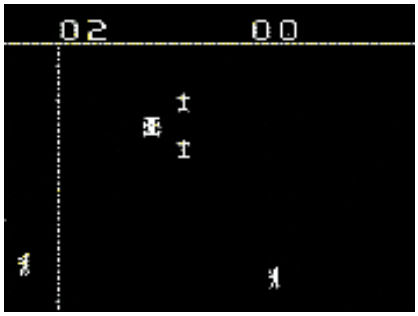

Image 10: *Death Race*, a gameplay screenshot. © Howell Ivey/Exidy (http://www.gamespot.com).

of transfer is a function of the overlap between the original domain of learning and the novel one and it should be possible to predict the quality and quantity of learning transfer by measuring the overlap between the situations. Unfortunately this is difficult, because the perception of a situation is more or less idiosyncratic as it is based on the individual knowledge with which people approach it. In addition, there is no consensus about which elements in a situation are important.

Thus, studying the evolvement of games and the evolvement of the players' realities (see Fromme 2003) is important for transfer theory.

Let us take racing games like *Need for Speed Underground 2* (EA Games/Electronic Arts 2004) as an example. The game (see image 7) introduces the player to the underground world of illegal nightly races and to the whole industry that has evolved around this scene. The game is a kind of a realistic sales catalogue for the goods of this industry and the player might, for example, get accurate information about the supply of subwoofers for the Mazda RX-8 from the game. But whether or not these similarities actually trigger learning transfer (for example, the impulse to buy a spoiler for their car) is difficult to tell without empirical research.

Other dimensions of similarity that may influence the amount and quality of learning transfer are concerned with

- the audiovisual aspects of the game
- and the game's level design.

For example, nowadays players often use 5.1 surround loudspeaker systems to listen to the music in a game and may listen to the same provocative music while driving their own cars. And visual similarities between gaming and driving a car are increasing as well. An example is the first-person perspective as shown in image 8, a screenshot from *Colin McRae Ralley 04* (Codemasters/Codemasters 2004). Here the player can even see the fight of the wipers against raindrops and mud on the windscreen (see image 8).

Concerning level design it may be important whether or not a game has similarities with the player's hometown. For example, a game like *Autobahn Raser* IV (Devilex Software/Davilex Software 2004) uses scenes of German cities like Berlin, Hamburg und Munich (see image 9 with the *Reichstag* building in Berlin, Germany).

It can be easily suggested that these and other similarities may trigger learning transfer, concerning the driving style of the player in reality, for example. But this is an old educational "reflex". Remember that back in 1976 the first public protests against 'violent' games were caused by *Death Race* (Howell Ivey/Exidy 1976). In the game the player controlled an onscreen car and the aim was to run over stick figures that were supposed to be skeletons escaping from a graveyard. Compared with state-of-the-art graphics, this game

seems ridiculously unrealistic (see image 10). Nevertheless, in 1976 people feared that this might strongly influence the players' driving style.

Thus, it is difficult to tell what kinds of similarities are important when it comes to the transfer potential of certain games. Transfer theory still has to develop in this respect and a lot of empirical research must be conducted (see chapter 3.2 for the methodical problems in these kinds of studies).

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4.2.3. Games and certain types of knowledge

Now the application of a transfer theory in which transfer is dependent on similar elements between two situations is illustrated by analysing several examples of digital games. This analysis (significantly) simplifies transfer processes by using a model of just three knowledge domains in which learning can occur.

The first one is the domain of the so-called *declarative* knowledge. It is comprised of knowledge of facts that can be reported verbally. The second one is the domain of *procedural* knowledge, skills, 'knowing how'. It is comprised of knowledge of physical actions (scripts) like riding a bicycle or playing the piano and knowledge of cognitive operations like reading fluently or playing chess. Usually, this knowledge cannot be entirely verbalised, and it requires training. The third domain is comprised of (declarative or procedural) knowledge with a strong *motivational* or *emotional* component that leads to emotional behavioural scripts, impulses, attitudes, motivations, values, and so on. This is a confused domain made up of heuristic reasons. It points to the fact that being motivated to do something in a specific situation is usually a combination of learned (and more or less accurate) knowledge and 'feelings'. (For a more thorough look at different domains of knowledge, see Anderson 1983; Gagné & Briggs 1979, 49-51; Zimbardo & Weber 1997, 256-263).

Declarative knowledge

Playing a game like *SimCity Classic* (Maxis/Brøderbund Software 1989) (see image 11) probably leads to certain forms of declarative knowledge. The objective of the game is to design and build a city. The player can mark zones of land for commercial, industrial, or residential use. He can add

Image 11: *SimCity Classic,* a gameplay screenshot. © Maxis/Brøderbund Software 1989.

