Gaming Business Communities:

Developing online learning organisations to foster communities, develop leadership, and grow interpersonal education.

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ABSTRACT

This paper explores, through observation and testing, what possibilities from gaming can be extended into other realms of human interaction to help bring people together, extend education, and grow business. It uses through action learning within the safety of the virtual world within Massively Multiplayer Online Games. Further, I explore how the world of online gaming provides opportunity to train a wide range of skills through extending Revans' (1980) learning equation and action inquiry methodology. This equation and methodology are deployed in relation to a gaming community to see if the theories could produce strong relationships within organisations and examine what learning, if any, is achievable.

I also investigate the potential for changes in business (e.g., employee and customer relationships) through involvement in the gaming community as a unique place to implement action learning. The thesis also asks the following questions on a range of extended possibilities in the world of online gaming: What if the world opened up to a social environment where people could discuss their successes and failures? What if people could take a real world issue and re-create it in the safe virtual world to test ways of dealing with it? What education answers can the world of online gaming provide?

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I would also like to thank the many members of my gaming community who allowed me to use them to test ideas. Your generosity of time and interaction with me over the past months has been greatly appreciated. I thank you and will endeavour to maintain your trust and do my best as the years continue and as we build and shape our community.

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INTRODUCTION

"The value of a college education is not the learning of many facts but the training of the mind to think."

Albert Einstein -- New York Times, May 18, 1921

This paper both investigates the learning equation developed by Revans (1980) - **L**earning = **P**rogramming from the past + Questioning - and extends it. I test its validity within the online world of Massively Multiplayer Online Games ("MMO") and examine potential benefits for business. This paper explores, through observation and the engagement of action inquiry, the possibilities for MMO's to be extended into other realms of human learning as a way to extend community education and develop learning organisations. The exploration begins by outlining the world of online gaming, or simulation, and by suggesting how the environment interacts on social levels. In extending Revans' (1980) learning equation for use in the MMO environment, I provide greater detail into how each step of the equation is engaged during the learning process. This will then be tested in a series of engagements with the online world to test the validity of the equation for use in training individuals and communities how to learn.

My extension of the learning equation aims to show how to allow individuals to develop a greater understanding of how they engage with a problem. This knowledge then allows the individual to interact with community members on problems with greater communicative precision. I will discuss how study of the world of MMOS can provided insight into how the online community moved beyond just being people playing to people becoming friends engaged in teaching, learning and leadership. The thesis will conclude by considering the possible applications for organisations - from traditional business to learning organisations - and how virtual worlds can open a whole new future of human cooperation.

The world of gaming and MMO's

The world of the MMO is a fully immersive environment that encourages interaction through an exchange of ideas to solve problems (Zichermann, Fun is the Future: Mastering Gamification, 2010). In the process, players are invited to purchase items from online stores to make their journey easier and generate income for the developer in a business model designed around virtual goods. Yet the world of the MMO has far more to offer than a gaming area to keep people entertained and generate basic business income. In my earlier work *Gaming Change: Lessons for leadership through an Appreciative Inquiry and Action Learning Approach* (2012), I discuss how MMO's can provide a landscape for transformational leaders to develop regardless of their international location. Further, I outlined how the use of play encourages individuals to align core values with their lives and work, making them more creative, innovative and productive. This paper now extends that argument and looks to the MMO to provide a virtual space that evolves individual learning from any age group, and create communities that learn.

Communities within the online world are rich and vast, spanning blogs, Facebook, twitter, and other web 2.0 social sites. The number of users ranges from 950+ million on Facebook alone (Carlson, 2012) to millions of business/social community sites with around 100 users. Yet every one of them has one thing in common, people want to interact. The same can be seen in the online world of the MMO. Recent trends show that users want better chat environments, voice and other person-to-person interactivity such as player versus player (PVP) warring zones. Software such as Teamspeak and Ventrilo make serious income from providing servers for voice chat software that allows players to interact in open and private chat lobbies. This is on top of how other businesses have generated income from the hardware, such as headsets, needed to connect to such servers. No matter how you look at it, millions of dollars are spent every day to allow people to communicate in online communities. This is because people want to belong. They want to interact and share in the community environment (Lincoln, 2009, p. 148). They want quality from the community that engages them with discussions, argument, information sharing, and help. They want something to latch onto that makes them feel like it is their space and they are part of something (Weber, 2009, p. 83) regardless of where the community exists.

