

# The Design of Computer Systems for Talk-Based Mental Health Care Interventions

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## Abstract

Mental illnesses are the second leading cause of disability and premature mortality in the developed world (Murray and Lopez 1996). However fifty percent of people with mental illnesses do not receive the required treatment (U.S. Department of Health and Human Services 1999). This report contends that the potential of technology in mental health care interventions has been largely unexplored and unexploited. One of the primary reasons for this is that few researchers from a technological background have engaged in this area. Three key ways in which technology can help are identified: increasing access to treatment, reducing the cost of treatments and improving the quality and outcomes of treatments. The report is written primarily for two audiences. The first group are people from computer science and Human Computer Interaction (HCI) backgrounds, who have an interest in designing systems for use in mental health care interventions. The second group is people from a mental health care background who are interested in the application of technology in their area. The first aim of this report is to give a broad overview of the models, theories and objectives of talk-based mental health care interventions. Part one of the report ends with a review of key therapeutic strategies and considerations for the design of computer systems. The second aim is to review current research on the uses of technology. Part two also elaborates on the potential benefits of technology and discusses three stages in the introduction of technology. Finally the third aim of the report is to identify several future research directions, to accelerate research in this domain. It is hoped that this report will provide a reference to guide, and later evaluate, the design of computer systems for use in mental health care interventions.

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## **1. Introduction: Why Design Computer Systems for Mental Health Care Interventions?**

In 1996 Harvard University in cooperation with the World Health Organisation and the World Bank published the results of a large international study entitled ‘The Global Burden of Disease’ (Murray and Lopez 1996). This study revealed that mental illnesses, including suicide, are the second leading cause of disability and premature mortality in developed countries. Cardiovascular conditions come first and all malignant diseases, including cancer, come third. Combined mental illnesses account for over fifteen percent of the total burden of disease in established market economies, such as Europe and the US, and major depression is the single leading cause of disability worldwide among persons over the age of five. In 1999 the US Surgeon General published it’s first ever report on mental health (U.S. Department of Health and Human Services 1999). The report officially acknowledged, for the first time, that mental health is fundamental to overall physical health and that mental disorders are real health conditions. Unfortunately the report also revealed that nearly half of all those with mental health disorders do not receive treatment. The primary causes of failure to receive treatment are lack of access to relevant services and social stigmas associated with mental health issues. The projections of The Global Burden of Disease study show that psychiatric conditions will continue to increase their share of the burden of disease in the next two decades, due primarily to an aging world population coupled with modern advances in the treatment of infectious disease. Based on these findings, mental health services face growing pressure to improve their effectiveness and efficiency.

This report focuses primarily on listening-and-talking based methods of addressing psychological problems and change. In contrast to biomedical approaches, such approaches achieve results largely without resorting to medication. The (U.S. Department of Health and Human Services 1999) found that such interventions are equally as effective as drug based treatments for many disorders. Our review of literature shows that to date the use of computer technologies in this area has been very limited. By understanding the models, theories and methods of talk-based mental health care, it should be possible to design systems that first complement and then extend the possibilities of existing services. The report identifies three key ways in which technology can benefit mental health care services: (1) increasing access, (2) reducing costs, (3) improving the quality and consistency of services. These benefits are discussed in greater detail in Section 10 of this report. The ultimate aim of research is to reduce the cost of and increase access to services, while also improving the quality of treatments.

The report also identifies three stages in the design of technology for mental health care: (1) designing systems that complement or copy existing non-computerised methods, (2) introducing more complex, technology intensive systems which enable therapists to fundamentally change the way they work, (3) more intensive use of technology may begin to have a feedback effect on the theoretical models of mental health care. Most research to date has focused largely on stage 1 of this process. As talk-based mental health care is a late adapter of technology, section 12 of the report explores the potential to

accelerate research on technology in mental health care by adapting ideas already proven in related domains e.g. education, other health sciences, human computer interaction.

This report can be broadly divided into three sections. The first section focuses on talk-based mental care interventions. For example: what is mental illness, when is intervention required, what are the common theoretical models of interventions, how is an intervention structured and what are some of the key strategies used in interventions? The second section focuses on current research on the uses of technology. Several broad categories of technology research are identified and reviewed. The final section speculates on potential future uses of technology.

Given the serious global significance of mental health disorders, it is incumbent on researchers to find new ways of improving mental health care services. The authors of this report hold a very positive view of the potential of technology in mental health care. This view is supported by our review of initial research, which indicates that the potential of technology is significant. Given that technology has been so under utilised there is great scope for research in this area. Even small changes could significantly impact the general health of populations and greatly reduce the costs to society of mental illness and the costs of effective treatment.

## 2. Mental Health and Mental Illness

Mental Health and Mental Illness can be thought of as points on a continuum. The World Federation for Mental Health states: “*Mental health should not be seen as the absence of illness, but more to do with a form of subjective well being, when individuals feel that they are coping, fairly in control of their lives, able to face challenges, and take on responsibility. Mental health is a state of successful performance of mental function, resulting in productive activities, fulfilling relationships with other people, and the ability to adapt to change and to cope with adversity specific to the individual’s culture*”<sup>1</sup>. (U.S. Department of Health and Human Services 1999) concluded that mental health is fundamental to overall well-being and cannot be separated from physical health. It is the springboard of thinking and communications skills, learning, emotional growth, resilience, self-esteem and a successful contribution to society. To enjoy good mental health, it is essential to maintain a realistic but positive view of one self. The way we view ourselves has a direct bearing on what we believe, which can affect relationships and our expectations of the world.

Mental Illness refers collectively to all diagnosable mental disorders. Mental disorders are health conditions defined by the experiencing of severe and distressing psychological symptoms, characterised by alterations in thinking, mood or behaviour, to the extent that normal functioning is seriously impaired, and some form of help is usually needed for recovery. Mental illness can affect an individuals' thought process, perception of reality, emotions and judgment which can result in low self-esteem, poor concentration, poor organisation skills and an inability to complete projects and make decisions. Individuals may also have difficulty in establishing support systems and sometimes display inappropriate behaviour. (Clare 1999) states that a diagnosis of mental illness usually means in practice that:

- A person is experiencing symptoms characteristically regarded as psychological, such as anxiety, depressed mood, elation, hallucinations, delusions, obsessional thinking or compulsions.
- The symptoms are severe and disabling; that is to say, the individual is distressed by them, cannot function, and feels ‘unwell’.
- The individual is so afflicted that he or she cannot ordinarily recover control without external help.
- Rarely is there a single cause of a psychiatric illness and rarely, too, a single treatment.

It is generally agreed that there are several contributory factors in the development of mental health disorders and that some individuals are more vulnerable to mental illnesses than others. Most schools of study agree that the main contributory factors are genetic disposition, past life experiences (particularly early life), current life events (such as bereavement or unemployment or financial disaster or by catastrophic stress such as war or disasters) and socio-cultural and economic factors. Physical illness may also be a contributory factor. The social norms of any society have a large influence on what it means to be mentally healthy: “*The meaning of being mentally healthy is subject to many interpretations rooted in value judgments, which may vary across cultures*” (World Federation for Mental Health). Some of the specific socio-cultural issues which affect mental health care include:

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<sup>1</sup> [www.wfmh.org/wmhd/2004/sec3\\_pt3\\_4\\_glossary.html](http://www.wfmh.org/wmhd/2004/sec3_pt3_4_glossary.html)

gender, disability, age, social class, sexual orientation, religious or secular assumptions and race, culture and ethnicity. Section 12 of this report discusses how adaptability in computer systems could prove particularly beneficial in addressing socio-cultural issues in mental health care.

### 3. The Treatment of Mental Health Disorders

The US Surgeon General concluded that a) the efficacy of mental health treatments is well documented and b) a range of effective treatments exist for most mental disorders (U.S. Department of Health and Human Services 1999). Treatments may take the form of talking, listening and learning (psychotherapy), physical treatment, (drugs, ECT, biomedical) and/or social interventions (attention to stresses at work, in the home, within marriage or relating to money, status, power).

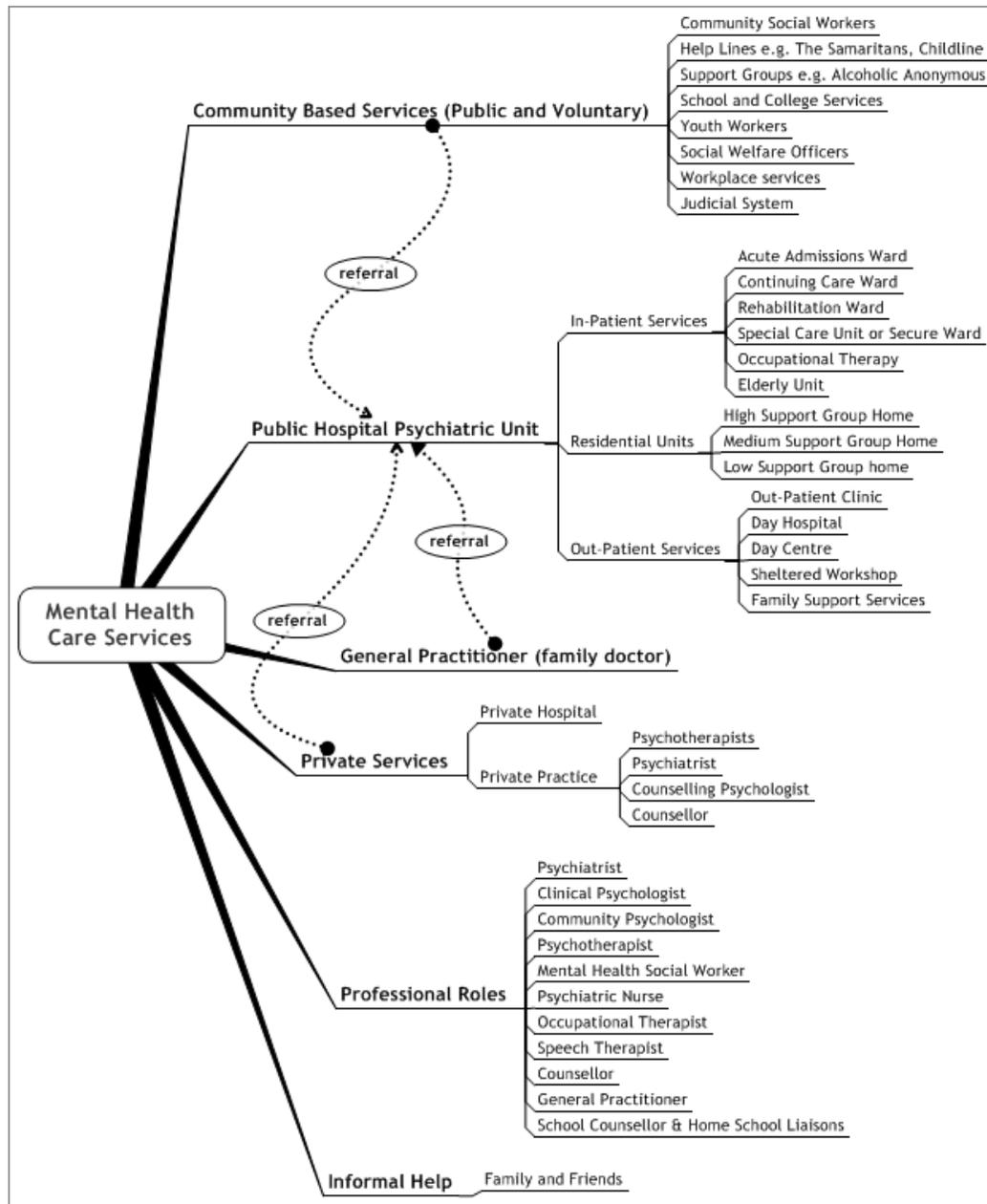


Figure 1: The Structure of Mental Health Care Services in Ireland.

(Egan 2002) uses the term “formal helping professions” to describe the range of specialised professions that combine to provide institutional forms of mental health care. Counselling, psychotherapy, psychiatry, clinical psychology and social working are counted among these professions. There is considerable overlapping between the actual day-to-day activities of professionals and many will have

training in more than one area (e.g. social working and family therapy or psychotherapy). In addition there is also a second set of professionals, who although not helpers in a formal sense, often deal with people in times of crisis and distress. Such professions include community social workers, youth workers, speech and communication therapists, welfare officers, career guidance workers, doctors, nurses, teachers, police officers and priests. These groupings have been called the 'core professions'. In addition to professional helpers life provides a whole range of informal helpers, including family and friends, who help people with the problems encountered in life on a daily basis. Unfortunately people experiencing mental health difficulties often experience difficulty in establishing informal helping structures. Fig. 1 maps a generalised structure of mental health care services.

For many people a general practitioner or family doctor is the first point of contact with mental health care services. If necessary this results in a referral to specialist services. One possible challenge in the design of technologies for mental health care is to increase the amount of care provided by general practitioners and reduce contact hours with more specialist, more expensive and less easily available services. Current work in towards goal is reviewed in Section 11.5.

Some of the specific disorders addressed by mental health care services include: anxiety and panic, depression, behavioural disorders, suicide and deliberate harm, obsessive-compulsive disorder, personality disorders, phobias, social skill and communication problems (including relationship problems), post-traumatic stress disorder, bereavement, autism spectrum disorders, anger control, psychosomatic problems, schizophrenia, addiction disorders (including alcohol problems, drug-related problems), sexual dysfunction, sexual abuse (including childhood abuse, rape and sexual violence towards women), eating disorders, support during physical health disorders.

This report focuses primarily on psychotherapy and counselling based mental health care interventions. The (U.S. Department of Health and Human Services 1999) found that such interventions are equally as effective as drug based treatments for many disorders.