Image 12: *Microsoft Flight Simulator 2000,* a gameplay screenshot. © Microsoft/Microsoft.

Image 13: *America's Army*, a gameplay screenshot. © MOVES Institute of the Naval Postgraduate School/US. Army 2002.

Image 14: *Special Force*, a gameplay screenshot. © Hezbollah/Hezbollah.

buildings, change the tax rate, enact city ordinances, and so on. The developer, Will Wright, had read several books on city planning and incorporated corresponding rules into the game.

Some players tend to guess that local politics are actually similar to certain phenomena in the game. The same may be true for games with a specific historical background or simulations of machinery. For example, players may learn much about airplanes by playing *Microsoft Flight Simulator 2000* (Microsoft/Microsoft 1999) (see image 12). (Allegedly, the 9/11 terrorists trained the approach of the World Trade Center with this game). Nevertheless, educators have often pointed out the problem that most of these popular games are not accurate simulations in some respects and may lead to wrong conceptions of reality. For example, in *SimCity Classic* the political power of the city's mayor does not correspond to the (much more limited) power of a typical mayor in the USA, and racial problems, typical of American cities, do not exist in *SimCity Classic*.

Such misgivings are even more self-evident in regard to games like *America's Army* (MOVES Institute of the Naval Postgraduate School/U.S. Army 2002). *America's Army* is a popular multiplayer first-person tactical shooter (7/2004 3.7 million registered players), released free of charge by the U.S. Army to "aid recruiting and public relations". It is (one of) the first overt state use(s) of digital games for political purposes. After a training tutorial, the player starts to fight terrorists, usually in 'Arabic looking' parts of the world (see image 13). When it comes to gameplay, the developers have intensely focused on specific areas of realism. For example, the game features real-world weapons that have different qualities of accuracy, deadliness, recoil, etc., as in life. In this respect, the game is a very accurate simulation.

But simultaneously, some other aspects of the game are intentionally unrealistic, even illogical. As in a lot of other games nowadays, a round of *America's Army* features two teams that fight against each other. The unusual thing here, though, is that team A sees itself as American troops, wears American uniforms and sees team B as the opposing force. Simultaneously, this is true for team B as well. In this way, the developers avoid the political issue of asking players to kill American soldiers and preclude the possibility of identifying with the political enemy.

The realism of the game within a certain narrative setting is seen by critics as a form of propaganda that may at least lead to the reinforcement of certain forms of descriptive (and emotional) knowledge and attitudes, for example, "most Arabs are terrorists", "war is clean" and so on.

From a western perspective, this ideological aspect

of certain games is much more obvious in a game like *Special Force* (Hezbollah/Hezbollah 2003). It is a first-person shooter military game, developed and published by the militant Islamic organisation Hezbollah. *Special Force* (do not mistake it for the latest version of *America's Army: Special Forces* from 2004) allows the player to take the role of an armed member of the Islamic Resistance to the Israeli invasions of Lebanon in the 1980s and to attack Israeli positions and Israeli politicians. It carries a deliberate and specific political message (see image 13). Mahmoud Rayya, an official from the Hezbollah bureau, said

Image 14: *Fugitve Hunter: War on Terror,* a gameplay screenshot. © Hezbollah/ Hezbollah (http://www.gamona.de).

> "[...] Special Force offers a mental and personal training for those who play it, allowing them to feel that they are in the shoes of the resistance fighters." (http://www.worldnetdaily.com/news/article.asp?Article_id=31323)

Whether or not this intention to "train" is effective remains an open empirical question.

Reinforcement of political positions is not limited to games that try to teach the player *intentionally* and *overtly*. For example, *Fugitive Hunter: War on Terror* (Encore Software/Black Ops Entertainment 2003) for PlayStation 2 is a first-person shooter in which the player takes the role of a former Navy SEAL turned into a fugitive tracker. His mission is to track and eliminate fugitives. The top fugitive is Osama bin Laden (see image 14).

Procedural transfer learning

Looking at a game like *Dance Dance Revolution* (Konami/Konami, 2001) from the point of view of transfer theories, it seems likely that the player will learn quite a lot about real life. *Dance Dance Revolution* is a dancing game in the true sense of the term. Using a large dance mat, the player dances by stepping on four directional buttons in time with the music and onscreen cues. Four columns of directional arrows that scroll to the top of the screen represent these cues (see image 15). Once a moving arrow reaches the stationary row of arrows at the top of the screen, the player has to step on the corresponding arrow on the mat. During gameplay, the step combos get more and more complex (for more details see M 1, Week 5, Multimodal and Pervasive Games).

Image 15: *Dance Dance Revolution,* a gameplay screenshot. © Konami/Konami (http://www.gamespot.com).

