An exploratory study accessing the effectiveness of the Nintendo Wii Fit/ Sport as a means of exercise compared to the traditional gym

An Exploratory Study Accessing the Effectiveness of the Nintendo Wii Fit/Sport as a Means of Exercise Compared to the Traditional Gym

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Abstract

An exploratory study accessing the effectiveness of the Nintendo Wii Fit/Sport as a means of exercise compared to the traditional Gym

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The main objective of this thesis is to investigate Nintendo Wii Fit/Sport as a fitness substitute for the traditional gym exercise and to assess the views of the participants who took part in the study

It also aims to research technology through multimedia and how it has enhanced learning, with a variety of games and fitness techniques for participants of all age groups. It endeavours to shows how the Nintendo Wii Fit/Sport can enhance fitness and general well being and health compared to the traditional gym.

The approach used for this research was a Case Study, which is a particular method of qualitative research. Qualitative research involves investigating participants' opinions, behaviours and experiences from the informant's points of view. It provides a systematic way of looking at events, collecting data, analysing information and reporting the results. In order to obtain these findings, the researcher chose a combination of Questionnaire, Interviews and Observation combined initially in Action Research and then later used as individual pieces of research.

The findings while not statistically significant or scientific show that the Wii Fit/Sport can and does improve our general well-being and health, while it may not replace the gym on a permanent basis; it would enhance fitness, promoting fun, laughter and games.

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Declaration

I confirm that the enclosed is all my own work, except where acknowledgements have been made.

Signed_____

Mary Gabrielle (Miriam) O'Connor
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Chapter 1 Introduction

1.1 Introduction

The main objective of this thesis is to investigate Nintendo Wii Fit/Sport as a fitness substitute for the traditional gym exercise and to assess the views of the participants who took part in the study.

Recent studies show that Multimedia in general, provides a significant opportunity to improve not only the quality of teaching but also guiding participants to obtain their optimum level of proficiency (Carter, 2002). Multimedia allows for all forms of communication to be utilised simultaneously for maximum effect and clarity which enriches collaborative learning and encourages students'/participants' independence (Carter, 2002).

1.2 Background to the Research

The use of computers as educational tools dates to the early 1960's when the machines taught students/participants in a fill-in-the-blanks format. Since then, the pedagogical uses have come to encompass drill and practice, simulation, programming in order to solve problems, and also project-oriented teaching, (Carter, 2002). Effective learning environments can provide opportunities for interaction and socialisation through hands-on experiences, play, discovery and creativity. Interactive multimedia technology with its use of text, graphics, audio, video and animation can provide a more realistic learning context. While ICT is not a solution for all educational problems, today's technologies are essential

tools for teaching and learning (Jung, 2005). As new concepts of learning have evolved, teachers are expected to facilitate learning and make it meaningful to individual learners rather than just provide knowledge and skills (Jung, 2005).

Technology is seen to have more and more tools in order to meet the needs and expectations of the learners, the convergence of technologies, the nature of training, the knowledge economy and the very fact that technology is being used in more diverse range of situations and processes throughout the learning environment (McNickle, 2004). Learners like the flexibility that technology offers and the diversity for accommodating a range of learning styles. Some of the benefits of using ICT include emphasis on active learning, enrichment of collaborative learning, and encouragement of greater student independence (Basturk, 2005). Computerised study guides can impact and maximise/optimise participants' overall level of proficiency. Also they emphasise that testing may be improved if participants complete tests on computer screens and receive immediate feedback about their performance thus maximising their potential an example of such a product is the Nintendo Wii Fit/Sport (Basturk, 2005).

The Nintendo Wii Fit/Sport represents a novel way of encouraging participants to interact with games through the use of a remote control device that provides a more intuitive and realistic means of control and interaction (Russell and Newton 2008).

The use of video games in an educational context is an area of increasing research interest (Kirriemuir and McFarlane, 2009). The use of a virtual environment such as those found in games has the potential for users to participate on equal terms regardless of academic achievement and to some extent, disability. Research has consistently shown that playing computer games increases reaction times, improves hand-eye co-ordination and raises players' self-esteem (Russell and Newton, 2008).

However, health practitioners have also been questioning the use of computers, television and video games and the promotion of inactive behaviours among adolescents and young adults (Leon and Abbott, 2007). Active gaming has now become very popular due to technological advances. These new generations of video games, on the other hand, are different from previous ones because they require participants to be active in their play rather than the previously sedentary types of play (Graves, et al, 2007).

The University of Wisconsin carried out a study on the physiological responses of twelve participants while playing the Nintendo Wii (Russell and Newton, 2008). The study set out to claim that the Nintendo Wii would obtain physiological responses that would contribute to physical activity recommendations and would be similar to other traditional daily activities, (Russell and Newton, 2008).

One of the most important findings from this study carried out by The University of Wisconsin, was that one of the sports games in the Nintendo Wii Sport reached an intensity that exceeded the threshold to provide cardiovascular benefits, and energy expenditure that could contribute towards physical activity recommendations, (Russell and Newton, 2008).

From reading this study the researcher knew that a study of that intensity would not be suitable for this project, but the researcher did want to prove that the Nintendo Wii Fit/Sport had the motivational likeability and high level of fitness factors needed to replace the traditional gym. According to the American College of Sports Medicine (ACSM), the minimal recommendation of physical activity is 30 minutes every day of moderate intensity (Lippincott, Williams and Wilkins, 2005).

1.3 Statement of Topic

Recent interest in interactive video games and multimedia technology has prompted the idea that exercise of this format may be of great benefit to children, adolescents and adults. These benefits are not just from an exercise perspective but also from a physiological and psychological aspect (Russell, and Newton, 2008).

Research supports interactive multimedia technologies as effective teaching mediums, while also being very supportive of physical activity encouraging exercise (Russell and Newton 2008).

1.4 Purpose and Scope of the Research

Below are some of the issues that will be explored throughout this study.

- To explore the learning theories and how we learn with the aid of computers.
- How technology has enhanced learning through multimedia, with a variety of games and fitness techniques for participants of all age groups.
- How the Wii Fit/Sport can enhance our general health and well being.

This project aims to investigate the area of multimedia in the combined sectors of education, learning, health and fitness. It will also investigate if technology will improve or enhance the participant's motivation as regards health and fitness rather than traditional methods such as the gym.

This project also tries to determine the effectiveness of the Nintendo Wii Fit/Sport as a fitness aid as opposed to the traditional gym. The aim of this project is to investigate the learning experience, knowledge gathered, convenience, and motivation for fitness and maintaining fitness throughout the winter months. In order to obtain these findings the author chose a combination of questionnaires, interviews and observation combined initially in Action Research and then later used as individual pieces of research. A case study approach was used to examine the attitudes of participants using multimedia. It also incorporated Triangulation which uses two or more methods of data collection in the study (Cohen and Mannion, 1994).

1.5 Relevance of the Research

Looking from an educator's perspective, this study attempts to create an effective learning environment which will assist participants to learn effectively and obtain their desired results. By evaluating the use of multimedia as a teaching and learning tool, the study hopes to bring benefits and improvements to participants' cognitive reasoning in any environment.

1.6 Objective of the Research

The overall expected outcome of this study will be as follows:

- It will enable participants to learn effectively through the successful use of an interactive educational multimedia application.
- It will provide a well designed user-friendly interface, with a variety of interesting games for the participants to use.
- It will also hope to prove that multimedia can aid the participants to learn effectively.

1.7 Thesis Outline

Chapter Two contains a review of the Literature. It looks at the role technology will play in education. It provides a literature review that reflects on computers in education, investigating how the implementation of Multimedia technology has impacted in the field of education.

Chapter Three considers the Research Methodology. It describes the setting up and execution of the experimental study. The purpose of this study is to quantify and qualify multimedia of instruction to improve the learning.

Chapter Four presents the research findings. The analysis will be qualitative in nature. The quantitative analysis will be based upon observation of student behaviour while using multimedia and student feedback.

Chapter Five discusses the research that was gathered from the fact-finding techniques used. It also looks at the information that supports the use of multimedia in education.

Chapter Six draws on the conclusions found throughout this research and puts forward recommendations for further research.

Chapter 2 Multimedia as a Teaching and Learning Tool

2.1 Introduction

The Literature review examines the role technology will play in the teaching and learning environment. It will examine the Learning Theories and how one learns with the aid of computers. How technology through multimedia has enhanced learning, with a variety of games and fitness techniques for participants of all age groups. It also shows how the Nintendo Wii Fit/Sport can enhance fitness and general well being and health.

Computers and multimedia technologies are changing our world in the way we work, shop, entertain ourselves and in the way in which we communicate, care for our health and well being. Computer and multimedia also has the potential to change the way we learn, entertain, and manage our health. The notion of using video games for learning causes some to cringe, others to leap for joy, and many to ask questions about this learning medium (Shaffer, Squire, Halverson, and Gee, 2004).

Computers, multimedia and video games combinations help us to learn in schools, communities, and workplaces. The new information age potentially has the power to assist the way we learn. Video games are more than just toys and are wildly popular with adolescents and young adults. They create new social and cultural worlds, which help people learn by integrating thinking, social

interaction, and technology, all the things they care about (Shaffer, Squire, Halverson, and Gee, 2004),

The goal of this literature review is to answer those questions about learning games and to help plot a path for people and organisations interested in developing or fostering the development of video games for learning.

2.1.1 History of Computers

Computer games are almost as old as the computer itself. The first academic papers on using computers to play games date back to the 1950s, where Shannon (1950) presented his ideas for building chess-playing programs (Marshall, 2004).

Between 1952 and 1972 the first computer games were created. These included:

- Noughts and Crosses - Douglas (1952),
- Chequers - Samuel (1959),
- Tennis for Two 1958 - (Winters 2003),
- Spacewar 1961 - (Gratez 1981),
- Pong (1966),
- Empire 1970 - (Langston 2004)
- Colossal Cave Adventure (1972).

During this creative time, 1952 to 1972, many of the techniques were designed and are still associated with modern game play. Between 1973 and 2000, most of the current games were created along with the hardware and software technology to support increasingly realistic 3D games.

Wolf (2002) suggests that there are now 42 different types of computer games. During the first three decades there were a number of influential games that have shaped and moulded the development of the computer games industry such as:-

- Space Invaders 1987
- Pac Man 1980
- Populous 1989
- Wolfstein 3D 1992
- Quake 1997
- Ultima Online 1997

In the early years of computer games, developers focused on producing games for hard core game players. Towards the end of the 1990s it became apparent that there were much better returns to be found in producing games that appealed to the mass market or the casual gamer such as young parents and teenage girls, rather than the traditional market of young to middle-aged men (Rousseau & Rogers 1998).

These games include:-

- Pokemon 1996
- Who Wants to be A Millionaire 2000
- Sims 2000
- Eye Toy 2003 – Featuring a range of very simple games the camera and its' associated software performed simple motion detection; this resulted in allowing the player to interact with the game without a joy-pad.

- Sky Active Games 2004 - Sky, the satellite television channel, operated an interactive service using the telephone.

- VIS Entertainment's I-Race 2004 - Vis Entertainment's I-Race makes use of satellite TV's ability to deliver a TV signal to any set-top box to create a virtual horse racing game. The game is created in a computer and then converted into a TV signal for distribution.

2.2 Exploring Learning Theories and how we learn with the aid of computers

"The main way we learn is not by a sequential training process; it is by an exploring process" (Li, 2000). Knowing how we learn is important (Pimentel, 1999). "Learning can be viewed as the continuous permanent incorporation of examples, observation, experiences, situation, rules, concepts and techniques for improving performances in the execution of

tasks. At the beginning of the learning process, the knowledge and performance of a learner can be rather low depending upon the initial knowledge. However, as learners get more experienced, it is because their performance improves" (Pimentel, 1999).

Learning theories describe how people learn; in life we all have a natural tendency to learn and grow, processing information in more than one way. Learning is the acquisition of information and knowledge of skills, habits, attitudes and beliefs. Merriam (2001) asserts that the knowledge base of learning is made up of a multitude of theories, sets of principles and explanations. To understand learning and how people learn is explained by two of the best-known theorists: the Behaviourist Theory, and the Constructivist Theory.

2.2.1 The Behaviourist Theory

Behaviorism became one of the dominant areas of research into learning throughout the twentieth century. It is particularly associated with Watson and Skinner. Watson (1930), an American psychologist, claimed that psychology was not concerned with the mind or with human consciousness. It is an approach to Psychology which claims that learning is the result of Operant Conditioning. Operant conditioning is a process both named and investigated by B. F. Skinner, (Kristinsdóttir, 2001). The word 'operant' refers to the way in which behaviour '*operates on the environment*'. A behaviour may result either in reinforcement or punishment. Reinforcement increases the likelihood of that

behaviour occurring again. The use of direct instruction from the computer game could be labelled as Behaviorism, a teaching approach which is often referred to as directed instruction (Steele, 2005).

Behavioural objectives are identified, lessons are planned, instruction is delivered, guided practice is provided, retention and transfer of learning activities are encouraged, and feedback is provided. Therefore, Behaviourism may be useful when direct instruction is needed to be followed step by step or memorised. These activities and games are completed individually, but real life is not always concerned with direct instruction; rather it is based on the idea that one must be able and competent to perform in a group situation or cooperative teams. The opposing view is that of the constructivists who view such activities as being inseparable from ordinary life.

2.2.2 The Constructivism Theory

Constructivism is recognised as a unique learning theory in itself. It is a philosophy of learning based on our experiences, constructing our own understanding, generating our own “rules” and “mental models” which we use to make sense of our experiences (Corti, 2005). As a teaching practice it is associated with different degrees of non-directed learning.

Constructivist learning theory sought to improve on what Behaviourist learning theory had already established by focussing on the motivation and ability for

humans to construct learning for themselves (Svinicki, 1999). It viewed Behaviourism as being too instructor-centred and directed.

According to the constructivist approach, participants learn how to articulate their ideas clearly and collaborate on tasks effectively by being part of group projects. Participants may also exchange ideas, tasks and games and they learn to "negotiate" or compete with others and to evaluate their contributions to a particular game. Learning activities require the participants' complete involvement; for example, partaking in the computer games. An important part of the learning process is that participants in a group reflect on, and talk about, the activities, set their own goals, being victorious over other participants and means of achieving their desired higher outcome (Ausubel, 1999). Instructors in the computer games and the tasks must demonstrate within the participants' zone of proximal development using scaffolding or questioning to provide the needed support to assist the participant in his/her development (Billman, 2002). In this way, participants control their own learning process, and they lead the way by reflecting on their experiences and the results or goals achieved. This process makes them experts of their own learning.

