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Personal Investigator: A therapeutic 3D game for adolecscent psychotherapy

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Although mental health problems increase markedly during adolescent years, therapists often find it difficult to engage with adolescents. The majority of disturbed adolescents do not receive professional mental health care and of those who do fewer still will fully engage with the therapeutic process (Offer et al. 1991; US Surgeon General 1999). Personal Investigator (PI) is a 3D computer game specifically designed to help adolescents overcome mental health problems such as depression and help them engage more easily with professional mental health care services. PI is an implementation of a new computer mediated model for how therapists and adolescents can engage. The model has its theoretical foundations in play therapy and therapeutic storytelling and applies current research on the educational use of computer gaming and interactive narrative systems to these foundations. Previously demonstrated benefits of computer games and interactive narrative systems in education include increased motivation, increased self-esteem, improved problem solving and discussion skills and improved storytelling skills (Bruckman 1997; Bers 2001; Robertson 2001; Robertson and Oberlander 2002; Bers et al. 2003; Squire 2003). PI aims to take advantage of these benefits in a mental health care setting. PI incorporates a goal-oriented, strengths based model of psychotherapy called Solution Focused Therapy (SFT). By engaging adolescents, in a client-centred way, it aims to build stronger therapeutic relationships between therapists and adolescents. PI is the first game to integrate this established psychotherapy approach into an engaging online 3D game. Results of trials of PI with four adolescents, referred to clinics for issues including anxiety and behaviour problems, attempted suicide, and social skills difficulties, are presented.

Keywords: Adolecsent Psychotherapy, Computer Gaming, Solution Focused Therapy, Storytelling

1. INTRODUCTION

Personal Investigator (PI) was designed as a 3D computer game to help engage adolescents in psychotherapy. The game targets adolescents with mental health problems such as depression, anxiety and social skills problems. It was designed both for potential self-directed use online but also as a computer-mediated tool to aid therapeutic conversations between adolescents and therapists. PI employs a 'detective' narrative, however instead of playing the role of a *private investigator*, a common character in many films and books, the teenager plays the role of a *personal investigator* hunting for solutions to personal problems. The choice of 3D represents a client-centred approach and allows the young person the potential to pace and personalise their journey through the game. The aim is to create an engaging fantasy environment and empower adolescents to direct their own therapy. In collaboration with the therapist the game aims to help clients to set their own therapeutic goals, recognise their own strengths and values, identify people in their lives who can support them, teach new coping strategies and focus on their future not their past. This therapeutic process is broken down into a series of structured goals, which the adolescent can understand and achieve more easily.

To date the use of computers in mental health care treatment/education has been limited, especially when compared to the larger bodies of work in other educational fields. This paper first sets out the reasons why a game such as PI is of benefit to adolescent psychotherapy. The paper then describes the theoretical foundations of PI and explores related work. The choice of Solution Focused Therapy (SFT) as a therapeutic model for implementation in PI is explained and links between goal-oriented gaming and goal-oriented therapy are explored. The design of the game is described and details are given of how the game is used in therapeutic sessions. Results of trials of the game to date, with four adolescents referred to clinics for issues including anxiety and behaviour problems, attempted suicide, and social skills difficulties are presented, along with a detailed case study of one user.

This research aims to answer the following questions:

- Can a model of SFT be successfully and safely integrated into a 3D computer game?
- Can such a game improve a therapist's ability to engage with adolescents?
- Can such a game improve adolescents' ability to learn coping strategies and overcome emotional problems?
- What are the specific positive and negative benefits of using such a 3D game?

2. MENTAL HEALTH CARE AND ADOLESCENTS

Although mental health problems increase markedly during adolescent years, therapists often find it difficult to engage with adolescents. The majority of disturbed adolescents do not receive professional mental health care and of those who do, fewer still will fully engage with the therapeutic process (Offer *et al*. 1991; US Surgeon General 1999). The main reasons cited by adolescents for these difficulties are:

- Feeling that no person or service could help.
- Feeling the problem was too personal to tell anyone.
- Feeling they could handle the problem on their own.

Kraus defined adolescence as "the no-man's land" between childhood and adulthood (Kraus 1980). During adolescence people experience a growing independence from former authority figures, combined with a heightened social awareness and dependence on peer groups. Adolescents are generally more private and self-conscious and also more confrontational than either younger children or adults. For adolescents, therapy is typically something imposed upon them (usually by their parents) and because of this they are less willing to accept it. Adolescents can view therapists as another authority figure, forcing them to obey rules. Difficulties engaging adolescents are also due to the serious nature that therapy is seen to have and the stigma that can be attached to it.

Disturbed adolescents are more likely to seek help from informal sources such as friends. Up to twenty percent also use the Internet to seek help for emotional problems (Gould *et al*. 2002). Examples of the types of problems include problems with friends, family problems, academic problems and suicidal thoughts. Seeking help from the Internet overcomes the gender divide. Boys, who are usually significantly less likely to seek help, are just as likely to seek Internet help as girls. This is particularly important because it suggests that the Internet can be used to target boys, who are resistant to existing prevention methods for high-risk behaviours. One major concern that exists is that, despite the growing number of websites underwritten by health care organisations, the most popular source of online information is chat rooms. Chat rooms are the Internet equivalent of informal help sources, but with the added risk that instead of approaching a trusted friend or family member, you are approaching a stranger whose expertise and intentions (positive or malicious) are unknown.

Research is necessary to make professional sources of mental health care more accessible to adolescents.

3. ENGAGING ADOLESCENTS IN PSYCHOTHERAPY

Assay and Lambert concluded that, across all therapeutic models, four main factors are responsible for achieving positive change through psychotherapy (Assay and Lambert 1999). They have also estimated the relative contribution of each of these factors:

- 40% Client Factors – Client and environment strengths and resources.
- 30% Quality of Therapeutic Alliance or Relationship.
- 15% Therapeutic Model and Technique.
- 15% Expectance, Hope and Placebo factors.

These results demonstrate the central importance of client factors to effective psychotherapy and also the importance of building a strong therapeutic relationship between the therapist and client. Therapeutic interventions are most likely to be successful if the therapist engages with the client in a client centred way. A quality therapeutic process for adolescents will actively engage their participation, involving their interests, strengths and ideas.

Research presented in this paper is developing a computer-aided model of how therapists can actively engage adolescents (fig.1). Instead of engaging directly with an adolescent the therapist uses a computer as a third party in their dialogue.

The model has its roots in traditional play therapy and therapeutic storytelling and applies current research on the benefits of computer gaming and narrative systems to this, in order to improve participation, motivation, self-esteem and problem solving skills.

Personal Investigator is an implementation of this new model. The next sections explore the theoretical foundations of PI and related work.

4. PLAY THERAPY AND STORYTELLING

Many different forms of psychotherapy use storytelling (Rosen 1982; Wigren 1994). Personal stories are central to a person's sense of self; through narrative thinking a person forms a sense of self, a sense of the world around them and of their place in that world (Bruner 1986; Bruner 1990). Psychotherapy can be seen as the process of inviting clients to tell and re-tell their life story from a variety of perspectives with the aim of generating alternative stories and reaching a coherent and meaningful narrative at the end (White and Epston 1990).