#### 4. Psychotherapy: Talk-Based Mental Health Care

Talk-based mental health care interventions include psychotherapy, counselling, mental health care social work and clinical and community psychology. Although psychotherapy, counselling and social working have different historical roots and have evolved separately, (Feltham 2000) contends that on a practical level these professions have '*much more in common than they have serious and demonstrable differences*'. Psychotherapy will generally have a deeper theoretical background than counselling or social work. (Feltham 2000) in The Handbook of Counselling and Psychotherapy offers the following general definition:

*Counselling and psychotherapy are mainly, though not exclusively, **listening-and-talking based methods of addressing psychological and psychosomatic problems and change**, including deep and prolonged human suffering, situational dilemmas, crises and developmental needs, and aspirations towards realisation of human potential. In contrast to biomedical approaches, the psychological therapies operate largely without medication or other physical interventions and may be concerned not only with mental health but with spiritual, philosophical, social and other aspects of living. Professional forms of counselling and psychotherapy are based on formal training, which encompasses attention to pertinent theory, clinical and/or micro-skills development, and personal development/therapy of the trainee, and supervised practice.*

The crucial part of this definition is highlighted in bold. Psychotherapy interventions are '**listening-and-talking based**' and the primary focus of any therapist is on how they can affect positive mental health '**change**' in their client's life. The definition highlights one of the key differences between psychotherapy and psychology. While both professions strive for an understanding of human mental activity, psychologists place greater emphasis on understanding, whereas psychotherapists place greater emphasis on the application of this understanding to achieve positive mental health change. Technologies designed for psychotherapy interventions need to consider how they can extend talking-and-listening based methods and improve therapists' ability to affect positive change.

(Egan 2002 pp15-16) suggests the range of professional training that an ideal professional helper might have:

1. A working knowledge of *applied developmental psychology*: how people develop or create their lives across the life span and the impact of environmental factors such as culture and socio-economic status on development.

2. An understanding of the principles of *cognitive psychology* as applied to helping, because the way people think and construct their worlds has a great deal to do with both getting into and out of trouble.
3. An understanding of the *dynamics of the helping professions* themselves as they are currently practised in our society, together with the challenges they face.
4. An understanding of clients as *psychosomatic beings* and the interaction between physical and psychological states.
5. The ability to *apply the principles of human behaviour* – what is known about incentives, rewards and punishment – to the helping process, because wrestling with problem situations often involves incentives and reward.
6. *Abnormal psychology*: a systematic understanding of the ways in which individuals get into psychological trouble.
7. An understanding of the *diversity* of age, race, ethnicity, religion, sexual orientation, culture, social standing, economic standing and the like among clients.
8. An understanding of the ways in which people act when they are in social settings – *the people in systems framework* – together with an understanding of clients in context – that is an understanding of clients in the social settings of life.
9. An understanding of the needs and problems of *special populations* with which one works, such as the physically challenged, substance abusers, the homeless.
10. *Applied personality theory*: because this area of psychology helps us understand in very practical ways what makes people tick and many of the ways in which individuals differ from one another.

#### 4.1 Goals of Psychotherapy

On a practical level, in terms of facilitating actual positive change for real clients, (Egan 2002) lays down a single foundational or quality of life goal for all helpers. That is, to improve the subjective well being or happiness of the client. He also states: “*helping encounters should be both remedial and preventive. Clients should leave helping sessions more capable of managing problems and both spotting and developing opportunities. Ideally they should leave with the ability to communicate more effectively with themselves and others.*” As subjective well being is a relative immeasurable quantity Egan also sets out two principal immediate goals of helping:

**Egan’s first goal:** to help clients manage their specific problems in living more effectively and develop specific unused resources and missed opportunities more fully. Helping encounters are successful to the degree to which clients are better positioned to manage specific problem situations and develop specific unused resources and missed opportunities. Note this stops short of saying that clients actually end up managing problems better or developing opportunities better. Ultimately clients choose to live more effectively or not. Helping is a two-way process. Clients are successful to the degree that they commit themselves to the helping process and capitalise on the lessons learned when they are ‘out there’ in their day-to-day lives. Therapists are successful to the degree which the client-helper interactions improve the clients ability to achieve these outcomes. Some modern therapies (e.g. Solution Focused Therapy) have taken issue with this measurement of success and believe interventions should be measurable in terms of quantifiable results, outcomes, accomplishments and impact.

**Egan’s second goal:** to help clients become better at helping themselves in their everyday lives. Most people in society are not educated on how to systematically tackle problems in their daily lives. Small problems or failures generally go unnoticed because of the need to do the next thing. When crisis situations occur people often lack the necessary management skills to successfully approach the problem because they are not “educated to do so”. For clients to be better able to manage their problems in living more effectively and develop opportunities on their own, it is essential that helpers share some form of problem management and opportunity development process with them. Goal two identifies the clients’ needs to:

1. Participate actively in the problem-management process during the helping sessions themselves.
2. Apply what they learn to managing immediate problems and opportunities.
3. Continue to manage their lives more effectively after the period of helping is over.

Helping at its best provides clients with tools to become more effective self-helpers. What follows next is a more specific listing of a range of the goals of counselling and psychotherapy. See (Feltham 2000) for further details.

**Crisis Intervention and Management:** People suffering breakdowns of many kinds, or survivors and witnesses of critical incidents, are often offered immediate help including debriefing, support, practical and active-directive help and referral to specialist resources. The aim is to provide sensitive, psychologically strengthening help and avoid the connotations of psychopathology. The main goal is to restore the level of functioning that existed prior to the crisis.

**Symptom Amelioration:** A symptom is a distressing or troublesome change of condition which manifests itself as a crisis, inability to function as normal or apparently inexplicable somatic phenomena. The majority of clients simply want symptoms to go away e.g. a depressed person will simply want to be less depressed. Behaviour therapists in particular focus on symptom amelioration. Their main aim is the identification of problematic behaviour and its reduction or elimination in the most efficient time span.

**Cure:** Therapists and counsellors generally avoid the use of the word cure. This is due to three primary reasons: (1) in clinical experience clients are rarely resolutely or dramatically cured, (2) suffering and problems with living are not regarded as biological disturbances to be treated with medical interventions (3) resistance to engendering hopes of unrealistic outcomes.

**Support:** Supportive therapies aim to uphold current ego-strength and coping skills and do not aim to challenge or uncover. Support may take the form of warm, non-judgemental listening and encouragement but should remain professional as distinct from befriending or friendship. The aim is to help a client through a difficult time.

**Psycho-educational Guidance:** The goal here is to improve behaviour and to teach personal skills in various areas of life. Examples include appropriate information giving, coaching, mentoring, life-skills training, assertiveness training, provision of social skills, relaxation training and relapse prevention programmes. The goal is not to uncover psychopathology, but to directly enhance cognitive, behavioural and interpersonal functioning, to assist clients meeting developmental challenges and to equip them with concrete coping techniques.

**Problem Solving and Decision Making:** For some clients the purpose of entering therapy is to examine a life situation or dilemma and come to a resolution or decision. The therapist facilitates exploration of feelings, issues and practicalities.

**Systematic, Organisational or Social Change:** Some forms of therapy (e.g. Family therapy) see conflict resolution and change within domestic partnerships, families, task groups and other groupings (including businesses) as their clear goal.

**Insight and Understanding:** For some therapists and clients the primary goal is to attain deeper and deeper insights or a state of continuous understanding of self, how conflicts arise, of motivations and the causes of problematic feelings, thoughts and behaviours.

**Self-Actualisation:** This includes all aims toward becoming a better person, having greater self-awareness or attaining fully functioning personhood. These are generally accepted as open-ended goals.

**Personality Change:** Eschewed by the more cognitive-behavioural and short-term approaches, this goal hints at the possibility of far reaching personality change. Many, particularly humanistic, psychotherapists regard their work as 'life-transforming therapy'.

**Discovery of Meaning and Transcendental Experience:** Particularly given the decline in formal religion, several, particularly existential, humanistic and transpersonal therapies have explicit aspirations towards the exploration of existential, spiritual or meta-physical meaning and transcendental experience.

## 4.2 Modalities of Treatment?

Counselling and Psychotherapy take place in many settings and in many forms:

**Individual Therapy** is by far the most common form of therapy and is often conducted in one of the following ways: fifty-minute sessions up to five times a week, sometimes for many years, using a couch or chair (psychoanalysis), fifty or sixty minute sessions once, twice or three times weekly for months or years (psychotherapy or counselling), single-session therapy, short-term and brief

counselling or psychotherapy (e.g. 6, 10, 20 sessions), open-ended, serial, or intermittent patterns of attendance.

Individual therapies offer clients optimal confidentiality, privacy, attention, intimacy, and safety. These benefits must be balanced against the therapist's expertise of specific areas and also the potential for dependence, manipulation, acting-out and abuse.

**Group Therapy** offers clients the opportunity to learn that others experience similar problems to themselves, to be accepted by a group, to give as well as receive help and insights and to learn to draw on others experiences and perceptions. Peer support groups such as Alcoholics Anonymous derive much of their effectiveness from mutual experience and committed support. Groups can often act as a bridge from individual therapy to everyday life. Like couple and family therapists, group therapists require particular training and skills and this work is sometimes conducted with co-leaders and facilitators.

**Family Therapy** deals with the issues of a family as a whole or else other family members may become involved for the benefit of a particular family member needing help. Family therapy is a specialised form of treatment that is usually associated with social and family service units. It has a rich and diverse theoretical and clinical tradition, which is discussed in greater detail later in this report.

Within each of the above broad areas there are many areas of specialism. In designing technologies for psychotherapy it is crucial to identify the treatment modality the system is being designed for. Section 9 of this report discusses a proposed computer mediated model for psychotherapy interventions.

### **4.3 Public vs. Private Practice**

There are many differences between the public and private delivery of mental health care services. Severe mental health disorders are generally dealt with by the public health care system (this is sometimes the result of a referral after initial contact with a private service). Particularly severe disorders generally result in in-patient or residential care. However the majority of cases are dealt with on an out-patient basis. Public systems face great time pressures in dealing with clients. Psychotherapists or counsellors working privately may often spend months or even years working with a particular client, often on a weekly basis. Such long durations of treatment are generally not possible (or desirable) in the public system. This difference often has an impact on the models and goals of psychotherapy adopted in both settings. Private therapy often involves psychodynamic approaches that encourage open ended exploration of clients' lives with the aim of gaining ever deeper insight and understanding. Public systems are more likely to adopt more structured, goal oriented approaches, placing greater emphasis on achieving specific targets and relieving specific problems faced by the client in the shorter term. Increasingly public systems are adopting 'Brief' approaches to psychotherapy, which emphasise the benefits of highly focused, limited duration interventions.

When designing technologies for public health care systems it is important to consider the time limitations imposed by the system e.g. how often will a therapist see a particular client, how long is a typical visit? These time considerations are one of the major differences in designing for mental health care situations as compared with educational settings.

## **5. The Major Schools: Theories of Psychotherapy**

(Karasu 1986) estimated that there are between 250 and 400 different approaches to psychotherapy. However there are only a handful of 'major schools' of psychotherapy and in practice most counsellors and psychotherapists often borrow and mix methods and techniques from various approaches. This borrowing and stitching is called eclecticism. Therapy or healing may occur without or apart from theoretical preparation or influence, but is commonly driven by theory. (Egan 2002) describes 'working knowledge' as the translation of theory onto the kind of applied understanding that enables therapists to work with clients.

What follows are brief descriptions of the most prominent schools of psychotherapy. There is no universally agreed way of classifying the schools. The categorisation used here is suggested by the Handbook of Counselling and Psychotherapy (Feltham and Horton 2000). Schools are categorised according to their closeness to the major movements in psychotherapy during the twentieth century – Psychodynamic, Humanist-Existential, Cognitive-Behavioural and Eclectic-Integrative Approaches. Three main sources have been used for this material – the 'Handbook of Counselling and Psychotherapy' (Feltham and Horton 2000), 'Modern Social Work Theory' (Payne 1997) and

'Counselling and Psychotherapy: Theories and Interventions' (Capuzzi and Gross 2003). Further details may be found in these texts.

## 5.1 Psychodynamic Approaches

Psychodynamic approaches to psychotherapy include: Psychoanalytic Therapy (Freudian), Adlerian Therapy, Analytical Psychology (Jungian) and Psychodynamic Therapy (Kleinian).

Psychodynamic theories assume that behaviour comes from movements and interactions in peoples minds. They emphasise how the mind stimulates behaviour and also how a person's social environment both influences and is influenced by the mind and behaviour. Psychodynamic treatments are often insight based, focusing on helping people to reveal repressed feelings and conflicts, to increase self-knowledge and explain behaviour. Great emphasis is placed on exploring early life experiences. This approach developed from the early discoveries and theories of Freud, who found that by helping patients recall and talk about painful childhood experiences, he could relieve them of debilitating hysterical symptoms.

Freud's psychoanalytic theory is the most influential of the psychodynamic schools. Two important basic ideas underpin psychoanalytic theory:

1. **Psychic determinism:** the principle that actions or behaviour arise from peoples thought processes rather than just happening.
2. **The unconscious mind:** the idea that some thinking and mental activity are hidden from our knowledge. Unconscious thoughts are still dynamic, in the sense that they cause us to act, even if we are unaware of them.

Freud's proposed the 'Structural Model' of the mind, dividing the mind into the Ego, Superego and Id. The Id is amoral. The Ego is responsible for imposing the reasonable demands of the real world on the Id. The Superego is super moral. Conflict is the pervasive character of mental life and arises from the incompatibility of instinctual drives with the moral, ethical and social sides of the personality. Resistance arises when thoughts and feelings are not compatible with beliefs we hold strongly or when overwhelming experiences threaten to overcharge the conscious mind. The unconscious mind represses intolerable ideas, but they return in the form of symptoms. Anxiety is a signal of this conflict and overwhelming anxiety is experienced as trauma, which can render an individual helpless. The ego may take counter-productive defensive measures, such as denial, displacement, projection and repression, in an attempt to protect the individual from the pain of self-knowledge.

Psychoanalytic therapists believe that beneficial mental health change can occur by increasing an individual's self-knowledge and bringing the unconscious into consciousness. Transference is an important aspect of change. This refers to times in therapy when past trauma is unconsciously repeated or transferred into the present, often onto the therapist as a symbolic parent figure. Transference creates creative and mutative moments when the past can be restructured and explored in more depth. Past trauma is re-experienced in the present, revealing hidden feelings and liberating creative potential for new resolutions and the prospect of taking greater responsibility for actions.

