

Gaming The Healthy Way: Global Fitness Gaming With The Wii Console

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Abstract: Over the past decade there has been a substantial revolution in the gaming industry. Add the word “motion”, and you are all set. This seems to be the age of motion gaming where you want to be part of the real action and not some bystander using the same old mouse pad, keypad or joystick to express your desires. The Wii console from Nintendo is the world’s largest motion games player. This is due to the fact that it was the first to jump the bandwagon of true to life motion gaming. This paper focuses on the Wii ,however for another reason. as a tool to implementing fitness training using the console’s capabilities.

Keywords: Nintendo,fitness,motion,virtual reality,wii

I. INTRODUCTION

Introducing Wii ...(As in “we.”) .While the code-name “Revolution” expressed our direction, Wii represents the answer. Wii will break down that wall that separates video game players from everybody else. Wii will put people more in touch with their games ... and each other.

The Wii, an advanced video gaming console, represents a bold new direction for Nintendo. In developing such an innovative product, the company has brought gaming to a whole new level. What makes the Wii especially unique is the Wii remote, a distinguishing feature. The white, wireless controller is used as a handheld pointing device, with the ability to detect movement in three dimensions. In developing the Wii console, Satoru Iwata asserted, “Our job is to constantly look into what people find fun and interesting...to focus on doing things that nobody else would do”. With this outlook, Nintendo has experienced overwhelming market expansion. So this begs the question: What exactly is it about Nintendo’s Wii gaming console that drives its success? In using the four consumer behavior principles of perception, consumer diversity, social influence, and scarcity, we can better evaluate how the Wii has become successful.

II. THE MACHINE

Perception

The Wii, which is made by Nintendo, could definitely be seen as a prototype within the gaming system world. This is because it is the first gaming system based on physical activity and can sense movements. “A distinguishing feature of the console is it’s wireless controller, the Wii remote, which can be used as a handheld pointing device, and detect movement in three dimensions”(after Wikipedia). From this we can state that the Wii is the first of it’s kind within the video gaming industry because of it’s unique features involving motion and physical

movement.

When it comes to a consumer’s hedonic needs, pleasure-seeking needs, the Wii provides a multitude of game choices in order for everyone to have a good time.

In Isaac Asimov’s short story, “The Feeling of Power”, he describes a society which is completely dependent on the use of technology; human computation and manpower have essentially been eliminated and mankind is fully reliant on the use of calculators for simple arithmetic. Of course, Asimov’s story was written in 1957 and may be an exaggeration of the advancement of technology, but the very idea of a technologically dependent civilization has continued to be questioned today. With the way our society has been developing over the decades, will there come a point when we lose our ability to perform basic functions? What if technology is actually devolving us and making us idle?[1]

This remains a very interesting idea to ponder, but a new device released to the public in 2006 suggests otherwise. In fact, the Nintendo Wii game system challenges this notion and actually compels its users to become interactive with the computer technology itself. The Wii is a remarkably advanced device for its time and has proven to be groundbreaking in many ways. Although it is merely a video game, it has benefited the lives of young gamers and physically inactive, it rehabilitates athletes, and even helps the elderly.

Breaking Boundaries:

The stereotype of a typical video game junkie is someone with a less than ideal social life, a young man spending hours in isolation, glued to a television or computer screen. This may be true in some cases, but the brilliance behind the Wii is its capability of generating interaction between human beings, and also between the player and the technology itself.

The Wii is Nintendo’s latest gaming console, released in

November 2006. The product was made public in the same month as the PlayStation 3, and although the two companies have been rivals for years, the Wii gave Nintendo the lead in late 2006. The PlayStation 3, although its graphics are incredibly realistic and advanced in the video gaming industry, still uses the standard, two-handed controller with a revolving joystick. The Wii remote, is unprecedented, in that it uses gyroscopic technology and Bluetooth capability to sense a player's movement. One may say that this new console is a just a step behind virtual reality gaming.