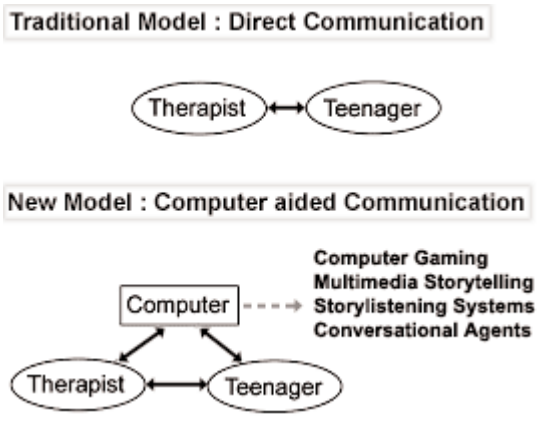

Figure 1 Computer aided communication in psychotherapy

Within a strengths-based approach to psychotherapy the process can be conceived as helping clients shift from initially self-limiting and problem-focused accounts of their lives to more positive and strengths-oriented accounts that are more liberating and empowering (Sharry 2001; Sharry 2004). For example, a person may begin psychotherapy by telling the story of how he became depressed and how this damages his life and end therapy with a 'new' story of how he has coped with the depression and how this leads to new possibilities in his life.

Engaging children or adolescents to tell their story through direct dialogue is not straightforward and the therapeutic process can become blocked. Whereas for adults dialogue is the favoured means of communication, children and adolescents often struggle to express themselves with words alone. Much research has been conducted into ways of engaging children and adolescents in a therapeutic process using play. Some examples of tools used are storybooks, construction materials, artwork, puppets and board games (Sharry 2004). Many therapeutic non-digital board games have been developed. Some provide enough symbols and props to allow for play and the expression of a narrative. The Hero's Journey, a fantasy board game developed around issues of woman abuse, blends game playing (i.e. rolling dice, deciding where to move your character, picking up cards) and the discussion of sensitive topics. Such games allow problems to be brought up and discussed within the game metaphor, providing an established vocabulary for the players to use. This can be easier for clients than using their own words. The game world is a simulation and as such is a safe environment in which to experiment and most importantly, in which to fail. These games can be cathartic, allowing players to deal with and master sensitive and difficult situations. Games provide the therapists with a way into the client's world. Research has shown that child and adolescent clients can use games almost as a safety net or shield from both the trauma of their problems and the trauma of therapy (Thorne 1982).

Adolescents can be resistant to these methods; they like to be treated as adults and will not engage if they perceive they are being treated as a child. Equally however many teenagers are private and self-conscious and often react confrontationally or not at all to direct dialogue with a therapist. However adolescents often show a great interest in using computers and video games and these can be an appealing way of joining with adolescents on their own terms. A recent UK survey reported that 53% of eleven to fourteen year olds play games four times a week or more, and that 44% play for more

than one hour at a time (McFarlane *et al.* 2002). Digital games currently constitute a client-centred approach to adolescent psychotherapy.

5. COMPUTER GAMES IN EDUCATION

The introduction, take-up and use of digital games in psychotherapy roughly follows the path non-digital games took as they began to be introduced in therapy in the late 1960s and 1970s. The benefits of non-digital games were first demonstrated in educational settings and then adapted in psychotherapy (Nickerson and O'Laughlin 1983).

Recent years have seen a substantial increase in research into the theoretical foundations of designing and using computer gaming in education. The Education Arcade is an international consortium of game designers, publishers, educators and policy makers, brought together to explore the potential of gaming and develop a framework for designing and evaluating educational games. Squire provides an overview of the theory of video game use in education (Squire 2003). He writes that video games are a powerful and influential medium because: "Primarily video games elicit powerful emotional reactions in their players, such as fear, power, aggression, wonder and joy. Video game designers elicit these emotions by balancing a number of game components, such as character traits, game rewards, obstacles, game narrative, competition with other humans, and opportunities for collaboration with other players." Malone wrote about the three main elements that 'Make Video Games Fun': challenge, fantasy and curiosity. He set out guidelines for designing entertaining educational games (Malone 1981; Malone 1981a):

- have clear goals that students find meaningful.
- have multiple goal structures and scoring to give students feedback on their progress.
- have multiple difficulty levels to adjust the game difficulty to learners' skills.
- have random elements of surprise.
- have an emotionally appealing metaphor and fantasy that is related to game skills.

Bowman used Csikzentnihalyi and Larson's discussion of 'flow' to describe how video games can engage users in optimal experiences (Bowman 1982). He suggests how video games can be used to improve learning by creating clear goals, challenging players, providing a novel experience, creating opportunities for collaboration and giving students more control over their learning environment. Thiagarajan stressed the importance of allowing equal time for reflection on ideas raised by the game and Hawley et al established the central role of the instructor in facilitating this reflection and extending in-game learning (Squire 2003).

Various studies have shown the benefits of computer games and virtual environments to encourage storytelling and personal narratives in educational settings. MOOSE Crossing (Bruckman 1997), a text based virtual world, demonstrated that engaging children in writing interactive fiction was extremely motivating. Ghostwriter (Robertson 2001; Robertson and Oberlander 2002) is an interactive virtual reality role-play game specifically designed to engage young people in educational drama and improve story writing skills. Trials showed that young people were motivated by and remained focused on their tasks while playing the game. Players formed relationships with each other and game characters. Stories written subsequently contained more portrayals of characters' relationships. There were also beneficial effects for self esteem. A further study (Robertson and Good 2004) investigated the benefits for storytelling skills of children as producers of computer games. A workshop was conducted in which a group of adolescents were given the opportunity to build their own interactive 3D role-play. Using this graphical format, adolescents found the process engaging and rewarding and showed an ability to develop sophisticated game narratives, plotlines, characters and settings, without being completely reliant on writing skills.

Marina Umaschi Bers has coined the term *Identity Construction Environments* to describe the constructionist computer tools she has developed for exploring personal and moral values and personal identity within community environments (Bers 2001; Bers *et al.* 2003). In Zora, a narrative based graphical virtual world, Bers investigated the use of constructed 3D communities as a tool for exploring personal identity in adolescents. Zora is distinctive from Bers' other Identity Construction Environments (Sage, Kaleidostories) in its use of 3D, chosen specifically because the project aimed at engaging adolescents. All 3D objects created within Zora virtual communities have associated stories and narrative attributes. Zora demonstrated the potential of a constructionist 3D graphical world to engage and support adolescents in personal reflection, self-discovery and identity formation. The system demonstrated positive health care benefits in a pilot study in the Pediatric Dialysis Unit of Boston's Children's Hospital.

6. COMPUTER GAMES IN ADOLESCENT PSYCHOTHERAPY

Some researchers from a psychology/psychotherapy background have developed their own games for use in therapy, while others have surveyed the use of computers in the area (Resnick and Sherer 1994; Griffiths 1997). However, research in the area of therapeutic games has been largely uncoordinated. There has been interest and work from a psychotherapeutic point of view, but little from a computer science's, or more specifically a game design's point of view.