It is obvious that the game is basically a kind of a dance learning software that conveys procedural motorial knowledge. Transfer to reality is likely, because the learned dance steps can easily be used on a dance floor. It is not surprising that there are popular dance competitions related to the game in Japan.

Image 16: *Virtua Fighter 4*, a gameplay screenshot. © Sega-AM2/Sega of America (www.gamespot.com).

Image 17: *Dark Silhouette: Silent Scope 2.* © Konami/Konami.

At first glance, a fighting game such as *Virtua Fighter 4* (Sega-AM2/Sega of America 2002) leads to a similar learning transfer. The goal of the game is to defeat opponents by using Asian martial arts techniques (see image 16). But on a closer look, all that the player learns is to press certain 'combos' of buttons at certain times. This is very different from kicking or beating a person in real life. For the same reason one cannot use shooters like *Counter-Strike* (a modification of Valve's first-person shooter *Half Life*) to learn to shoot. On a procedural level the player learns to move a (mouse) pointer on a certain (usually moving) area of a screen quickly and click. The player may learn certain forms of team play and strategies. To aim and shoot with a real weapon is something completely different, however. The case may be slightly different with games that, for example, use light guns like the arcade shooter *Dark Silhouette: Silent Scope 2* (Konami/Konami 2000) (see image 17).

Emotional and motivational learning transfer

Image 18: *Jeep 4x4 Adventure,* a gameplay screenshot. © WildTangent.

In addition to declarative and procedural knowledge, *emotional* and *motivational* forms of learning transfer are at the centre of educational studies of digital games. This form of transfer may happen in many different types of games. Racing games and games with political content were already mentioned above. And it is obvious that *advertisement games* (see image 18) try to trigger emotional learning. A fourth type of games that is very often discussed when it comes to emotional learning is "violent games".

Further Reading …

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4.3. Games and violence

4.3.1. Popular debates on games and violence

Image 19: *Max Payne 2: The Fall of Max Payne*, a comic cutscene. © Remedy/Rockstar Games.

Image 20: *Carmageddon,* a gameplay screenshot. © Stainless Software/ Interplay & SCI (http://www.gamespot.com).

Image 21: *Custer's Revenge,* a gameplay screenshot © Mystique & American Multiple Images/Mystique. (http://www.gamespot.com).

Image 22: *Mortal Combat,* a gameplay screenshot. © Midway/Midway. (http://www.gamespot.com).

The debate on 'violent' digital games is the most popular of all mass media discourses about digital games. The debate takes place in the games, for example in Max Payne 2: The Fall of Max Payne (Remedy/Rockstar Games 2003) (see the ironic commentary in image 19, for example) and in the public media as well.

In the USA, the first public protests against 'violent' games were caused by DEATH RACE in 1976. In the game the player controlled an onscreen car and the aim was to run over stick figures that were supposed to be skeletons escaping from a graveyard (see image 10). When players ran over the skeletons, tiny crosses appeared in their place. CBS's 60 Minutes discussed the game after getting complaints from irate parents that this was a terrible example to set for the children. The game inspired Carmageddon (Stainless Software/Interplay & SCI 1997) (see image 20).

The first game that caused protests due to its sexual content (see also Dietz 1998) was *Custer's Revenge* (Mystique & American Multiple Images/Mystique 1983) (see image 21).

> "As the game version of Custer [General George Armstrong Custer who was killed by Native Americans at Little Big Horn in 1876] you embarked on little more than a rape romp, as you ran literally across the screen from 'enemy' arrows toward a Native American woman strapped to a pole. Once there, Custer would get it on with (or, according to many critics, 'rape') the woman for points**."** (Gonzalez 2004).

In 1993 the fighting game *Mortal Combat* (Midway/Midway 1992) led to a much bigger controversy. At that time the game was a big step toward graphic realism and one of its features was the "fatality", a special finishing move executed against a defeated opponent. For example, one character would grasp a wobbling opponent's head, then rip the head and spine out of the opponent's body (see image 22), which would then crumple to the ground in a pool of blood. U.S. Senator Lieberman spoke against the game during a Senate investigation into digital game violence (Kent 2001: 461-480). In the following year, the Entertainment Software Ratings Board was established, the controversy about *Night Trap* (Digital Pictures/Sega 1992) acting as a catalyst (for details on rating systems in various countries see "Video game controversy" 2004).

Digital games were next under scrutiny in 1999, following the massacre at Columbine High School near Littleton,

Image 23: *Doom II: Hell on Earth*, a gameplay screenshot. © id Software/Activision.