The players in the world of online gaming are no different. People in online games join such forms of community as guilds (World of Warcraft), platoons (Battlefield 3), fleets (Startrek Online) and a host of others, commonly referred to as clans. These clans bring people together in their favourite environments to play as a group with a sense of community around the like-minded ideology (Stang, Osterholt, Hoftun, & Kirksaeter, 2007, pp. 81-83). The clan can be centred on a single gaming environment, such as World of Warcraft for example, or can grow into a community that spans multiple games (Steinkuehler, 2005; Jakobson & Taylor, 2003; cited in Squire, 2008, p. 649). Whichever path is taken the community spirit is kept alive by the desire for community interaction (Squire, 2008, p. 649) and the drive to solve the game's designed problems.

It is this drive for community that makes virtual space the perfect environment for the action learning equation. For Zuber-Skerritt (2001), action learning means learning from action or concrete experience that is furthered by taking action as a result of this learning (p. 1). This is what the gaming, or simulation environment provides and is why it has been used repeatedly in military training applications (Smith, 2010, p. 7). In the gaming world this form of simulation gives players the ability to test assumptions in real-time while engaging in the random problem generation created by fighting real life players. In games such as battlefield 3 (published by Electronic Arts, "EA") players are pitted against real world opponents, not computer generated Non Player Characters (NPC), who provide an unpredictable element to how objectives are completed. This head-to-head environment, where players must outthink each other and adapt to the ever-changing decisions of the opponent, drives players to learn how to better their peers on maps that can cover from two to 64 players. In 64 player maps, the world is so full of players that any action meets with immediate reaction. This causes players to think on the bases of reaction, an all-out engagement from an all or nothing mentality.

Here, the map becomes more reminiscent of the Normandy beach landing where players cannot move for fear of being shot. There is little time to think with the result that players simply react and learn at a rapid pace how to stay alive. In this style, the game becomes more about survival than capturing points or gaining kills. While this has some advantages in building strong neurological connections, in my experience, two to eight player maps generate greater learning potential. This is

because, opponents demonstrate greater propensity to slow down and become more thoughtful towards their actions considering carefully each move rather than running head on into the battle.

Other games also demonstrate the inbuilt ability for players to engage with action learning. Games such as Rift (Trion Worlds), Startrek Online (Cryptic - Now, Perfect World), and The Secret World (EA) all provide areas where action learning is engaged within the simulated player versus NPC or Player vs Player ("PVP") world. Games like World of Tanks (BigWorld), Left4Dead (Valve), and Team Fortress (Valve) just to name a few, interact in the PVP world in a similar way to that described in battlefield 3 above. Whatever environment is chosen, each game gives a unique opportunity to engage players with the action learning equation. This engagement can be used to develop team building exercises, leadership training or to engage players with learning how to learn. The totally immersive environment that these games create, allows individuals to develop strong reasoning and problem solving skills. Moreover, they do so by using their own learning style in the engagement of learning through activity as I demonstrate later. Further, with proper guidance, the virtual space provides room for any simulation to be created, manipulated, or problem investigated with little risk of emotional, environmental or physical damage.

Having introduced the gaming environment and some of its potential in combination with action inquiry and action learning, I use the next section to outline the theoretical framework used in developing the test environment for this paper. Then I will proceed to discuss the methodologies and the construction of ways to test the use of the action learning equation in the gaming world.

THEORETICAL FRAMEWORK

"We can't solve problems by using the same kind of thinking we used when we created them."

Albert Einstein -- Paraphrase of his statement made in the New York Times (25 May 1946).

In the introduction, I discussed the world of gaming and simulation and how it opens opportunities to individual and community engagement of the action learning equation. Here I will discuss the theoretical framework that was used to inform this paper and give further background on action learning theories.

The world is a place of action. Life twists and weaves through struggle and diversity and we engage daily with problems that require choices. These choices are not based on physical or organic matter but on the sentient cognition of human beings (Zuber-Skerritt, 2001, p. 2) and whatever the result must be lived with. These cognitions develop from our parental teachings, education, social environment and media engagement (Domke, Shah, & Wackman, 1998; Holtgraves & Kashima, 2008; Willingham, 2007, pp. 144-200), which, in different ways, begins to form the background to our understanding of the world we engage in. However, no two backgrounds are alike because we all see the world based on how we make sense of our own visual and audible understandings of what is taking place (Willingham, 2007, pp. 274-278). This makes prediction of decisions by any particular group or person difficult due to the range of anomalies between individual thinking (Zuber-Skerritt, 2001, p. 2) and the background knowledge developed for future reasoning. However, while prediction may be difficult, guiding ones training to a particular way of reasoning is relatively easy given enough repetition over time (Kukla, 2000, p. 16; Willingham, 2007, pp. 33 and 149-152) and engagement with peer groups connected towards with the shared goal.