Adlerian Therapy introduced the idea of holism in people. Alder believed a client's consistent pattern or behaviour, goals, thoughts and emotions must be viewed as a whole, and referred to this as the lifestyle. He believed mental health depended on a full and balanced participation in three life tasks: occupation, social life and an intimate relationship. Jung's Analytical Psychology was strongly influenced by Eastern philosophies. He introduced ideas such as individuation (the development of a symbolic attitude and the emergence into consciousness of split-off elements of the psyche), the collective unconscious and psychological types such as introvert and extrovert. Klein's Psychodynamic Therapy places a great emphasis on relationships, particularly with care givers. Difficulties with care givers underlie many problems in the present and past. Emotional understanding is a powerful tool and an understanding relationship can allow individual's to develop their capacities to feel, think and understand themselves and others better. Klein used the term 'phantasies' to describe people's internal models or pictures of the world and ourselves in relation to it. (A good example is: One adult know the world is a friendly place, whereas another lives in constant fear of attack.) These phantasies grow dynamically through life. Problems arise when infantile phantasies do not get modified through play and age appropriate relationships with real people.

Free association is one of the primary strategies of psychodynamic therapies, aimed at revealing the unconscious. The client is encouraged to say whatever comes to mind and dreams are explored. The therapist maintains a state of reverie, making links between associations and waiting for signs of

repression, shown through hesitations or resistance to ideas, or slips of the tongue. Jung placed particular emphasis on creative forms of free association, such as painting. Klein was one of the early proponents of play based therapies.

Psychodynamic interventions are often very time intensive, often based on years of work. This means that while this approach remains popular in private practices it is usually impractical for publicly funded and emergency interventions. Although modern research suggests that pure psychodynamic approaches are no longer the most effective treatments, the influence of the psychodynamic theories is pervasive.

## 5.2 Cognitive-Behavioural approaches

Behavioural psychotherapy developed from early work in learning theory. Whereas psychodynamic theory states that behaviour comes from processes in the mind, learning theory argues that we cannot know what is happening in someone else's mind. We can only study and influence the behaviour which emerges. Aside from inborn reflexes, all behaviours are learnt through contact with the world (conditioning). It is therefore possible to learn new behaviours to replace those which cause problems (counter-conditioning). Treatments focus on doing things which lead to consistent changes in behaviour. Behavioural theory focuses on two main types of conditioning: respondent or classical conditioning and operant conditioning.

Exposure therapy and systematic desensitisation is one of the most commonly used counter-conditioning techniques in behavioural therapy. Clients are first taught relaxation techniques. Then they are gradually exposed to an anxiety provoking stimulus and learn to use the relaxation techniques to fight their anxiety. Section 11.5 reviews of how Virtual Reality systems have been used to extend traditional exposure techniques.

Cognitive therapies developed in part from behaviour theory and also incorporated lessons of social learning theory. They argued that the way we think about our world and ourselves plays an important role in our emotions and behaviour. Emotional and behavioural problems can be addressed by helping clients to identify and change their thought patterns (cognitive processes). Beck's Cognitive Therapy is the most evidence-based, influential and widely used cognitive approach (Feltham and Horton 2000). It is a goal oriented, problem solving and structured model. Beck hypothesised that mental health disorders such as depression were 'thinking disorder'. People with mental disorders show a negative bias in their thinking or cognition and these cognitions are linked to feelings, behaviour and physiology. Beck identified three significant types of cognitions that are available for study by the conscious mind:

*Information processing:* the information constantly received from internal (physiological) and external sources, which the brain processes and makes sense of.

*Schema:* hypothetical cognitive structures which act as filters to incoming information. These are a persons the internal rules and underlying beliefs, learned through early life experiences.

*Automatic thoughts:* these are thoughts that occur spontaneously and are part of an individual's internal dialogue. These thoughts are on the edge of awareness and can be difficult to recognise.

Beck's cognitive model proposes that it is not just people's situations and experiences which make them depressed or anxious, but rather their own internal schema and how they process experience. People can have adaptive and healthy schema or maladaptive and unhealthy schema, which tend to be negative, rigid and inflexible. All incoming information is distorted to fit internal schema. Long lasting change comes for modifying a person's dysfunctional schema and beliefs. This is called cognitive restructuring.

The first aim in treatment is to educate clients about the cognitive model, which relates thoughts to emotion and behaviour. The therapist and client then attempt to conceptualize the client's problems, by identifying the client's current thinking patterns, assessing current precipitating factors and considering predispositions factors including past traumatic experiences, genetic vulnerability and personality factors. Once a formulation has been arrived at, the therapist and client work together to set specific goals for achieving change. Some of the specific strategies used to bring about cognitive restructuring include Socratic questioning, cost-benefit analysis, considering alternative perspectives, completing automatic thought forms, reality testing and cognitive rehearsal. Other strategies are more behaviourally focused including monitoring, recording and rating daily activities and scheduling productive activities.

Today few therapist use exclusively behavioural or cognitive approaches. Cognitive-Behavioural Therapy (CBT) has developed to include successful aspects of both approaches, with therapists focusing on changing thoughts and feelings alongside behaviours. CBT is an active-directive counselling style. The therapist directs the therapy in collaboration with the client. Client self-efficacy is one of the most important aims of treatments. Self help exercises and therapeutic homework are commonly given. The client is taught therapeutic skills and is direct in ways of ultimately becoming their own therapist, in the aim of preventing relapses. Treatment focuses on the here and now of the client's life. Explicitly agreed and operationally defined treatments are used, to achieve agreed treatment goals and bring about desired changes in life. Some of the most commonly suggested treatments, for particular issues include: exposure therapy, systematic desensitisation, relaxation training, response prevention, coping tactics, cognitive restructuring, self-monitoring, self regulation, covert sensitisation, aversion and satiation, psychoeducation, role rehearsal, social skills training, modelling and contracting.

CBT is one of the best researched psychotherapy treatments. The empirical validation of treatments is emphasised. A number of studies have shown that Beck's methods are superior to drug based interventions and other therapies for a wide range of problems, including anxiety disorders, mild to moderate depression, emotional disorders, phobias (including social phobia), interpersonal problems, post-traumatic stress disorders, habit disorders, obsessive-compulsive disorders, chronic fatigue syndrome and psychosis (Feltham and Horton 2000) pp320 (Payne 1997) pp129. CBT is widely used in publicly funded health based interventions. Some of the key reasons for this are that they are widely applicable, goal-oriented, problem solving, easily learned and effective. CBT is more highly structured than other therapeutic methods and employs more psychoeducational elements. Interventions generally follow a specific formulation of assessment (including questionnaires), goal setting, attempting specific strategies and then measuring success based on valid and reliable clinical measures (e.g. the Beck Depression Inventory (Beck et. al. 1974)). CBT is also less time intensive than more free form methods. These are critical factors for hard pressed public agencies.

Of all the psychotherapy models reviewed in this report, CBT has received the most attention in terms of computerisation. See Section 11.5.1 for a review of this work.

### **5.3 Humanistic-existential approaches**

Humanistic and Existential approaches to psychotherapy include: Existential Counselling and Therapy, Gestalt Therapy, Narrative Therapy, Person-centred Counselling and Therapy, Primal Therapy, Psychosynthesis Therapy and Transactional Analysis.

Humanist and Existential approaches to psychotherapy emphasise the ability of human beings to reason, make choices and act freely. They focus on the capacity of the people to gain the personal power to control their lives and change ideas governing how they live. Psychodynamic and behavioural theory emphasise how the past has an important influence on the present. Humanist and Existential approaches emphasise how it is our interpretation of the past which is important. Consequently, people are able, through their personal freedom, to create or define themselves and reinterpret their past in an empowering manner, giving it new meaning and freeing them to act towards a more fulfilling future. Humanist and Existential approaches encourage clients to focus on and experience the 'here and now' and not dwell too much on past or future. One of the primary aims is personal empowerment. Clients are helped to accept their freedom to define their own lives (self-definition or self-creation) and also their own freedom to change their lives. This poses challenges as well as creating opportunities. The client must accept personal responsibility for both the positive and negative aspects of their own character and situation. With freedom to act also comes responsibility for our actions. We are free to act, but we are not free from responsibility to our environment and the consequences of our actions. This report focuses on person-centred and narrative therapies.

Person-centred therapy was first developed by Carl Rogers and colleagues in the 1940s. One of the key initial assumptions, that set it apart from psychodynamic therapy of the time, was that clients should not be viewed as having illnesses to be cured. Rather therapy was to be seen as a process of exploring a client's potential in a collaborative way. Helping clients towards the fulfilment of potential and wholeness (actualisation) is the core motivational construct. Rogers thought there were two selves in many of us: the self-concept and the ideal or true self. The self-concept is the way a person sees themselves. The ideal self is the true self or who one would like to be. Congruence is the amount of agreement between the self-concept and the ideal self. Greater congruence leads to greater psychological health. If a person's idea of who they are bears a great similarity to what they want to be, that person will be relatively self-accepting and psychologically healthy. The aim of person-centred

counselling is to increase the client's congruence. The client-therapist is central to person-centred counselling. Rogers' greatest contribution to psychotherapy practice was the '*necessary and sufficient conditions for therapeutic personality change*':

- The therapist attempts to gain an emphatic understanding of the client's view of the world and to communicate that understanding.
- The therapist maintains unconditional positive regard for the client, that is, a positive, non-judgemental and accepting attitude.
- Therapists must be congruent or genuine within the relationship, that is, what they do and say reflects their personality and attitude and is not put on to influence clients.

Person-centred therapy is largely non-directive. The therapist does not set specific goals for the client or suggest focusing on specific experiences. The therapist also refrains from making specific interpretations of a client's experience. The healing effects is predicted to occur through the client experiencing an emphatic, non-judgemental, positive and accepting relationship that frees them to achieve greater self acceptance and congruence. The importance placed on the client-therapist relationship in person-centred therapy has had a major influence on other modern treatments

Narrative Psychotherapy is a more recently developed humanistic approach. The core text in its development is 'Narrative Means to Therapeutic Ends' (White and Epston 1990). It developed out of movements in psychology by theorists such as Bruner who argued that storytelling represents a fundamental human means of communication and making meaning. Personal narratives 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). It is our interpretation of the past which is important. Mental health problems can arise when a person tells overly negative stories or becomes blocked from telling their story. Such silencing can occur for many reasons including social isolation, overly critical environments, purposeful oppression (as in the case of physical or emotional abuse or ethical or political repression) or because a person feels their story does not fit with accepted or perceived social norms. Narrative 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). Within a strengths-based approach to psychotherapy, the process can be conceived of 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, Brosnan et al. 2004). Personal stories are always co-constructed in the presence of a real or implied audience. In narrative interventions the therapist or counsellor is both a witness to and co-creator of the client's story. Many narrative interventions will seek to create a record of the client's story. This record can act as a tool for reflection. Traditionally this record is usually written, however multimedia systems now offer greater scope for media rich records and also greater possibilities for sharing and co-constructing therapeutic stories. See Section 11.5.2 for a review of computerised collaborative storytelling systems.

#### **5.4 Eclectic-integrative approaches**

Recent trends suggest that eclectic approaches to client treatment work best. Examples of eclectic and integrative approaches to psychotherapy include: Cognitive Analytic Therapy, Multimodal Therapy, The Skilled Helper Model and the Trans-theoretical Approach. The Skilled Helper Model is discussed in Section 6 of this report.

Cognitive Analytic Therapy (CAT) was developed by Anthony Ryle in the 1980's in the context of the National Health Services (NHS) in the United Kingdom, with the aim of providing a psychological treatment which could realistically be provided in the NHS. CAT evolved as an integrated therapy based on ideas from psychoanalytic therapy, cognitive therapy and including ideas of personal empowerment and empathic relationships common in humanistic approaches. The model emphasises collaborative work with the client, and focuses on the understanding of patterns of maladaptive behaviours. Therapy is brief in duration (typically 12 to 16 sessions) and is based on a structure of description, recognition and revision. CAT allows therapists to integrate therapeutic skills from many treatment schools into this overall structure. The treatment is supported by frequent use of rating sheets for ongoing joint evaluation. For details of CAT see (Ryle and Kerr 2002).

Multimodal Therapy was initially developed as an integrated treatment by Arnold Lazarus, who felt that many specific therapies lacked sufficient breadth. He described seven dimensions or modalities of human behaviour, namely Behaviour, Affect, Sensations, Images, Cognitions, Interpersonal and Drugs/biology. The acronym BASIC ID describes these modalities. Lazarus believed that unless

treatment addresses each of these seven modalities, significant issues will be overlooked and the probability of client relapse will increase. Multimodal therapy has a broad basis in cognitive-behavioural treatments, underpinned by broad social and cognitive learning and draws on communications theory and systems theory. A large spread of causes are associated with psychological disturbances, including: (1) conflicting or ambivalent feelings or reactions (2) misinformation (3) missing information including ignorance, naiveté and skills deficits (4) maladaptive habits including conditioned emotional reactions (5) low self esteem and lack of self acceptance (6) inflexible and rigid thinking styles and attitudes (7) unhelpful core schema (8) tendency to cognitively 'awfulise' events (9) unhelpful beliefs maintaining a low frustration tolerance (10) information processing errors or cognitive distortions (11) interpersonal iniquity such as misplaced affection, undue dependency or excessive antipathy and (12) biological dysfunctions. Treatment is psycho-educationally based with the therapist ensuring the client understands why each technique or intervention is used. The therapist begins by describing the BASIC ID formulation to the client and the client's presenting problems are then formulated in terms of each category. A 15-page Multimodal Life History Inventory (Lazarus and Lazarus 1991) is available, but not always used, to elicit comprehensive information about a client's history and BASIC ID. From this a Structural Profile may be drawn (Lazarus 1989), which describes the client's normal modalities of behaviour e.g. are they more affectively or cognitively orientated. Multimodal therapy then suggests a wide range of treatments based on this assessment. See Appendix A for a list of frequently used techniques suggested by Multimodal Therapy. For further details on Multimodal Therapy see (Lazarus 1989).