In 1984, a psychotherapeutic text based game entitled 'Adventures of Lost Loch' was developed for use by adolescents with low impulse control (Clark and Schoech 1984). The game was successful in engaging clients who had previously been difficult to engage by other means. Clients were more cooperative with their therapists, with whom they developed effective therapeutic relationships and their session attendance rate greatly improved.

Other games have incorporated subject matters particularly relevant to therapy. For example, SMACK (Oakley 1994) deals with the decisions and consequences related to drugs. Players are placed in realistic situations, where they decide what to do and then they see the consequences of their choices, either negative or positive.

Researchers at McGill University in Montreal have developed a game called Eyespy: The Matrix, to treat individuals with low self-esteem. Research has shown that people with low self-esteem exhibit a perverse vigilance in discerning signs and expressions of rejection in others. In the game you must identify a smiling face from a 3x3 grid of otherwise frowning faces. The game showed an ability to help individuals learn skills to deal with negative social information (Dandeneau and Baldwin 2004).

Some therapists have used off-the-shelf commercial computer games with adolescent clients. David H. Allen, an early proponent of computer games in therapy, reported success using Ultima, an off-the-shelf adventure game, with adolescents aged 7-14. Children who completed therapy with the game appeared "to have more self-confidence, a sense of mastery, more willingness to accept responsibility, and less stigma about being in therapy" (Allen 1984). J.E. Gardner used Super Mario Brothers with 5- to 10-year-olds, finding that the game helped the children displace their aggression, develop problem solving skills and deal with negative and positive outcomes in the game (Gardner 1991). Furthermore the use of the game acted as an icebreaker, providing common ground between the therapist and client. The game allowed the therapist to observe the client playing the game in a relaxed state.

Board games are still a more common tool in therapy than computer games. There have been several attempts to convert established therapeutic board games into computer games. Busted is one such game for young offenders with substance abuse problems (Resnick and Sherer 1994). It differs from the games described above in that it is used with groups of 4 or 5 participants. Clients play themselves facing real life situations, making choices and facing consequences. The game is removed from fantasy and closely related to reality in order to help map lessons learned in the game to the client's life. It was hoped that this design aspect would help link players' behaviours to the consequences. Research into the transference of knowledge from the game world to the outside world is an important matter, which requires more consideration. A framework for developing a computerized version of a popular therapeutic board game created by Gardner called the Talking, Feeling and Doing game was designed by Olsen-Rando (Schaefer 1999).

There has been increasing use of biofeedback-based video games for the treatment of anxiety disorders and attention problems. At NASA's Langley Research Centre Alan Pope has developed methods for using off the shelf Nintendo and Playstation games in combination with electroencephalogram (EEG) biofeedback, to train children with Attention Deficit Disorder (ADD), Attention Deficit Hyperactivity Disorder (ADHD) and hyperactivity disorders. Results concluded that the inclusion of games in normal biofeedback treatments increased the therapeutic effect on ADD symptoms. Both children and their parents rated as significantly higher their enjoyment of coming to video game based sessions. Children found the sessions more inherently motivating and remained more focused on tasks (Pope and Paisson 2001).

Researchers at the Virtual Reality Medical Center have demonstrated the effectiveness of virtual reality exposure therapy in combination with physiological monitoring and feedback to treat a range of anxiety and panic disorders including social phobia, fear of public speaking, fear of flying and posttraumatic stress disorder due to motor vehicle accidents.

7. PERSONAL INVESTIGATOR – GAME DESIGN

The next sections describe the design of PI. Ethical issues and therapeutic requirements of the game are

discussed, the choice of a therapeutic model is explained, the difference between PI and previous therapeutic games is explored and a detailed description of the game is given.

7.1 Ethical Issues and Therapeutic Requirements

There are important ethical issues to be considered in designing a game for a mental health care setting. Designers must obey the basic health care principal 'first do no harm', which means that above all else any tool used will not have harmful effects on the client. Games used in mental health care must be based on accepted treatment models and must be designed in full collaboration with mental health care professionals. PI is designed to be integrated into a therapeutic session and used by adolescents in collaboration with a therapist.

Another issue in the design of a therapeutic game is how much and what type of gameplay the game should involve. Therapists expressed concerns that excessive gameplay would distract from the therapeutic process, that adolescents would focus too strongly on achieving game goals and lose focus on the overall therapeutic goal. Lindley speaks about this issue in terms of gameplay gestalts and judges game types in terms of the perceptual, cognitive and motor requirements necessary to achieve gameplay tasks (Lindley 2002). Many of the most popular commercial games (e.g. Quake, Unreal Tournament) focus on motor skill gameplay (fighting, shooting, racing, running). These games engage the player through fast paced action, which requires very fast perceptual and motor coordination, rather than focusing on deliberative cognition, character development and storytelling. Role Play Games (RPG's) offer an alternative to this type of gameplay. Here the emphasis is on strategies, character interaction, relationships and emergent stories. The choice of RPG type gameplay, focusing on storytelling, allayed therapists concerns about the distracting effects of gameplay.

Designing therapeutic 3D computer games is an interdisciplinary activity. It requires expertise from game designers, artists and psychotherapists among others. In the early 1980s it was less complicated to design and build a therapeutic computer game to a reasonable standard. The onset of high quality 3D graphics and AI techniques in gaming has made this less and less possible. Adolescents have much experience of playing high quality commercial games and have high expectations of what constitutes a good computer game. Research has demonstrated that for educational games to be successful they must strive for high quality, otherwise their effect will be lost (Elliott *et al.* 2002).

7.2 Choosing a Therapeutic Model

To design a successful therapeutic computer game for adolescents it was first necessary to choose a suitable psychotherapy model to implement. It was important to choose a structured rather than a freeform therapeutic model. Cognitive Behavioural Therapy (CBT) and Solution Focused Therapy (SFT) are both highly structured and goal oriented forms of therapy that can be used in conjunction with each other for the treatment of mental health disorders, including depression and anxiety disorders (Sharry 2004). SFT is an established and effective strengths-based, goal-focused approach to counseling and psychotherapy. It is more personalised than CBT, focusing on recognising the client's own strengths, achievements and goals. Evidence shows that SFT is as effective as traditional psychotherapies in helping clients (Gingerich and Eisengart 2000). SFT helps clients construct solutions rather than focus on problems, concentrating on the future and not on the past (De Shazer 1988; Sharry 2001).

To implement SFT on a computer, the approach has been divided into five therapeutic conversational strategies:

Setting Goals: Instead of focusing on problems, clients set goals they want to achieve.

Recognising Exceptions: Exceptions are times when the client's problem is not present or is less acute. SFT helps clients recognise and explore these times with a view to repeating them more often.

Coping: SFT helps clients to recognise ways they currently have of dealing with their problem, suggests positive alternatives and explores how they have successfully overcome past problems.

Identifying resources: SFT helps clients identify resources, in particular support from family and friends, which they can draw upon. Drawing on this support can make a vital difference for clients. Resources refer also to the client's own strengths i.e. things they are good at.