These peer groups provides fresh input into a problem and new perspectives that help introduce the possibility of the individual being incorrect about their assumptions or understandings (Barnes & Bloor, 1982, p. 33) formed from the background knowledge. The group also provides a support structure which, if respected by the recipient, provides a perceived level of credibility that increases the change of acceptance of the new belief or idea (Scull, Kupersmidt, Parker, Almore, & Benson, 2010, pp. 983-984). In action learning theory, the peer group provides, ideally, diversity and perspective that individuals can engage with to develop new learning (Marquardt, Leonard, Freedman, & Hill, Fundamentals of Action Learning and How it Works, 2009, pp. 25-26). These individuals of the group are chosen so that the members develop a level of openness and trust. Further, they must genuinely care about the problem and be focused on finding a solution. When this is achieved, action learning groups have a greater chance of success to solve difficult issues (Passfield, 2001, p. 47). The same is also true for groups undertaking action inquiry (Torbert, et al., 2004, pp. 5-8).

This is because action leaning and action inquiry are based on the premise of inside-out investigation, unlike traditional scientific methods in the physical realm which are designed to investigate from the outside in. Torbert et al. (2004) argue, that traditional scientific theory and method sees a hammer head hitting a nail and causing the effect of the nail, regardless of its own choices, entering the wood (p. 5). While, action Inquiry looks from the inside-out approach to investigate the gap in our knowledge and ability to undertake the action (p. 5). The result is the individual beginning a journey to investigate how to use the hammer in the first place. This is achieved through 1) implementing an inquiry to learn how to do the new thing; and 2) an inquiry necessary to see if it was accomplished (p. 5). The importance of this type of learning is the ability for an individual to gain greater insight into not just what they learned but how they learned. Torbert et al. (2004) suggests that the world generally ignores the inquiry focusing instead on the action and robs us of greater opportunities. Further, they argue that this has become the norm today in both education and business (p. 5) leaving individuals to become purveyors of predefined processes rather than instigators of innovation.

The gaming environment, however, has the ability to reverse this trend by bringing players together to reflect and engage with the simulated problem that they are focused to solve. Here a player can invest themselves for the discovery of ways to improve through engagement with other players. Here, players learn, for example, how to increase firepower, improve tactics and develop ways to use the environment better to their advantage to solve the mission goal. This in turn, brings the inquiry back into action. These small groups of players create a perfect subset for action learning environments due to the "no one way wins" design of the computer gaming environment. I suggest that this can be further extended into any simulated design of any problem through the use of Revans (1980) action learning formula. Revans (1980) submitted that action learning could be mathematically expressed as follows: **L**earning = **P**rogramming from the past + **Q**uestioning. For Revans (1980), P was representative of past programmed, or prior, knowledge which was developed from reading books and listening to lectures, while Q was developed from the critical analysis held in a social environment, to tackle the complex problems confronting people (Marquardt, Leonard, Freedman, & Hill, Fundamentals of Action Learning and How it Works, 2009, p. 27). His approach was to focus on knowledge gained that did not come from an educator (Bray, Lee, Smith, & Yorks, 2000, p. 43).

Marquardt, Leonard, Freedman, and Hill, (2009) and others, however, submitted in the mid to late 1990's, that the learning equation is incomplete and must include critical reflection for true learning to occur. Reflection, they argued, is the essence of any learning process as could be evidenced in Kolb's well-known learning cycle (Kolb, 1984, cited in Marquardt, Leonard, Freedman, & Hill, Fundamentals of action learning and how it works, 2009, p. 27). For them, critical reflection helped to develop the next course of action that cycles into the next learning cycle and in their detailed explanation of action learning written in 2009, they re-submitted the refined formula as **L**earning = **P**rogramming + **Q**uestioning + **R**eflection (p. 27).

With this formula, individuals can undertake various steps to understand the process to gaining learning.