The time spent working on and using computers and the combination of increased practice and motivation has helped participants to learn; such learning environments must be taken advantage of to produce optimal learning (Pimentel, 1999). In the constructivist model, the participants are urged to be actively involved in their own process of learning, so it is up to the participant,

not the computer game, to make the necessary changes, learn the various steps and achieve the desired goals. The computer instructors' function is more as a facilitator who coaches; the participants develop and assess their understanding, and learning of particular activities (Educational Broadcasting Corporation, 2004).

No one theory of instruction is right; usually a variety of theories or a combination should be applied to match the participant's ability and learning mentality (Granholm, 2006). Saljo (1979) asked a number of adult students to explain what they thought learning to be. The results are listed 1 to 5.

1. Learning is acquiring information
2. Learning is storing information that can be reproduced
3. Learning is acquiring facts, skills and methods that can be retained and used when necessary
4. Learning involves relating parts of the subject matter to each other and to the real world.
5. Learning is interpreting and understanding reality in a different ways (Ramsden, 1992).

Ramsden (1992) claims that the points 1 to 3 viewed students' learning as something external to the learner, something that just happens becoming their possession. Whereas points 4 and 5 are more internal or personal, learning is seen as something that you do in order to understand the real world. This system of 5 points could be hierarchical; students who view learning as

understanding reality are also able to see it as increasing their knowledge (Ramsden 1992).

The tools of education change, so too, does the nature of learning and the attainment of knowledge. Learning by drill and memory is being replaced by a more constructivist learning method that teaches the student to be more curious and critical. For example, the traditional classroom is being challenged by the multimedia classroom which provides a mixture of visual as well as audio stimulation that greatly enhance the learning experience.

2.3 Computers and Multimedia in the Learning Environment

Incorporating computers and multimedia into the learning environment is taken for granted as a natural process, which can sometimes appear to be quite simple, but the root of understanding how we learn when incorporating computers and multimedia, is not straightforward (Forrester and Jantzie 2003). According to Belkin and Gray's, (1977) learning theory, "*Learning implies a change in the individual as a result of some intervention. It may be viewed as an outcome or a process*". Each learning situation has an inferred process of information presentation (Roland, 2004). Learning performances is based on a belief of how best participants learn the steps and tasks taken to achieve specific goals.

Skinner is well known for his work in behaviour modification through operant conditioning, and has been an advocate of programmed instruction (Esptein,

1997). Applying Skinner's approach in computer video game design and implementation requires using carefully planned steps of stimulus-response pairing and reinforcement to reach a particular level or goal. For example, Behaviourism and computers require participants of the game to engage their attention to one area requiring constant repetition. An example of this would be drill and practice software for stimulus-response exercises, especially those based on operant conditioning. Using direct instruction stating exactly the steps required for the game or lesson. An example would be the aerobics lesson using the Wii Fit/Sport, (Ausubel 1999). The teacher would break down the aerobic lesson into steps and provide hints that would guide the students to a desired behaviour. The use of this method reflects a belief that by tightly structuring the environment the behaviour of the participant can be shaped to achieve desired changes (Phys, 2005).

2.3.1 What is Multimedia?

Multimedia systems and games are being used more and more, where face-to-face interaction does not occur between the teacher and the learner (Parlangeli, et al, 1999). These multimedia systems and games are very interactive and are used mainly for storage and retrieval of data. Multimedia is the presentation of information by a computer system using graphics, animation sound and text (Burdett et al, 2002).

2.3.2 Benefits of Multimedia in an Educational Context

"One learns by doing a thing; for though you think you know it, you have no certainty until you try" (Becker, 2008). Within the last couple of years multimedia has become very popular. Introducing multimedia as a teaching/learning tool has many possible benefits. These include self-paced learning, self-directed learning, the exercising of various senses and the ability to represent content in a variety of media (Ward, 2003).

In many ways, the use of multimedia and multimedia computer games in schools/colleges has followed a similar pattern. Computer games are experiencing a re-birth as a learning technology. However, this time it seems to be capturing a more widespread interest in the use of games and game technology. For example, Nintendo is now advertising its DS handheld console to casual gamers and promoting its new game "*Brain Age*" as a game that "*trains the brain in just minutes a day*". Another of the Nintendo products is the Wii Fit/Sport which has games that incorporate yoga, strength training, balance and aerobics. The games are interactive and require the player to physically move, which is better than nothing (Nintendo 2009). Playing such games effectively could mean that participant's heart rate could be increased to its optimal level (Höysniemi, Aula, Auvinen, Hännikäinen, and Hämäläinen 2004). It appears that a shift towards a more positive public perception of video games may be occurring that may foster broader acceptance than was experienced during the 1980s and early 90s (Becker, 2008).

Multimedia allows learning to be set at one's own personal pace (Selkirk 2005). The multimedia principle is the recommendation to use both words and pictures in instructional presentations as they: "*construct verbal and pictorial mental models and allow students to build connections between them*", (Clark and Mayer, 2003).

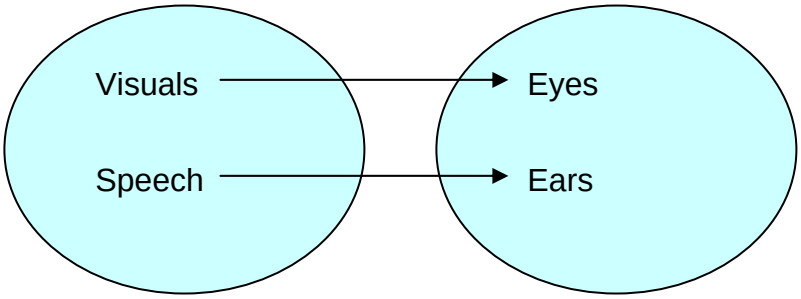

Fig. 2.1 V*erbal and pictorial mental models* - (Clark & Mayer, 2003)

According to Mayer 2003, visual and auditory experiences are processed through separate and distinct processing channels:

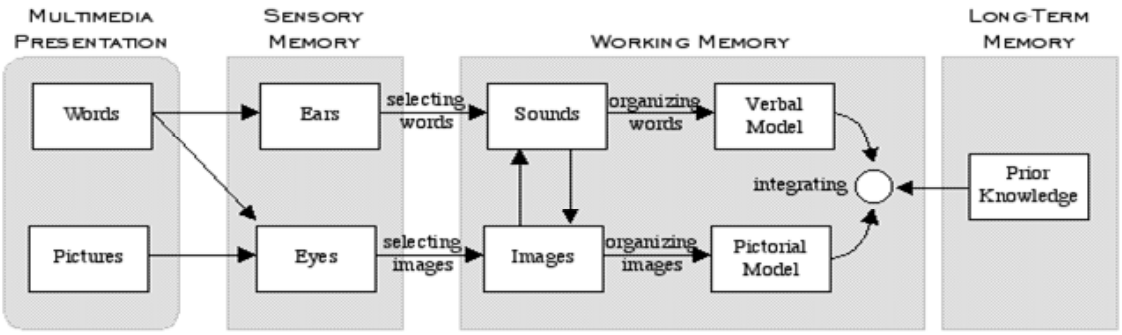

Fig. 2.2 Visual and Auditory Experiences

Visuals utilise right brain visual and spatial processing to complement the left brain processing used in listening.

Left Brain	**Right Brain**
Logical	Random
Sequential	Intuitive
Rational	Holistic
Analytical	Synthesizing
Objective	Subjective
Looks at parts	Looks at wholes (Clark and Mayer, 2003).

Fig. 2.3 Left and Right Brain

In order to promote a more whole-brained learning experience, instruction techniques should be used that connect with both sides of the brain. They can increase the participant's right-brain learning activities by incorporating more visuals, and movement into activities (Clark and Mayer, 2003).

Software and computer instruction games can reflect one or both of these approaches to learning and may make assumptions about the learning or instructing style that will be used, rather than what is actually used. In order to achieve educational goals, certain techniques can be used to bring this about in relation to different theories of instruction. For example, tutorials can help to achieve basic skills and tasks, while simulations offer interaction with real life experiences as in a real life fitness/yoga class. Thus the challenges are to discover and identify the necessary instructional approaches and embody them in the software, so as to ensure that the best harnessing and full potential for the participant is achieved (Granholm, 2006).

2.3.3 Educational Model

Constructivism and computers together as a team provide participants with almost unlimited access to information that they need in order to do research and test their ideas and the particular goals they wish to achieve. *"Constructivist theory claims that understanding comes from a person's taking the effort to integrate newly communicated claims and ideas with his/her own prior beliefs and understanding. In that view, understanding cannot be transmitted nor does skills-practice result in understanding, which can be automatically applied as needed"* (Becker, 2000). This interaction facilitates communication, allowing participants to present their beliefs and achievements, check present and previous results and discuss with fellow participants who may also express their opinions of the learning environment (Fletcher, 2003).

According to Kolb's learning theory, the learning process is where knowledge is created through the transformation of experience (Kolb, 1984). Many theorists such as Pigaet and Vygotsky have studies demonstrating the process of learning and much of what we know today comes from their theories. Pimental (1999), claims that experimental learning emphasises the role that appropriate environments and experiences play in the learning process.

David A. Kolb (1984) included four elements in his model: concrete experience, observation and reflection, the formation of abstract concepts and testing in new situations (Becker, 2008). These four elements form the nodes of a connected circle of experiential learning, with learners able to begin at any point along the

circle. Ideally, learners will posses balanced abilities in each of the four areas, but in reality, they tend to polarise towards one of four 'poles'. These four poles are summarised below.

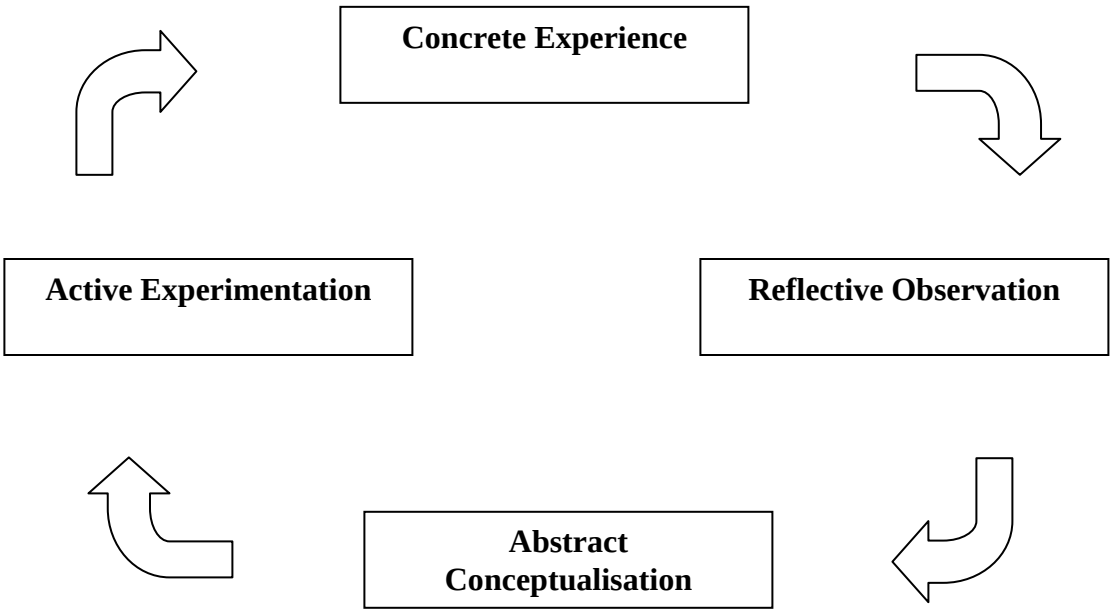

Fig 2.4 Kolb's (1984) Learning Process

- **Concrete Experience** involves the learner carrying out an activity, for example, active exploration of a computer game. This is where the learner is encouraged to browse through the content at his/her own pace, manipulate and test ideas, carry out problem-solving exercises, while remaining in control of his/her learning paths.

- **Reflective Observation:** the learner quietly reflects on the activity recently carried out, to see if they fully understand what they have just completed.

- **Abstract Conceptualisation:** the learner tries to make sense of what was done during the activity drawing on previous experiences or observations while doing so.

- **Active Experimentation:** prompts the learner to decide how one is going to put what has just been learned into action. This could involve the use of case studies, role play or question sessions where the learner's recent experiences can be applied to a real life context that is relevant to them.

Kolb claims that once an individual's style is identified, instruction can be organised to support his or her strengths to give confidence, while still encouraging the further development.

2.3.4 Effective Learning Environments

It is important to highlight that games and play may be effective learning environments, not because they are "*fun*" but because they are immersive, require the player to make frequent, important decisions, have clear goals, adapt to each player individually, and involve a social network (Oblinger, 2006). The Wii and its underlying technology can be important teaching aids, allowing

students to interact with digital representations of physical objects and substances in ways that let students see how factors such as momentum affect the behaviour of study subjects. For example, Wii have just launched the Wii Fit Active game, which is run in the manner of a personal trainer, who gives tips to help you achieve your goals. The Wii can be used to create teaching exercises, for example, for some learners and for some subjects, using a whole-body input device translates to higher levels of engagement and increased learning. In addition, users can customise their characters and store that information on their Wii-motes, allowing them to take their digital identities with them. The Wii-motes is the hand-held controller which transmits motions wirelessly to the game console. This digital identity creates a more persuasive learning experience for the user. Incorporating games into the learning environment can be very effective and the following are attributes associated with how people learn (Oblinger, 2006).

- **Social -** Games are often social environments, sometimes involving large spread individuals or groups. "*It is not the game play as such but the social life around the edge of the game that carries much of the richness in terms of the game's meaning, its value, and its social and cultural impact*" (Dzewaltowski, 2009).

- **Research -** When a new player enters a game, he or she must immediately remember previous learning, also decide what new information is needed, and apply it to the new situation. Those who are

- **Problem solving -** Knowing what information or techniques to apply in which situations enables greater success, particularly, problem solving. This often involves collective action through communities of practice (Oblinger, 2006).