A gyroscope is a device that uses precession to essentially "defy gravity". A company called InvenSense has produced this Micro-Electromechanical system (MEMS) gyroscope that allows the controller to sense the player's movement across each of the three dimensional axes; X, Y, and Z [2]. Because gyroscopes have the ability to maintain their orientation at all times, the MEMS is able to sense the movement of the controller in correlation to the gyroscope. The Bluetooth technology that is present in the Wii is similar to that of most modern-day mobile phones and other high-tech devices. This technology allows multiple machines to wirelessly communicate in sync with each other. Another unique aspect of the Wii is its Sensor Bar; this is what allows the controller to sense how far each player is away from the television. Players can play in groups of up to four without worrying about accidental bumping or crowding in front of the television screen; the Sensor Bar allows the controller to be up to 30 feet away. There are also several different controller variations that the Wii offers. One may choose to use the standard controller by itself, or pair it with the Nunchuck or the Wii Zapper. Nintendo's newest addition is the immensely popular Wii Fit balance board. Each of these allows the player to take part in different video games in natural ways. For instance, shooting and sports games enable the player to hold the controller as if they were using a fishing rod, gun, bowling ball, tennis racket and so on. This "naturalistic" style of gaming has attracted players of all types. Because there is no particular skill needed in learning the controls or button combinations, compared to that of previous gaming consoles, the Wii appeals to those who are not necessarily video game enthusiasts, even the elderly.

Promoting good health:

There are many seniors in today's society that disregard the new technology at hand, despite the popularity of state-of-the-art cellular phones and LCD television sets. However, among many nursing homes, there is a newfound love for the Wii. In the UK, several nursing homes have invested in a Wii gaming console in hopes to mentally and physically benefit the residents that use it. Sheraton Court Care Home in Teesside has found that the Wii motivates the residents to interact with each other more, since it gives them a sense of competition. The Wii also ensures that those who typically remain in their rooms get out more, partake in exercise and gain physical coordination. Residents find that the video game is more appealing than watching television and the two most popular games are golf and bowling [3].

The Center for Disease Control and Prevention states that two of three primary causes of childhood obesity are lack of physical activity and excessive video game play. Alarming statistics indicate that 30.3% of children ages 6-11 are overweight, and that 15.3% are obese (See Figure 1). Luckily, the Nintendo Wii has come to the rescue by pairing physical fitness with video game play. Shortly after the release of the console itself, Nintendo introduced the Wii Fit program in order to combat the current obesity epidemic. The Wii Fit offers a series of programs that target different sports and aerobic activities. Nintendo even intends to release a game titled, "Jillian Michaels Fitness Ultimatum 2010" that can be used with this package. This fitness program uses a balance board that not only uses the same gyroscopic technology to sense weight and movement in the player (and recreate it on the television screen using the player's "Mii" character of his or her choosing), but it also has the ability to indicate the users body mass index and map his or her health progress throughout usage. The idea of seeing the physical appearance of one's character change throughout the fitness program is an entertaining and motivational aspect of the video game. For some, video games bring out their competitive nature, compelling them to "be the best" and achieve a high level of physical fitness. "It is also designed to inspire players into setting personal goals, which help them stick to their Wii Fit exercise routines" [4].

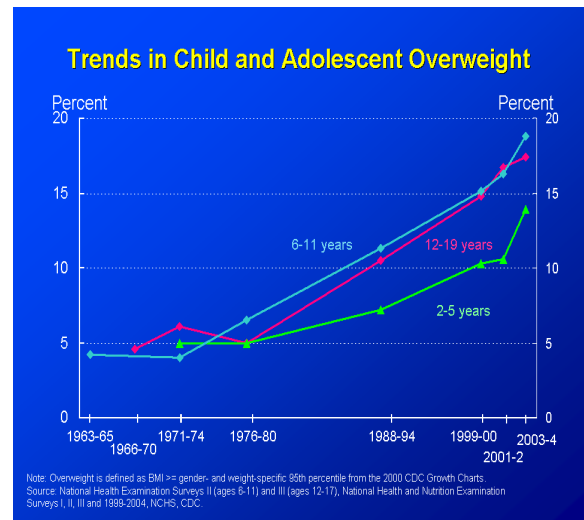


Figure 1. Trends in child and adolescent overweight

Although the Wii is ideal for the physically inactive and the elderly, the health benefits reach far and wide; to athletes as well. A recent study at Hope College used the Wii and the video game "Dance Dance Revolution" to determine whether or not the use of kinesthetic video games was as effective as the standard rehabilitation exercises that injured athletes used. Kirk Brumels of the college found that they were; in fact, the video games may have been more effective than the traditional exercises. The study proved that among the 25 athletes observed, their overall balance improved with the use of the Wii Fit and Dance Dance Revolution rather than the balance board used in an athletic training room. According to the surveys completed by the athletes, the video games were more

entertaining as well as easier to use. Brumels also found that athletes were more prone to exercise for the entire duration of their rehabilitation when using the video games [5].