The Miracle Question: "Imagine you woke up tomorrow and the problem was solved, how would your life be different?" By imagining a future without their problems, clients are motivated to seek a solution.

SFT was chosen as the therapeutic basis for PI

because it shares a goal-oriented approach with computer games. Both actively use goals as a form of motivation. The first step in SFT is for the therapist and client to set an overall goal they want to achieve (e.g. overcome depression). This overall goal is achieved by completing each of the smaller strategies set out above (e.g. identifying resources). Computer games operate in a similar way. To achieve the major goals (e.g. finish the game), players must achieve minor goals (e.g. fight an enemy). In both SFT and computer games new skills or strategies must be learned in order to achieve goals. Furthermore, the skills learnt achieving one goal can often be reused or adapted to attain further goals. A traditional computer game will reward its players for reaching a goal in different ways, e.g. receiving a special new tool, reaching the next level. In PI the goals defined for the game are therapeutic goals, which will benefit the client in their day-to-day life.

7.3 Innovations in Personal Investigator

Overall, the development and study of computer games in therapy to date have shown several main benefits:

- adolescents engage more in the therapeutic process.
- the stigma felt by adolescents attending therapy is reduced.
- stronger therapeutic relationships develop between therapists and adolescents.

The trials of many previous games have had limited user numbers. PI aims to confirm the above benefits, but also explores some new aspects of computer games and differs from previous computer games in several respects.

Most games developed to date focus on interaction with a pre-written story, in which the player chooses a particular course of action from a preset list of options. These games tend to focus on specific issues (e.g. impulse control, substance abuse) and the therapeutic value for clients lies in witnessing the consequences of their character's actions. PI implements a therapeutic model in an open manner, it is not designed to deal with any specific issue. Our research builds on the benefits demonstrated in educational research and uses a computer game to help adolescents build a structured personal story. In PI adolescents create their own goals and objectives, the game then rewards them for engaging in dialogues and tasks, in order to achieve these goals. It gives the client the choice over the order in which these stages are tackled, as well as giving them the power over the pace at which they move through therapy.

PI also differs from previous therapeutic games by allowing the adolescent to create a personal record of their own game. In PI the player creates a virtual detective notebook in which they write down all their game information, their goals, objectives, ideas and thoughts. As a reward for completing the game, clients receive a printout of their notebook, which serves as a permanent record of their game. Clark and Schoech reported benefits of having a tangible output from a game (Clark and Schoech 1984). The notebook is a tangible record, which can be used to encourage reflection by adolescents on lessons learned in the game.

PI is one of the first therapeutic games for use in one-to-one therapy to incorporate 3D navigation and high quality graphics. It has also been designed to run over the Internet, as a game introduced to the client by the therapist in a session then continued elsewhere between sessions (e.g. home or school). The therapist would review the client's progress in the game at each session, which would provide further material for discussion. This feature makes the game more accessible, and draws on adolescents preference for seeking help online. In future tests we hope to evaluate the feasibility and benefits of using the game over the Internet.

PI is the first computer game to implement a model of SFT. The game explores the benefits of incorporating this goal-oriented therapeutic model into a goal-oriented game. PI also incorporates the use of peer narratives into this therapeutic model. During the game, players have the opportunity to watch videos about other adolescents who have overcome personal problems.

PI is designed to be easily incorporated into the regular working practices of therapists. The use of biofeedback or Virtual Reality treatments in therapy requires specially trained therapists and also specialist equipment, not available in general practices. PI is designed to be easy to use and require no specialist training.

7.4 The Game – Personal Investigator

The choice of a compelling fantasy narrative was crucial to the development of the game. PI employs a detective narrative, to engage adolescents and help them construct their own personal narrative and tell their own story in discussion with a therapist. Detective stories are a popular and enduring

theme in literature, cinema and television. Several computer game titles have successfully employed a detective fantasy (Max Payne, Blade Runner). The educational game series, Carmen Sandiego, has been very successful and popular with adolescents (e.g. 'Carmen Sandiego Junior Detective' by Broderbund or 'Carmen Sandiego Word Detective' by the Learning Company). Titles like 'Detective Barbie: Mystery Cruise' by Mattel Media or 'Secret of the Silver Earring' by Ubisoft, demonstrate that the detective fantasy in computer games generates widespread cross-gender commercial interest.

The detective metaphor particularly suits a solution-focused approach to problem solving and has already been applied to SFT (Sharry 2001), where terms like 'becoming a solution detective' or searching for 'clues' to solutions of personal problems are used. The existence of these ideas in SFT literature made it easier to design and ground the game therapeutically. The detective metaphor provides an established vocabulary for the players to use. In PI, instead of playing a *private investigator* hired to solve a case, the adolescent plays a *personal investigator* whose mission is to resolve a personal problem.

In PI players visit the Detective Academy, a detective school which teaches players coping strategies and strengths to deal with their problems. The adolescent plays the role of a trainee 'solution detective'. The overall goal is to learn how to find solutions to personal problems and graduate from the Detective Academy as a Master Detective. PI maps SFT's five therapeutic conversational strategies, discussed above, into five distinct and separate game areas (Figure 2). Waiting in each of these areas are five different computer characters, each of whom is a qualified master detective.

The trainee learns to become a Master Detective by talking to these five master detectives. Each master detective has a key, which the trainee must collect. To collect a key the trainee must accomplish the tasks the detective sets. To help trainees, the detectives present stories from other adolescents about how they learned to use the particular strategy being discussed. When a key is collected, a visual reward sequence, with triumphant music, is played to reinforce the players sense of achievement. When all five keys are collected, the trainee can graduate from the academy and become a master detective.

Figure 2 Mapping the game areas

The first character the player meets is the principal of the Detective Academy, whose job is to guide players through the goal setting stage of therapy. The principal stands at the entrance of the Detective Academy and has the key, which allows the trainee to enter the academy.

The principal gives the trainee a detective notebook (see Figure 3), which appears at the bottom of the screen, and tells them *"this book will be a mirror to your mind, it is where you can write all your ideas and hunches as you go along."* The player is then asked to think of a detective name and write it in their notebook. Next the principal introduces the basic SFT principle:

> "Now I know you started this game because you have a problem that you want to solve, but before you enter the academy you must turn that problem into a goal you want to achieve. Solution detectives don't think of problems, they think only of the goals that lie underneath. Take a look at your notebook".

In the notebook the trainee is first invited to state a problem they would like to work on. They are then asked to describe this problem as a solution they would like to achieve. Finding this solution becomes the overall therapeutic goal of the player's game. From this point on, the game attempts to positively focus the player's attention on achieving solutions.

Usually a goal is negotiated with the therapist at the start of therapy. This can be a difficult step to complete, but here it is presented as a game goal and is not as serious or daunting for an adolescent

Figure 3 Receiving the detective notebook.

to achieve. When this step is achieved, the principal awards the trainee their first key, which allows them to enter the academy.