- **Transfer -** Games require transfer of learning from other areas. For example, life, school, and by playing other games all aid in the learning process. The key is being able to see the connection and transfer existing learning to a unique situation is part of game play.

- **Experiential -** Games are inherently experiential. Those who play games engage multiple senses. For each action, there is a reaction. Feedback is swift. Hypotheses are tested, and users learn from the results (Oblinger, 2006).

Experience and reflection are important parts of learning. An ideal learning environment is one where the learner can develop new skills and then reflect on the new skills learnt. The learner should be able to alternate between both in any learning environment. The importance is on learning how to learn and how to share the learning. Oblinger (2006) states that "*It is not necessary that each member assimilate everything that the community knows, but each should know*

who within the community has relevant expertise to address any problem". Being able to develop these skills is significant from both a personal and professional point of view and not just in the game world.

2.4 How technology has enhanced learning through multimedia, with a variety of games and fitness techniques for participants of all age groups.

From the 1970's computers and related information technologies were introduced to educators as educational tools (Kosakowski, 1998). The use of computers can promote visual, verbal and kinesthetic learning, enabling people to enhance higher-level thinking and problem solving (Panitz, 1999). Information Communication Technology, (ICT) has the potential to help participants capitalise on their strengths and compensate or bypass any difficulties they may have. The use of ICT should allow the participants to achieve something that could not be achieved without it or at least allow participants to learn something more effectively and efficiently than they might otherwise be able to do (Ayerst, 2000).

Research shows that the use of ICT increases the motivation to take part in the various activities, thereby experiencing improved task outcomes (Becta 2, 2001). The use of ICT can provide an environment in which the level and pace for each task can be geared to suit the individual participant needs. Using computer games means that participants can partake and complete tasks and games in a safe, non-judgmental environment independently or as part of a

team or party if they so wish, either way the use of digital technology could enable participants to become more active and independent (Baylor, 1999), by bringing the outside world into one's own home at the touch of a button (Becta 2, 2001).

Interactive multimedia technology is a development which uses different media such as audio, video, text, graphics, and animation in one program, and its power of linking various concepts has tremendous potential for enhancing learning. With the capability of creating a more realistic learning context through its different media and allowing a participant to take control, interactive multimedia can provide an effective learning environment to different kinds of participants of all ages (Min, 1996).

Multimedia systems are being used increasingly in e-learning, where face-to-face interaction does not occur between an instructor and the participants (Parlangelie, 1999). Dr. Mayer (Clark and Mayer, 2003) claims that the multimedia principle is the recommendation to use both words and pictures in instructional presentations as they, *"construct verbal and pictorial mental models and allow students to build connections between them".* Mayer also claims that visual and auditory experiences are processed through separate and distinct processing channels.

2.4.1 ICT and Games

Incorporating computers into the learning environment is supported both by the governmental bodies and the institutions such as Universities, Institutes of Technology and Schools. Information Communication Technology (ICT) has the potential to help students with learning, capitalise on their strengths and compensate or bypass their difficulties. The primary basis for ICT adoption is that it should be seen to complement the achievement of broader educational aims, which establish the professional skills of teachers and the personal growth of students (Becta 2, 2001).

Those who believe in using ICT such as the use of games in education usually start from a common set of assumptions. They examine the role of game players who on a regular basis show signs of persistence, risk-taking, attention to detail and problem-solving skills, all behaviours that ideally would be regularly demonstrated in school (Klopfer, 2009). They also appreciate that game environments allow players to construct understanding actively, and at their own individual pace. Well-designed games enable players to advance on different levels at different stages in response to each player's interests and abilities, while also promoting collaboration and just-in-time learning (Osterweil, 2009).

Any game should provide the teacher with the materials that try to relate the students' game experience to existing curricula, whether through discussion or other hands-on or paper and pencil activities. It should also provide materials and places for them to get started with and incorporate them into the game

process without having to be experts at the game. Strategy guides and FAQs that come with most games provide an excellent model for the design of such materials, and can be supplemented by the students themselves, as they grow to become experts in the game space. In addition, games should be designed so that teachers can access specific game experiences easily, without necessarily having to work their way through the game the way students do. This creates a relatively pain-free way for the teacher to introduce a lesson about a game activity into the classroom.

Various other research sources show that using ICT increases motivation to take part in learning and consequently the learners experience improved learning outcomes (Becta 2, 2001). For example, with the Wii Fit/Sport, motivation is recognised by the player being able to progress up levels every time they excel on their current level. It provides a friendly environment in which the level and pace for learning can be geared to suit individual needs. There are a number of ways in which computer games can support students, the most significant being that computers are non-judgmental and treat everyone in the same way. As a result, the students find acceptable the manner in which the computer corrects errors or refuses to take incorrect answers. Hakkarainen et al (1999), suggest that *"It can also have an empowering influence for our students, in being an aid to self motivated study and decision making"*.

According to Baylor (1999), argue in *"Creating a Learning Revolution"* that digital technologies could enable students to become more active and independent

learners. This is very relevant to teaching as it is all about discovering and learning different things. ICT and games have the potential to bring the outside world into the learning environment at the touch of a button (Becta, 2001).

"Exergames" (Chamberlin, 2008) is the merger of video games in an exercise activity. The use of ICT through games of this nature is widely recognised for its potential to enhance teaching and learning. One of the underlying goals of designers of some exercise video games is to increase people's motivation to exercise. One such game is the Wii Fit/Sports**.**

2.4.2 What is the Wii Fit/Sport?

The Wii Fit/Sport was the brainchild of Miyamoto-san from Nintendo. His goal was "*to create a device that made getting fit fun whilst enabling families to exercise together"* (Iwata, 2008). After two years of developing the peripheral for the Wii Fit, the 'Wii balance board', and a further year developing the game, the Wii fit was released in Japan in December 2007. Exercises included were yoga, strength training, aerobics and balance games (Crowley and Peel, 2008).

The Wii Fit is a multimedia tool, which incorporates high quality graphics and images, sound and animation effects, with 3-D modelling and virtual reality all combined into a computer based instructional game and learning environment, (Plummer, 2002). It is essentially a video game system that uses a wireless controller capable of sensing position and motion, allowing users to interact with the game applications through physical movements. For example, in Wii

Tennis, users swing the controller (often called the Wii-mote) as if it were a tennis racket. Sensors in the controller transmit those motions wirelessly to the game console, which renders the player on the screen as a game character swinging a tennis racket in the same curve, with the same speed, sending the ball – hopefully back over the net. The controller takes many forms, from a basic wand-like remote to golf clubs, fishing rods, or a fitness pad that senses the position and balance of a user standing on it.

The Wii Fit is a unique and innovative way to help you and your family stay fit in the comfort of your home, through simple daily exercises. More than a gaming experience, Wii Fit is a health and lifestyle product with more than 40 exercises, across four categories: balance games, yoga, muscle workouts and aerobic exercises (Nintendo, 2009).

Training on the Nintendo Wii Fit falls into four categories, with more than forty Nintendo exercises designed to help the participant improve balance and posture, alter their BMI or just relax (Nintendo, 2008).

- **Category One** – **Aerobic Exercise:** 10 minute exercises that are designed to get the heart pumping.
- **Category Two** – **Muscle Conditioning:** Controlled motions using arms, legs and other body parts.

- **Category Three** – **Yoga Poses:** Classic poses that focus on balance and stretching.
- **Category Four** – **Balance Games:** Fun activities, such as ski jumping and heading soccer balls, which challenge the player's overall body balance (Nintendo, 2008).

Nintendo Wii Fit uses a Balance Board, which is used for daily tests such as the BMI and Fitness Age. These tests help the user to keep track of improvement via progress charts:

- **Body Mass Index (BMI):** A weight evaluation based on a ratio of weight to height.
- **Nintendo Wii Fitness Age**: The Wii Fitness Age is measured by factoring the user's BMI reading, testing the user's centre of gravity and conducting quick balance tests".

"*The Nintendo Wii Fit has designed a range of activities that encourage participants young and old in a variety of games, such as the Muscle Workouts, Yoga, Aerobic Exercises and Balancing Challenges",* (Nintendo, 2008).

"Wii Fit and Wii Sport is a combination of fitness and fun, designed for everyone, young and old. By playing Wii Fit a little every day, you, your friends, and your family can work towards personal goals of better health and fitness" (Nintendo, 2009).

If one is to learn from the researchers, the Nintendo Wii Fit/Sport Company must have an understanding that participants perceive things differently and be conscious of creating a learning environment where the method of instruction chosen will encourage quality learning (Granholm, 2006).

2.4.3 Benefits of Wii Fit/Sport

Since its introduction in late 2006, the Wii has been a favourite of the gaming community, which has praised the system for transforming the gaming experience into a physical activity. Retirement communities have adopted the technology to encourage residents to exercise and the Wii Fit/Sport, which includes a balance board to simulate movements from hula-hooping to yoga, has been popular with some fitness professionals. Physical therapists have embraced the Wii as a tool to help patients regain balance, coordination, range of motion and muscle tone through an engaging fun activity (Educause, 2008).

The Wii Fit/Sport has a number of major benefits such as the convenience of partaking in fitness games at a time and place that suits the participant (Frank et al, 2003), rather than being in a real live class and having to stay to the pace of the class; with this tool, participants are able to choose a pace that suits them (Carter, 2002). The feedback received such as progress, time, speed, weight, calories burnt, and BMI levels, is important and may not be available in a real life class, (Carter, 2002). Other benefits of these games are that it can be played over and over again, on your own or with a group of people.

There is always another benefit to the Wii Fit/Sport. Imagine that you are in the comfort of your home; you are able to exercise and still be able to do your laundry and clean your home without getting dressed and worrying about whether you will be pointed at and laughed at. For women, the Wii Fit/Sport is a benefit and is a replacement of gyms for the sole reason that in the gyms, they are getting harassed, whilst in their home there is no one else around besides a computerised personal trainer to work with you around the time you are on the Wii Balance Board. These could be some of the deciding factors and discourage people from attending the gym. Being in a private setting for anyone is more conducive to being relaxed and being able to concentrate on your positions to get through the program. Some of the students suggested the following benefits:

- Greater engagements in learning – users participate rather than just observing, and the activities are not presented as learning in the traditional sense. This may increase engagement from clients who have a negative perception of traditional learning and/or of their own abilities.

- Building teamwork, communication and collaboration skills.

- Customising the experience by choosing levels– the tests could prove a more flexible tool than more standardized learning tools. Wii fit and Wii sports can be used by the trainer to set achievable goals for their clients.

- Cognitive development could be enhanced using tools such as Big Brain Academy

- Used as a supplementary tool to enhance the teaching of motor skills, hand-eye coordination and concepts such as balance or coordination.

- Used by therapists to maintain the health of their patients as the Wii fit encourages people to exercise.

- Helping parents interact better with their children.

- Confidence building - games such as Wii fit and yoga in a controlled environment could provide people with confidence to do activities in real life

2.4.4 Wii Fit/Sport versus the Gym

Getting fit and staying fit does not have to involve an expensive gym membership and hours pounding away on a treadmill – it can even be something to look forward to (Maher, 2009). As of late the only place to go in order to strength train or to get a good cardio work out was by going to the gym. However, now thanks to the Wii Fit/Sport, people of all ages are able to get the benefit of all the different equipment in the gym in the comfort of their own home.

One of the benefits of been in your own home is that there is no added stress of impressing other people, as it is just you and the computer. Thus, we can see that the gym is only good if you are alone. There is a great possibility that the Wii Fit/Sport is going to be very popular and it is likely that there will be a Wii Fit/Sport in a great deal of homes in the future.

The gym is an option that provides members with the opportunity to be able to improve their health and possibly to lose some unwanted pounds! The goals of the Wii Fit/Sport are similar in that it is a product that acts as a personal trainer for you, but which is considerably cheaper than going to a gym or getting a real personal trainer. If one intends to make a commitment to health and wellness, this would seem to be the perfect product, (Maher, 2009),

2.5 How the Nintendo Wii Fit can enhance our general well being and health, particularly for obesity, rehabilitating accident and stroke patients in recovery.

The current high level of obesity is of concern and one of the major reasons for the rise in interest in 'Exergames' (Lynes, 2008). Dr. Donal O'Shea, (2008) consultant endocrinologist at St. Vincent's University Hospital Dublin stated that a survey on health and weight carried out in 2000 provided a very important insight into how inactive the Irish have become and how unaware we are of realising that we are obese and not just overweight.

A survey carried out by the Food Safety Promotion Board on Irish adults in 2000 found that over 20% of men were found to be obese. This is 12% more than in 1990 when the rate was just 8%. Also in 1990 the rate for women was also up by 3% from 13% to 16%. The survey also showed that obesity in women over the age of 50 years had increased by almost 30% (Irish Health, 2008).

Exercise enhances and benefits our physical and mental health (Carron, Hansenblas and Estabrooks, 2003). The benefits from exercise to our physical health include the decreased risk of a variety of diseases such as cardiovascular disease, osteoporosis, and hypertension, certain cancers, poor cholesterol profiles, diabetes, and obesity (USDHHS, 1999). Research has also shown that exercise has a number of benefits for our mental health such as reduced risks of psychological problems like anxiety and depression and enhancing a positive effect on our well being and general mood (USDHHS, 1999).

Steffens (2007) claims that we really do need to exercise because exercise prevents disease*. "If you exercise and are active you are less likely to develop cardiovascular disease, type-2 diabetes and osteoporosis, have a stroke or get certain types of cancers, such as colon and breast cancer. Physical inactivity is ranked just behind cigarette smoking as a cause of ill health".*

Tan (2008) also claims that there are six inspiring reasons why we should exercise:

- Helps Strengthen Your Heart

- Maintains Strong Bones and Muscles
- Helps Manage Your Weight
- Induces Quality Sleep at Night
- Puts You in a Better Mood
- Improving Lymphatic System

Research carried out by Jeffrey W.H Yim, (2008) in the field of exercise psychology, showing that performing physical activity in groups increases exercise participation.