III. CURRENT MARKET TRENDS (FITNESS GAMING)

The newest generation of video games is about to get kids - and their parents - off the couch in a way that older games have not come close to. The first notable difference in the new games, which debuted this month, is the hands-free play. They offer what's called "full-body gaming," so if you want something to happen, you need to do more than flick your wrist or give your thumbs a workout.

One such game has been created by Ubisoft here in Montreal, called *Your Shape Fitness Evolved*. It uses new Microsoft technology to take your physical measurements (height, arm and leg length) and creates a digital image of your body, which it then places in the game. The silhouette, which looks just like you down to the clothes you're wearing, reflects your movements on screen. And that's just the beginning of what is truly a meet-the-Jetsons experience.

Using arm gestures instead of buttons to scroll through the menu items that pop up on the television screen, players can choose from a variety of fitness options, including working with a personal trainer, taking any one of several fitness classes or playing fitness-related games. Video games have a reputation for contributing to what researchers call an obesogenic environment — and rightfully so.

The first wave of video games in the late 1970s, followed by Nintendo's Game Boy a decade later, changed the play habits of our children - the result of which is being felt now. Obesity rates among Canadian children have tripled in the last 25 years, and research suggests there is almost a two-fold increased risk of obesity for every hour spent playing video games. The more video games are played, the less physical activity is done.

And it turns out that playing video games is not good for the diet. Researcher Jean-Philippe Chaput has found that kids who sit on the couch and play video games consume more calories than kids who are sedentary but don't play video games. Chaput is a junior research chair in the Active Living and Obesity Research department at the Children's Hospital of Eastern Ontario in Ottawa.

So prevalent are video games that half of 2,002 U.S. children surveyed in 2008 said they have game controllers in their bedrooms. Which gives some clue as to how U.S. sales of video-game products reached \$19.66 billion in 2009.

To their credit, video-game manufacturers have responded to criticism by turning sedentary screen time into active

screen time. Nintendo's Wii, which debuted in the fall of 2006, and *Wii Fit*, which followed a year later, were the first to encourage gamers to get moving.

Suddenly, video games were more than just fun. They were exercise.

But are they?

Initial studies of exercise-games indicate that while they burn more calories than sedentary games, they fall short of the intensity that would qualify them as exercise.

And in those cases where the video games try to mimic traditional exercise options like step aerobics or running, researchers discovered that performing the actual activity burns significantly more calories than the virtual one.

"The *Wii Fit* is a very, very, mild workout," said John Porcari, lead researcher of a *Wii* study sponsored by the American Council on Exercise. But it hasn't been all bad news for the gaming industry. Porcari also studied *Wii Sports* and concluded that exer-games like tennis, boxing, golf and bowling have the potential to offer fitness benefits. "You're better off doing *Wii Sports* than *Wii Fit*," he said. "In *Wii Sports*, there's more jumping around, and you're not constrained by having to stand on the balance pad. I just think there's much more freedom of movement and you get a better workout."

Its 2011, and lifestyle researchers like Porcari and Chaput have a whole new line of exer-games to test in the lab, all of which combine fun and fitness as never before. Montreal yoga instructor Amanda Star did her own screening of the *Your Shape Fitness Evolved* in Montreal's Ubisoft offices, where the game took a team of 80 developers, including certified fitness consultants, three years to develop.

Set up to resemble a fitness video, instructional classes include a "Zen" workout that combines tai chi and yoga moves into a moderately paced workout. The session is led by an avatar who talks and moves like a fitness instructor, right down to providing real-time feedback on your technique.

"It's incredible," said Star, who became instantly involved in the game. Not only was she fascinated by seeing her own image on the screen, she listened intently to the feedback on her technique. The source of all this technology is a small black box equipped with three cameras and four microphones that sits just below your TV screen. Called *Kinect* and built to accompany the *Xbox 360*, it uses depth and motion sensors to track your entire body in 3D.

Star is cued to lower her arms and bend her knees a little more. When she does, the game rewards her with a perfect score, all the while keeping the workout flowing. Star continues the workout and gets a few more less-than-

perfect scores, which makes her determined to have another go at the game.

So sophisticated is the game, it remembers who you are and keeps track of your progress. There's also a voice-recognition feature that further identifies individual gamers. And like any good instructor, the avatar reduces the number of cues as you master the workout. If Zen isn't your thing, there's cardio boxing, aerobics and weight-training classes to enjoy. There are also a few fun games that use physical challenges to score points. Worth noting, however, is that all games are performed from a standing position because the cameras can't track movements on the floor.