The Trans-Theoretical Approach also encourages an eclectic approach to helping interventions. It provides a very detailed model of how psychological change occurs, and identifies 10 means for affecting change: consciousness raising, self-liberation, social liberation, counter conditioning, stimulus control, self re-evaluation, environmental re-evaluation, contingency and reinforcement management, dramatic relief and helping relationships. A four stage model of the 'states of change' is also described: pre-contemplation, contemplation, action and maintenance. Finally the Trans-Theoretical Approach identifies five levels of psychological functioning at which change may be aimed: symptom or situational, maladaptive cognitions, current interpersonal conflicts, family or system conflicts and intrapersonal conflicts.

## **6. A Generic Overview Model**

Recent trends suggest that eclectic approaches to client treatment work best. Effective eclecticism however requires some integrating framework to give coherence to the entire process. One aim of this report was to find a broadly accepted and integrative overview model of counselling and psychotherapy.

The Skilled-Helper Model (Egan 2002) has been in development since 1975 by Professor Gerard Egan of Loyola University, Chicago, US. It is the most widely used model of counselling and psychotherapy in the world (Egan 2002). (Orlinsky & Howard, 1987) say that it is a generic model of helping. (Connor, 1994) reports that it is the core theoretical model for training counsellors in the UK, that succeeds largely due to the fact that it spells out, in a flexible, step-by-step fashion, the way human beings actually think about constructive change. It is a client-centred, humanistic and broadly problem management and opportunity development model for counselling and psychotherapy.

The model, fig.2, is separated into three stages plus an overall actions line. Each stage centres on a series of tasks that help clients move forward in managing problems and developing opportunities. The theme of stage one is problem/opportunity clarification and ownership. Stage two is about goal setting and commitment to goals. Stage three is about strategies for accomplishing goals. In practice the stages overlap and interact.

### ***Stage 1: The Current Scenario***

**Story:** Help the client tell their story and describe, in their own way, their current situation. In this step the therapist allows the client's story to emerge naturally without attempting to point out misconceptions or blind spots.

**Blind Spots:** Help the client break through blind spots that prevent them from seeing themselves, their problem situations, and their unexplored opportunities as they really are. If the client can get an undistorted picture of themselves, their problems and unused opportunities, they will have a better chance of doing something about it.

**Leverage:** Help the client choose the right problems and/or opportunities to work on. Clients can gain leverage by working on issues that will make a difference.

### **Stage 2: Preferred Scenario**

Possibilities: Help the client use their imagination to spell out possibilities for a better future. This stage calls for open creativity. It can help clients move beyond the problem-and-misery mindset and develop a sense of hope.

Change Agenda: Help clients choose realistic and challenging goals that are real solutions to the key problems and unexplored opportunities identified in Stage 1. Possibilities are turned into goals that constitute the change agendas.

Commitment: Help the clients find incentives that will help them commit themselves to their change agendas. Unless the clients is committed to achieving change, their goals end up as no more than some nice ideas. Clients are often sincere in setting goals but then struggle when confronted with the demands of everyday life.

### **Stage 3: Actions Strategies**

Possible Actions: Help clients see that there are many ways to approach achieving goals.

Best Fit: Help clients chose best-fit strategies, from the range of possible actions. Choose action strategies that best fit their talents, resources, style, temperament, environment and timetable.

Plan: Help clients craft a plan, to organise the actions they need to accomplish their goals.

### **Actions**

Stages One to Three, are about planning for change, not constructing change. The Action arrow spans the three stages, indicating that right from the beginning of the process the client needs to act on their own behalf right. Without goal accomplishing actions the process of discussing problems and opportunities and developing goals is a hollow process. Through out the helping process the therapist reviews the client's progress and actions and helps adapt the action strategies accordingly.

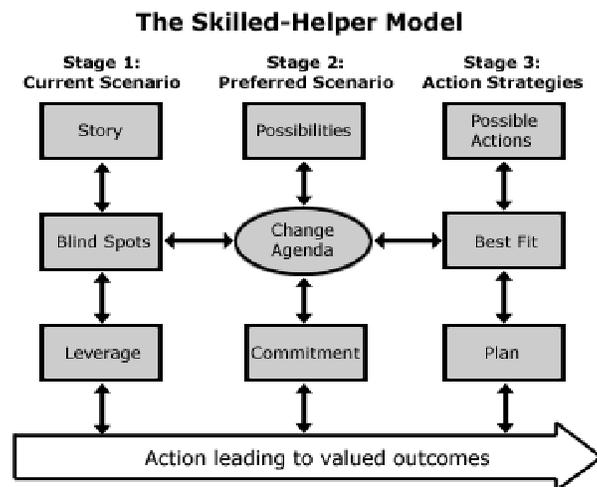


Figure 2: The Skilled-Helper Model, by Gerard Egan (Egan 2002).

The Skilled-Helper Model is designed as a flexible, broad overview to guide psychotherapy practice. The stages are not rigidly designed and in reality they often overlap and interact. The model acts as a map for therapists, helping them identify 'where they are' with a client and what kinds of interventions would be most useful. Egan refers to the models as a 'browser, for mining, organising and evaluating concepts and techniques that work for clients, no matter what their origin'. (Connor 2000) states that it is a "relatively open system, utilising an overarching framework or higher-order or trans-theoretical concept that provides internal consistency while at the same time allowing for the assimilation of explanatory concepts and/or methods from other schools or approaches."

## **7. When and How does Psychotherapy Work Best and What Hinders Successful Outcomes?**

The question 'does psychotherapy work' is an important question for anyone considering designing systems for mental health care interventions. The overall effectiveness of psychotherapy and the efficacy of specific treatments is not a black and white issue. (Eysenck 1952) questioned the usefulness

of psychotherapy and since then other critics have further criticised its effectiveness and even questioned its intentions (Egan 2002). (Masson 1993) even went so far as to claim that in the United States it is a multi-billion dollar business profiting from peoples misery. However criticism has often focused on specific flaws of particular types of therapy and of particular therapists. Psychodynamic treatments are criticised for their extended durations, humanist approaches for their vagueness and lack of empirical evidence. The majority of evidence however points clearly to the beneficial and healing power of psychotherapy. (Hill and Corbett 1993) and (Whiston and Sexton 1993) provided reviews of 50 years of outcome research and concluded that hundreds of efficacy studies have demonstrated the usefulness of specific helping methodologies for a particular kind of problem. (Lipsey and Wilson 1993) state: *“Meta-analysis reviews (of helping outcomes) show a strong, dramatic pattern of positive overall effect that cannot readily be explained as artefacts of meta-analytic technique or placebo effect”*. In 1999 the U.S. Surgeon General concluded that the efficacy of mental health treatments is well documented and a range of treatments exist for most mental disorders (U.S. Department of Health and Human Services 1999). Consumer Reports in 1994 and 1995 (Seligman 1995) published the results of large-scale survey of clients' satisfaction rating with helping. The reports indicate:

- Clients believed they benefited substantially from psychotherapy.
- Psychotherapy alone did not differ in effectiveness from psychotherapy plus medication.
- Psychiatrists, psychologists, and social workers did not differ in their effectiveness as helpers.
- Clients whose choice of helper or length of therapy was limited by insurance or managed-care systems did not benefit as much as clients without those restrictions.

(Mohr 1995) found that approximately 50% to 75% of clients who undergo treatment have a positive outcome, while 5% to 10% of clients actually deteriorate when treatment is terminated. (Hansen, Lambert et al. 2002) found that a substantial minority of clients, 15% to 40%, do not change to any marked degree by termination of services. (Egan 2002) states that one of the major causes for variations in the success of helping interventions is the skill of the therapist involved. (Luborsky, Crits-Christoph et al. 1986; Egan 2002) reports that

- There are considerable differences between therapists in their average success rate.
- There is considerable variability in outcome within the caseload of individual therapists.
- Variations in success rate typically have more to do with the therapist than with the type of treatment.

The real question is therefore not ‘does psychotherapy work’, but rather under what conditions does it work best, how can it achieve more consistent results, can it be improved and is there any better alternative?

(Assay and Lambert 1999) concluded that, across all therapeutic models, four main factors are responsible for achieving positive change through psychotherapy. 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 will actively engage the client's participation, by involving their interests, strengths and ideas. Research has found that technology can potentially play a role in helping to increase client engagement, motivation and empowerment in treatments (Sharry, Brosnan et al. 2004; Coyle, Matthews et al. 2005).

In the past two decades there has been an increase in the number of studies which attempt to identify specific factors which influence successful or failed psychotherapy interventions. This research area has been broadly termed Patient-Focused or Outcome-Focused research. For further details on this work see the Journal of Consulting and Clinical Psychology 69(2) for a special edition on this area. Models have also been developed to help therapists consistently choose appropriate treatment strategies based on the needs of their clients e.g. the Systematic Treatment Selection model (Beutler and Harwood 2000). Sections 11.2 and 11.3 of this report review initial research into computerised training

and computerised monitoring and feedback systems, that aim to improve therapists treatment selections and outcomes.

Some of the other consistently reported hindrances to successful psychotherapy outcomes include lack of client engagement and action and poor social support. (U.S. Department of Health and Human Services 1999) also found that 50% of people requiring mental health care do not receive the required treatment. The primary reasons for this are lack of access to appropriate treatment and the social stigmas associated with mental health disorders. Again there are strong initial indications that technology can help to overcome these obstacles, see sections 10 and 11.

### **7.1 The Client Therapist Relationship**

Given the importance, noted above, of the client-therapist relationships to the therapeutic outcomes, many books have been written about the means of developing a quality therapeutic relationship. However four core values have emerged as fundamental to establishing a beneficial working relationship: respect, empathy, genuineness and client empowerment. (Egan, 2002, p46) states, *“respect is the foundational value, empathy is the value that orients helpers in their interactions with clients, genuineness is the ‘what you see is what you get’ professional value and client empowerment is the value that drives outcomes”*. Rogers’ person-centred theory proposed that a quality therapeutic relationship could, in and of itself, provide the ‘necessary and sufficient conditions for therapeutic personality change’ (Payne 1997). Modern research however suggests this is not the case.

The first key element of a respectful relationship is that the therapist must obey the basic hypocratic oath common to all health care professionals. This is *“first do no harm”*. Any computer system designed for a mental health care setting must also obey this basic requirement. Empathy emphasises the therapist ability for both feeling and understanding another person’s experience and also communicate that understanding. Some of the skills used by therapists to develop empathic relationships include: empathic presence (visibly tuning in to clients), empathic listening (listening to the clients words, stories, points of view, decisions and intentions or proposals), processing what you hear, listening to oneself (the helpers internal conversation), sharing empathic highlights (communicating and checking understanding) and probing and summarising. Clients will only trust their therapist if they believe they are genuine. Egan suggests that helpers should learn, where appropriate, to express directly whatever they are presently experiencing, listen to others without distorting what they hear, aim to communicate concretely without distorting their own message and be free in their communications with others. They should also be prepared to manifest their vulnerabilities, learn to enjoy psychological closeness and be willing to commit themselves to others. Therapists are encouraged to start with the premise that clients can change if they chose. Clients should not be seen as victims or as overly fragile. Helping is seen as a natural, two way process that is shared with clients. One of the ultimate goals of therapy is to empower the client to help themselves.

The Working Alliance Inventory is a broadly accepted measure of the quality of the client therapist relationship. (Bordin, 1979) defines the working alliance as the collaboration between the therapist and the client based on their agreement on the goals and tasks of therapy. The inventory takes the form of two questionnaires, one for clients and one for therapist.

One of the primary concerns, expressed by therapists sceptical about the use of technology in psychotherapy, is that technology will be detrimental to the client-therapist relationship. There is however considerable evidence that this is no the case (Caspar 2004; Sharry, Brosnan et al. 2004; Coyle, Matthews et al. 2005). Research suggests that although technology is not suitable for all clients, in many cases technology can enhance the client-therapist relationship.

(Egan 2002), chapters 4 to 7, gives extensive details on the client-therapist relationship.

## **8. Conclusion to Part One: Identifying Specific Skills and Strategies**

Psychotherapy and counselling are effective ways of treating common mental health care disorders. Part one of this report has provided a review of the major theories and objectives of talk-based mental health care interventions. Several factors can now be identified as central to successful interventions: therapist efficacy, a quality client-therapist relationship, client empowerment, engagement and actions, personal storytelling, psychoeducation, identifying and correcting internal thought processes, and problem solving and management skills. Table 1 identifies some of the key eclectic strategies for affecting psychological change in mental health care interventions. There is no universally accepted way of categorising therapeutic strategies. The categorisation used here is adopted from (Palmer 1996) and (Jinks 2000), in their discussions of Multimodal and integrative therapies.

Psychodynamic therapies are relatively freeform, focusing on unravelling past experiences and revealing the unconscious. Humanist and existential treatments place great emphasis on a person's ability to define their own identity and make their own choices. They place great emphasis on the empowering effects of an empathic relationship. Cognitive and Behavioural treatments are more structured, prescriptive and goal orientated. They are also widely used in public health care. Recent research suggests that eclectic or integrative approaches are the most effective approach to treatment, with strategies being adapted to suit the needs of the client. The Skilled Helper Model provides a broad integrated overview of a psychotherapy intervention.

Recent attempts to design computerised treatment programs have, in the main, focused on the computerised delivery of behavioural, cognitive and cognitive behavioural therapy (CBT). Earlier attempts at using computers to replicate psychodynamic and humanist/existential approaches encountered difficulties, with natural language processing and the intangibilities of replicating a human relationship and client-therapist dialogue (Cavanagh, Zack et al. 2003). Cognitive and behavioural programs have the advantage of being more structured, systematic and goal based and of involving more psychoeducational elements. Research also suggests that CBT includes active mechanisms for change above and beyond the effects of the client-therapist relationship (Przeworski and Newman 2004).