Yim, (2008) discovered that the exercise enjoyment and engagement benefits from a group of players rather than a player on their own. He also discovered that people who would not normally exercise found the exercise game very enjoyable and engaging. In the United States such 'Exergames' have become a common leisure activity in which children and adults partake on a regular basis (Dalleck, 2008). Retirement communities have adopted the Wii Fit/Sport technology to encourage residents to exercise, which includes a balance board to simulate movements from hula-hooping to yoga, has been popular with some fitness professionals. Physical therapists have embraced the Wii as a tool to help patients who have had an accident or stroke regain balance, coordination, range of motion and muscle tone through an engaging fun activity (Educause, 2008).

2.5.1 Disadvantages of using Wii Fit/Sport

There are some disadvantages, such as delays in getting started with the fitness program due lack of motivation and having to enter personal details (Maher, 2009). Before any interaction can take place with any of the games, the Wii Fit/Sport asks the participant to register a number of personal details, such as ones age and height. This information then produces a microscopically accurate read out of ones weight and BMI level. However, one of the advantages of the game is that personal information can be password protected if desired. As with any computer-input devices, the Wii Fit/Sport carries a risk of repetitive motion injuries, not to mention the risk of injuries resulting from engaging in energetic, physical activity indoors. Plenty of Wii users have ended up with cuts, bruises, and black eyes from swinging their arms and the Wii-motes, because there are not fastened correctly around the wrist end up been thrown around the room, battering into walls, furniture, lights and other players (Oblinger, 2008).

Tam Fry (2008), Honorary Chairman of the National Obesity Forum, an independent charity, working to improve the prevention and management of obesity called for "*children to be banned from playing the game, (Wii Fit), claiming the BMI measurement was misleading*". An article in the Daily Mail, (2008) claimed that a 10 year old girl having entered her height, had her measure of her Body Mass Index, (BMI) in the category of "*fat*" (Daily Mail, 2008). Fry (2008) also claimed the BMI results are not accurate for adults and should definitely not be used for children as a child's BMI can change every month; also, children of a young age can look stocky, but be very fit. Fry (2008)

believes that the Wii Fit/Sport should carry a warning for parents and has strong concerns for children using the game. The following are some of the downsides of the Wii Fit/Sport that should be considered:

- **Not the only connection** - This should never be the sole source of family time. Board games, puzzles and card games provide the same high-quality family time and are often more mentally challenging.

- **It's inside** - Don't forget about the importance of vitamin D from sun exposure, the appreciation for nature, breathing fresh air and rolling in the grass.

- **Screen time** - Even though it's activity, it's still screen time for the children and that should always be limited. Two hours is a good goal for children overall, including computer, television and video game time. It's unhealthy to focus on one set point for too long. Be sure to encourage reading and outdoor activities in addition to this avenue.

- **Age-appropriate** - Adults should view all aspects of the system first to ensure their little ones won't hear or see anything that they wouldn't let them watch on television or say at the dinner table. No game should be played unless approved by a parent. Also, the game system should be in

- **Negative perceptions** of computer games may make people dismissive of using it and seeing its benefits.

- **Apprehension** - People were apprehensive of the negative comments from the Wii Fit\Sport and brain training. The students observed that they would like a function that would give people more encouraging feedback but could not find a function to do that.

- Some students felt embarrassed going on the Wii Fit/Sport at first in front of a group of people in case they embarrassed themselves. Social aspect put some people off.

- New skill sets needed for clients unused to gaming. Older people may find it difficult to use at first.

- Some games assume you know what you are doing and know the controls already.

- People did not like that the Wii Fit/Sport could tell them their weight

- Supply problems - Difficult to get hold of Wii Fit boards, the Wii Fit/Sport can be addictive and people become very competitive.

Whilst use of the Wii Fit/Sport as a test has shown some benefits for clients in society generally, and is often reported in the news, more work will need to be done to evaluate the therapeutic value as opposed to pure entertainment value.

Nintendo, (2008), claim that the reasoning behind using "*the Wii Fit/Sport, is a combination of fitness and fun, designed for everyone, young and old. By playing Wii Fit a little every day, you, your friends, and your family can work towards personal goals of better health and fitness".* The health and fitness industry has grown and changed dramatically in the past number of years according to Daniele Nadalutti, (2007), who claims that "*Scientific evidence shows that the regular practice of physical activity and sports provides people of all ages with physical, social and mental health benefits*".

2.6 Conclusion

In conclusion there is no doubt that as we progress in the digital age integrated information technology has become pervasive in modern life and will likely become more so as the technology improves and the range of applications to which information technology is applied increases. Currently the age cohort of frequent users is from lower age groups, however as the technology become more user friendly, the rate of adoption has become more widespread across all age group for applications such as mobile communication, portable music

devices such as ipods. It is only a matter of time before we become more comfortable with and more reliant on a wider range of technologies which will impact on all areas of our lives.

To date fitness would have been an area in which information technology has had little impact, as the nature of exercise, such as running, swimming, and other general fitness was essentially technology free. However, now digital read outs in products such as Nike fit motivate, monitor speed, performance and provide a means of assessing the effectiveness of an exercise activity such as running, (Fit- Friend, 2009).

Through interactive technology such as Wii fit/sport not only does one have the opportunity to exercise but incorporates social interaction with others such as friends, parents and children, grand parents and children and all to interact with the technology in a way which is fun and socially rewarding.

The purpose of the primary research undertaken is to strive to understand the changes in the interaction with technology and assess participants' perception of the Wii Fit/Sport as an effective means of exercise and achieving health and fitness. Wii Fit/Sport may not provide as strenuous an exercise regime as traditional methods such the gym but it has the potential to provide health benefits in a more fun and interactive way.

The study attempts to identify these three key objectives:-

1. Will the Nintendo Wii Fit/Sport replace the traditional Gym?
2. How has technology enhanced learning through multimedia, with a variety of games and fitness techniques for participants of all age groups?
3. How can the Nintendo Wii Fit/Sport enhance our general well-being and health?

Chapter 3 Research Methodology

3.1 Introduction

This chapter discusses the methodology used to answer the research questions. The purpose of this project is to quantify and qualify multimedia as a method of instruction to improve the quality of life.

This research examines the usefulness of the Wii Fit/Sport and if it would enhance / complement or replace the traditional gym. Information and data were gathered by using fact-finding techniques such as questionnaire, (See Appendix 1 - Questionnaire), interviews (Parasuraman, 1991) and observations (Science Buddies 2009). This would elicit an overall view of opinions, behaviours and experiences, which in turn would lead to more detailed result. A total of fifty questionnaires were distributed, forty two of which were returned. When compiling the questionnaire the researcher tried to take into consideration a number of points (Gatech 1997),

- What did the researcher want to achieve from this questionnaire?
- How many questions should the researcher use?
- How was the researcher going to word the questions?
- How did the researcher want to receive the answers?
- How much time was needed to complete the questionnaire? (McNiff, Lomax and Whitehead, 2006)

3.2 Research Methodology

The approach used for this research was a case study. A case study is a particular method of qualitative research. Quoting Needham (2000), Yin (1994) points out that a case study is an empirical enquiry which "*allows investigation into a contemporary phenomenon within its real-life context*". Qualitative research involves investigating participants' opinions, behaviours and experiences from the informant's points of view. Case study provides a systematic way of looking at events, collecting data, analysing information and reporting the results.

3.3 Research Questions

Initially, the researcher decided that questions were going to incorporate Action Research. The reason for using this method was to prove if the Wii Fit/Sport was an alternative or an addition to one's fitness regime; could it enhance or replace the gym or any other fitness activities? The researcher chose this method as she believed it was different from other forms of research in the following ways:-

- Focused on participant
- Focused on learning
- Promoted good practice
- Lead to personal and social development
- Responsive to social situations
- Questioning

- Focused on change
- Responsibility on participants
- Highlighting the values of best practice, (McNiff, Lomax and Whitehead, 2006).

The Researchers questions have changed as the method of research intended was a combination of action research, questionnaires, interviews and observation, the research will now concentrate on the three most suitable techniques.

The following research questions were explored:

1. Will the Nintendo Wii Fit/Sport replace the traditional Gym?
2. How has technology enhanced learning through multimedia, with a variety of games and fitness techniques for participants of all age groups?
3. How can the Nintendo Wii Fit/Sport enhance our general well-being and health?

The action research investigation was held with a group of six students of varying ages from different courses.

3.4 Background to the Research

The purpose of this experiment is to measure the effects of students' using a Multimedia approach within their own environment compared to the traditional

gym. The trial experiment consisted of a group of six friends who are students in Athlone Institute of Technology (AIT), and a work colleague who obtained the Wii Fit/Sport in order to get back in shape in the privacy of their own home. Other participants also included family and friends and work colleagues. Sinett, (2006) claims that, the average gym user goes to the gym less than twice a week. Della Vigna, (2006) from the University of California at Berkely attempted to identify the reason why people buy health club memberships but don't use them, and suggested that it may be because of consumer overconfidence.

> *"First people overestimate the number of times that they will go to the gym and then secondly they congratulate themselves by buying an expensive gym membership that rewards the frequent visitors with financial savings. This consumer overconfidence results in millions of dollars of profits for the health-clubs all the while reducing household income by hundreds of dollars a year"* (Della Vigna 2006).

The researcher handed out questionnaires to colleagues, family and friends and they in turn passed them on to people they knew who had either purchased or received a Wii Fit/Sport. The results from the questionnaire showed a high level of enthusiasm about the easy way in which people thought they were going to get fit. A total of fifty questionnaires were handed out but only forty two of those were received back. The balance of eight questionnaires which were not returned were from those send by email.

3.4.1 Theory of how Wii Fit/Sport Works

> "The Nintendo Wii Fit has designed a range of activities that encourage participants young and old in a variety of games, such as the Muscle Workouts, Yoga, Aerobic Exercises and Balancing Challenges" (Nintendo 2008).
>
> *"Wii Fit and Wii Sport is a combination of fitness and fun, designed for everyone, young and old. By playing Wii Fit a little every day, you, your friends, and your family can work towards personal goals of better health and fitness" (Nintendo 2009).*

If we are to learn from the researchers, the Nintendo Wii Fit/Sports Company using the computer games and instructors must try not just to impart steps or instructions but also an understanding that participants perceive things differently. In order to achieve this for participants, Nintendo Wii Fit/Sport must be conscious of creating a learning environment where the method of instruction chosen will encourage quality learning (Granholm, 2006).

3.5 Research Tools

The study has adopted several approaches in an attempt to gather significant data, opinions and ideas. The following approaches were used: Action Research, Questionnaires, Interviews and Observations. It is important to note that no one technique is significantly better than another, although a

combination of several offers a more comprehensive view of the potential requirements.

The researcher has chosen Action Research as a method, to try and discover if people would use the Wii Fit/Sport as an alternative method or as an addition to their fitness regime. The researcher also wanted to find out if the novelty of using the Wii Fit/Sport would disappear in the same way as gym membership or if the Wii Fit/Sport was going to be better used to its full potential.

3.5.1 What is Action Research?

Action Research is research into a practice undertaken by those involved in an exercise with an aim to changing or improving it (McKernan, 1996). It is a process of enquiry into the effectiveness of the practice. Action Research is about both “action” and “research” and the links between the two. It is possible to take action without research or to do research without taking action, but the amalgamation of the two is what distinguishes action research from other forms of investigation; this type of research is not restricted to any one form of enquiry (McNiff, 2002).

This form of research is focused on an effort to improve the quality of a task and/or performance. It is designed and conducted by practitioners who analyse the data to improve their own practice. This method can be carried out by individuals or by teams of colleagues. The team approach is called collaborative

. It also has the potential to generate real and continued improvements. It gives participants opportunities to reflect on and assess their practice techniques; to explore and test new ideas and methods; to assess how effective the new approaches were; to share feedback with fellow team members; and to make decisions about new approaches (McNiff, Lomax, and Whitehead, 2006).

The purpose of using Action Research is to find if the Wii Fit/Sport was used less often than people had predicted, if reasons could be identified as to why this would happen, and if a experiment / test could be set up to make necessary changes using a small group of people, evaluating these changes and then reflecting on progress or lack thereof.

3.5.2 The Research Process

The researcher chose a group of six students from Athlone Institute of Technology (AIT); and an individual (work colleague). The groups were known as “Trial Group” and “Trial Individual”. The researcher’s involvement in the action research was to act as an observer to both the trial group and the individual, checking on each one, on non specified dates and times. The researcher had also intended on taking part on occasion as she felt it would help the participants to be more aware of the advantages and disadvantages during the trial. This involvement would benefit the research, leading to a better understanding of any changes necessary. The researcher also interviewed each trial group participant and took notes on their progress or lack thereof (See

Appendix 2 - Reflective Diary). The researcher observed their progress and discussed the benefits and disadvantages of the research.

The trial group had initially planned in January that they would use the Wii Fit/Sport on a daily basis as part of their fitness routine until the summer months. The owner of the Wii Fit/Sport decided that all the participants should meet in his house every day at 6pm after college, five evenings a week. Each night their goal was to increase the previous night's score. They also took a record or Body Mass Index (BMI) etc. The first month was going well and gradually it became a social event as well as fitness. The trial group chose the Wii Fit/Sport method of exercising as they felt it would be fun and cheaper than going to the gym. It was also important to them that they increase or at least maintain their fitness level until the summer months. Each trial participant is involved in various types of sports and so wanted to maintain their fitness level until they were able to get back to their summer time routine. The trial group of six found the nightly routine to be good fun and not as methodical or boring as going to the gym. Each trial participant felt that it would not be a problem to stick to their initial plan of using the Wii Fit/Sport until the summer months as they were having fun and it was a break after college.

The individual trial member started around the same time in January, again preferring to use the Wii Fit/Sport every evening instead of using the gym. She explained that because she lives a number of miles outside Athlone she preferred to go home directly after work and exercise there, rather than having

to leave her home to go back into town to the gym. She also favoured not to go directly to the gym after work as it meant arriving home very late in the evening. The Wii Fit/Sport meant for her that she was home early and could still complete her workout. She also confirmed that she felt the Wii Fit was more fun than the gym and that she would definitely stick to the routine until the summer months at least.

Action Research Cycle One started in January 2009, the week after starting back to college. The researcher had planned that each trial group would be visited during the first week. Each trial participant would be interviewed briefly and in an informal manner. While observing at each visit, the researcher would take the necessary notes in a reflective diary. The interviews would give clear guidelines, advantages, disadvantages and changes required so that each trial member could improve their own practice.