Inside the Detective Academy, there are four distinct areas to be explored, corresponding to the four remaining aspects of SFT. For example, in the 'Backup' area the player meets a jovial New York policeman (Figure 4), who helps them understand the need for support and invites them to watch a video testimony from one of his former pupils:

> "Hey, how are you doing? My name's Detective Spade and I'd like to tell you about backup. When the police are in trouble they call for backup. Even on TV the great detectives have a partner who helps them out. Being a solution detective is much the same, you often need other people to help you out. Sometimes it takes great strength to call for backup, but it really makes a difference. I'll let my partner tell you more."

The view in the game rotates to a video screen and the policeman's 'partner', a teenage girl, describes how she overcame a personal problem by talking to her brother. After listening to the story the trainee is asked to take a look at their notebook and write about people in their life who could help them. They are also encouraged to think about their own internal strengths, write about things they are good at and past successes. When these goals are completed the detective acknowledges the trainee's good work and awards them with another key:

> "I gotta tell you, I think you're doing a fantastic job. Now that you've got a partner, I think you're well on your way to becoming a great solution detective. You've earned another key."

Interaction in the other rooms follows a similar pattern (Figure 5); players meet a character, who explores a therapeutic strategy with them, and tells them what they need to do to get a key. In two of the further three rooms they hear a video narrative from former pupils of the Detective Academy.

In the Evidence room players meet a forensic scientist. She helps them think about times in their life when their problem is less prevalent or not there at all. The scientist encourages the player to understand what they are doing differently at these times and set goals for repeating them more often.

In the 'Finding Clues' area, the player is asked to write about how they cope with difficult times. The detective encourages the trainee to write about positive, active ways of coping, that draw on their strengths and interests.

The character in the 'Detecting Solutions' area poses the 'miracle question' to the trainee, who is asked to draw a simple picture in their notebook, of how their life would look if their problems disappeared. The trainee is asked to write down what they and others would think, feel and do differently. The trainee is also asked to rate on a scale of 1 to 10 how close they are to achieving this new future. The answer to this question allows the therapist to judge the confidence and optimism of the adolescent.

The adolescent can tackle the game areas in any order of their choosing. When all the game goals have been achieved, the trainee graduates from the Detective Academy. As a reward, players receive a printout of their detective notebook, which can then be used in further therapeutic work outside of the game.

7.5 Technical Implementation

PI was constructed using two main authoring packages. A beta version of Adobe Atmosphere was used

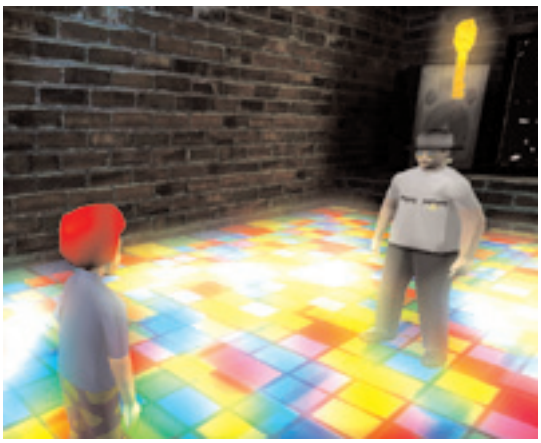

Figure 4 Meeting Detective Spade

Figure 5 Inside the Detective Academy

to create the 3D environments. Atmosphere is quick to develop in, has an excellent lighting system and runs online through Internet Explorer. The game was programmed using the Atmosphere JavaScript API. The detective notebook was constructed using Macromedia Flash MX. Atmosphere and Flash communicate via the web browser. The voices of all the game characters are pre-recorded voiceovers. The game does not attempt to use any natural language processing. Adolescents can write nonsensical answers if they choose to, but are told that to achieve the fullest benefits of the game they should be as honest as possible.

The videoed stories told by teenagers in this version of PI are presented as true stories, and are based on real clinical cases, but for reasons of availability and privacy these videos were acted by teenagers from a local school.

7.6 Using Personal Investigator in a Therapeutic Session

When PI is used in a session, the therapist and adolescent sit together at the computer, with the adolescent taking control of the keyboard and mouse. The adolescent chooses a username and logs into the game. The game creates an individual account for each adolescent, allowing them to save their progress as they go along and return to saved games at a later date.

The adolescent has full control over the game; they play at their own pace and choose their own path through the world. The game affords the therapist an opportunity to observe the adolescent and quietly analyse their answers and actions. If the adolescent asks for help, the therapist can elaborate on the subjects brought up by the game or answer more specific questions from the adolescent in relation to their situation. Throughout the game the therapist is a partner in the exploration of the game world and is no longer an interlocutor.

In a one-hour session the game will normally be used for thirty to forty minutes.

8. TRIALS

Before PI was used in a mental health care setting it was tested and approved by several mental health care professionals.

Four adolescents have completed a pilot study using PI with three therapists in three Dublin clinics. The adolescents ranged in age from 13 to 16 (two boys and two girls) and were referred to the clinics for issues including anxiety and behaviour problems, attempted suicide, and social skills difficulties. Both the adolescents involved and their parents gave their written consent to the use of the game.

Initial expectations were that the game would take one session to complete. However, on average the game took three sessions spread over three weeks to complete, due to the amount of discussion the game produced between therapists and adolescents.

It is important to point out the inherent difficulties in getting detailed feedback when conducting cross-disciplinary studies in therapeutic settings. Direct access to therapeutic sessions or clients by the game designers is not possible. Feedback is in the form of questionnaires from therapists and adolescents and post trial discussions with the therapists. Questionnaires consisted of a combination of multiple-choice questions and also open questions asking for descriptions of game experiences. Multiple-choice questions offered five possible answers. Depending on the phrasing of the question, these answers were either:

- Very Easy, Easy, Not Easy, Difficult, Very Difficult.
- Very Helpful, Helpful, Not Sure, Unhelpful, Very Unhelpful.

The questionnaires and consent form are included in Appendix A.

9. EVALUATION

9.1 Therapist Feedback

All three therapists who used the game with clients commented that it was ‘very easy’ to integrate into their therapeutic work. Two therapists rated the game ‘very helpful’ and one ‘helpful’ in engaging adolescents in therapy, and in helping clients to talk about their personal issues. One therapist commented that the game was a good medium through which to communicate with adolescents. All therapists thought the game was particularly helpful in keeping their clients focused on a therapeutic task for an extended period of time, while keeping the process enjoyable and fun. One therapist stated that the game was ‘very helpful in encouraging clients to think more widely around problems, to examine resources in solving problems and to reinforce coping skills’.

Therapists believed the use of a 3D environment was ‘very helpful’ in engaging adolescents. For

example one therapist stated that it made the game 'interesting and appealing to the young person' and that it was 'very realistic'. One therapist said the 3D gave clients a sense of control and mastery in therapy.

Writing in the detective notebook was described as 'very helpful' by one therapist, who said it was empowering for her client to be able to type her answers out and that it was good for recording ideas which her client could then look back on and also to serve as a therapeutic record. It was rated 'helpful' by the other therapists, but they had reservations over the reliance upon literacy skills, which some of their clients had not mastered.