Learning organisations and businesses on the other hand, are more adaptable to the methodology to be found in action inquiry, as developed by Torbert et al. (2004). This is because action inquiry deals with organisations as whole. In their book, the use of inquiry allows businesses to engage with the learning process through action inquiry's three primary aims:

1) On a personal level, to gain Effectiveness and Integrity within ourselves by filling gaps in our learning;

2) With relationships with family, friends, customers and colloquies or strangers, Critical and Constructive Mutuality; and

3) On the large scale with the organisation, society and environment, to generate sustainability (Torbert et al., 2004, p. 7).

In the gaming environment, however, both action learning and action inquiry take place at the same time, as shown in figure A. This is due to the dynamic space that the game world provides where social interaction, via voice chat, text chat and collaborative activity can all be present while engaging with the problem under investigation.

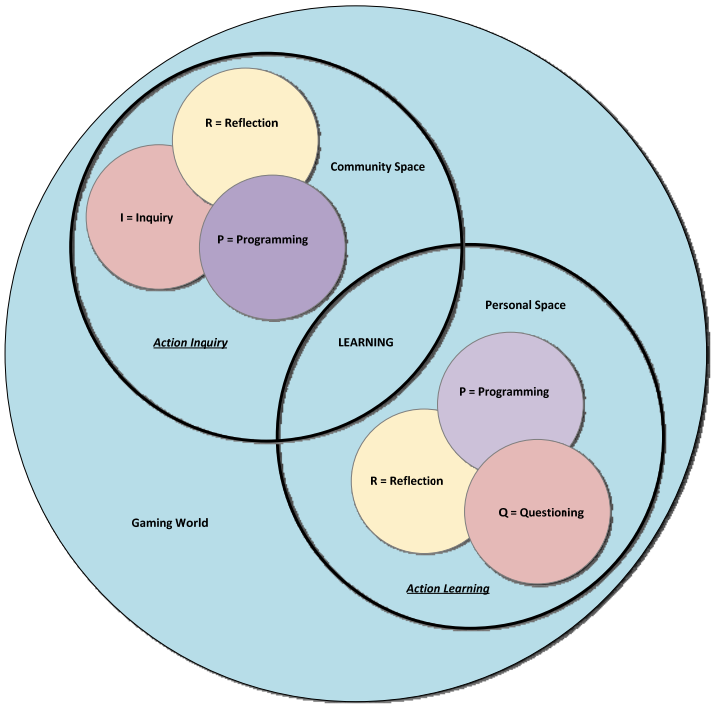

Figure A.

The result is engagement of both action learning and action inquiry methodologies at the same time. Accordingly, to facilitate the use of both methods in the research data it is important to understand when each is engaged. To do this the learning equation needs to be investigated to see where cross over's may exist. To begin it was important for me to look at the definitions of both of the key words - question and inquiry - to see if the methodologies required adjustment. This is because at first glance, action inquiry, as described by Torbert and associates, seems to be a methodology that invests itself separately from the action learning equation through the process of inquiry. According to Torbert et al's use of the word, it denotes some form of external investigation for information. I suggest that this is merely the methodology approach they have taken, as - according to the dictionary definitions - both question and inquiry have the same goal, the elicitation of information (Oxford University Press, 2012).

This is confirmed by a reading of Torbert et al's own statement "that all action and inquiry is action inquiry" (Torbert et al., 2004, p. 6) and through the aims of each theory, which are almost identical. Action inquiry states its three main objectives as: 1) Effectiveness and Integrity within ourselves by filling gaps in our learning, 2) Critical and Constructive Mutuality with others, and 3) Sustainability (Torbert, et al., 2004, p. 7). While action learning states its three main objectives as: 1) to help the individual to find out how to deal with ill-defined problems, to help them to learn how to learn; 2) to make useful progress on a problem or opportunity in an organization, to make things happen; and 3) to help people create the conditions in which they can learn with and from each other in pursuit of a common task (Edmonstone, 2003, p. 5). A further component is the need for reflection, which is described throughout Torbert et al.'s (2004) methodology for action inquiry, and which is also present in the action learning formula (Marquardt, Leonard, Freedman, & Hill, Fundamentals of Action Learning and How it Works, 2009, p. 27).