This research process required a number of action research cycles to be put in place in order to achieve desired results. A cycle can be altered or adjusted following the results and evaluation of a previous cycle. This method of research is a learning process where each participant using the Wii Fit/Sport could reflect on, and talk about, their activities (Ausubel,1999).

Kemmis, (1988) has developed a simple model of the cyclical nature of the typical action research process showing two cycles. Each cycle has four steps: Plan, Act, Observe and Reflect. The problem is then re-assessed and the

process begins with another cycle. This process and cycles continues until the problem is resolved (Kemmis and McTaggart, 1988).

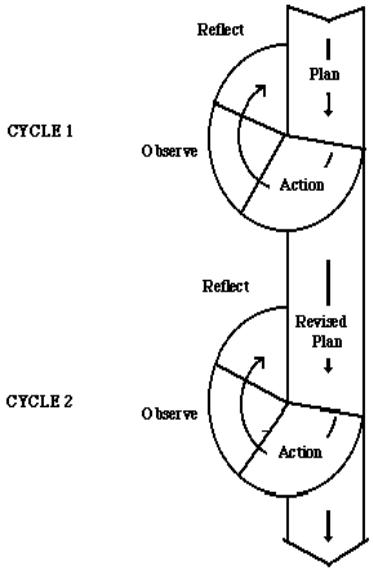

Fig. 3.1 Kemmis model of the cyclical nature of action research

In February, the researcher decided that due to time constrains Action Research was not be a suitable method of testing as it would be more preferably over a longer period of time. The researcher had started with Action Research Cycle one and it was proving to be very interesting and could have proved very beneficial had more time been available. The researcher's initial reasons for using this method were to prove if the Wii Fit/Sport could complement or replace the gym or any other fitness activity. However, cycle one of the action research was in place, the results of which would add greatly to other research methods. The researcher had other research methods in place such as Questionnaire,

Interviews and Observations. These methods were to be used in each cycle but can be just as effective alone.

3.5.3 Questionnaires

The researcher chose questionnaires because they are an inexpensive way to gather data and a well-designed questionnaire will collect the required data efficiently and with little effort. The researcher found that the biggest challenge in developing a questionnaire was to translate the objectives of the data collection process into a well-conceptualised and methodologically sound study.

Before designing the questionnaire, the researcher had to make a number of decisions like:

- How many participants would be taking part?
- How long should it take for the questionnaire to be completed?
- What were the objectives?

One of the rationales for using questionnaires was that the questionnaire did not request the name of the respondent, thus removing the need for the participant to reply to the questionnaire in a way to please the researcher. In this way the participants felt at ease when filling out the questionnaire.

3.5.4 Interviews

“An interview is a conversation between two or more people” (Kvale 1996). The researcher believes that qualitative interviewing is the most useful method of

interviewing for this particular project. Kvale (1996) defines qualitative research interviews as "attempts to understand the world from the subjects' point of view, to unfold the meaning of peoples' experiences, to uncover their lived world prior to scientific explanations"

Qualitative interviewing is useful for:-

- Capturing and describing a process
- Exploring individual differences between participants' experiences and outcomes
- Understanding the importance or lack of the Wii Fit/Sport to its participants
- Documenting difference in participants' beliefs.

Patton (1990) identifies three basic types of qualitative interviewing for research or evaluation: the informal conversational interview, the interview guide approach, and the standard open-ended interview.

The researcher felt that the qualitative interviewing because of its very personal informal and conversational nature of interviewing was the best approach. This type of interview occurred spontaneously and so the participants felt more at ease seeing it as an informal conversation rather than an interview. The main advantage is that the interview is highly individual. The researcher was very

aware that these interviews were very personal interviews and so highlighted many of the basic ethical issues of any research method (Patton, 1990).

Among these issues are:

- Confidentiality
- Informed Consent
- Risk Assessment
- Promises and Reciprocity
- Interviewer Mental Health

The above issues were addressed verbally between the researcher and the participants and each was briefed on any ethical concerns they might have before starting the project such as:-

- Sharing very personal information,
- Agreeing to take part in the study,
- Ensuring personal details will not be disclosed.
- Participation in this project is of ones own free will
- Free at any time to leave the project.

However, there may be a few disadvantages with the interview method, such as:-

- Participants may say more than they intended to say.

- Participants may have bad days or be temperamental or not feeling well on days of interviews.
- Conducting interviews can be very time-consuming.

The researcher's rationale for using Interviews as a fact-finding technique was to give the study a real world perspective. Interviews provide in-depth and valid information. The one-to-one nature of an interview means that the researcher can clear up any misunderstandings as they occur.

3.5.5 Observations

There are a number of different ways to design an observation study (Malderez, 2009), and the researcher needed to decide the best technique to be used. It may also be necessary to combine a number of techniques as some are very similar, in order to have the best method. The following is a list of observation methods:

3.5.5.1 Natural vs. Contrived

Conducting the study in a natural setting means that the researcher/observer is observing the participants in their "real life" environment. This method can be a very time-consuming way of gathering the information that the researcher specifically needs for the project. However, because the data collected is in the participants' natural setting it does mean that the data collected will be accurate in reflecting "real-life" behaviour rather than "contrived" behaviour.

A contrived setting would be where the researcher/observer would create a specific setting. The contrived setting offers the researcher greater control over the gathering of data but may be questionable as to whether or not the data collected does truly reflect a "real life" situation.

3.5.5.2 Disguised vs. Non-disguised Observation

Disguised would be a form of observation when the participants did not know they were being observed. The researcher believed this would not be a suitable method of observation due to the ethical concerns of recording the participants when they used the Wii Fit/Sport. However, if it were to be used the researcher wondered if this may have showed a more true or natural behaviour and may reflect the participants' true reactions.

Non-disguised observation is when the participants are aware that they are being observed. Using the non-disguised observation technique alone alleviates ethical concerns. By using this approach, the researcher is offered the opportunity to follow up the observations with questions for the interview. This allowed the researcher to delve deeper into the participants' behaviour.

3.5.5.3 Human vs. Mechanical Observation

Human observation would be where the researcher (the human) would observe the participants in order to collect data for the project. Mechanical observation involves using various types of machines to collect data, which is then

interpreted by researchers. This form of observation was not suitable or feasible for this project.

3.5.5.4 Direct vs. Indirect Observation

Direct observations involve looking at the actual behaviour or occurrence rather than at an end result of that occurrence, which would be an indirect observation. The researcher could observe the participants completing a twenty minute session and then check the number of calories burned. However, with Indirect Observation, the researcher could check the end results without having seen any participant partaking in the exercises. In this case direct observation would be more accurate.

3.5.5.5 Structured vs. Non-structured Observation

Structured observations are made when the data that is being collected can be organised into clear categories so that the researcher can record the data by simply ticking boxes. Non-structured observations are not looking for specific facts or actions, but rather are capturing everything that occurs.

After careful consideration the researcher decided that because a lot of the observation techniques over-lapped in their meaning, the researcher decided

that a combination would be the best option. That way valuable data would be collected for the study. All observations were noted by the researcher.

The rationale for using observation as a method of research best allowed the researcher and the participants to establish a trusting relationship while the research was being carried out.

3.6 Conclusion

This study is exploratory in nature and due to the small number of participants and the action research methodology the results achieved can not be relied upon with any degree of statistical accuracy. Also given the iterative manner of the collection of the research, the researchers' insight varied over the course of the study and by the final iteration the researcher felt that the trust of the participants had been gained and thus the participants were more open to the providing a more open and honest feedback than would have been achieved simply by having the participants fill out a questionnaire as a once off interaction with the researcher. While having several contact sessions with the trial participants elicited more informative responses. However, time and cost constraints meant having a reduced number of trial participants possibly impacting on the reliability and validity of the results obtained.

Chapter 4 Research Findings

4.1 Introduction

The project aimed to determine the effectiveness of the Wii Fit/Sport as a fitness aid against the traditional gym. These findings took account of the learning experience, knowledge gathered, convenience, and motivation for fitness and maintaining fitness until the summer months. In order to obtain these findings, the researcher chose a combination of Questionnaire, Interviews and Observation combined initially in Action Research and then later used as individual pieces of research.

4.2 The Study

The questionnaire was completed by a total of forty two participants ranging in age from 5 years to forty five years. The questionnaire was then distributed after the Christmas holidays, among work colleagues, students, family and friends and some were passed on to friends of friends. This study aimed to determine if the Wii Fit/Sport could replace the gym and the questionnaire was designed to find if this was the case or not. The results of the questionnaire proved that the Wii Fit/Sport could not replace the Gym.

The trial group participants consisted of six students and a work colleague. They were chosen because they took an interest in this project. They completed the questionnaire and when asked if they would like to get involved in the study, they all agreed.

Results gathered from the questionnaires and interviews, along with any observations made, were recorded.

However, the interviews combined with observations only took place between the seven participants, where a similarity arose between questions then the researcher was able to bridge the gap and investigate further so as to get a better understanding.

4.3 Findings by Research Question

4.3.1 Will the Nintendo Wii Fit/Sport replace the traditional gym?

The study aimed to determine the effectiveness of the Wii Fit/Sport as a fitness aid against the traditional gym. The combination of questionnaires, interviews and observations proved that not only did each participant enjoy the Wii Fit/Sport; they also found it to be motivating and a good form of exercise.

The three methods of collecting information were used to obtain results which would determine if indeed the Wii Fit/Sport would replace or enhance one's fitness levels. These methods also took into account the learning experience, knowledge gathered, convenience, and motivation for fitness and maintaining fitness throughout the winter months. The questionnaire was chosen as it was the most direct form of questioning to obtain information. This questionnaire was handed out or emailed so the participants could complete in their own time. The participants were informed that they had two weeks to complete the questionnaire and return to me/

The questionnaire took the format of fourteen questions, and was specifically designed to obtain information with regard to the Wii Fit/Sport and gym usage. The questionnaire was completed by the participants, the trial group and trial individual.

Question one of the questionnaire asked the gender of the participants using the Wii Fit/Sport. When the results were compiled it showed that 71% were female against 29% male.

The researcher interviewed the trial group asking why they thought there was such a high percentage of females over males. The comments received were:-

Participant 1 - “Some men would see this as a “girlie” game and so wouldn’t admit to it”.

Participant 2 - “Girls can be just as competitive as boys, so there is no reason why they should feel like that”.

Participant 3 - “Men wouldn’t see it as a real work out, just as a game”.

Another of the questions asked if the Wii Fit/Sport was more beneficial than going to the gym or a keep fit class.

Participant 1 - “No I don’t think so, the gym is important for training and is a much more stabilising way of increasing and maintain fitness especially out of season”.

Participant 4 - “I think it’s great, if you don’t want to go to the gym, but I’m not sure if it would replace it altogether”.

Participant 5 - “I think it would replace the gym, why not, the gym is so boring, I hate it and this Wii Fit/Sport is much more fun”.

Participant 6 - “It will never replace it, how could anyone especially athletes, increase fitness levels, the Wii Fit/Sport wouldn’t be enough”.

Participant 7 - “I think it’s enough for those who hate the gym but maybe combining it with yoga once a week might be better”.

One of the important questions in the questionnaire asked if the Wii Fit/Sport would replace the gym. The results from the questionnaires showed that 83% of the 42 participants claimed that they did not think the Wii Fit/Sport could replace the gym, while 17% claimed that it could replace the gym. The comments received from interviews were: -

Participant 2 - “No way, it’s not enough”.

Participant 3 - “I think it will, why not, everyone want to be fit but not have bulging biceps, the Wii is enough and it’s not as boring and repetitive as the gym”.

Participant 4 - “No I don’t think the Wii will ever replace the gym maybe used to enhance an already fitness regime”.

Participant 5 - “I think it would replace the gym why not its much more fun, more convenient, you can play with friends and family, its all fun and games and that’s the way exercise should be. The gym is no fun you get no satisfaction and its bloody hard work”.

Participant 6 - “I also feel so terrible when I go in and see all these skinny b’s I hate doing a work out, puffing and panting, so much easier at home in my own time”.

4.3.2 How has technology through multimedia enhanced learning, with a variety of games and fitness techniques for participants of all age groups?

Technology has enhanced learning, as participants felt they had a choice of exercising or not. The set-up was easy and participants felt relaxed and confident to find their own level and their own pace. In the questionnaire one of the questions asked was to rate the setting up of the Wii Fit/Sport. From the analysis the setting up of the Wii Fit/Sport seemed to be no trouble with a total of 100% claiming it was easy. The results from Chapter 5 have proved that more and more people are now so familiar with technology that it’s not a problem any more.

The participants were also asked the same question, the comments received were as follows: -

Participant 1 - *“Very easy, even I could do it”.*

Participant 2 - *“Yes it was easy to set up and you could do it in your own time in your own home”.*

Participant 3 - *“I didn’t feel under pressure setting up, normally I’m not very good at all this technology, I can’t even use the computer that well, but I found it easy to set up and I enjoyed the time”.*

Question two illustrates the most common age group using Wii Fit/Sport,

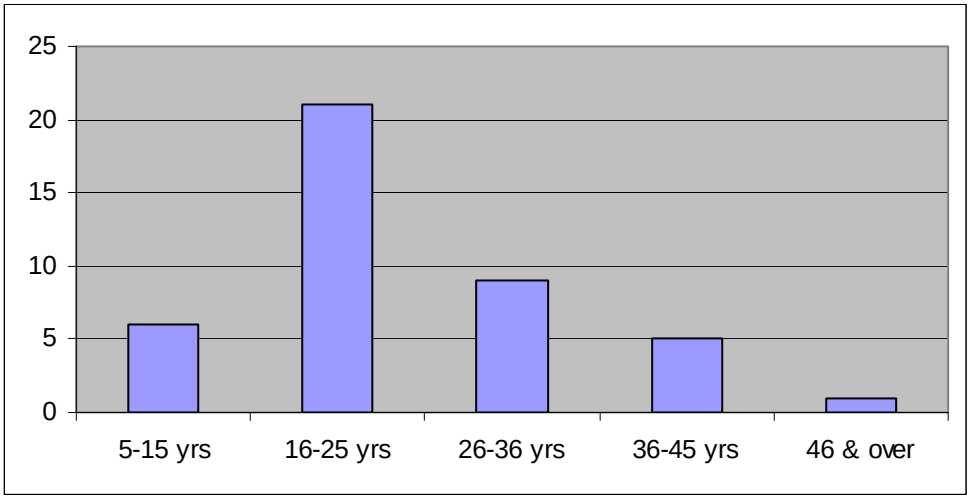

Chart 4.1 Most common age group using Wii Fit/Sport

It was not surprising to learn that the most common category of people who use the Wii Fit/Sport were between the ages of 16 and 25., The reasons for this are probably because teenagers have grown up with technology. A total of 83% aged from 16 to 45 years used the Wii Fit/Sport while only 2% represented those over 46 years. The remaining 15% were the age group 5-15 years. This is the age group probably most interested in new technology and advancements, (Rousseau & Rogers 1998).