Colorado, when two teenage students killed 12 other students and a teacher before committing suicide. In a taped conversation between the two they stated that the shootings would be "just like DOOM" (*Doom II: Hell on Earth*, id Software/Activision 1994; see image 23), indicating that the popular shooter from id Software had influenced their fantasies about the crime. In 2003, two Haitian-American interest groups protested against the line "Kill the Haitians," a directive found in the mission-based game *Grand Theft Auto: Vice City* (Rockstar/Take-Two 2003). In the same year the biggest mass murder in German post-war history was committed by a student from a school in East Germany. He killed 13 teachers, two students and a police officer before committing suicide. The student had played the online shooter *Counter-Strike*, which led to a demand to prohibit all "killer-games" by the leader of the national opposition party.

As graphic and interactive realism in games develop, popular discourses of this kind will go on. They make for an interesting research field for historical educational science.

Further Reading …

Gonzalez, L. (2004) "When Two Tribes Go to War: A History of Video Game Controversy". In: *Gamespot.* Download <http://www.gamespot.com/features/6090892/index.html> (visited 7/26/2004).

"Video game controversy" (2004). In: *Wikipedia, the free encyclopedia*. Download <http://en.wikipedia.org/wiki/Video_game_controversy> (visited 7/24/2004).

4.3.2. Theories of violence and digital games

The effect of gaming violence on aggressive dispositions is controversial. Compared to about 5000 empirical studies on TV violence, relatively few studies on game violence can be found. These are often older studies in which recent technical developments are not taken into account. These include such developments as the trend of having graphically personified avatars and NPCs (see image 24), immersive audio and the possibility to interact with NPCs verbally, for example.

Nevertheless, the body of research in this field is growing. Two main theses are being discussed. The first one suggests that exposure to violent games contributes to a general

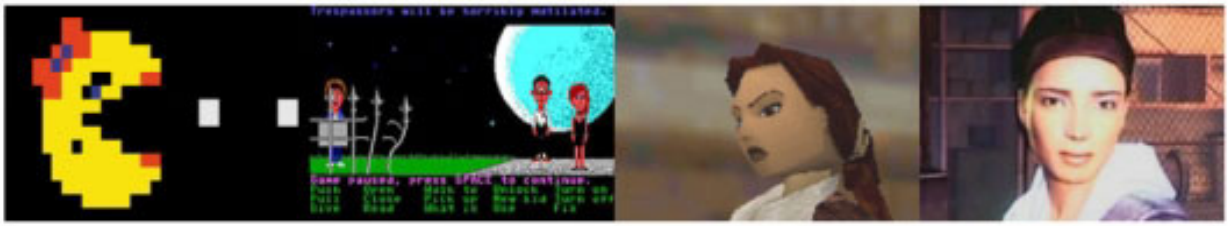

Image 24: Gameplay screenshots from *Ms Pac-Man* (1982) © Atari/Atrari; *Maniac Manson (1987)* © Lucasfilm/Lucasfilm*; Tomb Raider II* (1997) © Core Design/Eidos; teaser from *Half-Live 2* (2004) © Velve.

desensitisation in regard to real-life violence; the second one suggests that it contributes to an increased likelihood of *aggressive behaviour.*

Theories backing these theses are usually based on theories of TV violence. Here, most aggression researchers agree that there are negative effects to prolonged exposure to violent television programmes (Anderson & Bushman 2002). Thus, the popular belief in *catharsis theory* (Dollard 1939; Feshbach 1961) which suggests that the depiction of physical force actually reduces aggression is by now considered to be empirically falsified (Bushman**,** Baumeister & Stack 1999).

The theory of *cognitive dissonance* (Festinger 1957) claims that humans tend to avert, ignore or modify experiences that do not match their basic cognitive structures and dispositions. Thus violence in media or in games does not affect persons who do not tend to violence because of their socialisation. But there is a minority of high risk groups (Funk 2001) with already violent attitudes, and these pre-existing attitudes may be reinforced by violent games.

The theory of *habituation* (Drabman & Thomas 1974) suggests that the frequent watching of media violence leads to a desensitisation to this media phenomenon and can lead to desensitisation to violence in real life as well. Hence, the recipient has lower levels of empathy. In the past, research on this subject was mainly concerned with pornography. Nowadays, researchers link this theory to violent games as well (Funk 2000).

Social cognitive learning theory (Bandura & Ross & Ross 1963; Bandura 1971; Gage & Berliner 1988; Mischel 1973) suggests that much human learning occurs in a social environment. By observing others (so-called "models") people acquire knowledge, rules, skills, beliefs and attitudes. But model learning is not simply 'monkey see, monkey do.' Individuals also learn about the usefulness and appropriateness of behaviours by observing models and the consequences of modelled behaviours, and they act in accordance with their beliefs concerning the expected outcomes of actions. Because of this, violent behaviour is more likely to be learned, if (media) violence is performed by authorities (the hero), if it is successful and if the player is emotionally aroused. Social cognitive learning theory has assimilated theories of cognitive dissonance and habituation and can be seen to be the most important learning theory concerned with violent behaviour today.