Watching video stories from adolescents, who had similar problems to the clients and had overcome them, was described as 'very helpful' by two therapists and 'helpful' by one therapist. All three therapists remarked on how interested their clients were in these stories.

All therapists described client's interaction and dialogue with the computer characters in the game as 'very helpful'. Two therapists recommended having a pause and repeat button for the computer characters, so that at any point the therapist could elaborate on what was being discussed.

Critical feedback from the therapists centred on some of the minor design issues of the game. Requests were made for bigger fonts, pause, forward and rewind options for the dialogues, interim printouts of the detective notebook (rather than just at the end) and a more elaborate graduation ceremony to reward participants on completion. There was also frustration expressed at certain technical problems. Each therapist experienced the system crashing at least once, making it necessary to restart the game. Such technical problems are a function of the prototype status of the project, but are especially undesirable in a therapeutic setting.

In general, there was unanimous agreement that the use of PI helped increase adolescent engagement in therapy and helped therapists develop therapeutic relationships with their clients. Therapists also agreed that PI successfully implemented a model of SFT.

9.2 Young person feedback

All four adolescents rated PI as 'very easy' to use. They also unanimously rated the game as 'very helpful' in assisting them to think about and solve a personal problem. When asked to name what they thought was helpful, they named 'collecting the keys', 'answering the questions', 'hearing from other people' and 'listening to the videos'. Listening to the videos of other young people's experience was rated as particularly valuable and rated by three as the most memorable aspect of the game. One adolescent stated that it was 'good to hear from other people'. Three adolescents said the use of 3D was 'very helpful'; the other one was 'not sure'.

Three adolescents described the detective notebook as 'very helpful'. However one adolescent thought it was 'unhelpful', because of difficulties typing answers into the book and reading text from it. Listening to the computer characters and answering their questions was described as 'very helpful', 'helpful' and 'alright'.

The gaming goal of collecting keys motivated the adolescents to answer therapeutic questions. One adolescent gave suggestions for improving the game. He felt that the game was too short and would have liked the opportunity to answer more questions and gain more keys. He also suggested the possibility of adding an 'extra level' in the game for more experienced or older players.

In general, all four adolescents found that the game helped them with their problem and found it fun. One wrote that PI 'helped me figure out my problem'. They all believed that other adolescents would find it engaging and fun use.

9.3 Case Study

In order to give a more detailed account of one adolescent's use of the game, a brief case study is presented. Sue (not real name) was 13 years old when she was referred to an adolescent mental health service because she was anxious about attending school, being in public places and having to talk to other people. She also had low self-esteem and a mild learning disability. Prior to the introduction of PI, the therapist had already seen Sue for seven sessions over several months. Although there had been some progress, Sue was uncommunicative, would often forget her goals and not carry out plans between sessions.

After the game was introduced, there was noticeably more discussion between the therapist and Sue. She completed the game over four sessions and found it very engaging. Playing, navigating around the game environment and typing her answers in the game (writing was a difficulty for her in school) all helped boost her self-esteem. Before answering each question in the game, Sue usually engaged in an extended dialogue about the subject with the therapist. The final answers were often very meaningful to her and gave her confidence as she had ownership over them. One of her difficulties was feeling

anxious when out shopping, when she would be very self-conscious of other peoples' reactions. When asked in the game how she could cope with this anxiety, she typed (after discussion with her therapist) 'think that people are minding their own business', which meant that she had realized that it was better to shift her thoughts from believing that people were focused on her (thus making her anxious and self-conscious) to an opposite belief, which would help her be calmer and more collected. This represented an important cognitive strategy that she built upon and remembered in subsequent situations. The use of PI facilitated this discussion and in this respect helped the therapeutic process.

The positive outcome for Sue was reflected in her self-rating within the game. In the third session she was asked by one of the computer characters to rate between 1 and 10 how close she was to her goal. She chose 7. In the fourth session, she changed this to 10, indicating that she felt she had made sufficient progress towards her goal, to consider ending the therapy.

It is important to emphasise here that PI (or any game used in therapy) should not be viewed as a panacea, but as a tool that helps a client engage in a meaningful way in therapy. In this case PI helped create sufficient conditions from which effective therapeutic work could proceed.

10. DISCUSSION

Based on feedback from the initial pilot study, it is possible to discuss the benefits and weaknesses of PI as a therapeutic computer game. PI confirmed the general benefits of using games (specifically computer games) in therapy, such as heightened engagement and motivation of the client, an increase of enjoyment in the sessions and a more rapid development of a therapeutic relationship.

The use of high quality 3D graphics proved beneficial. Initially, it functioned as a factor to engage adolescent clients. Further to this the 3D aspect and navigation gave clients a sense of control and empowerment and allowed them to pace their journey. In talking-based therapies the pace of the session is often controlled by the therapist. However, the 3D virtual environment allowed the player to control how fast they dealt with each aspect of therapy and gave them control over the order in which they tackled different therapeutic tasks. The use of visual rewards to acknowledge successfully completed tasks also reinforced adolescents' sense of achievement. Finally, the 3D environment represented, according to some of the therapists, 'a safe place to go' for clients. It provided an environement where they could escape the difficulties of their day-to-day lives and where they could solve their personal problems. It helped to remove them, in part, from the stigma related to the therapeutic setting.

The adaptation of SFT into the game, through the use of a detective metaphor, engaged the interest of clients. It gave them an easier framework through which they could understand the different concepts of SFT. The overall therapeutic approach was broken down into a series of achievable tasks. This helped clients to stay focused and motivated during sessions. The game's detective metaphor gave clients a set of concepts and expressions which they could use to talk about their situations more comfortably. For example, the game's use of concepts like 'solution detective', 'backup', 'finding clues', allowed clients to speak more comfortably about difficult personal issues, as well as helping them understand useful therapeutic concepts.

Playing PI was benefical in helping adolescents tell a structured personal story. The use of a virtual detective notebook helped clients record and construct their personal narratives throughout the game. The printout of the notebook served as a record of the therapeutic session, which client and therapist could use in future sessions or which the client could take away as a reminder of what was discussed and agreed upon during the session. A critical feature of the game was the therapeutic conversation that was evoked between therapists and clients. Before and after answering the questions, the clients would discuss their answers with the therapist. These conversations could last up to ten minutes per question. Adolescents had less difficulty answering questions, because they were not posed directly by the therapist but by the computer. The game helped the therapists to become allies with the adolescents playing the game.

The use of peer narratives proved particularly popular in PI. Adolescents found it useful and encouraging to see stories of how other adolescents used the skills, taught in PI, to overcome a personal problem.

Two therapists were concerned about possible literacy difficulties some clients might experience with the game. The current version of PI is overly reliant on writing and literacy skills. One client reported having difficulties typing on the computer keyboard. The addition of several minor features would help reduce the amount of required reading, such as using computer characters to read on screen text. It would be interesting to develop a game which, like Disney's Toontown online, allowed the

expression of emotions through a fixed vocabulary, for example a drag and drop pictorial system.