One of the greatest challenges facing mental health care services is that, although effective treatments exist for most disorders, 50% of people requiring help do not receive the appropriate treatment. As more people are able to access appropriate treatment pressure will grow on services to manage the costs of treatment and also ensure consistent quality and outcomes.

Modality	Techniques and Interventions
Generic Skills and Strategies	Developing a quality relationship <ul style="list-style-type: none"> <li>• e.g. show respect, emphatic listening, emphatic communication, non-judgmental</li> </ul> Problem management and planning Client empowerment Storytelling
Behaviour	Modeling Rehearsal and reinforcement Roleplay and psychodrama Exposure therapy Systematic desensitisation Risk taking exercises Response delay and prevention Stimulus control Relaxation training Self monitoring and recording Diary keeping Homework
Affect/Feeling	Developing an empathic relationship Identifying, expressing and experiencing feelings Here and now awareness Cathartic work Empty Chair technique Creative expression <ul style="list-style-type: none"> <li>• e.g. artwork, music or creative writing</li> </ul> Techniques for managing strong emotions: <ul style="list-style-type: none"> <li>• e.g. anger management training</li> </ul>
Imagery	Emotive imagery and visualisation <ul style="list-style-type: none"> <li>• e.g. anti future shock imagery, coping imagery, rational-emotional imagery.</li> </ul> Metaphorical communications Dreamwork

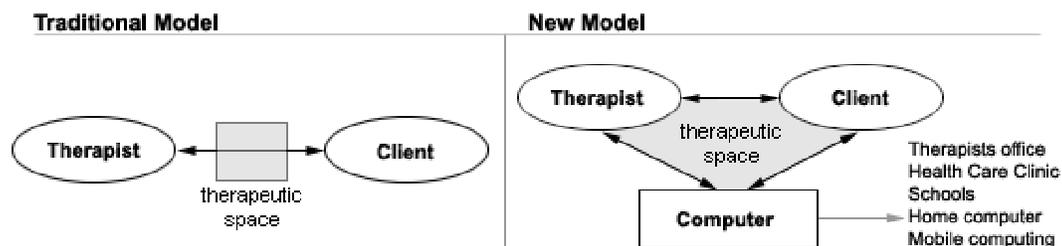
Cognition	Psychoeducation Bibliotherapy Identifying personal beliefs and core schema <ul style="list-style-type: none"> <li>e.g. identifying automatic thoughts</li> </ul> Cognitive restructuring <ul style="list-style-type: none"> <li>e.g. developing new perspectives, correcting misconceptions, disputing irrational beliefs, self-acceptance training,</li> </ul> Cognitive rehearsal <ul style="list-style-type: none"> <li>e.g. coping statements, positive self statements</li> </ul> Positive asset search Identifying and improving coping strategies Goal setting Problem-solving and solution focused training Homework Diary keeping
Interpersonal	Communication training Assertion training Social skills training Role-play Contracting
Psychodynamic	Exploring early life experiences and relationships with care givers Dream interpretation Interpreting transference patterns Free association Observing signs of repression e.g. hesitations, slips of the tongue
Social Interventions	Family therapies Parenting skills training and confidence building Organisational/ work place changes Social change
Other Strategies	Play therapy
Drugs/Physical health	Substance reductions programs Lifestyle changes e.g. exercise, nutrition Drug treatments

**Table 1: Common treatment strategies by modality.**

Part two of this report focuses on the potential of technology to improve mental health care services.

## 9. Introducing Technology in Psychotherapy

The second part of this report focuses on research on the uses of technology in talk-based mental health care interventions. By understanding the models, theories and methods of psychotherapy, it should be possible to design systems that first complement and then extend existing mental health care services. Computer technologies offer the possibility to fundamentally change the process of talk-based mental health care. Traditional psychotherapy interventions focus on face-to-face dialogues between therapists and their clients. Computers offer the potential to reshape this interaction, by becoming a third party in the therapeutic dialogue and increasing the scope of the therapeutic interaction, fig.3.



### Figure 3: Computer-Mediated Model of a Mental Health Care Intervention

A review of literature on the uses of computers in psychotherapy, section 11, demonstrates that, both in research and practice, talk-based mental health care is a late adapter of computer technologies. (Wolf 2003) states that *'in contrast to other health care disciplines, the practice of psychotherapy is not technologically intensive'*. As a practice it is mainly a pragmatic and practical profession, rather than an academic discipline. In light of this emphasis, (Goss and Anthony 2003) conclude that *'the focus has been resolutely on the practical application of technology and its value'*. Many mental health care academics and practitioners are sceptical of the benefits of technology, citing fears such as damage to the client-therapist relationship, ethical and security issues and worries that the current skills of therapists may become obsolete (Caspar 2004). Others fear that technology in and of itself has a damaging impact on the mental health of society e.g. increased isolation due to excessive time spent online or the influence on young people of violent video games. There are however strong indications that these fears are unfounded, e.g. online discussion groups can provide peer support for people experiencing mental health problems (Page, Delmonico et al. 2000; Houston, Cooper et al. 2002; Tate and Zabinski 2004) and appropriately designed computer games can actually help improve mental health care for teenagers, by increasing motivation and engagement and helping to build client-therapist relationships (Coyle, Matthews et al. 2005).

Given the serious global significance of mental health disorders outlined in the introduction to this report, it is incumbent on mental health care researchers to find new ways of improving mental health care services. The authors of this report hold a very positive view of the potential of technology in mental health care. This view is supported by our review of initial research, which indicates that the potential of technology is significant. Given that technology has been so under utilised there is great scope for research in this area. Even small changes could significantly impact the general health of populations and greatly reduce the costs to society of mental illness and costs of effective treatment. The potential benefits of technology in mental health care can be divided into three broad categories:

1. Increasing access to treatment
2. Reducing the costs of treatment
3. Improving the quality and consistency of treatment and of successful outcomes.

These categories are discussed in greater detail in section 10. Our review of literature, section 11, has shown that most research and development, to date, has focused on the first two categories. Current uses of technology are generally justified on the basis of cost effectiveness and increased access, rather than on actually improving the effectiveness of treatment (Caspar 2004). However this need not be the case in future.

The first challenge for technology design is to complement and improve existing practices. The second and greater challenge is to extend and make possible new forms of treatment not currently available. The ultimate aim of research is to reduce the cost of and increase access to services, while also improving the quality of treatments. It is possible to identify three stages in the introduction of technology in this area:

Stage 1: designing systems that complement or copy existing non-computerised methods.

Stage 2: introducing more complex, specialised, technology intensive systems which enable therapists to fundamentally change the way they work.

Stage 3: More intensive use of technology may begin to have a feedback effect on the theoretical models of psychotherapy and future models may evolve and adapt based on the lessons learned through the greater integration and changes offered by technology.

To date most research has focused on stage 1 of this process. Technology has mainly been used to replicate traditional therapeutic strategies e.g. electronic contact as a natural extension of face-to-face dialogue and the computerisation of self-help materials. There are two primary reasons for this. Firstly researchers are only now beginning to explore the potential of technology and secondly, perhaps most importantly, research has been conducted primarily by people from a mental health care background. Few people from a technological background have yet engaged in this area. Research into technology in education and other health science areas has been ongoing for several decades. Commonalities between these fields and the mental health care field suggest that researchers in mental health care can potentially accelerate the introduction and impact of technology by adapting the lessons learned in these fields. As stage 1 technologies become more widespread and as more technologist collaborate in this research area, it will be possible tackle more significant research challenges and design more

technology intensive systems, thereby offering therapists the opportunity to fundamentally change the way they work with clients.

Section 10 of this report elaborates on the potential benefits of technology. Section 11 reviews current research on the use of technology. Six categories of technology usage are identified: (1) generic uses, (2) therapist training, (3) computerised assessment, client records and outcome monitoring, (4) electronic contact and online information sources, (5) computer supported treatment. Section 12 looks at future possibilities.

## **10. The Potential Benefits of Technology**

The potential benefits of technology in talk-based mental health care interventions may be divided into three broad categories: (1) increasing access to treatment, (2) reducing the cost of treatment, (3) improving the quality and consistency of treatment and of successful outcomes. (Caspar 2004) has catalogued previously proposed benefits of technology. Several new potential benefits are also identified here.

Access to treatment can be increased through the use of electronic contact and online and computer supported treatments, to complement face-to-face treatment and allow clients greater convenience in their access to treatments. Many people who were previously unable to access professional help may now have the opportunity. This may be particularly significant for several client groups e.g. people with disabilities, isolated communities (e.g. rural or island communities (Angelos, Lentziou et al. 2005)). It has also been proposed that people from under-privileged socio-cultural backgrounds will benefit. Access to otherwise unavailable specialised treatments and expert therapists treating specific disorders can also be increased. (Seligman 1995) reported that allowing client's greater choice improves therapeutic outcomes. Technology also offers the possibility to reduce the stigma's associated with mental health care, thereby increasing the amount of people prepared to seek the required help. Technology can reduce stigma by making treatments more client centred, empowering and adaptable. Aftercare follow-up, to monitor long term outcomes of helping interventions, will also become easier to administer.

The costs of services can be reduced in many ways. The required contact time between therapists and clients can be reduced through the use of computer supported treatments (sections 11.4 and 11.5). Computers can perform many of the repetitive tasks in interventions e.g. administering initial assessment questionnaires. Individual therapists will therefore be able to treat more clients. Increasing amounts of treatment may also be delivered in primary health care settings and through out patient services, thereby further reducing the need and cost of contact hours with more specialised services. Databases and electronic client records may allow services to more easily manage and coordinate their workload. Collaboration between therapists may also be increased, further eliminating repetition in activities. Research on continuous monitoring and feedback systems can allow clinics to ensure clients receive treatment based on necessity e.g. clients who have responded well to treatment can have their contact hours reduced and treatment may be terminated, whereas clients struggling with treatment can have their contact time increased and treatments modified as required (Percevic, Lambert et al. 2004).

Increasing access and reducing costs will play a part in improving mental health care services. There are also many ways in which technology can potentially improve the quality and consistency of treatments. Continuous monitoring and feedback can play a part in improving clinical outcomes, particularly in the cases of resistant clients where initial interventions are not succeeding (section 11.3). (Luborsky, Crits-Christoph et al. 1986; Egan 2002) reports that one of the major causes for variations in the success of helping interventions is the skill of the therapist involved, and that there is considerable variability in outcome within the caseload of individual therapists. Computerised monitoring can help to improve the consistency of outcomes by ensuring more optimal uses of appropriate therapeutic techniques. Greater use of computers in the training of therapists (section 11.2) can potentially improve the skills of practicing therapists.

Computer technology can allow treatments to become more adaptable e.g. to broad socio-cultural factors or individual client cases and learning styles. Research in IT in education can also be adapted to increase learning outcomes and problem solving skills. The scope of a therapeutic interaction can also be extended and integrated into client's daily lives e.g. by encouraging clients to complete therapeutic homework or through the use of mobile computers to trigger required actions at prearranged intervals. Computers have also been shown to increase client engagement and motivation for therapeutic tasks, e.g. see (Glanz, Rizzo et al. 2003). Contrary to the predictions of many therapists there is also potential to enhance client-therapist relationships e.g. see (Coyle, Matthews et al. 2005). Technology can also

allow clients greater freedom for self expression e.g. through multimedia storytelling and music composition. These factors can all contribute to client empowerment and giving clients greater control. Client empower is one of the key factors to successful outcomes.

Finally one of the greatest advantages of technology based systems is that once such systems are in place they are more easily scalable than traditional services. (Dishman 2004) uses the term 'mainframe healthcare' to describe traditional health care services and describes how future technology can deliver the health care equivalent of a low cost home PC.

## **11. A Review of Current uses of Technology**

What follows is a review of research to date on the uses of computer technology in talk-based mental health care interventions. Subsections 11.1 and 11.2 describe uses of technology in non-client contact situations. The further subsections describe uses of technology in client contact situations.

### **11.1 Generic Uses**

Although many of these uses of computers noted in this section may seem trivial in research terms, it is very important to note that the uses of a computer listed here are generally the only uses made of computers by most practicing psychotherapists and counsellors.

Many therapists are familiar with the use of email, fax machines and PDAs to communicate with fellow professionals and organise their work schedule. The use of the Internet for research purposes is also common. Many therapists use word processing tools to keep case notes and some hospitals and clinics have developed database applications for storing client records (e.g. Pinpoint in the Mater). (Murphy 2003) gives details of the percentages of therapists using the technologies mentioned here. Databases are discussed in greater detail in Subsection 11.3.2.

### **11.2 Therapist training**

(Berger 2004) reports that although computer based training has many documented benefits and has become increasingly popular in other health science and educational programs, it is still largely unused in psychotherapy training. In general psychotherapy training relies on lectures and written material, role play with other students, watching video taped segments of clinical sessions and supervised practice (Beutler and Harwood 2004).

Computer based training techniques can be divided into three broad categories (Berger 2004); computer mediated communication, computer based tutoring and computer based learning environments.

#### **11.2.1. Computer Meditated Supervision and Communication**

There is a long tradition of supervised practice in psychotherapy training. An experienced therapists reviews the trainee's sessions with clients and provides feedback. Computer-mediated supervision can be broadly divided into two categories, delayed and live. Delayed communication includes any form of electronic contact that allows trainees to communicate with a supervisor across time and distance. (Coursol and Lewis 2000) describe a group supervision system in which trainees email an electronic portfolio of case notes and recorded videos of their sessions to a supervisor. The supervisor replies to the trainees submissions with comments and suggestions that are shared amongst the whole supervision group, which then meets in a virtual space and discusses their work via videoconferencing.

Live supervision allows an expert to provide real time feedback to a trainee during actual sessions. The supervisor is able to observe the trainees session (e.g. through a one way mirror) and provide live feedback, without having to physically enter the session. Trials have been conducted using audio feedback via a small receiver in the therapists ear (Baum and Lane 1976), visual feedback using a monitor visible only to the therapist but not the client (Neukrug 1991) and of pocket PC's that allow two way communication between trainee and supervisor (Casey, Bloom et al. 1994). Trials indicate that this form of supervision is feasible, useful and less disruptive than other forms of live supervision (Berger 2004).