Therefore, I suggest that the action inquiry methodology can be expressed mathematically in the following way: **L**earning = **P**rogramming + **I**nquiry + **R**eflection or L = P + I + R. This is important to quantify, due to both action inquiry and action learning interacting at the same time within the gaming environment. To ignore one methodology over another would be to miss important social interaction data during community interactions. For example, the gaming environment allows us to undertake both an interpersonal investigation to gain greater understanding of the problem, while at the same time community enquiries are taking place to discover gaps and solve the problem. Further, Individuals can learn about their own gaps in knowledge and gain learning from the community through simultaneous feedback and insightful questioning (Marquardt, Leonard, Freedman, & Hill, Fundamentals of Action Learning and How it Works, 2009).

In the gaming world, because the simulation is nothing more than action inquiry in motion, I suggest parameters of the environment can be developed to engage players in the learning equation. However, to do so I propose that the learning equation needs to be expanded to encompass elements of human cognition and interaction.

Extending the formula for action

As discussed above, the methodologies for action learning and action inquiry are often blurred into one within the gaming environment and the use of the learning equation. This next section examines how the learning equation can be extended to develop online variables that provide an interactive learning environment for individuals and learning organisations.

In my experience within the gaming environment, I have seen players reflect continuously on what they encounter in ways that appear to be similar to the very nature of how we learn. Researchers in the field of cognition and media argue how interactions develop inferences and reasoning based on an individual's own thought relationships towards and from experiences (Domke, Shah, & Wackman, 1998; Holtgraves & Kashima, 2008; Tetlock, 1989; Willingham, 2007, pp. 144-200; Lane, Kang, & Banaji, 2007). Schon (1987) extends this argument, from an action research position, stating that reflection-in-action may indirectly influence future action due to the present reflection, on the reflection-in-action, informing and shaping how to handle the action (p. 31). Both action research and cognitive and media scientists seem to agree that reflection on actions taken, informs how we interact again with the same or similar situations in the future (Willingham, 2007, pp. 144-200; Marquardt, Leonard, Freedman, & Hill, Fundamentals of Action Learning and How it Works, 2009, p. 28).

I suggest that in the gaming world, a player follows this same reasoning pattern as they continuously encounter the same or similar situations repeatedly within the programmed reality. This in turn creates continuous reflection on schemas learnt that strengthen positive results and weaken unsuccessful attempts. The result is a player who constantly reflects on how to improve their gaming activity both during play and after play. This reflective practice begins to build positive habits in all aspects of their learning engagements and results in players having a greater understanding of how they solve problems (Zichermann, Fun is the Future: Mastering Gamification, 2010).

Returning to the equation L = P + I + R and L = P + Q + R, the constant position for players to self reflect can be added and expressed as follows: $L = P + I_n + R_n$ or $L = P + Q_n + R_n$. Both I, Q and R now include a subscript loop which is intended to demonstrate the loop in occurrence until the inquirer achieves enough information for the desired program to be complete. This is the same process used in group action learning where groups are asked to use questioning and reflection to encourage the discussion of norms, values, beliefs and assumptions to foster double and triple-loop learning (Marquardt, Leonard, Freedman, & Hill, Fundamentals of Action Learning and How it Works, 2009, p. 27). In addition, this reflection in exercise allows for the exploration of meaning in experiences, thoughts, feelings and actions (Kolb, 1984, cited in Marquardt, Leonard, Freedman, & Hill, Fundamentals of action learning and how it works, 2009, p. 28) that continues to develop positive schemas towards learning. Why is this relevant? For my purposes, knowing how many times a player engages with inquiry, questioning or reflection to solve a problem helps with designing an appropriate environment for learning within the virtual world of gaming.

To illustrate this let me use an example of a person turning on a television set. When a person looks at a television set, they see it as either on or off from the observed state connected with images being displayed on the screen or not. This connection to the current state of the television derives from knowledge produced from experiencing the television in an on state as children or adults, depending on when they first encounter a television set. Each step of this knowing is what I am interested in for programming a virtual test of the same knowledge. Therefore, I must begin with the simple steps of inquiry undertaken by an individual investigating a television's current state. This can be achieved by tracing each step of thought communicated internally within the mind so that a set of programmed variables can be extracted. Understandably, I can only do this on myself or through verbal communication based on cognitive science reports. While this is not foolproof, it will help to illustrate the point of how large and complicated the program variables of learning may become.

Let me begin with a general inquiry of the current state of the television. This involves the following steps:

Instigation of L_1 to discover the current state of the television, ON/OFF:

1) First I must inquire into the state of the TV, either on or off determined by images displayed and any sound being produced as developed from programmed knowledge from the past, Revans (1980) **P** in the formula.