Overall, it can be argued that PI's structured division of SFT within a computer game metaphor and the use of simple game goals and rewards helped adolescents engage and maintain focus during therapy. The level of control adolescents were given, of pacing and of subject matter, can be viewed as a significant factor in motivating them, increasing their confidence with therapy and helping them learrn new coping strategies. Furthermore, the less direct and less confrontational communication between therapist and adolescent helped make sessions less stressful for clients and helped develop the therapeutic relationship.

11. FUTURE DEVELOPMENTS

Trials of PI are currently continuing in three Dublin clinics. While current feedback on PI gives good indications of the benefits of using the game in therapy, feedback in future tests should involve pre- and post- questionnaires in order to provide more detailed base line data. Current feedback on the use of PI was gathered from post-questionnaires, in combination with more detailed post-interviews with therapists. Testing the game over a longer period and with a greater number of adolescent clients will allow us to gather more specific user data e.g. what effect does using PI have on adolescents attendence rates, do lesson learnt playing the game remain with the adolescents in the longer term?

To date, PI has been used in face-to-face therapy with adolescents, although it is possible to use the game over the Internet. Research into using it remotely between therapeutic sessions would be interesting and could help motivate adolescents to continue therapeutic work when they are away from therapy. For example, the therapist could introduce the game in the initial session and then the adolescent could continue working on the game in their own time. Data from these games could then be used as material for discussion in future therapeutic sessions.

Currently, PI does not adapt to each adolescent's situation. The characters in the game deliver a fixed dialogue. A possible future development of the system will include a non-expert interface which allows therapists to tailor dialogues used within the game to address specific issues and cases. Future designs will also draw on research in the area of story listening systems (Cassell, 2004), to develop more powerful and adaptive story-prompting systems.

It would be useful to develop upon the sharing of peer narratives, which was a successful aspect of the game with adolescents. Future games could make this sharing of narratives more central to the game. Currently each player creates a written record of their game, in the form of a detective notebook. It would be interesting to allow adloescents record and edit a multimedia narrative of their game (perhaps using webcams or simple animations). This narrative could then be made accessible to other players within the game and the stories most relevant to them (including stories taken from other players' games) could be made available.

12. CONCLUSION

The research presented addresses the need to help adolescents engage more easily with therapeutic services and to make therapeutic sessions more focused and efficient. It aimed to do this through the use of a therapeutic computer game. Initial trials indicated that the game helped players to construct a therapeutic personal narrative. Initial testing also suggested that SFT can be successfully integrated into a 3D computer game. Feedback also indicates that PI can help teenagers engage better in therapeutic sessions, helping to build a therapeutic relationship. The use of 3D in the game had an empowering effect on teenagers, giving them control over the pacing and direction of the therapeutic process. Further trials are required to comprehensively explore many of the findings presented here and to explore the use of PI remotely.

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REFERENCES

Allen, D. H. (1984) The use of Computer Fantasy Games in Child Therapy. In Schwartz, M.D. (ed), *Using Computers in Clinical Practice: Psychotherapy and Mental*

Health Applications. Haworth Press, New York, N.Y., pp. 329–334.
Assay, T. P. and Lambert, M. J. (1999) The Empirical Case for Common Factors in Therapy: Quantitative Findings. In Duncan, B.L., Hubble, M.L. and Miller, S.D. (ed), *The Heart and Soul of Change*. American Psychological Association, Washington, DC, pp. 23–55.
Bers, M. (2001) Identity Construction Environments: Developing Personal and Moral Values Through the Design of a Virtual City. *The Journal of the Learning Sciences* 10(4), pp. 365–415.
Bers, M., Gonzalez-Heydrich, G. and DeMaso, D. (2003) Use of a Computer-Based Application in a Pediatric Hemodialysis Unit: A Pilot Study. *Journal of the American Academy of Child and Adolescent Psychiatry* 42(4), pp. 493–497.
Bowman, R. F. (1982) A Pac-Man theory of motivation. Tactical implications for classroom instruction. *Educational Technology* 22(9), pp. 14–17.
Bruckman, A. (1997) MOOSE Crossing: Construction, Community, and Learning in a Networked Virtual World for Kids. PhD Dissertation, Media Lab, Massachusetts Institute of Technology. Available at http://ic.media.mit.edu/Publications/Thesis/asbPHD/PDF/asbPHD.pdf (Retrieved December 2004).
Bruner, J. (1986) *Actual Minds, Possible Worlds*. Harvard University Press, Cambridge, MA.
Bruner, J. (1990) *Acts of Meaning*. Harvard University Press, Cambridge, MA.
Cassell, J. (2004) Towards a Model of Technology and Literacy Development: Story Listening Systems. *Applied Developmental Psychology* 25(1), pp. 75–105.
Clark, B. and Schoech, D. (1984) A Computer-Assisted Therapeutic Game for Adolescents: Initial Development and Comments. In Schwartz, M.D. (ed), *Using Computers in Clinical Practice: Psychotherapy and Mental Health Applications*. Haworth Press, New York, N.Y., pp. 335–353.
Dandeneau, S. D. and Baldwin, M. W. (2004) The Inhibition of Socially Rejecting Information Among People with High versus Low Self-Esteem: The Role of Attentional Bias and the Effects of Bias Reduction Training. *Journal of Social and Clinical Psychology* 23(4), pp. 584–603.
De Shazer, S. (1988) *Clues: Investigating Solutions in Brief Therapy*. W. W. Norton & Company, New York, N.Y.
Elliott, J., Adams, L. and Bruckman, A. (2002) No Magic Bullet: 3d Video Games in Education. *Proceedings of ICLS2002 International Conference of the Learning Sciences.* Available at http://www.cc.gatech.edu/-asb/papers/aquamoose-icls02.pdf (Retrieved December 2004).
Gardner, J. E. (1991) Can the Mario Bros. help? Nintendo Games as an Adjunct in Psycotherapy with Children. *Psychotherapy* 28, pp. 667–670.
Gingerich, W. J. and Eisengart, S. (2000) Solution-Focused Brief Therapy: A Review of the Outcome Research. *Family Process* 39(4), pp. 477–498.
Gould, M. S., Munfakh, J. L., Lubell, K., Kleinman, M. and Parker, S. (2002) Seeking Help From the Internet During Adolescence. *Journal of the American Academy of Child and Adolescent Psychiatry* 41(10), pp. 1182–1189.
Griffiths, M. (1997) Video Games and Clinical Practice: Issues, Uses and Treatments. *British Journal of Clinical Psychology* 36, pp. 639–641.
Kraus, L. M. (1980) *Therapeutic Strategies with Adolescents. Social Casework* 61(5), pp. 313–316.
Lindley, C. A. (2002) Conditioning, Learning and Creation in Games: Narrative, The Gameplay Gestaltand Creative Simulation. *Proceedings of NILE2002, Narrative Interaction and Learning Environments*, Edinburgh, pp.16–23.
Malone, T. W. (1981) What makes computer games fun? *Byte* 6, pp. 258–277.
Malone, T. W. (1981a) Toward a Theory of Intrinsically Motivating Instruction. *Cognitive Science*(4), pp. 333–369.
McFarlane, A., Sparrowhawk, A. and Heald, Y. (2002) Report on Educational Use of Games: Teachers Evaluating Educational Multimedia Report. A report to TEEM. Available at http://www.teem.org.uk/publications/ (Retrieved December 2004).
Nickerson, E. T. and O'Laughlin, K. S. (1983) The Therapeutic Use of Games. In Schaefer, C. E. and O'Connor, K. J. (ed), *Handbook of Play Therapy*. John Wiley & Sons, New York, N.Y., pp. 174–188.
Oakley, C. (1994) SMACK: A Computer Driven Game for at-risk Teens. *Computers in Human Services*, 11(1), pp. 97–99.
Offer, D., Howard, K. I., Schonert, K. A. and Ostrov, E. (1991) To whom do adolescents turn for help? Differences between disturbed and nondisturbed adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry* 30(4), pp. 623–630.
Pope, A. T. and Paisson, O. S. (2001) Helping Video Games 'Rewire Our Minds'. Proceedings of Playing by the Rules Conference. Available at http://culturalpolicy.uchicago.edu/conf2001/papers/pope.pdf (Retrieved December 2004).
Resnick, H. and Sherer, M. (1994) Computer Games in the Human Services – A Review. *Computers in Human Services* 11(1/2), pp. 17–29.
Robertson, J. (2001) The Effectiveness of a Virtual Role-Play Environment as a Story Preparation Activity. Unpublished PhD thesis, University of Edinburgh. Available at http://homepages.inf.ed.ac.uk/judyr/index.html (Retrieved December 2004).
Robertson, J. and Good, J. (2004) Children's Narrative Development Through Computer Game Authoring. *Proceedings of IDC2004, Interaction Design and Children*, University of Maryland, pp.57–64.
Robertson, J. and Oberlander, J. (2002) Ghostwriter: Educational Drama and Presence in a Virtual Environment. *Journal of Computer Meditated Communication* 8(1), online at http://www.ascusc.org/jcmc/vol8/issue1/robertson/robertson.html.(Retrieved December 2004).
Rosen, S. (1982) *My voice will go with you: The teaching tales of Milton H. Erickson*. W. W. Norton & Company, New York, N.Y. US.
Schaefer, C. E. (1999) *Innovative Psychotherapy Techniques in Child and Adolescent Therapy*. John Wiley & Sons, Inc, New York, N.Y., U.S.
Sharry, J. (2001) B*ecoming a Solution Detective: Identifying your clients' strengths in Practical Brief Therapy*. Brief Therapy Press, London.
Sharry, J. (2004) *Counselling Children, Adolescents and Families*. Sage, London.