For a more detailed discussion of computer mediated supervision in psychotherapy training see (Watson 2003).

#### **11.2.2. Computer Based Tutoring Systems**

Computer based tutoring systems (CBTSs) include online websites, CD ROM's and DVD's that enable the computerised delivery of predefined information to a learner. These systems model the traditional classroom approach to learning whereby an expert teacher transfers declarative knowledge/information to a student who role it is to absorb this content. Information may be presented in the form of text, graphics sounds, movies and animation and may also be interactive allowing the user to navigate through the information. Regular multiple choice tests are often included to allow the user to check their knowledge. The basic function of CBTSs is to impart well-structured knowledge. The advantages of CBTSs over traditional classroom learning include the ability to allow self-paced learning, increased accessibility, decreased costs and constant quality. In a meta-analysis study (Kulik 1994), found CBTSs to be at least equivalent to or superior to conventional instruction and that students learned more in less time with CBTSs. Although CBTSs have been developed, used and evaluated in other health science and educational settings they have been little used in psychotherapy settings (Berger 2004).

(Evans, Sparkes et al. 1999) claimed that their CD ROM based training module was the first computer based self study system for psychotherapy training. (Berger 2004) reports that there has been only one fully evaluated computer based training system in the field, Calipso (Williams, Aubin et al. 2001). Calipso teaches a cognitive behavioural approach and is specifically designed to help health workers in primary care with the identification, assessment and management of disorders including anxiety, depression and schizophrenia. In a controlled study with 80 psychiatry students', ratings of practical skills in a mental-state examination task revealed that students who used the Calipso showed significantly greater skills.

### **11.2.3. Computer Based Learning Environments**

CBTSs described above implement an objectivist/behaviourist approach to learning, in which an expert imparts knowledge to a student whose role it is to absorb content. Computer based learning environments (CBLEs) model an alternative constructivist/cognitivist approach to learning. Rather than imparting specific knowledge to the learner, CBLEs create learning environments which enable the learner to construct new understanding through active experimentation and reflection. Feedback is an essential element of any CBLE. There has been a great deal of research on CBLEs in educational settings, see (Papert 1980; Jonassen 1998; Resnick 2002). The design, use and evaluation of learning environments for psychotherapy training has been limited (Berger 2004).

COCACO (short for Coherence in Case Conceptualizations) is a system that aims to train therapists' ability to develop complete and coherent case conceptualizations of presenting clients (Benninghoven, Caspar et al. 1998). Developing adequate case conceptualizations has been identified as a contributory factor to treatment efficacy. COCACO is a semantic networking tool that supports therapists in the process of case conceptualization. (Semantic networking tools enable users to draw visual maps of concepts connected to each other via lines.) Therapists training with COCACO create visual maps of their case conceptualizations, linking nodes of information about a client (e.g. the client's problems, behaviour and resources) with concepts, hypothesis and theoretical knowledge. The aim of COCACO is to guide trainee therapists towards an optimal integration of the client's presenting information with abstract concepts and psychotherapy theory, to form a comprehensive case conceptualization. A system of multiple constraint satisfaction using connectionist algorithms (Caspar 1998) is used to provide feedback to trainees on various parameters that indicate the 'degree of fit' or coherence of both the overall visual solution and also of individual nodes with other parts of the network. A controlled study of COCACO with 34 postgraduate psychotherapy students showed that those students using the system developed more detailed case conceptualizations than those not using the system and that COCACO is a potentially valuable tool for training information-processing abilities such as the integration of a multitude of information (Berger 2004).

(Beutler and Harwood 2004) describes the motivation for and initial implementation of a concept for a Virtual Reality (VR) training simulator psychotherapists. The concept is compared with the VR simulators used to train aircraft pilots. It would allow therapists to be exposed to sessions with virtual clients, including particularly difficult clients or clients with severe disorders, without the risks for clients associated with training therapists in real life situations. The system aims to train therapists in the elements of the empirically supported and multifaceted Systematic Treatment Selection (STS) model. For details of the STS model see (Beutler and Harwood 2000). As an initial proof of concept, a fully scripted patient story was developed and mapped onto a 2D computer generated virtual patient. This virtual patient was implemented using a software program called Baldi, developed by the Centre for Spoken Language Understanding at the University Boulder based on the CSLU toolkit (<http://cslu.cse.ogi.edu/index.html>). For the initial implementation 24 possible scenarios for this story

were scripted representing various levels of patient coping styles, resistance levels and distress. Each scenario begins from one of twelve possible patterns of behaviour and one of two possible coping styles. From that point the (fully scripted story) branches based on the verbal interactions of the trainee with the system. Branching decisions are not made by the system itself. Rather an expert human observer makes these decisions by observing the trainees dialogue the virtual patient (verbal questions, support statements etc) and classifying whether the responses are suitable based the recommendations of the STS model. Responses deemed correct result in improvements in the patient's condition and the story moves forward. Inappropriate responses lead to the patients condition worsening. No details are given of trials of the system. For further details of this system see (Beutler and Harwood 2004). The paper also contains an interesting discussion of the challenges of implementing a fully immersive VR system for use in psychotherapy training. It is suggested that the limitations of VR and AI systems are most pronounced in the areas that are of most relevance to the training of psychotherapists. *'Computer simulations do not yet allow one to carry on spontaneous verbal discourse with a computer generated image, especially about abstract topics that often comprise psychotherapy.'*

(Berger 2004) describes the implementation and testing of an intelligent computer based tutorial system called the Intensive Feedback Tool (IFEE). The aim of IFEE is to train therapists to recognise clinically important information in sessions with clients. The core of IFEE is latent semantic analysis (LSA) module for free text. LSA is a computational model for human knowledge representation that enables semantic similarities to be extracted from passages of text. Decisions on semantic similarities are made based on an analysis of a semantic space, a large number of written documents feed into the system. The creation of the semantic space in IFEE is described in (Berger 2004). For training purposed with IFEE a series of videotaped clinical intake interviews were created. These videotaped sessions were presented to a series of experienced therapists who entered there views of the patient into the free text editor of IFEE. Trainees using the system view the same videotapes and also enter their views with the text editor. Based on LSA the program is able to offer the trainees feedback on how their views compare on the views of experts. Views of the trainee versus the experts are considered in many categories including 'motivation for treatment', 'nonverbal behaviour' 'goals in life' etc. Based on this feedback the trainee learns to develop elements of their interviewing technique not covered at all or not covered as completely as the experts. Greater details of IFEE and of a control study will be published in (Caspar, Berger et al. In press)

This review of computer based psychotherapy training shows that although several research studies demonstrate potential, this potential has yet to be exploited. The minimal use of computers in psychotherapy training may also have a knock on effect on the use of computers in psychotherapy practice. Therapists who have little experience of using computers themselves may be less open to the possibility of using computers in interventions with clients.

### **11.3 Computerised Assessment, Client Records and Outcome Monitoring**

#### **11.3.1. Computerised Questionnaires & Interviews for Assessment and Diagnosis**

Along with electronic contact (section 11.4 below) the most popular use of computers in clinical practice to date has been for computer administered questionnaires and interviews, to aid in client assessment and diagnosis. (Parkin 2000) states that the *'use of computers in clinical practice is at present largely limited to computerised versions of written tests or interviews'*. (Butcher 2004) suggests that the popularity of computerised systems *'is due chiefly to the level of repeatability of results with which they commonly are associated'*. Computer administered assessments and diagnosis offer the possibility to eliminate many of the interpersonal variables of face-to-face written assessments, including variations in administration from clinician to clinician. (Marks 1999) states, they *'simplify the interviewer's task and provide more control over the interview. They give the clinician standardised information about the patient's psychopathology and diagnosis. This eases comparative research using routine clinical data. Computerised ratings of severity also expedite the tracking of patients' progress.'* Many computerised assessment procedures produce written reports, summarising the information entered by the client and making recommendations, which clinicians can use to help them make treatment decisions.

One of the initial focuses of research on computerised assessment, diagnosis and rating procedures was to validate the results of these procedures against therapist administered paper versions. (Parkin 2000) reports that that quality of data obtained by computer based assessment is as high as that from clinical interviews or written tests. Patients also have a greater sense of control than in standard interviews. A meta-analysis study revealed that for statistically based assessments, computerised tests offer a 10%

accuracy advantage over clinical prediction (Butcher 2004). (Marks 1999) reports that computerised tests have been validated for conditions including phobias, depression and anxiety, obsessive compulsive disorder and alcohol and substance abuse problems. Studies showed that clients often found it easier to disclose sensitive information to a computer, particularly regarding alcohol and drugs, sexual behaviour, diet and suicidal ideas (Marks 1999; Parkin 2000). A computerised implementation of the National Institute of Mental Health Diagnostic Interview Schedule produced similar diagnosis to those with face-to-face interviews. Clients reported feeling less embarrassed with a computer than with a clinician, but said they could describe their feelings better to a human. A trial of a self-assessment screening instrument, Primary Care Evaluation of Mental Disorders (PRIME-MD), administered using interactive voice response (IVR), validated its efficacy versus a clinically administered PRIME-MD, and showed that it was a valid way to improve the rate of detection of mental health disorders in primary care (Marks 1999).

Extensive trials of the Minnesota Multiphasic Personality Inventory (MMPI), validated computerised versions for both the statistical and narrative elements of this personality inventory (Butcher 2004). Several advantages of the narrative reports generated by computers are identified: *“First, they allow for considerable amounts of personality data to be incorporated into the treatment objectives because they can be available immediately. Second, they are often more comprehensive than individual interpreters’ reports, and they are often less subjective as well. Third, they tend to be more reliable than the interpretations that individual interpreters might make. Fourth, they are cost effective and can be generated quickly.”*

In the area of neuropsychological assessment evidence of the benefits of computerised testing is inconclusive (Butcher 2004). While an implementation of the Cambridge Neuropsychological Test Automated Battery demonstrated a potential to detect early signs of Alzheimer’s and Huntington’s disease, other trials have concluded that current computer programs lack the necessary accuracy and comprehensiveness to improve on judgments made by highly skilled clinicians.

(Parkin 2000) reports on the use and validation of computer administered tests in the field of child and adolescent psychiatry. Tests have been developed for reports of self concept, behaviour and personality and depression screening. It is reported that computerised tests can *‘enhance children’s ability to describe their own perceptions of themselves and their behaviour in a way that might not otherwise be acceptable to them’*. Some studies show that for young people computerised testing is equally or more acceptable than written tests or interviews. The two main factors identified for this preference are the increased control children have over the interview and that they need not fear immediate or prejudicial human responses. Tests have also been developed to assess children’s performance, for example measuring visual vigilance and impulsiveness and attention. Such tests have shown significant differences between children with mental health problems and normal controls, but the systems developed were disappointingly poor at discriminating between them. Standard interviews such as the Achenbach child behaviour checklist, which is filled in by parents, have also been computerised.

The potential of computerised adaptive testing (CAT) in mental health care has generated interest, but as yet has received limited attention. Research on CAT in the field of ability and aptitude testing has demonstrated two main benefits: efficiency and precision. CAT provides tailored and individualised testing for each person assessed. Programs administer the test, individualise the test items (based on an item pool), score responses and determine when to terminate the test based on whether a particular assessment question has been successfully answered. (Butcher 2004) describes the use of CAT for personality assessment. An Item Response Theory based computerised implementation of the Absorption scale from the Multidimensional Personality Questionnaire, produced results as accurate as non-computerised testing, but in 50% to 75% less time. Various implementations of the MMPI, based on the CAT countdown strategy developed by (Butcher, Keller et al. 1985), showed item savings of between 26.7% and 31.1%. (Handel, Ben-Porath et al. 1999) concluded that a computerised adaptive version of the MMPI-2 gives similar results to the conventional version in terms of scale validity and classification accuracy, but gave substantial item and time savings. For further details on CAT see (van der Linden and Glas 2000; Butcher 2004).

### **11.3.2. Date Base Systems to Improve Clinical Performance**

(Unutzer, Choi et al. 2002) describe the use of a web-based data management system, entitled Project IMPACT, to improve care for depression. The system was installed in 18 participating clinics and allowed study staff 24 hour access to patient records. A total of 1801 patients were enrolled, with the system tracking information of enrolments, disenrolments (with reasons for disenrolment), contact information, initial assessments and follow-up assessments, treatment plans and relapse prevention

plans. The system facilitates the standardisation of intervention models across participating clinics. It gives clinician reminders about patients who have not received initial assessments or follow-ups or whose treatment plans have expired and may be ineffective. Clinical specialists in depression can compare their own case loads with those of other, display treatment histories of individuals, produce summaries of their active cases, access individual clinical notes, treatment plans and psychiatric consultation notes. The system has demonstrate several benefits over older paper based methods: information is available to clinicians in real time, error checking routines on data entry have reduced data collection errors, data loss has been reduced and clinical users valued the search and reporting features and reminders that facilitate treatment according to intervention protocol. Failure to fully integrate the system with existing clinical recording systems meant that some clinicians had to enter information in their own local records as well as into the web-based management system. Clinicians also reported having difficulty capturing certain types of clinical information due to a lack of designated fields in the database. No details are given as to whether the system had any effects on outcome ratings of patients suffering from depression. Future proposed developments of this system include: the use of streaming video to standardise training of research staff in multi-site trials on assessment instruments and other study procedures, allowing access by primary care providers and patients to their records, tailoring education programs for patients to meet their individual needs and allowing patients to complete assessments via websites or interactive voice response.