Another question asked the participants to state their level of fitness. Most participants claimed their fitness level was “very good” to “fair”, with only one participant claiming to have a “bad” level of fitness, while no one claimed to have a “very bad” level of fitness.

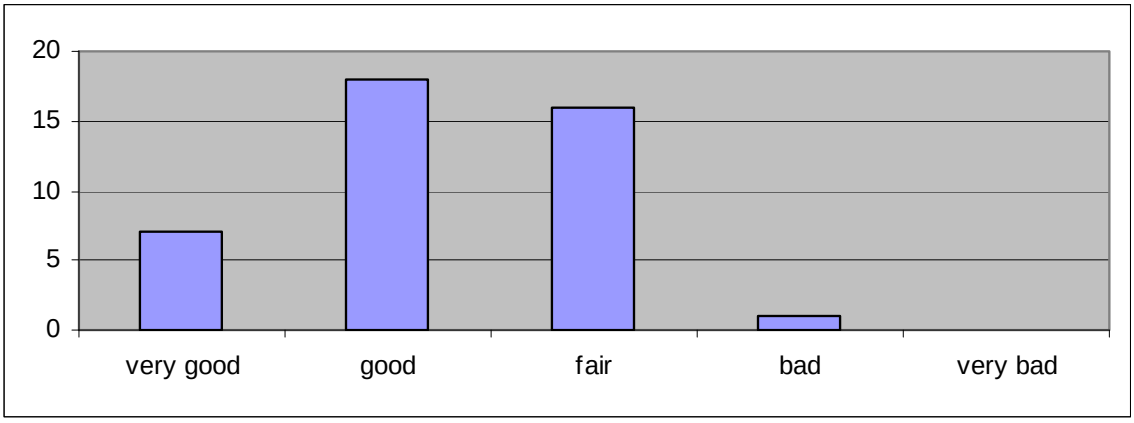

Chart 4.2 Participants level of Fitness

At the interview stage the participants were asked about their fitness levels and how they knew if they were fit or not or if they were merely estimating. The comments were as follows: -

Participant 1 - “I work out in a gym mostly; there, they check blood pressure and weight on a continuous basis. If someone is willing to accept the instructors help, they will guide them about their weight, how many sit ups you should do, the number of press up and so on, so that way, because everything is checked regularly you are able to see the fitness levels improving”.

Participant 2 - “Most people know themselves if they are fit or not by what they are able to do, if your able to run one mile this month but next month you are able to run five miles when then you fitness has improved”.

Participant 3 - “You probably don’t know exactly was is good, fair or bad, these are probably just representations for yourself”.

The questionnaire queried the participants' reasons for purchasing the Wii Fit/Sport.

The reasons were similar;

Participant 1 - "liked the idea of incorporating technology and fitness and been able to keep track of BMI and calories".

Participant 4 - claimed that "it was the "in thing" and so they wanted it".

Participant 5 - claimed their children "wanted it as a Christmas present because their friends or cousins had it and it was great fun and they too wanted it".

Participant 6 - claimed that they thought it would be an "easy alternative to going to the gym".

Participant 7 - claimed that they wanted to "increase their exercise regime and thought this would be a great alternative".

The final question in the questionnaire asked if the participants used any other form of interactive computer game. A total of 60% said "Yes" while 40% said "No". The researcher wondered if the participants using the Wii Fit/Sport liked the idea of mixing multimedia technology along with a fitness game or if they thought it was solely for fitness. When asked to give their comments, they explained that: -

Participant 1 - “I like the idea of mixing the two it is much more fun”

Participant 2 - “The combination of both means, that it feels more like playing a game rather than completing a fitness technique”.

Participant 3 - “I love new technology and I find this so fascinating, this is the way of the future”.

4.3.3 How can the Nintendo Wii Fit/Sport enhance our general well-being and health?

The results from the questionnaire, interview and observations show that the Wii Fit/Sport can and does improve our general well-being and health. Participants claimed that while it may not replace the gym on a permanent basis, it would enhance fitness, promoting fun, laughter and games.

From the questionnaire two questions were similar as they asked if family members or friends would join in the activities and if they preferred to be with others or alone. The results of these questions were surprising because a total of 98% of participants who used the Wii/Fit/Sport did so with family or friends. This left only 2% to use this multimedia technology alone. At this point the researcher wondered why this might be the case, was it because they wouldn’t use the Wii Fit/Sport unless they had someone with them? Nearly everyone answered “yes”, they preferred to have family members and/or friends join in as it was much more fun and enjoyable. The interview elicited comments like:-

Participant 1 - “It is a fun game to be used when friends called”.

Participant 2 - “I think it’s not just a game but also an exercise which could be completed in ones own home at a convenient time”.

Participant 3 - “I prefer the group participation, as its much more fun”.

Participant 4 - “I don’t think I would do it if I had to do it on my own, no fun”.

Participant 5 - “I don’t mind partaking on my own, I much prefer it rather than trying to do exercises in front of “skinny b’s”, I am able to do it at home on my own in my own time, and it suits me”.

Participant 6 - “I don’t mind doing it on my own but I would prefer at least one other as you get much more enjoyment and I think feel the benefits better”.

Participant 7 - “I like to have some friends but the six of us here is enough when others come round it can be a bit too much and you can get a bit fed up”.

The questionnaire also asked how often the participants would use the Wii Fit/Sport

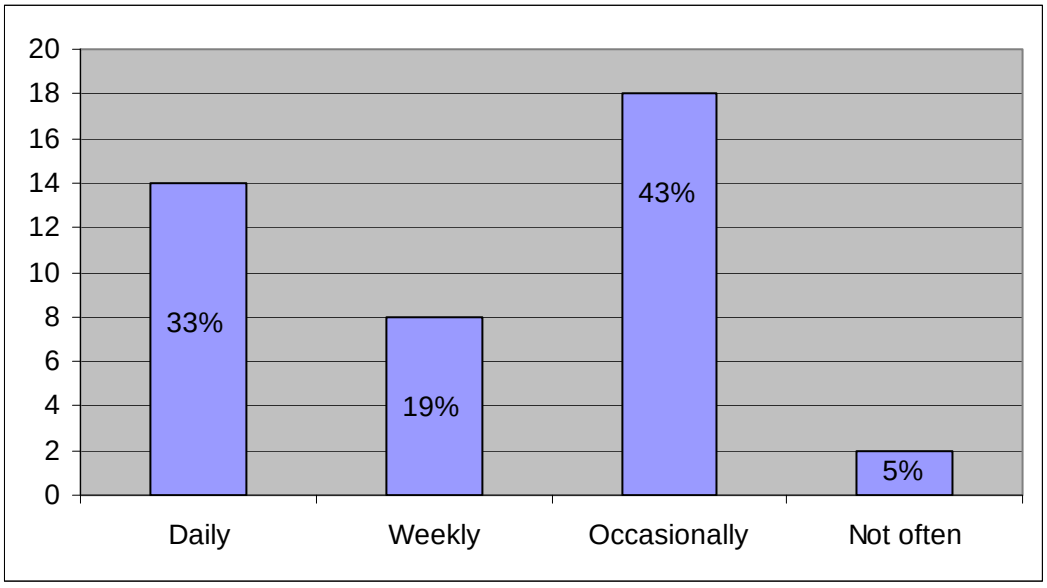

Chart 4.3 How often participants use the Wii Fit/Sport

The above graph shows the results of how often participants used the Wii Fit/Sport.

At the interview when asked why the above results for a daily work out may have been so low, the comments received back were:-

Participant 1 - “People are too busy, don’t have time”.
Participant 2 - “You get fed up when the results (weight loss) you want, do not come as quickly as you want”.
Participant 3 - “I sometimes give exercising up for a while, and then I go back to it again”.
Participant 4 - “I stop going to the gym once I get holidays from college because I prefer to go for walks or swim and even if I go walking late in the evening, it’s still bright and I feel better for it”.

The questionnaire also queried if using the Wii Fit/Sport would be more beneficial than going to the gym or taking a keep fit class. A total of 55% agreed with the above statement while the balance of 45% disagreed. The researcher felt the percentages were very close and wondered if participants thought the Wii Fit/Sport would perhaps be better as an alternative or an addition to their current fitness regime. At the interview the participants were asked why they thought there was such a slight margin. The comments received were:-

Participant 5 - “I think it could be used along with going to the gym, or instead of going to the gym, because I think the gym is better for a greater over all body work out”.

Participant 6 - “I think it will eventually replace the gym, this is only the first design, wait for another ten years see what Nintendo will have designed then”.

Other questions asked if the information received from the Wii Fit/Sport such as Body Mass Index (BMI) and calories were useful or beneficial. A total of 93% felt that “Yes” they were important while only 3% said “No”. This result the researcher felt was important because it showed that more and more people are health conscious, aware and have an understanding of such things as the Body Mass Index (BMI).

A further question from the questionnaire asked if they thought that knowing about calories and Body Mass Index (BMI) were beneficial.

Participant 7 - “Oh Yes I think so, everything is BMI now”.

Participant 1 - “Yes it’s good to know that you are loosing calories even though you’re having a bit of fun”.

Participant 2 - “Yes it is important to know, its makes you feel you are doing something and I think it can be motivating to try and increase it the next day”.

Participants were also questioned if they had even joined a keep fit class, gym or other such activity and if so, how often did they use it. A total of 55% said “Yes” while 45% said “No”. The graph below shows how the percentages were

divided between the gym, keep fit and other fitness classes, with a huge percentage claiming to do nothing at all.

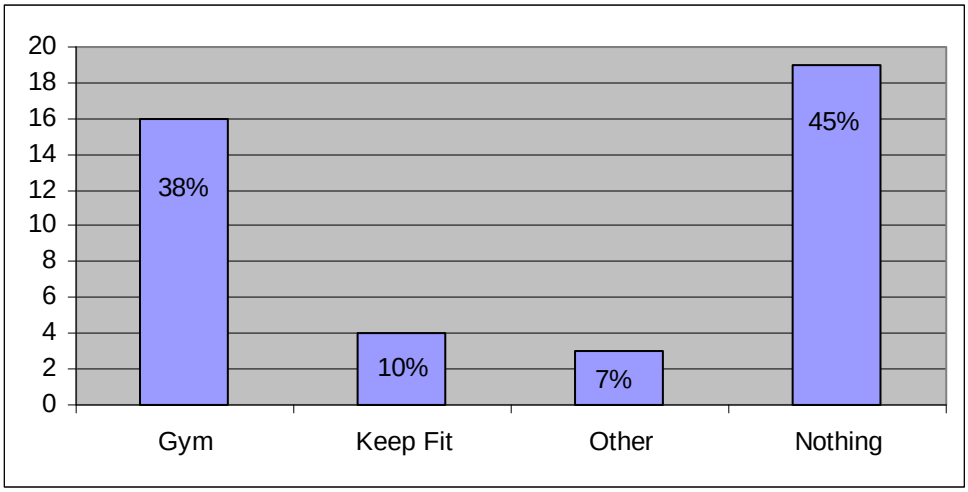

Chart 4.4 Participants who attended fitness activities

Only 12% of participants stated that they partook in some activity on a daily basis while 31% were on a weekly basis and 5% monthly. The balance of 7% partook in some activity sporadically.

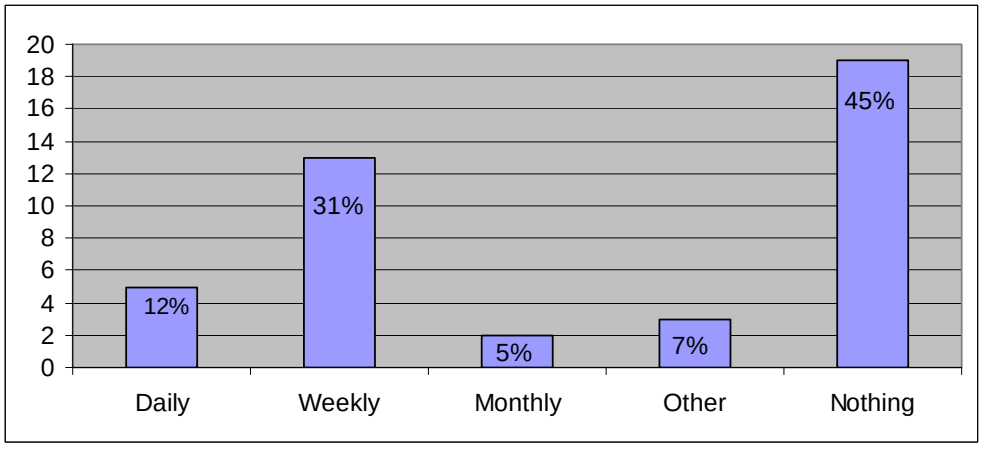

Chart 4.5 Participants fitness schedule

The interviews elicited some interesting responses, the researcher believed that overall, the interviews proved the group and individual trial participants enjoyed the Wii Fit/Sport. They claimed that this method of fitness was only going to be used for the winter months and occasionally during the summer for fun and games with friends at parties and barbeques. Once the summer months arrived they said they would prefer to partake in outdoor sports such as tennis, football, golf and tag rugby. Each of the trial participants said that they enjoyed each evening and looked forward to the games and activities. They felt it was a great release from study and a chance to have some fun while keeping fit. Some did not feel it was for fitness but more for enjoyment, fun and competitiveness, but stressed that they did feel the better for it and it was a good alternative to the gym but would not replace it. The work colleague claimed that she would have preferred if she had a friend with her when completing the tasks, as it would have been more fun and motivating. She claimed that some days she didn't use it at all, because it was cold, she was too tired or just couldn't be bothered; she stressed, however, that if she had a friend with her, one would encourage the other and the competition between them would have also been an extra bonus. However, she did state that she enjoyed it very much as she knew she wouldn't have travelled back into town to the gym every evening, whereas at least with the Wii Fit/Sport she was getting some exercise occasionally.