Squire, K. (2003) Video Games In Education. *International Journal of Intelligent Simulations and Gaming* 2(1), pp. 49–62.
Thorne, E. M. (1982) A Child's Use of a Game to do Grief Work. In Nickerson, E.T. and O'Laughlin, K. S. (ed), *Helping through action: Action-oriented therapies*. Human Resource Development Press, Amherst, Mass.
US Surgeon General (1999) Mental Health: A Report of the Surgeon General. A report to US Department of Health and Human Services. Available at http://www.surgeongeneral.gov/library/mental-health/home.html (Retrieved December, 2004).
White, M. and Epston, D. (1990) *Narrative means to therapeutic ends*. Norton, New York.
Wigren, J. (1994) Narrative Completion in the Treatment of Trauma. *Psychotherapy* 31(3), pp. 415–423.

APPENDIX A – CONSENT FORM AND QUESTIONNAIRES

Consent – Personal Investigator Game

I consent to have the feedback I give in relation to the Personal Investigator game used as part of a research study evaluating the game. In this regard I consent to have my responses on the questionnaire evaluating the Personal Investigator game used as part of the research study.

I understand that no information that identifies me will be used and all personal details will be kept confidential.

Name .....
Date .....
Signature .....

Parental Consent

Name of Parent .....
Date .....
Signature .....

Name of Parent .....
Date .....
Signature .....

Doctor/Researcher .....
Date .....
Signature .....

'PERSONAL INVESTIGATOR' PROFESSIONAL QUESTIONNAIRE

Thank you for using the Personal Investigator video game in your work with this young person. We would be grateful if you would take a few moments to give your feedback. Please attach this form to the young person's feedback form.

Name: .....
Occupation: .....
Date: .....

1. Please describe briefly the issues and difficulties the young person was dealing with that made you decide to use Personal Investigator (PI)

2. Please circle how easy was it to use PI as part of your therapeutic work.
   Very easy Easy Not easy
   Difficult Very Difficult

   2.1 Please say what was easy or difficult?

3. Please rate how helpful PI was in engaging this young person to think about and solve the problem.
   Very Helpful Helpful Not sure
   Unhelpful Very Unhelpful

   3.1. Please say what was helpful or unhelpful?

4. Please rate how helpful were the following aspects of PI in the therapeutic work

   The 3D environment
   Very Helpful Helpful Not Sure
   Unhelpful Very Unhelpful
   Any Comments:

   Writing in the note book
   Very Helpful Helpful Not Sure
   Unhelpful Very Unhelpful
   Any Comments:

   Watching the videos
   Very Helpful Helpful Not Sure
   Unhelpful Very Unhelpful
   Any Comments:

   Listening to the dialogue
   Very Helpful Helpful Not Sure
   Unhelpful Very Unhelpful
   Any Comments:

   Please turn over for more questions

5. What did you find most useful about PI in this case?

6. Overall, what problems do you think the game could help a person with?
7. Overall, which aspect of PI works best in helping young people?

8. Overall, what could be improved to make PI more effective and helpful?

9. Overall, what age range do you think the game is best suited to?
   Any Other comments:

Thank you for completing this questionnaire

'PERSONAL INVESTIGATOR' – YOUNG PERSON QUESTIONNAIRE

Thank you for playing Personal Investigator. We would be grateful if you would take a few moments to give your feedback.

1. What age are you? .....
   Date filling in form: .....

2. Gender male female
3. Please circle how easy was it to play Personal Investigator (PI)
   Very easy Easy Not easy
   Difficult Very Difficult

   3.1 Please say what was easy or difficult?

4. Please rate how helpful PI was in assisting you to think about and solve a personal problem:
   Very Helpful Helpful Not sure
   Unhelpful Very Unhelpful

   4.1 Please say what was helpful or unhelpful?

5. Please rate how helpful were the following aspects of PI

The 3D environment
Very Helpful Helpful Not Sure
Unhelpful Very Unhelpful
Any Comments:

Writing in the note book
Very Helpful Helpful Not Sure
Unhelpful Very Unhelpful
Any Comments:

Watching the videos
Very Helpful Helpful Not Sure
Unhelpful Very Unhelpful
Any Comments:

Listening to the dialogue
Very Helpful Helpful Not Sure
Unhelpful Very Unhelpful
Any Comments:

Please turn over for more questions

6. What did you like most about PI?

7. Is there anything you think that should be different in PI?

8. Can you mention any parts of the game you particularly remember?

9. What age range do you think the game is best suited to?

10. What problems do you think the game could help a person with?
    Any Other comments:

Thank you for completing this questionnaire

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