Similar to Kinect, but not quite as technologically advanced, is Nintendo's PlayStation Move. It isn't controller-free, but it, too, can track a gamer's position with the help of the PlayStation Eye. Both game systems allow for multiple players, which adds a social component to gaming as well as a little friendly competition. It's too soon to gauge the fitness value of this new generation of video games, but obesity researchers like Chaput and McGill University's Ross Andersen are happy to see the pendulum swinging toward more physical activity. "I see tremendous potential in this technology," Andersen said.

Chaput notes that unlike the Wii Sports games, which demand mostly upper body movements, the new hands-free technology allows more lower body movements, which boosts energy expenditure. And with no controller needed to track movement, gamers no longer bypass the physical component of the game by simply flicking the wrist of the hand holding the controller. The games force even the laziest of gamers off the couch.

Still, Chaput isn't 100 per cent sold on exer-gaming for kids. "Children need to get outside," he said. "There are all sorts of studies that point to the physical and mental benefits of spending time outdoors." That said, he realizes that where video games are concerned, the genie is out of the bottle, so he appreciates their evolution from a totally sedentary activity to one that promotes exercise.

Andersen said he thinks even seniors can benefit from the new technology. The ability to work out in the safety of their home with the help of a game that is not only fun, but provides feedback on their progress could be beneficial for a population that struggles to get to a gym -especially during the winter.

But both lifestyle experts warn that exer-gaming isn't a substitute for old-fashioned physical activity like a game of road hockey or a workout at the gym. "I don't think that people will get leaner playing these games," Chaput said. Maybe not, but they can sure have fun trying. Several options to work out with video exer-games: Kinetic for the XBox 360 retails at \$149.99. Bundled with the Xbox 360, it retails from \$299.99 (4GB) to \$399.99 (250 GB). Kinetic exer-gaming software includes: Your Shape Fitness Evolved \$49.99 Zumba Fitness \$49.99 Kinect Motion

Sports \$49.99 Dance Central \$49.99 EA Sports Active 2 \$99.99 Playstation 3 (320 GB) Move Hardware Bundle retails at \$399.99. The software bundle that includes the Sports Champions suite of exer-games retails for \$99.99.

IV. THE WII VS. ITS COMPETITORS

Although both Xbox and PlayStation 3 severely surpass the Wii in realistic graphics and storage capacity, the Wii has exceeded its competitors in sales by an exponential amount since its release [6]. Video game reviews argue that this is simply due to the Wii's ability to bring people together [7]. Because its naturalistic controller is so simple to use for all ages, the Wii appeals to the whole family. Furthermore, "the games are simply more fun with more players" (walyou.com). Wii has also inspired various clubs and organizations, including Wii senior bowling tournaments and "Wiimbledon", a Wii tennis tournament held annually.

Although the Nintendo Wii is great for interactivity within the household, Nintendo also created a Wi-Fi connection system for the Wii and Nintendo DS in order to compete with Microsoft's Xbox Live. Xbox Live is a game console that was released in 2002 and allows players to compete with friends or worldwide opponents. The game has better graphics and more online perks than the Wii, however, is still much less popular, perhaps due to the monthly fee it charges its users. Jack Patrick Rodgers however, criticizes Wii online gaming because it "removes any trace of human contact" and does not appeal to hardcore, online gamers [8]. Rodgers makes it very clear, however, that the beauty of the Wii is that it interests casual gamers or individuals who have never been drawn to video games; "women, little tykes, grandparents, even the Queen of England"[8]. The article does mention one point that contradicts the ultimate objective of the Nintendo Wii. "It's important to note that many of the Wii's games (including [Super Smash Bros.] Brawl) don't require physical exercise and are similar to the games on Xbox 360 or PlayStation 3" [8]. It is true that Wii offers games that enable players to plug in a standard remote and play the old fashioned way; thus defeating the purpose of ensuring players' physical movement. Upon my observation of Wii Wednesday at Common Grounds Café, I was surprised to see that the players were initially playing with standard Nintendo remotes. After asking them what other controller variants there were, they did show me how the Nunchuck and the steering wheel could be used with the Wii controller. Unfortunately, it seemed that the game they were playing (a driving game) seemed to take away from the physical movement aspect of the Wii, since it allowed players to remain seated on the couch.