Each trial participants claimed that the Wii Fit/Sport gave them the freedom and flexibility to work out, maybe not to the same extent as the gym but was definitely an alternative and one which provided more fun and motivation.

Chapter 5 Discussions

5.1 Introduction

The main purpose of the research was to gather information about the usefulness of the Wii Fit/Sport and if it would enhance or replace the traditional gym.

The researcher believed that the triangulation method was the most realistic way of getting greater insight. Sometimes when a questionnaire has been completed it may only show a one-sided view or a quick response to simply get it finished. However, by using the interviews and observations, the researcher was able to investigate further and get more insightful results.

In order to offer the project a real world perspective, the researcher decided that input was necessary from the students participating in the study. The researcher decided to use the interviews to gather information and fill in the gaps left by the questionnaire. This information was a mix of thoughts, ideas and suggestions which was acquired from each trial participants as they would further highlight the reasons why the Wii Fit/Sport may or may not replace the gym. These interviews were brief informal conversations (See Appendix 2 - Reflective Diary) where sometimes the researcher felt progress was made as the conversations could be very informative and other times not so informative.

5.2. Discussions by Research Question

5.2.1 Will the Nintendo Wii Fit/Sport replace the traditional Gym?

The participants who agreed that the Nintendo Wii Fit/Sport would not replace the gym determined the overall effectiveness of this project. However, with the rapid changes continuously happening in technology, this “negative” answer could change very quickly to a “positive” answer. Quoting Capper and Coople (1985), Cotton (1991) states, “students using multimedia sometimes learn as much as 40 percent faster than those being taught using traditional teaching methods. This is so due to the fact that the students receiving multimedia have a hands-on approach to the material being taught”.

Liu (1996) states, that watching television/video tapes or engaging in computer activities can increase concentration spans of four-year olds and older. The potential of multimedia technology through audio, colour, graphics, animation and video can not only provide real life representations, but also allow interactivity, an aspect that television and video control recording cannot provide. The Wii Fit/Sport proved successful in providing games that incorporated competitiveness, goal achievement and interest. In addition, the Wii Fit/Sport provided the learner not only with a choice over his or her own learning but a sense of achievement in completing the program effectively. For example, the participants can work at their own pace regardless of the level at which they are supposed to be. This promotes self-confidence because it gives the participants a feeling / sense of control over what they have learned and

achieved. Pinn (2000) claims that the computer has allowed the student to become a more active participant in his/her own learning.

Contrary to the traditional gym and its ways, multimedia forces each participant to remain focused on the task at hand. For example, the participants are less likely to get too distracted during a practical session. However, in the gym it is very easy for participants to simply get distracted by other gym members and feel that they are being watched. Thus they can lose track of their fitness regime. However, using multimedia and its teaching methods this helps the student to stay focused. The participants will pay far more attention and understand the information more clearly. For them, this is a new way of learning and in a sense fun and entertaining.

A study was conducted demonstrating multimedia effectiveness. For example, Moule (2002) suggests that this kind of approach will empower students to take an active role in the learning process, take control of their own learning and adopt adult learning principles.

Overall, the participants agreed that it was definitely worth using, but only in addition to the gym or some other fitness regime. The participants believed that it would not replace the gym permanently, as some participants required higher fitness levels that they felt the Wii Fit/Sport was able to give. They also claimed that this may well be the way of the future and it may replace the gym in ten years' time but presently this would not be the case.

5.2.2 How has technology enhanced learning through multimedia, with a variety of games and fitness techniques for participants of all age groups?

Technology is moving at a fast rate. For example, Microsoft, Sony and Nintendo are at the top of the games industry. Figure 5.1 below shows an approximate breakdown of the history of the industry since 1975. The history of the games industry is divided into a series of generations, each of which lasts approximately five years. Each generation begins when a new series of hardware is released, which is typically more powerful than its predecessors.

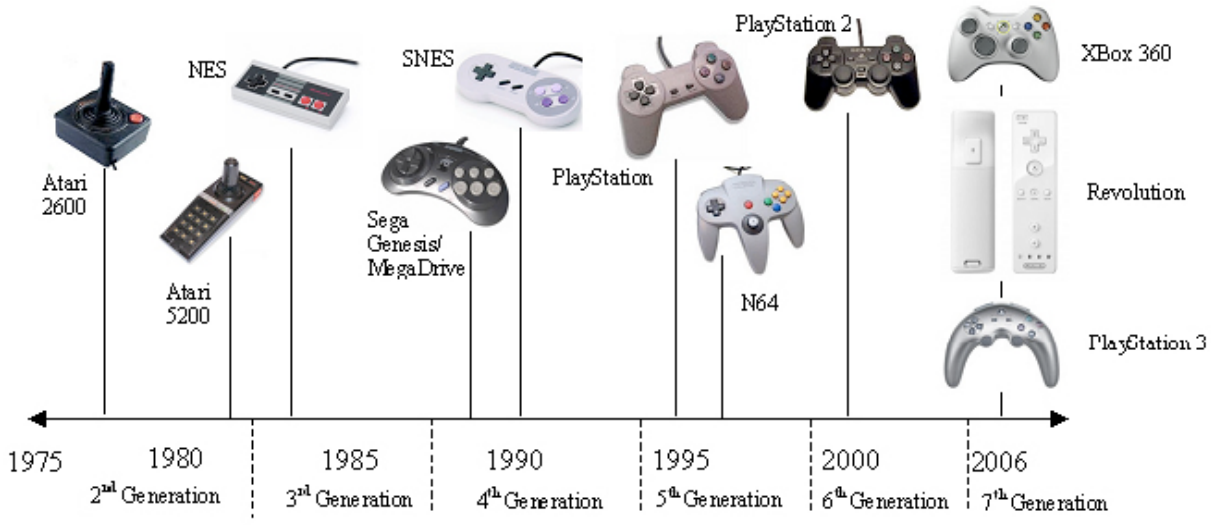

Fig 5.1 A timeline showing the evolution of game controllers over the past twenty years

Technology has been an invaluable addition to learning, with the introduction of the various games in the Wii Fit/Sport and the ability to guide one's knowledge of calories and Body Mass Index (BMI). It also gave the participants a choice of

exercising or playing. The set up was easy and participants felt relaxed and were confident of finding their own level and pace. In the questionnaire one of the questions asked was “How would you rate the setting up of the Wii Fit/Sport”?

From the analysis the setting up of the Wii Fit/Sport seemed to cause no difficulty, and of the forty two participants, 100% claimed that the set up was easy and very user-friendly. For example, as stated in Chapter 4, Findings, students like the flexibility of using multimedia and being able to use it on their own. The participants were also able to learn to use the multimedia when it was convenient to their schedules. The results proved that a large percentage of people across all age groups are now so familiar with technology that nothing seems to be a problem. The researcher wondered how this was, the case for those of an older age where technology was very new to them. Moule (2002), claims that those who may be initially apprehensive about using computers, multimedia or any kind of technology are eventually fearless after a time through use and exposure of such challenges. However, there is a minority where this is not the case and this minority will always continue to be terrified.

According to Handzic (2002), it is possible that the opportunities to discuss various aspects of the task with each other helps the students to better access the quality of the information available and adjust their prediction strategies over time. It can also help them to perceive the task as less complicated. Another factor was that some participants saw it as a fun game to be used when friends

called. Others saw it as a game too but also as an exercise, which could be completed in one's own home at a convenient time. Some participants compared the Wii Fit/Sport as being similar to an exercise DVD or a televised exercise class similar to the ones on the Sky channel. Others claimed that because everyone was having so much fun, it didn't feel like a workout, but more of a game.

Participants in the trial group felt very much in control of what they were doing and learning. However, one of the disadvantages the researcher identified was that the participants could lose track of time. During observations the researcher noticed that participants could lose concentration or get distracted when chatting. This could result in the participants running over time or not completing the correct work out. However, during the sessions being observed by the researcher, all participants remained interested and motivated in their tasks. Their facial expressions were of excitement, interest and curiosity.

As stated in the Literature Review, the participants feel that it is quite acceptable to make as many mistakes as they wish. The participants can learn through trial and error, eliminating the sense of failure and embarrassment should they make a mistake.

5.2.3 How can the Nintendo Wii Fit/Sport enhance our general well being and health?

Interactive exercise-based video game applications such as the Nintendo Wii Fit/Sport are promoted to increase the enjoyment of not only a video game but combining it with an exercise to make the video game an enjoyable activity experience for many children and young adults (Plante et al., 2003).

Research has also examined virtual reality technology for its various psychological benefits, from aerobic exercise to competitive fun games (Plante et al., 2003). The possibility of utilising Interactive Video Game Technology as an incentive to induce interest in exercise, thereby leading to the physical and psychological mood benefits derived from the exercise itself (Plante et al., 2003).

The use of video games for serious educational purposes (Aldrich, 2005) and important skills such as communication and teamwork may be designed or reinforced by video games through their capacity to offer a more social approach to learning, working or playing with others (Bailey et al, 2006). This use of video games is gaining attention from teachers and educators as a form of alternative teaching method to train small groups of children with multiple abilities, disabilities and health issues, producing fair and reasonable results (Bailey et al, 2006).

5.3 Summary of Research Questions

5.3.1 Will the Nintendo Wii Fit/Sport replace the traditional gym?

At the present time the Wii Fit/Sport will not replace the gym. The participants enjoyed using the Wii Fit/Sport and believed it would enhance or complement a current fitness regime. They also believed that it may replace the gym or other forms of exercise but only for a short period of time. They believed that while it was great fun and was a form of exercise it was not sufficient to help people increase their level of fitness.

5.3.2 How has technology enhanced learning through multimedia with a variety of games and fitness techniques for participants of all age groups?

The technical aspects of the Wii Fit/Sport was welcomed and used at ease by all the participants. The teenagers and those in their twenties and early thirties have grown up with technology (Rousseau & Rogers 1998) and so the participants did not seem to wonder at these developments and new inventions. The combination of technology, multimedia, and exercise was welcomed and embraced by all who partook in the study.

5.3.3 How can the Nintendo Wii Fit/Sport enhance our general well being and health?

The Nintendo Wii Fit/Sport are promoted to increase the enjoyment of not only a video game but combining it with an exercise to make the video game an

enjoyable activity experience for many children and young adults (Plante et al., 2003).

5.4 Conclusion

The researcher believes that the Wii Fit/Sport will not replace the gym at this present time but in ten, fifteen or twenty years, who knows? The rapid movement of technology indicated that this could be the way of the future. Research gathered for this study has shown that while the Wii Fit/Sport has a likeability factor and is a great enhancement to any fitness regime, at this time the participants do not believe it is strong enough to totally replace the gym. The researcher believes that the old saying “laughter is the best medicine” applies here because the participants who partook in the study laughed a lot. That fun and enjoyment alone had to benefit their well being, even if they never lost weight.

The participants, when asked to define health and well being, described how they felt at that time, their emotions and feelings. They claimed that exercise was important and was a serious part of their life but that fun, laughter and enjoyment were of equal importance.

They claimed that some days while they may not have completed their specific tasks correctly, they felt better because they had “fun and craic” with family or friends which led them to feel better in themselves.

Chapter 6 Conclusion

6.1 Introduction

The potential for the use of multimedia in teaching, learning health and fitness is enormous and the number of multimedia systems available on the market is increasing rapidly (Latchem et al, 1993). An example of such a system is the Nintendo Wii Fit/Sport.

6.2 The Potential of Multimedia

Preece & Keller (1993) claims that the use of multimedia in education promises that participants:

- Will be excited and motivated
- Will be able to determine their learning direction
- Will be actively engaged in their learning and exploring

Much of the literature reviewed while conducting this research supports the views expressed above and considerable research has been conducted throughout the world in the hope of proving this claim Preece and Keller (1993). However, some authors such as Preece and Keller (1993) suggest that much more research is needed before multimedia techniques can go as far as replacing the traditional chalk and talk teaching methodologies. The main conclusion was that incorporating multimedia as a teaching tool is very beneficial. For example, an interactive multimedia program such as the Wii Fit/Sport, which addresses the needs of a child and family and allows for the revisiting of information while being fun, flexible and cost-effective, may be the

answer. Much observed evidence proves that in many cases multimedia enhances learning. For example, the Wii Fit/Sport was well received by each of the participants in this study. It was viewed very positively as a valuable resource, which aided the learning of several exercises and games. Not only has the research identified this, but also the researcher has made the point that it was very important to ensure that the learning resources would be used efficiently and effectively by each participant as they needed to be confident in their skills. Each participant really valued the flexibility and usability of the Wii Fit/Sport, as they commented on how user-friendly and easy it was to use and to understand. Each participant enjoyed this because at least they felt that they had achieved something by being able to use this technology in the comfort of their own home and not have to go to the gym. Although the computer may never manage to be as practical as a human teacher/instructor, it does help those who are trying to learn by themselves to achieve results.

It is important to note, that as more multimedia is produced for the Wii Fit/Sport, in general the participants did view it as a valuable and important learning resource. This learning resource should be presented to participants in a way that helps them understand it is for their own interest and not simply a task to be completed. One of the greatest advantages in using multimedia applications such as the Wii Fit/Sport is that it allows one to practise as often as one likes without the pressure of being observed. The same functions or tasks can be repeated until participants are happy and satisfied that they have mastered that particular task. In the end, the participant gets a sense of achievement and

feels that they have completed something worthwhile no matter what age they are.

6.3 Potential weakness of the study

One of the observations that were made was that the participants did not always take note of their activities and it ended up being more of a game than the serious issue of fitness. The mix of fun, laughter and discussions meant that times and objectives were not adhered to correctly.