In addition to these theories most researchers regard digital games (in contrast to TV) as a medium that supports *learning by doing.* It is seen as a more effective way of learning than just watching and listening to TV or films. Thus, all forms of undesired learning from games may be especially effective compared to the 'old media'.

The main conclusion that can be drawn from all these theories is that games may have some effects on some people in some circumstances (still to be uncovered), but they do not have pervasive effects on young people in general. "The important research goal is to identify which, if any, children are at risk for negative impact [...]" (Funk 2000).

Further Reading ...

Goldstein, J. (Ed.) (1998) *Why We Watch: The Attractions of Violent Entertainment*. Oxford: University Press.

4.3.3. Research methods and findings

In general, researchers employ two different *quantitative methods* to test theories on games and violence: correlational analysis and experimental studies (for details Gunter 1994). It is important to be familiar with these methods in detail, because otherwise it is not possible to estimate the reliability of certain data and the soundness of conclusions that are based on them.

Correlational analysis

In *correlational analysis*, investigators obtain information from questionnaires administered to subjects (test persons) regarding their digital gameplay activities and various self-reported aggressive behaviours. The questionnaires also typically collect additional background information on the subjects that may also be linked to aggressive activity. Researchers then use statistical analysis to identify relationships between a subject's preference for violent games and his or her aggressive tendencies. These kinds of investigations are called 'correlational' because of the difficulty of discerning the direction of the relation between media violence and aggressive behaviour: does the playing of violent games lead to aggressive behaviour, or does aggressive behaviour lead one to choose games with violent content? Or perhaps there is no causal relation between these aspects but instead an (unknown) third variable that causes both of them.

Provided for this, a majority of investigations concerning TV or film suggest that there is a high correlation between exposure to media violence and aggressive and at times violent behaviour. In addition, in a number of research efforts it has been reported that exposure to media violence is correlated with increased acceptance of violent behaviour in others. In addition, there is a difference between light television viewers' and heavy television viewers' perceptions of violence in the world. The latter, for example, are more afraid of being personally involved in crime. A majority of correlational studies examining the relationship between digital game playing habits (violent and non-violent) and real-

world aggressive behaviour have come to similar results (Anderson & Dill 2000: 775; Anderson 2004).

Going into details, Funk (2001) identifies three groups of "high risk players" that may be influenced by violent games: younger children (aged 12 or younger), bullies and their victims and children with defects in emotion regulation.

Experimental studies

In *experimental studies* subjects (probates) are randomly assigned to exposed and control groups. Probates in the exposed group play violent games, usually first-person shooters, while the control group plays games with no violent content or no games at all. Investigators then observe the level of aggression (or empathy) exhibited by players in each group after exposure to the selected media. Effects are estimated as the increase in aggression exhibited by the group playing the violent game compared to those who did not.

Image 25: *Castle Wolfenstein 3D*, a gameplay screenshot. © Id Software/Apogee 1992.

To measure the increase in aggression that is exhibited, several methods are used. One is the use of projective tests. For example, after having played, common social situations are described to the groups. Pictures are provided to help the subjects gain a better understanding of the situations. Then they are asked to describe the likely outcomes of these situations. As the pictures are ambivalent, probates tend to project dominant emotions and cognitions onto them (Funk 2000).

This method can also be used to test the level of empathy. In this case, half of the pictures are structured so that an empathetic response is one reasonable response. In the other half, an aggressive response is one possible outcome. Then the average responses of the groups to the pictures are compared.

Another method was used in a recent popular study by Anderson and Dill (2000). One group of participants played *Castle Wolfenstein 3D* (Id Software/Apogee 1992), a first-person-shooter with Adolf Hitler as the ultimate enemy; see image 25). The other group played *Myst* (Cyan/Broderbund 1993), a graphic adventure (strangely enough, according to Anderson and Dill, *Myst* "[…]shares the 3D 'walk through' format of Wolfenstein 3D"). Then the participants started a competitive reaction time task on the computer. In this task, every participant's goal was to push a button faster than his or her opponent in a cubicle next to them. If participants lost this race, they received a noise blast at a level supposedly set by the opponent (actually set by the computer). Aggressive behavior was operationally defined as the intensity and duration of noise blasts the participants themselves chose to deliver to the opponent.

Basically, this experimental design adopts a series of Albert Bandura's famous experiments (Bandura/Ross/Ross 1963) and

Image 26: a boy and a girl imitate an adult model's aggression. © Philip G. Zimbardo, Inc. (Zimbardo/Weber 1997: 226).

has the same methodical problems. Bandura showed little children a film with an adult who hit and insulted a large inflated plastic figure, a so-called Bobo Doll. After that, the children were frustrated (their current toys were taken away) and they were brought to a room in which, amongst other things, there was the same Bobo Doll as in the film. Then aggression was measured by the degree with which the children hit the Bobo Doll (see images 26). As it turned out, the children who saw the film hit the Bobo Doll much more than children who did not.