This is surely a downside to such an innovative game console, but it is hardly comparable to the many great accomplishments the Wii has attained in the health field. There are, however, other negative aspects to the game system for which Nintendo has created a "Health and Safety Precaution Webpage" for.

Disadvantages:

Seizures, motion sickness, electric shock, and of course, eye and muscle strain are only some of the cautions that

Nintendo warns its consumers about when using the Wii. The webpage advises Wii users to avoid excessive play and to take 10 to 15 minute breaks in order to evade “tendinitis, carpal tunnel syndrome or skin irritation” [9]. A more common issue that Nintendo addresses is the correct use and precautions that need to be considered when using the Wii controller. After various complaints of broken objects and injured onlookers, the flimsy wrist strap of the original Wii was recalled and replaced with a more durable one. “In Wii Sports bowling, the proper way to let go of the ball while bowling is to release the “B” button on the Wii Remote—DO NOT LET GO OF THE Wii REMOTE ITSELF. If you are having so much fun that you start perspiring, take a moment to dry your hands” [9]. It is evident from these clear warnings, that the naturalistic gaming style of the Wii has, perhaps in several cases, become a dangerous aspect of the console.

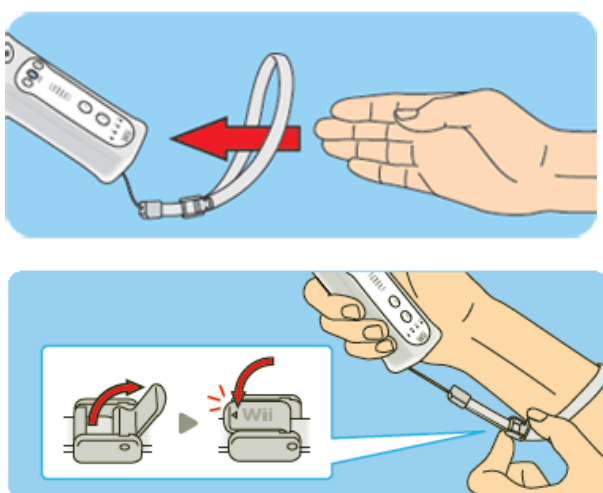


Figure 2: Connecting the accessory

THE PROOF

Two clinical research papers were presented at the British Geriatrics Society (BGS) conference in Brighton that suggest the children’s game ‘Nintendo Wii’ can help rehabilitate patients after strokes and falls.

The first paper, submitted by the University of Essex and Colchester Hospital University Foundation Trust, examined how the Wii could help people recover from falls. The study looked at improving balance and function in two groups undertaking falls prevention training. One group used the Wii; the other did not. The results showed that the group using the Wii had improved outcome measures over the non-Wii group. Furthermore, the patient feedback about using the Wii was positive.

The second paper looked at the use of the Wii to help improve upper limb impairment following stroke.[10] The team at NHS Lanarkshire and Gartnavel General Hospital found that over three quarters of patients using the Wii reported improved use of their arms in everyday tasks. People engaged in the trial also reported high levels of enjoyment using the console; many saying they could now compete with their grandchildren!

Professor Graham Mulley, President of the British Geriatrics Society (BGS) said: “although small, these scientific presentations show the lighter side of health research in latter life. It potentially widens the scope of rehabilitation we can offer patients as we work towards improving independence, in a rather novel way. This is especially important for people aged 65 and over who account for the vast majority of the 300,000 people living with disabilities as a result of stroke[11] and the 310,000 people who present to hospitals with fractures as a result of falls each year.[12]”

V. CONCLUSION

Every new piece of technology we are introduced to will surely offer us both benefits and nuisances. The possibility of creating something to solve modern problems flawlessly simply does not exist. Although other, less stimulating game consoles will continue to be popular among serious gamers, the Nintendo Wii has changed the face of video games, especially for newfound Wii-lovers, and those who embrace the interaction aspect of video games for social entertainment. The Nintendo Wii’s health promotion is admirable, and may in fact serve to influence its competitors to produce a similar console, or even something completely new in support of the new health trend. Surely, all these examples are excellent evidence as to how a piece of technology can significantly impact modern civilization. It is true that the Wii is only a game, but it is a machine that has changed the video game stereotype from something mindless and unproductive to something quite beneficial. Perhaps if Isaac Asimov were alive today, he would recognize the innovations of the Wii, and reconsider his theory of technology’s harmful conquest.

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