The researcher had set out a list of rules (See Appendix 3 - Rules of Trial Participants). These were presented to each of the trial group participants and were requested by the researcher to be followed and adhered to during the trial process. The researcher also decided that specific dates or times would not be defined to each trial group. This may have led to a lack of consistency on both the participants and the researchers' part. On reflection the researcher also believes that more specific rules should have been designed for the participants. Detailed dates and times should have been set out for the researcher to call. The participants should have been requested to keep a reflective diary of each day's events. Keeping a clear time-line is important, logging in everything that happened at each session, such as date, time, thoughts, suggestions, recommendations and feelings (McNiff, Lomax, and Whitehead 2006). The researcher noted that this type of extra information would have been an invaluable source. However, it is also true to say that this type of commitment would have been time very consuming and inconvenient.

The researcher had wanted to create a questionnaire that would move thinking forward; not just by getting the answers required but more information such as thoughts, ideas and suggestions which in turn would lead to more questioning. Collingwood (1939) claimed that there was no such thing as correct questions but appropriate questions that would lead to further questioning. Such was the case with this questionnaire as some answers prompted another question or a deeper answer. The advantage would be to send out a follow-up questionnaire, but because this was not possible, due to time constraints, the researcher decided to take advantage of the interviews and observations for this purpose. However, unfortunately it was only with the six participants of the trial group and the individual trial member so information and feedback was limited.

Video and audio-taping (McNiff, Lomax and Whitehead, 2006) could also have been a consideration, for the trial group and individual. Unfortunately, due to ethical concerns and time, this was an option. Had the researcher had more time then the ethical issues and confidentiality could have been addressed. The extra information received from recordings made has been of huge benefit to the findings.

6.4 Limitations to the Research

The study has the following limitations:

Time was the main limitation; the researcher hadn't realised this would have been an issue until the research was well underway. The feedback gathered from participants combined with other information led to further questions, and

the more questions that appeared the more time was needed. The researcher decided to concentrate on a limited number of participants and guide the study around them.

A second questionnaire should have been designed as a follow up to the information gathered on the initial one. Rules and Guidelines for the participants should have been more explicit. The researcher should have requested that the participants kept a reflective diary. The use of video and audio taping would have been a good idea but more time would have been needed to ensure all ethical issues were covered.

Another area the researcher found during this study was with regard to the elderly, autistic and disabled and their use of the Wii Fit/Sport. Retirement communities have adopted the technology to encourage residents to exercise with the Wii Fit/Sport, which includes a balance board to simulate movements. Hula-hooping to yoga have been popular with some fitness professionals. Physiotherapists have embraced the Wii as a tool to help patients regain balance, coordination, range of motion and muscle tone through an engaging fun activity, (Educause, 2008).

6.5 Direction of Future Research and Practice

Elderly, Autistic and Disabled

During the course of this research the researcher obtained lots of information with regard to the elderly, autistic and disabled and their use of the Wii Fit/Sport.

The use of video games in an educational environment is an area of increasing interest and research, showing that these games have the potential for users to participate on equal terms regardless of ability or disability, (Pearson and Bailey 2007). Retirement communities have adopted the technology to encourage residents to exercise with the Wii Fit/Sport, which includes a balance board to simulate movements from hula-hooping to yoga, which has been popular with some fitness professionals. Physiotherapists have embraced the Wii as a tool to help patients regain balance, coordination, range of motion and muscle tone through an engaging fun activity (Educause, 2008). Recent research has noted that by using this technology on a regular basis, the elderly, disabled and autistic have benefited greatly not just in their general well being but also in their rehabilitation performances (Harrison et al., 2002). The use of these computer games increases reaction times, improves hand-eye co-ordination and raises players' self-esteem (Lawrence, 1986).

Another area of interest to the researcher was that video games have also been used to help develop social skills in children who have developmental problems such as autism. Children and adolescents with autism can have serious problems with language but the use of video games can greatly enhance their development of language skills and social skills (Sedlak et al, 1982).

Video games such as the Wii Fit/Sport has also been used as a form of physiotherapy, occupational health or rehabilitation therapy (Szer, 1983), as they are used to encourage physical activity in wheelchair users and those

needing muscle training (O'Connor et al, 2000). Video games used in this circumstance can be very beneficial as they eliminate the boredom associated with making a series of repetitive movements, which in turn can act as a distraction from pain, (Szer, 1983). The results indicate that using interactive video gaming increased overall student learning and achievement. This poses a challenge for games designers to understand how to shape learning in terms of games, and how to integrate games and game-based learning environment for schools (Squire, 2008).

The areas, of the Elderly, Autistic and Disabled proved to the researcher to be very interesting and would be very motivating to further research those areas in the future.

However for this study the researcher had to choose a limited area and so realised that after some time spent researching the areas of computers and multimedia in the learning and fitness environments confirming to be very interesting and would be an area of interest for future research. Also the researcher found that video games can actually enhance our general well being and health, particularly for obesity proving to be the opposite of initial thoughts.

As mentioned previously, the overall increased learning found in this research is consistent with current research. However, it is important to highlight the fact that good interactive video programs have proven to increase student skills and knowledge (Squire, 2008). It is also important to note that special consideration

has not been made for special needs or people with learning difficulties. The participants taking part in this research were considered academically sound and therefore the researcher was not made aware at any time that any of the participants fell into the category of “special needs” or “slow learners”. These participants had not been given any extra help or extra benefits at any time while this research was been conducted.

Appendix 1 - Questionnaire

Questionnaire - Private and Confidential

Please tick appropriate answer

1. Male [ ] Female [ ]

2. Please tick the appropriate age group
   5-15 [ ] 16-25 [ ] 26-35 [ ] 36-45 [ ] 46 and over [ ]

3. If family members use the Wii Fit/Wii Sport, please state gender, age and reasons why _____

   _____

   _____

4. Describe current fitness level?
   Very Good [ ] Good [ ] Fair [ ] Bad [ ] Very bad [ ]

5. What were your reasons for buying the Wii Fit/Wii Sport?
   _____

   _____

6. How often do you use the Wii Fit/Wii Sport?
   Daily [ ] Weekly [ ] Occasionally [ ] Not Often [ ]

7. The Wii Fit/ Wii Sport will be more beneficial than going to the gym or taking a keep fit class? Agree [ ] Disagree [ ]

   Why?_____
   _____

8. Rate the setting up and instructions given on the Wii Fit/Will Sport,
   Easy [ ] Difficult [ ] to understand

   If difficult, how did you over come the problem

   _____

   _____

9. Do you partaking in the activities of the Wii Fit/Wii Sport alone or in the company of family and friends? Alone [ ] With Others [ ]

If with others Why?_____

If along Why?_____

10. Do you think you will find the information from the Wii Fit beneficial eg BMI, Calories, etc.? Yes [ ] No [ ]

What aspects are useful or beneficial_____

Why?_____

11. Have you ever invested in Gym membership or a keep fit class, Yes [ ] No [ ]
Gym [ ] Keep Fit Class [ ] Other [ ]

How often did u attend Daily [ ] Weekly [ ] Monthly [ ] Other [ ]

Why?_____

12. Do you think the Wii Fit/ Wii Sport will totally replace the gym or keep fit class?
Yes [ ] No [ ]

Why?_____

13. Any comments_____
_____
_____
_____
_____

14. Do you use any other form of interactive computer game please state_____
_____
_____

I would like to take this opportunity to thank you most sincerely for taking part in this research. Please be assured that this information is private and will be used only as part of my thesis.

Miriam O'Connor

Athlone Institute of Technology

Appendix 2 - Reflective Diary

Please Note that all answers obtained from the participants were hand written and later typed in the format below.

The researcher on the first visit to the trial groups explained to each member that notes would be taken and answers would be written down from all questions asked. The researcher also stressed that because of ethical and privacy issues, names would not be used answers would be copied down verbatim but each member would not be directly quoted.

Trial Group

Question Was the easy accessibility of the Trial members home an advantage?

- "This location is so convenient as its near the college and also has plenty of room to move around".
- "This is great we are so close because if we had to go to my house on the outskirts of the town, I don't think anyone would arrive, its too far away for the other to bother".
- "The weather is getting worse and if I went home I wouldn't want to leave this way I only have to cross the road and am passing any way so this is good".
- "This apartment is much warmer than mine anyway and there is always food in the fridge unlike mine".
- "I enjoy the craic, we have great fun and I always beat the pants off ?????".
- "I don't see this as exercise this is fun and a release from the days heavy load".

Observations
Looking on I felt they were here for the fun of it – exercise of weight loss really wasn't an issue for them. They enjoyed every aspect of the experiment and the social gathering of an evening.

Question Was the easy accessibility of the Trial members home an advantage?

Any other comments?

We all have a great laugh and I'm getting to know the others better, I know them from class but this scene is different and you get to know other on a different level, even you are different to how I though you were.

Sometimes I miss the gym because I feel If I'm not killing my self then I'm not doing the exercise I should be doing but I haven't put on weight, so it much be working, anyway we would have this craic in the gym.

Question Would you use the Wii Fit/Sport alone or do you prefer to work with a group or with friends and family.

Oh ya, definitely much more fun with others are with you

I don't mind been on my own

Oh No way I couldn't do it on my own – I would loose interest very quickly.

Its good motivation to have friends and much more fun.

Observation
During this Session I noticed that while the participants agreed to complete this trial and also agreed I could call at unspecified time, they were very conscious of the fact I was there are watching them. I felt they were watching me watching them. This would be like in a class room environment, where they were half watching me, to see if they were doing the tasks right.

Question Are you taking this serious or is it just fun
No it is serious I just want to beat the lads
Its just for fun
Why do you want us to write down the results
We did start off writing down the results but then everyone get so engrossed and forget and so we left it a while.

Observations
During this session I noted they really enjoyed the fun of completing tasks making mistakes such as not been able to balance properly didn't seem to be a problem.

Question What about other options of fitness, such as dance, pilates, yoga?

- No Id hate that stuff, the Wii is much more fun
- Yes, I tried pilates last year and I do like it and I might go back again and it is also good for balance
- Too expensive
- Costs too much and you need to sign up for ten week or something
- No fun, this is much better
- I love salsa dancing but there were always too many girls
- We all went salsa (the girls) last year we had a great time but it was €10 every week and it was too expensive, it was great fun especially dancing with the foreign men, there were no Irish men.
- Salsa is a no go area, golf is the only activity where I will have hip movements.
- This is much more fun and isn't costing anything , ???? Bought it so I suppose we should give him something for the use of it every week, maybe we will buy him a pint.

Observation
This I felt was really funny the guys faces at the very thought of doing salsa, this didn't however stop them imitating what they though salsa dancing was all about, for guys who dislike salsa so much they certainly knew enough about it.

Question Guys Why Would You Not Go To Salsa Dancing?
No way – you wont catch me in tight jeans
Too expensive
The only hip movement I will be doing is on a golf course
Well my fancy footwork is only for Karma
That sort of dancing is only for ????? Not real macho men like us!

Question Do you think the Wii Fit/Sport will replace the traditional gym?

- No I don't think the Wii will ever replace the gym maybe used to enhance an already fitness regime.

- I think it would replace the gym why not its much more fun, more convenient, you can play with friends and family, its all fun and games and that's the way exercise should be. The gym is no fun you get no satisfaction and its bloody hard work.

- I also feel so terrible when I go in and see all these skinny b's I hate doing a work out puffing and panting, so much easier at home in my own time.

- I think the Wii is just a like a video, putting it on when it suits and its no extra trouble and it calculates, your BMI and calories so I think its great.

- I think its like the exercise video that used to be on TV years ago, a fitness slot on the "Live at Three" it was easy to follow in your own home and some time its was specifically catered for older people.

- I don't think it will replace the gym but it will enhance your fitness, its better than nothing I suppose.

- It won't replace on a permanent basis unless you were very diligent and completed the tasks every day.

- I think that its great fun when friends come around we can all play and even the kids get involved so its great fun and it has to be good for you.

Observation
I believe as time went on the participants were more relaxed around me and after a time probably forgot I was there. They are became more open and relaxed in themselves.

Question Was set up easy or not

- Very easy even I could do it.

- Yes it was easy to set up and you could do it in your own time in your own home.

- I didn't feel under pressure setting up, normally I'm not to good at all this technology, I cant even use the computer that well but I found it easy to set up and I enjoyed the time.

TRIAL INDIVIDUAL

Question Have you stuck religiously to your new fitness routine?

- No way although I am better than I thought I would be. Sometimes I won't use it at all because I'm just not up to it.

Question Why is this?

- Ah sometimes it is just too cold or I couldn't be bothered and other time I'm so tired as work is mad at the minute.

Question If you had paid gym subscription would you feel more compelled to use it?

- No if I don't feeling like exercising I just won't do it – even though I know I probably should I would just get lazy, and it does not matter if it's the gym, or something else.

Observation
The trial individual I believe felt under pressure while I was there – insisting that I join in rather than having me sitting looking at her. I felt she was under a lot more pressure – even though she knew me fairly well. She knew it was better for her to exercise but sometime couldn't be bothered.

Question Do you mind doing your work-out on your own?

- No I don't mind although my sister was over at the weekend and we had great fun and we must have spend three hours before I realized

- So I think I would prefer if I had someone here with me although I wonder during the three hours with my sister was I just playing or was it a real work out, I should have checked that.

Question Did you take an account of your activities

- No I never thought of it – I should have done, sorry that was probably part of the trial.

Question So for the trial you had initially thought you would do this on your own are your thought different now?

- Yes and No, I'm still going to complete the trial as promised and most evening I will be on my own, I cant expect anyone to travel out to me when it suits, but I will also use it more when I have my sister or some friends over.

- Why don't you join me now?

Question Do You think this Wii Fit/Sport will replace the Gym

- Maybe but possibly not now but maybe in the future

Observation
The participants when asked to defined health and well being described how they felt at that time, their emotions and feelings. They claimed that exercise was important and was a serious part of their life but that fun, laughter and enjoyment were of equal importance.

They claimed that some days while they may not have completed their specific tasks correctly. They felt better because they had "fun and craic" with family or friends and so felt better in themselves. On all occasions when joining the Trial group this was obvious, they really enjoyed every aspect, probably more so when there was a group.

Appendix 3 - Rule of Trial Participants

Day	Wii Fit/Sport to be used every day
Time	A specific time period allocated each day e.g. 6-9pm No less than 20 to 30 minutes per person
Participants	All Trail Members
Games	Trial Members own choice.
Extra Note	Trial Members **ONLY** to part-take in games together each day, friends are not allowed to join until trial is over.

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