Critics of these kinds of experiments point out two basic methodical problems. The first problem: there is a distinction between hitting a Bobo Doll and violence against humans. Much of the aggression following gameplay could have been seen as 'play fighting', rather than 'authentic' aggression (Freedman 2001). Correspondingly, punishing an opponent with a noise blast may not be authentic aggression either. In general, most of the behavioural measures in experimental studies on violence are analogues to aggression rather than the real thing (due to ethic restriction). The second problem: even if a game increases aggression in the described way this is just a short-time effect in a laboratory setting. This does not indicate a long-time strengthening of the disposition to act violently.

The existent experimental studies on digital games and aggression have yielded weak evidence for a strong causal relationship (Durkin & Aisbett 1999: 25; Anderson & Dill 2000: 775). In some studies at least some support for the hypothesis that violent digital game content can increase aggression was found. The most discussed recent study by Anderson and Dill (2000) was already mentioned above. The researchers found that the group of players who *lost* a round of *WOLFENSTEIN 3D* 'punished' opposing players with a noise blast that lasted 6.81 seconds on average, compared to *MYST* players, who blasted opponents for 6.65 seconds - a 0.16 second difference. There was no difference between players who *won* their round of *Castle Wolfenstein 3D* or *Myst.*

In conclusion, most researchers are reluctant to make definitive judgments about the impact of violent digital games on players at this point in time because of the limited amount of empirical studies that have been done so far and because of the methodological problems these few studies have. When additional research becomes available, this may change (Durkin & Aisbett 129-130; Freeman 2001).

Further Reading …

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4.4. Games as edutainment

4.4.1. Games as a cure for educational problems?

Everybody has memories about boring instruction or unprofessional teachers. Taking up this issue (and recently pointing to studies like PISA), many supporters of edutainment (Prensky 2001, Gee 2003) have started to compare 'traditional teaching' (which basically means that the teacher talks and the students listen) with the various forms of playing activities in digital games which seem to be amazingly motivating (Bowman 1982; Gage & Berliner 1988: 384; Zimbardo & Weber 1997: 325). Using the learning principles of games to enhance the boring ways of learning in school, university etc. seems to be a very promising idea and further technical improvements in games suggest even more powerful new opportunities for games as educational media in the future (Squire 2003).

From the viewpoint of historical educational science, this is a familiar pattern of argument and it can be traced back to the debates on programmed learning back in the 1960s, when F. B. Skinner promised to revolutionise western educational systems with his learning machines. Arguments in this and later debates about e-learning in general have been concerned with the use of digital games for educational purposes as well.

Firstly, the above-mentioned comparison between traditional school methods and games as learning environments can be seen as a rhetoric strategy to let games shine in a brilliant light. It draws a very one-sided picture of didactic methods at hand. Since the beginning of the last century, there have been a lot more teaching methods available than just lecturing and questioning, for example those in the tradition of J. Dewey or the German 'Reformpädagogik'. Thus, the main problem with ineffective or boring instruction in school is not a lack of didactic knowledge but of the *implementation* of good didactic knowledge in the educational system.

Secondly, the above-mentioned argument suggests that the method of learning is more or less indifferent to the goals and content of learning. Lots of empirical studies that compared the effectiveness of different learning and teaching methods clearly indicate that this is not the case (Terhart 2000). For example, it is quite obvious that the method of teacher-telling is not very effective when the learning goal is the improvement of skills of discussion or team work. On the other hand, methods of discovery learning are often not very effective if the goal is the improvement of forms of 'knowing that'.

Why is this important for educational games? The focus of school instruction is knowledge in a written form. Presumably,

this has some evolutionary advantage in comparison with older forms of teaching, for example apprenticeship. In gaming, the focus is on knowledge in the form of moving pictures, sound, and actions. Thus, the main question concerning educational games is whether or not teaching methods that work effectively with game knowledge are suitable for school and academic knowledge as well.

Thirdly, empirical evaluations of e-learning that are actually at hand usually lead to sobering results concerning their effectiveness. Supporters of edutainment usually argue that this might be true but future technological improvements suggest powerful new opportunities. But this argument was used by Skinner already 40 years ago when he defended his boring machines. Thus, this is not a very strong argument.

4.4.2. Gaming as formal and informal education

All this does not mean that (non-educational) digital games are of no educational value. But it is important to take a close look at what kind of important knowledge can effectively be learned from gaming and what cannot. In order to answer this question it is useful to separate *informal* learning from games from learning that occurs in games that are used in a *formal* educational setting (school, university etc.).