### **11.3.3. Computer Supported Monitoring of Patient Treatment Response**

In the past two decades there has been an increase in the number of studies which attempt to identify specific factors which influence successful or failed psychotherapy interventions. This research area has been broadly termed Patient-Focused or Outcome-Focused research (for further details see the Journal of Consulting and Clinical Psychology Vol.69(2) for a special edition on this area). One key conclusion of this research is that, ongoing feedback to the therapist of patient treatment response can increase the probability of successful treatment outcomes, particularly in cases where treatments might otherwise fail. Several models for continuous monitoring and feedback have developed, to provide continuous assessment and feedback to therapists and aim to improve the consistency of quality and the rates of successful outcomes, as well as encouraging systems of care that strive to be efficient and effective (Percevic, Lambert et al. 2004). The Brigham Young University Model focuses on identifying early predictors of treatment failure and deviations from 'expected treatment response'. The Random Walk Model focuses on identifying fluctuations, or 'random walks', from predicted linear trends towards improvement and aims to help clinicians administer an adaptive allocation strategy, whereby clients who need additional treatment will get it and clients who are no longer suffering can terminate treatment or move to less intensive therapies.

In recent years several applications have been developed to implement the continuous monitoring and feedback models discussed above. The AKQUASI program incorporates a questionnaire presentation module and a scoring/feedback module based on the random walk model. The system can be used from any device which is Internet enabled (PC's, laptops, PDA's, mobile phone). Clinicians can tailor questionnaires, schedule plans and scoring/evaluation algorithms, based on a palette of predefined functions, input elements and psychometric instruments. Feedback is given in several forms: (a) scale scores, calculated against selected norms and displayed in graphical form, including several options as expected treatment-response bands, (b) evaluations of these scores and changes over time in relation to the concepts of 'clinically significant change' and expected treatment response, feedback through symbols and colours (c) integrative evaluations of treatment status or progress, based on clinical rules and given with 'explanation' and 'suggestion' and (d) aggregation over patients (Percevic, Lambert et al. 2004).

The Outcome Questionnaire Analyst (OQA) is also implemented as Internet accessible system. It was developed for use with standard outcome questionnaires, the Outcome Questionnaire-45 and the Youth Outcome Questionnaire. It scores, evaluates, provides graphical feedback and messages (e.g. signal alarms) as well as generating standard report to end users such as therapists, clinicians and administrators (Percevic, Lambert et al. 2004).

Tests of continuous monitoring and feedback systems have demonstrated several benefits including: a reduction in the duration of treatments, reduced failure rates for at risk patients, greater success rates of clinically significant improvement and reduced operating costs.

## 11.4 Electronic Contact and Online Information Sources

Much of the literature on the use of technology in psychotherapy has focused on various forms of online electronic contact. (Anthony 2003) suggests that, despite the growing potential of technology in mental health care interventions, what remains unchanged for psychotherapy is *'the fact that communication between two parties is the key to finding mental well being in the face of our life circumstances'*. On this basis it is natural that, any system that allows two or more people greater flexibility to communicate has a potential application in mental health care interventions.

There is documented evidence of the use of email (Chechele and Stofle 2003; Rochlen, Zack et al. 2004), Internet relay chat (Chechele and Stofle 2003; Hopps, Pepin et al. 2003), video conferencing (Simpson 2003; Hilty, Shayna et al. 2004), shared hypermedia (Castelnuovo, Gaggioli et al. 2003), virtual environments (Anthony and Lawson 2002) and text messaging (Bauer, Percevic et al. 2003). These forms of contact are a natural extension of traditional face-to-face therapy and of the previous delivery of treatment via letters and telephone. The past decade has also witnessed the proliferation of websites providing psychoeducational information, see (Grohol 2000; Heinlen, Welfel et al. 2003) for reviews. Many of these websites include online questionnaires that help users to make decisions as to whether and what type of help would be suitable for them and help people to access the forms of online therapy listed above. Online discussion groups, forums, e-health groups and list servers have also been used to facilitate online group therapies and provide peer support and psychoeducational information, see (Page, Delmonico et al. 2000; Houston, Cooper et al. 2002; Tate and Zabinski 2004). Collectively these forms of online computer mediated communication have become known as Internet Therapy. The Islands System project is currently attempting to various forms of Internet Therapy to provide mental health care services to isolate European island communities (Angelos, Lentziou et al. 2005)

Much of the research in this area has focused on developing models of practice for therapists working online (Suler 1999; Maheu 2003). Other researchers have focused on identifying the similarities and differences between online and face-to-face contact and on the benefits and challenges posed to therapists operating purely online. For example (Rochlen, Zack et al. 2004) suggests the benefits include convenience and increased access, disinhibition and internalisation, increased time for reflection and the therapeutic benefits of writing emails. Possible challenges suggested including missing non-verbals, misreading, time delays, technical difficulties for clients, issues of crisis intervention and issues of mistaken identity and security. Work has also been done to assess the attitudes and suitability of clients for online therapy. Ethical guidelines for the practicing of online counselling have been published by the American Counseling Association (American Counseling Association 1999) and the British Association of Counselling and Psychotherapy (Goss, Anthony et al. 2001), and the foundation of the International Society for Mental Health Online (<http://www.ismho.org>).

To date the most common form of Internet therapy has been email (Rochlen, Zack et al. 2004). See (Castelnuovo, Gaggioli et al. 2003) for a review of the pros and cons of various forms of electronic contact in psychotherapy and (Goss and Anthony 2003) for further details on each modality of Internet therapy.

## 11.5 Computer Supported Treatment

This section looks at uses of technology in which a computer plays an active part the treatment of clients.

### 11.5.1 Computerised Treatment Programs for Cognitive and Behavioural Therapies

Recent attempts to design computerised treatment programs have, in the main, focused on the computerised delivery of behavioural, cognitive and cognitive behavioural therapy (CBT). Earlier attempts at using computers to replicate psychodynamic and humanist/existential approaches encountered difficulties, with natural language processing and the intangibilities of replicating a human relationship and client-therapist dialogue (Cavanagh, Zack et al. 2003). Cognitive and behavioural programs have the advantage of being more structured, systematic and goal based and of involving more psychoeducational elements. Research also suggests that CBT includes active mechanisms for change above and beyond the effects of the client-therapist relationship (Przeworski and Newman 2004). This review focuses on more recent implementations of cognitive and behavioural strategies, which have been more extensively tested. For a review of older systems, see (Marks 1999; Cavanagh, Zack et al. 2003; Newman, Erickson et al. 2003). The use of Virtual Reality in exposure therapy is discussed separately in section 11.5.5.

Computerised treatment programs (CTPs) maybe divided into two categories: (1) computer assisted treatments in which the computer is used as an adjunct to traditional face to face therapy, and (2) standalone systems in which the computer delivers (almost) the entire psychotherapeutic treatment.

#### **11.5.1.1 Computer Assisted Treatment**

‘Good Days Ahead: A Multimedia Program for Cognitive Therapy’ is a DVD based learning program, covering the core self help elements of CBT (Wright, Wright et al. 2002). It is designed for the treatment of anxiety and depression. The program features several core sections including: a psychoeducational introduction to the methods of CBT, methods of identifying automatic thoughts and cognitive errors and changing thoughts and behaviour, taking action to overcome anxiety and depression, methods for identifying and modifying basic beliefs and scheme. Good Days Ahead differs for previous computerised CBT programs in that it is more multimedia rich. The psychoeducational material is complemented throughout by the use of videos, showing characters overcoming depression and anxiety using the methods of CBT. There are also graphics, multiple choice questions, checklists, mood ratings and interactive self help exercises to encourage users to apply the lessons learned in real life situations. Homework is assigned after each computer session and feedback is given to reinforce lessons. In a controlled study, clients experiencing major depression received nine 25 minute sessions with a therapist along with nine 25 minutes with the program. Results were compared with clients receiving nine full 50 minute sessions with a therapist. A study demonstrated the effectiveness of the program. Response rates were identical for computer assisted and standard therapy. For further details see (Wright, Wright et al. 2002).

In recent years there have been several studies on the use of PDA’s in computer assisted therapy. (Norton, Wonderlich et al. 2003) describe the use of PDA’s in the treatment of bulimia nervosa. (Gruber, Moran et al. 2001) describe their use in group therapy for social phobia, where the PDA was used to help with cognitive restructuring homework. Results showed that 8 sessions of computer assisted group therapy was equally as effective a 12 sessions of standard group therapy in reducing the symptoms of social phobia. (Przeworski and Newman 2004) also describe the use of a PDA in group treatment of social phobia. The program included a diary function for ongoing self monitoring of anxiety, as well as guidance on relaxation, cognitive restructuring, self-control desensitisation and homework exercises. Clients received 6 computer assisted sessions instead of a standard 14 sessions. The system demonstrated major savings versus standard treatment and proved equally effective. Clients expressed enthusiasm for using the PDA, found it very helpful and there was a high rate of compliance with homework exercises. (Newman, Consoli et al. 1999) describe limited trials of the same system for the treatment of General Anxiety Disorder (GAD).

#### **11.5.1.2 Standalone Treatment**

In recent years there have been several studies on the use of standalone computerised treatment programs. These systems do not aim to fully remove the possibility of human intervention, rather they aim to minimise the required contact time in treatments and make it easier for treatments to be delivered in primary health care settings (e.g. GP’s office), or in the clients own home. Standalone systems have been created for several platforms, including interactive CD ROMs and DVDs, Internet and Interactive Voice Response (IRV). IRV has generated particular interest because of its potential to deliver computerised help to clients without the need for clients to own expensive equipment or have home Internet connections. The costs of the technical infrastructure are borne by the health care provider. The client simply needs a touchtone telephone to access treatment.

(Gega, Marks et al. 2004) reports on a trial at London clinic to test the effectiveness of four previously validated standalone computer treatment programs. Fearfighter (Shaw, Marks et al. 1999; Kenwright, Liness et al. 2001; Gega, Marks et al. 2004) was used for the treatment of panic/phobias, Balance (Yates 1996) for generalised anxiety and mild depression, COPE for non-suicidal depression (Osgood-Hynes, Griest et al. 1998) and BTSTEPS for obsessive compulsive disorder (Greist, Marks et al. 2002). Fearfighter and Balance are PC based applications that can be used either in a clinic or from home via the Internet. BTSTEPS and COPE use IRV. Clients with a touch tone phone use these systems to access self help materials and guided self help exercises. (Gega, Marks et al. 2004) reports that the use of these systems by clients, complemented by brief contact with real therapists, enabled therapists to treat significantly more clients per hour than would have been otherwise possible. The greater throughput of patients did not appear to sacrifice on the effectiveness of treatment. Because the systems were available from home many clients received treatment where it would not have normally been possible and also patients had 24 hour access to help. The clinic gave a rough estimate of potential cost savings of between 15% and 41% per annum compared with a standard clinic. (Gega, Marks et al.

2004) concludes that the widespread dissemination of computer aided treatments might eventually reduce demands on primary and secondary services and lessen medication use and chronicity.

Beating the Blues is a standalone, interactive, PC based CBT program for anxiety and depression. The program is accessed by clients in a general practitioners clinic, after clients have received a short introduction to the system from a therapist or GP. Like Good Days Ahead (discussed above) Beating the Blues is a full multimedia system. It consists of eight one hour sessions. Content is in the form of videos, which show people learning to overcome anxiety and depression, animations, voiceovers and interactive modules including questionnaires and self rating scales. Several clinical trials of Beating the Blues have been completed (Proudfoot, Goldberg et al. 2003; Proudfoot, Swain et al. 2003). Results show the standalone treatment to be equally as effective as standard therapy for treating anxiety and depression and in client completion rates. Clients reported significantly higher treatment satisfaction for Beating the Blues than for standard human treatment.

The limited trials reported here show that computerised cognitive behavioural programs have the potential to be effective in treating anxiety, depression, phobias and obsessive compulsive disorders. Computerised treatment programs have the potential to greatly reduce mental health care costs and to greatly increase the number of patients a single therapist can treat. They can also increase access and make treatment more convenient for clients. Reports show that computerised treatments are acceptable to clients. On the negative side, it must be noted that the programs discussed above are largely just computerised implementations of standard self help procedures. At present the use of computers is justified not because it is better than human intervention, but because it is more cost effective, allows greater availability or has higher patient acceptance. These systems have yet to be broadly accepted within the wider mental health care community. The issues of cost saving must be offset by the initial cost to clinics of setting up the computer infrastructure required to take advantage of these systems.

#### **11.5.2 Collaborative Multimedia Storytelling**

Personal stories are a fundamental element of most, if not all, psychotherapy interventions. Narrative psychotherapists see psychotherapy 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). Some researchers have explored the potential of computer based collaborative multimedia storytelling systems to help therapist engage clients (particularly children and adolescents) in collaborative storytelling. The Working Things Out (WTO) project is an interactive DVD/CDROM containing the stories of eleven adolescents who have successfully overcome problems including depression, bullying, eating problems and self-harm (Sharry, Brosnan et al. 2004). WTO is designed to be used as an educational and therapeutic resource with young people experiencing mental health problems, either individually or in small groups with the support of a professional facilitator. It can also be used preventatively to raise awareness of mental health issues. What distinguishes WTO from other similar DVD/CDROM based resources is that the eleven adolescents involved in the project played an active part in the creation of their multimedia stories and this creation process facilitated an empowering therapeutic intervention. (Sharry, Brosnan et al. 2004) suggest *'the computer provides novel means of both expressing and listening to therapeutic stories. The computer facilitates the expression of the therapeutic story by allowing the incorporation of sound, image, animation as well as text and verbal communication in the telling. Equally the computer facilitates the listening to the story, by providing interactive interfaces that allow the listener to pace the story to their own need and make choices about what is relevant. The computer becomes the processor of told information, the viewer takes on the information and interprets it in a way meaningful to them.'*

(Jones 1996) describes a program designed for use with children with emotional and behavioural problems, which encourages expression through the use of thought and speech bubbles in a comic strip environment. There is also much documented evidence of use of video-based, multimedia scenarios to engage adolescents in social learning. However such systems have generally been used in educational settings rather than psychotherapy settings and are beyond the scope of this review. See (Goldsworthy 2002) for further details.

#### **11.5.3 Therapeutic Computer Games**

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; Griffiths 2004). Research has focused primarily on the use of computer games to engage adolescents in therapeutic processes. However, research in the area has been largely

uncoordinated. There has been interest and work from a psychotherapeutic point of view, but little from a computer science, or more specifically a game design's point of view.