Simulations are usually mentioned when it comes to informal education and games. For example, *SIMCITY* has often been used as an example for the possibilities of learning about urban space, city planning and economics through experimentation with building and running virtual cities and businesses (see 2.3.1). Patricia M. Greenfield suggests that modern digital games demand special visual skills and thus provide these skills (*informally)* for non-gaming occupations (Greenfield et al. 1996).

When it comes to games in formal educational settings, McFarlane & Sparrowhawk & Heald (2002) conducted a broad empirical qualitative study about the use of non-educational games in English schools. They found that games developed several skills valued in the curriculum. The skills included

- communication
- planning
- group decision making
- negotiation
- strategic thinking
- application of numbers and
- the handling of data.

4.4.3. Prospects

Provided that digital games can and do support school and academic education, the main questions are:

- Do digital games (designed for educational purposes) support learning better than the best other didactic method available? There is no sound empirical data on this question at the moment.
- What design principles of (non-educational) games can be used to design educational games? Games obviously do a good job of balancing important design components, such as character traits, game rewards, obstacles, game narrative, competition with other humans, and opportunities for collaboration with other players. But there are only a few theoretical attempts at describing these components and how they may be used (Gredler 1996; Cordova & Lepper, 1996; Gee 2003; Prensky 2001). Further thorough studies of digital games by means of learning theory (see chapter 2) and didactic analysis (see M3) can change this situation.

Further Reading …

Bowman, R. F. (1982) "A 'Pac-Man' theory of motivation: Tactical implications for classroom instruction". In: *Educational Technology*, 22 (9), 14-16.

Squire, K. (2003) "Video games in education". In: *International Journal of Intelligent Simulations and Gaming* 1(2). Download <http://website.education.wisc.edu/kdsquire/manuscripts/IJIS.doc >.

4.5. Educational game studies and other fields of game studies

Educational analysis may be interesting for an interdisciplinary approach to digital games which is focused on the connection between the learning 'layer' and the gameplay layer, the narrative layer and so on of a game. These layers go more or less well together to create an interesting experience, i.e. they may be more or less coherent (for the term "coherence" regarding gameplay see Poole 2000: 64). An educational analysis can then be part of an analysis that looks for the coherence of a gaming experience as a whole.

Image 27: *Half-Life*, train ride. © Valve/Sierra.

A simple example of such an interconnection between the learning layer and the narrative layer of a game is the well-known train ride at the beginning of *Half-Life* (Valve/Sierra 1998). Here, at the very beginning of the game, the player is inside a train that rides through several parts of the Black Mesa facility (see image 27). In this way we learn to play the role of Gordon Freeman, a graduate of MIT, on his first day on the job. He is on his way to his laboratory. Sitting inside the train gives the player an interesting view of several locations of the huge area he is supposed to work in. From a narrative perspective, this is a typical introduction to the setting of the story. But simultaneously we get information that helps us master the game ahead. For example, we learn not to touch the tracks, as they are electrified, and we learn about the dangerous radioactive material that is used inside the facility. This information is not simply displayed, but is spoken by a taped voice inside the train, which is to be heard automatically by every employee on his first day at Black Mesa. This goes well with the narrative setting of the game.

The story layer of the game may in turn benefit from this strategy to supply gameplay information within the story parts of the game, because the player may pay more attention because he does not want to miss any hints. On the other hand, this may endanger an aesthetic way of reception that is necessary for experiencing a good story.

Thus, the delicate interplay of gameplay, didactic elements, story and so on within a game is important and fragile and needs to be analysed with a multidisciplinary approach (for a controversial view that wishes to privilege the gameplay layer see Eskelinen 2001).

4.6. Assignments for Week 4

Select **one** of the alternatives given below.

Assignment 4a: Knowledge in games

Questions: What do you think about the thesis that players actually learn a lot in games that are not designed to be "educational games"? Do you think that there are or may be games in the future that are comprised of interesting knowledge (an interesting view) of the world?

Assignment for the student in charge: Open the discussion by writing a short presentation (c. 500-1000 words) and post it to the discussion area for this assignment (due: Wednesday evening, early Thursday morning at the latest). Look for examples to support your opinion. Think about a game or a single situation in a game that gave you an opportunity to learn something for "real life".

Assignment 4b: "Problematic" games

Questions: Are there any 'problematic' games in respect to the development of young players? Should anybody be able to play whatever he/she wants, or should there be restrictions concerning age? Are there any limits concerning sexism, racism or violence in games or are games just fun and is every restriction censorship?

Assignment for the student in charge: Open the discussion by writing a short presentation (c. 500-1000 words) and post it to the discussion area for this assignment (due: Wednesday evening, early Thursday morning at the latest). Outline the main arguments for and against an educational evaluation and rating of games in respect to the questions above. Choose one or two controversial games as examples to illustrate the subject. After that, outline your own opinion and defend it against probable counterarguments.

Assignment 4c: Video Games and Aggressive Thoughts....

In recent years, Anderson & Dill's article "Video Games and Aggressive Thoughts, Feelings, and Behaviour in the Laboratory and in Life" was (probably) the most frequently quoted paper on experimental empirical research on 'violent' digital games. A close look at this article can give you a good insights in the methods of psychological research on digital games and on the problems this kind of research has to deal with. The article covers two different studies (a correlational and a experimental one) that both want to test the authors' General Affective Aggression Model (GAAM).

The focus of this assignment is on this aggression model and on Study 2. It is not necessary to understand all statistic

data of the study, but you should understand the main test design and be able to identify the main statistical results within the text.

Discuss the plausibility of the article's main hypotheses that the exposure to violent video games can increase aggressive behaviour in both short and long terms. For this, use a threefold approach:

a) Describe the General Affective Aggression Model (GAAM).

b) Describe the design of the experimental test that Anderson & Dill present in their second study. Explain why they choose this particular test design in respect to the GAAM and why they try to control certain variables.

c) What are, in your opinion, the interesting results of Anderson & Dills research? What can be criticised in respect to their test design?

If you are not familiar with articles on empirical psychology, these additional specific questions may support your understanding of the text:

- According to the Anderson & Dill's General Affective Aggression Model, there are several input variables that influence specific internal states and processes that eventually can lead to an increase of aggressive behaviour. Describe these variables and states/processes and their interrelations.
- What is "priming" and what is the "weapons effect", both concepts mentioned in the article?
- Which of the variables of the GAAM must be controlled, if you want to back the hypotheses that the *violent content* of games can increase violent behaviour? What other aspects of games may increase violence?
- According to the GAAM, what can be the two long term effects of playing violent video games that are in return input variables of the model itself?

h) How do Anderson & Dill justify their use of Wolfenstein 3D and Myst as games in their test? What games would you use if you had to do test the GAAD?

- How did the designers test the influence of gaming on aggressive thoughts, feelings and behaviour?
- What do the authors mean by "The effect of violent video games appears to be cognitive in nature"?

Assignment for the student in charge: Open the discussion by writing a short presentation (c. 500-1000 words) and post it to the discussion area for this assignment (due: Wednesday evening, early Thursday morning at the latest).

4.7. References

Literature

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AMERICA'S ARMY: SPECIAL FORCES (MOVES Institute of the Naval Postgraduate School/US. Army 2004)

AUTOBAHN RASER IV (Devilex Software/Davilex Software 2004)

BMX XXX (Z-Axis/Acclain 2002)

CARMAGEDDON (Stainless Software/Interplay & SCI 1997)

CASTLE WOLFENSTEIN 3D (Id Software/Apogee 1992)

COLIN MCRAE RALLY 04 (Codemasters/Codemasters 2004)

COUNTERSTRIKE (*HALF-LIFE* modification)

CUSTER'S REVENGE (Mystique & American Multiple Images/Mystique 1983)

DANCE DANCE REVOLUTION (Konami/Konami, 2001)

DARK SILOUETTE: SILENT SCOPE 2 (Konami/Konami 2000) (arcade)

DEATH RACE (Exidy/Exidy 1976)

DOOM II: HELL ON EARTH (id Software/Activision 1994)

DONKEY KONG (Nintendo/Nintendo 1981)

FUGITIVE HUNTER: WAR ON TERROR (Encore Software/Black Ops Entertainment 2003)

GOTHIC 2 (Piranha Bytes/JoWooD 2002)

GRAND THEFT AUTO: VICE CITY (Rockstar/Take-Two 2003)

*Jeep 4x4 Adventure (*WildTangent/WildTangent)

KNIGHTS OF THE OLD REPUBLIC (BioWare 2003)

MAX PAYNE 2: THE FALL OF MAX PAYNE (Remedy/Rockstar games 2003)

MICROSOFT FLIGHT SIMULATOR 2000 (Microsoft/Microsoft 1999)

MORTAL COMBAT (Midway/Midway 1992)

MYST (Cyan/Broderbund 1993)

NEED FOR SPEED UNDERGROUND 2 (EA Games/Electronic Arts 2004)

NIGHT TRAP (Digital Pictures/Sega 1992)

SIMCITY CLASSIC (Maxis/Brøderbund Software 1989)

SPECIAL FORCE (Hezbollah/Hezbollah 2003)

VIRTUA FIGHTER 4 (Sega-AM2/Sega of America 2002)