There was a burst of research in the early 1980's. At this point games were often text based or less graphically intense and game development was with the reach of non-expert developers. 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.

Personal Investigator (PI) is a 3D computer game specifically designed to help adolescents with mental health problems. It 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 a 3D game. PI differs from previous therapeutic games by encouraging the adolescent to create a written record of their own discoveries. (Clark and Schoech 1984) reported benefits of having a tangible output from a game. A pilot study of the game has been conducted with four adolescents, referred to clinics for issues including anxiety and behaviour problems, attempted suicide, and social skills difficulties. Initial results indicate that playing PI in sessions is very helpful in engaging adolescents. It can increase the amount of dialogue between therapists and adolescents and help in setting therapeutic goals. The use of 3D had an empowering effect, allowing the adolescent more control over the pacing and direction of the therapeutic process. For full details of the theoretical foundations, design and pilot study of PI see (Coyle, Matthews et al. 2005).

For a more detailed review of computer games in mental health care see (Coyle, Matthews et al. 2005)

#### **11.5.4 Biofeedback**

The use of biofeedback in mental health care is based on evidence of the important relationship between cognition-behaviour-emotion and physiological change. Direct observation of physiological change can potentially enable:

- Self-awareness and psycho-physiological monitoring: the therapist and client can gain an insight into the clients' physical and emotional state.
- Training: allow the client to learn new techniques of controlling their physiological state.

Research on the use of biofeedback may be divided into three categories:

1. Biomedical engineering: ongoing research to develop the tools with which to measure and classify physiological signals. Measurements currently possible include monitoring relaxation-arousal trends, monitoring and classification of EEG bandwidths activity. Much work is currently ongoing on the issues involved in classifying specific emotions, however this work is still in its early stages.
2. Representation: once the relevant signals have been measured and classified, what are the most effective ways of representing these measurements? In the past measurements were generally

displayed as graphical trends. More interactive ways of representation are currently being explored e.g. musically, pictorially and using computer games. 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 Paison 2001).

3. Clinical verification: research to determine the actual effectiveness of biofeedback in the treatment of specific disorders.

The core reference book for biofeedback practitioners is (Schwartz and Andrasik 2003). To date biofeedback treatments have been used to treat many disorders including anxiety disorders, ADHD, impulse control problems and chronic pain. Biofeedback treatments have proven particularly effective for engaging children and adolescents, see (Culbert, 1999).

### **11.5.5 Virtual Reality Treatments**

There is a large body of research into the use of virtual reality systems for anxiety treatments. Virtual environments have primarily been used in exposure therapies, where clients with specific phobias can be placed in safe, yet realistic environments where they experience the various stimuli associated with their phobia. Virtual reality treatments have demonstrated specific improvements over traditional methods.

The largest research centre dedicated to research of virtual reality exposure treatments is the Virtual Reality Medical Centre. They have demonstrated the use of virtual reality exposure, in combination with physiological monitoring and feedback, to treat a number of panic and anxiety disorders. They describe their treatment methods as follows:

*"After an intake session and skill building sessions to teach the patient how to control automatic responses to anxiety-provoking situations, the therapist and client collaborate to create a hierarchy of anxiety-inducing situations. In careful, controlled stages, the client is exposed to these virtual experiences that elicit increasingly higher levels of anxiety. Each stage can be repeated until the client is comfortable with the experience and satisfied with their response. At every step, the therapist can see and hear what the client is experiencing in the virtual world. If the level of anxiety becomes overwhelming, the client can return to a less stressful level of treatment, or simply remove the head-mounted display and exit the virtual world."*

Research is focused in several main areas:

- Ongoing improvements to virtual reality hardware and software technologies. Of interest here is any research into visual or intelligence aspects of virtual environments (e.g. life like virtual character, intelligent characters, visual fidelity etc.).
- Issues related to presence in virtual environments.
- Extension of existing treatment methods to a greater range of disorders.
- Efficacy studies of existing treatments.
- Can cheaper, non-head-mounted, game type technologies deliver the same benefits?

A details review of virtual reality treatments is beyond the scope of this report. For reviews of the use of virtual environments in mental health care see (Glanz, Rizzo et al. 2003; Riva 2003; Wiederhold and Wiederhold 2004; Wiederhold, Riva et al. 2005).

## **12. Future Possibilities**

A review of literature has shown that, although research into the uses of technology in talk-based mental health care is in its infancy, many potential benefits have been demonstrated. Section 9 of this report identified three stages in the introduction of technology in mental health care. Most of the research identified in our review has focused on stage 1 of this process, i.e. designing systems that complement or copy existing non-computerised methods. Some research areas have progressed further than others e.g. electronic contact, computerised assessment and diagnosis and virtual reality exposure treatments. However even these areas are still at an early stage of development. Great scope remains

for future work in these areas, both to confirm initial findings and to refine and improve on them. Stage 1 research is creating the platform for future work.

Research to date has, in the main, focused on how technology can reduce the costs and increase access to mental health care. The question of how technology can actually improve mental health care has received less attention. Section 9 of this report identified the possibility to accelerate this aim by adapting the lessons of related fields e.g. IT in education and other health sciences. This section of the report aims to identify several specific areas that may be applied in mental health care research. Selected, rather than extensive, examples are cited to illustrate this potential.

### ***Constructionist Learning Environments***

Section 11.2 of this report reviewed initial use of computer based learning environments (CBLEs) and computer based tutoring systems (CBTSs) in psychotherapy training. The computer assisted cognitive behavioural programs reviewed in Section 11.5.1 are largely computerised multimedia versions of standard self-help and psychoeducation material, and as such are largely CBTSs. The potential of constructionist CBLEs have not however been explored in client interventions. (Jonassen 1991; Jonassen 1992) suggests that whereas the strength of CBTSs lies in their ability to teach basic concepts and well structured knowledge, CBLEs are most appropriate for advanced knowledge acquisition and ill-structured knowledge domains. CBLEs offer the learner/client the opportunity to experiment and construct new understanding by build personally meaningful artefacts, rather than simply by absorbing knowledge.

There has been a great deal of research on CBLEs in educational settings, see (Papert 1980; Jonassen 1998; Resnick 2002). Several domains of constructionist learning offer strong possibilities for future mental health care exploration. CBLEs offer the potential to improve and personalise learning outcomes by increasing client engagement, increasing collaborative learning, and increasing experimentation (e.g. simulations, microworlds, game based learning). For example Marina Umaschi Bers has coined the term *Identity Construction Environments* to describe the computer tools she has developed for exploring personal identity within community environments (Bers 2001). Her work pays particularly attention to the relationship between to personal and moral values and personal identity. 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 (Bers 2001). Trials, including one at a Paediatric Dialysis Unit in Boston's Children's hospital, demonstrated the potential of a 3D graphical world to engage adolescents in personal reflection, self-discovery and identity formation. Such ideas have not yet been explored in a mental health care setting.

### ***Simulations, Microworlds and Computer Games***

(Coyle, Matthews et al. 2005) gave initial indications and theoretical foundations of the potential of 3D computer gaming in adolescent mental health care. Work with adolescents presents particular difficulties for mental health care workers. Future research on computer games may have significant potential in this area. Again research on computer games in educational and other health care settings has progressed further than in mental health care. Documented benefits of computer games 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, Gonzalez-Heydrich et al. 2003; Squire 2003). Organisations such as the Education Arcade, the Serious Games Initiative and Games for Health Initiative have been founded in recent years to coordinate this research.

### ***Self Expression and Storytelling***

Personal storytelling is fundamental to most psychotherapy interventions and section 11.5.2 of this report highlighted initial research on the benefits of collaborative multimedia storytelling. Far greater bodies of research have been conducted on the educational potential of digital storytelling e.g. interactive fiction, user friendly video editing systems, and multimedia storytelling toolkits. Lessons from constructionist educational research may also be adapted to enhance self expression and storytelling in therapeutic settings. A substantial body of work has investigated the use of peer storytelling, story listening systems, and conversational agents, e.g. see (Ryokai & Cassell, 1999; Ananny & Cassell 2001, Cassell 2002, Druin 1997). Harry (Holdich 2002) is a text-based system designed to encourage creative writing. Using a combination of keyword recognition and plotline prompts the system encouraged users to expand upon stories they write based on fictional scenarios. By tailoring the prompting and using it to implement a therapeutic model such a system could be adapted to encourage narrative psychotherapy. (Marsella, Johnson et al. 2003.) describes the implementation of an agent based Interactive Pedagogical Dramas in Carmen's Bright IDEAS, a multimedia title designed to teach problem solving skills to mother's of pediatric cancer patients.

The possibilities of using the audio, photographic and video capabilities of mobiles, to allow clients document, explore and reflect on their own life stories has not yet been explored. Nor has the potential of multimedia weblogging or ideas of '*citizen journalism*' (Ananny and Strohecker 2002).

### ***Adaptability***

The potential of adaptable computer systems has yet to be investigated in a mental health care setting. For example systems can be designed that enable standardised therapeutic methods to be adapted to broad socio-cultural factors, to the needs of individual clients or to the preferred working styles of therapists. Research in an educational setting has demonstrated that intelligent tutoring systems which adapt content to the learning styles of users can increase educational benefits, e.g. see (Kelly and Tangney 2003). Adaptable systems also offer the potential of increasing the collaborative efforts of therapists and technologist. Future systems may be designed in such a way that therapists can play an more active role in building and tailoring the content delivered by computerised systems (Coyle, Doherty et al. 2005).

### ***Online and Home Care Systems for 'Wellness in Place'***

Initial research on the use of PDAs, interactive voice response systems (IVRs) and online treatments has demonstrated benefits including increased access, improved convenience, reduced cost and increased compliance with homework and self help tasks. However the full scope of such systems has yet to be fully discovered. For example is a physical health care context (Dishman 2004) has envisaged a fully integrated system of '*wellness in place*', to enable many health care treatments and after care services to be delivered in the home by informal care givers e.g. family and friends. The potential of modern mobile phones has also not been explored. Modern mobile phones can offer many of the combined benefits of IRV and PDA based systems i.e. an existing, extensive and cost effective hardware platform, combined with mobile content delivery and support.

### ***Intelligent Systems***

(Bickmore 2004) has provided initial demonstrations of the benefits, in physical health care, of empathic conversation agents designed to create a perception of caring. Patients formed better relationships (based on Working Alliance Inventory) with empathic agents than with non-empathic agents and as a result were more likely to comply with a month long physical health care program. The effectiveness of all forms of computerised mental health care delivery may be improved by further research into systems embodying fundamental therapeutic values (e.g. respect, empathy and genuineness). Developments in natural language processing and emotional analysis of freeform text and dialogue may in future allow for the successful computerisation of more humanistic and psychoanalytic therapeutic models. Improvements in life like synthetic characters can have direct benefits in some of the areas discussed in Subsections 11.2 and 11.5 above.

### ***Outcome Monitoring and Feedback***

Section 11.2.3 of this report reviewed discussed the use of computerised assessment and diagnosis. While initial benefits have been demonstrated the mental health care sector is lagging behind other health care sectors in taking advantage of medical informatics. For example, a diagnostic program designed for surgical units increased diagnostic accuracy from 81% to 91%, with a fall in the rate of perforated appendixes from 36% to 4% and unnecessary abdominal operations from 25% to 7% (Parkin 2000). Section 11.3 also described initial research on computerised monitoring and feedback systems. Such systems have the potential to improve the consistency of quality treatments and outcomes, and have been shown to be particularly beneficial in cases where treatment might otherwise fail. Within this area improvements can be made in data presentation and evaluation methods. (Percevic, Lambert et al. 2004) identifies that methodological advances in psychometric assessment such as adaptive assessment, non-standard item format and complex worlds (e.g. response time, physiological measures, speech and video analysis), although used in related areas for many years, have not yet made a breakthrough into psychotherapeutic research and practice. The integration of mobile data collection, case-base reasoning and data-mining into outcome monitoring has also not been explored.

### ***Human Computer Interaction Issues***

As the use of computers in mental health care becomes more widespread, general issues of human computer interactions research will become increasingly relevant. Usability research will take on greater significance, as will the training of therapists and technological literacy issues. There are currently no psychotherapy training courses within the UK or Ireland that offer technology modules.

### 13. Conclusion

This report has highlighted the serious global significance of mental health care disorders and demonstrated that mental health services face growing pressure to improve their effectiveness and efficiency. This report has provided a review of the major models and theories of talk-based mental health care. It has also reviewed the current state of the art in the use of technology in this area. Our review has shown that research on technology in talk-based mental health care is in its infancy. Several future research directions have been identified.

By understanding the models, theories and methods of psychotherapy, it should be possible to design systems that first complement and then extend existing mental health care services. As talk-based mental health care is a late adapter of technology, there is great potential for research in this area to have a significant impact on the costs of, access to and the quality and consistency of services. Even small changes could significantly impact the general health of populations and greatly reduce the costs to society of mental illness and costs of effective treatment.

Computer technologies offer the possibility to fundamentally change the process of talk-based mental health care. Research to date has demonstrated that computerised versions of traditional approaches are effective in reducing the costs and improving access to treatment. The challenge now for mental health services is to expand and integrate the use of these proven computerised services into mainframe health care systems and reap the benefits of initial research. The greater challenge for technology researchers is to design systems that don't simply reduce costs and improve access, but actually improve the quality of treatments and the consistency of successful outcomes. Creative ideas are required to move this research forward, provide it with direction and create the platform for more intensive development of technology in the area. To realise the full potential of technology will require the close collaboration of researchers across diverse backgrounds e.g. psychotherapy, psychology, computer science, human computer interaction, IT in education and other health sciences. The overall goal is to deliver more technologically intensive, more empowering, lower cost mental health care systems, that can be easily scaled to meet growing health care demands, yet remain sensitive to the needs of clients and take advantage of the fundamental humanistic skills of mental health care workers. It is hoped this report will provide a starting platform for researchers, from both a technical and mental health care backgrounds, to engage in this research challenge.

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