2) Question: If (this is the loop for Q_n and is noted as Q_1)

    2a) the TV shows no picture and produces no sound;

        2a1) Q_2;

        is the TV in an off state?

        2a2) if yes; Q_3

        Is the TV switched off at (Q_4) the wall; or (Q_5) via the remote control, and so on until Q_n is satisfied.

        2a3) If Q_2 is no;

        Q_n is there a power cut? Is it broken and so on?

As you can see, the mind takes a number of steps in its enquiry towards the current state of the TV, which it then continues into a further set of questioning steps until the first question is satisfied. These calculated steps then loop to try and answer Q_1 as follows:

3) Based on the reflection of the answers to Q_n noted as R_1, what is the state of the TV?

    3.1 The TV's current state is switched off via the remote control. Learning one has occurred.

4) Learning 2 - L_2 therefore to turn on the TV I must find the remote control.

At this point, I can instigate both action learning and action inquiry. This is because both engage in the investigation of information to discover the remote controls location. Let me illustrate through step 5.

5) L_2 - Question, Q_1 what location holds the remote control.

5a) Inquiry one, I_1 - look around and see if there is a remote in the room;

5b) Q_2, is the remote present? YES/NO

5b1) If Q_2 is yes, pick up remote and press the power button to turn on TV. Of course, the ability to use the remote also has its own set of experienced learning, but it is not necessary to go over these here.

5b2) If Q_2 is NO, begin and inquiry noted as $I_{2,}$ and ask others if they know the location of the remote.

As can be seen, the use of enquiry or questioning is the same, the result is information on the location of the remote control. Accordingly, the answers to I_1 or I_2 in question 5b, would lead us on to the remotes location whereby, once the remote is found, it would be noted it as L_2. Once complete the individual would return to the inquiry for the completion of L_1 and confirm the state of the TV as off and not broken, by trying to turn it on.

6) Test - initiate action learning through new action and test the result of L_1.

6a) Pick up the remote and press the power button as defined in step 4b1. Now check to see if the TV does in fact turn on, YES/NO, L_4.

6) Logic test: is the TV working YES/NO if yes sit down and watch; if no investigate further, reflecting on steps 1 to 3 as to why the remote did not work, was it battery failure, is the TV off at the switch and so on.

While I have missed a few steps, the results show that a number of personal action learning and action inquiry steps are taken to produce the learning result of seeing if the TV is working. In this simple task example, we can see that a number of variables are stepped through in our mind during each step of the tasks process. These steps are very often taken for granted. However, understanding these steps allows programmers to design scenarios in the gaming environment to solve all manner of issues from the complicated to the simple.

Furthermore, this understanding allows leaders to see the more complex processes of how conflict may arise and find solutions through a redefining of the process. The understanding of the steps also allows for open-ended programming of group action inquiry scenarios, which result in greater learning. Anyone as old as I am, may remember old text based computer games such as Dungeons and Dragons, which had similar steps to resolving problems. Further, while these steps seem simple by our understanding of technology today, these steps, which can grow seemingly without end, are still the learned experiences that our mind processes every time we turn on the TV (Willingham, 2007, pp. 144-200).

The ability to learn through experience or books does not stop with age. Cognitive science tells us that the mind is always capable of learning new things and only opportunity prevents such learning (Jarvis, The Age of Learning: Seniors learning, 2011, pp. 163-164). Therefore, those developing action learning strategies using the gaming environment must also consider that the gaming world provides no barrier to age, time or workplace objectives. Each puzzle, or proposed learning, can go on for as long as the developers of the game keep the servers running. Each task can be extended into any scenario and experience can be gained at every step of inquiry. Accordingly, leaders and supervisors must consider carefully the complexity of the issue faced and how much time should be allocated to achieve some, if not all, learning on the issue under program design. Failure to allocate enough time may result in failure to learn through anxiety and shutdown, while too much time may provide the same result through boredom (Zichermann & Cunningham, Gamification by Design: Implementing game mechanics in web and mobile apps (Kindle Edition), 2011, p. 18). Therefore, time allocation to a problem must be considered when engaging the learning equation. This can be expressed as follows: $L = P + I_n + R_n$ / **G**iven **t**ime to **C**omplete or $L = P + I_n + R_n$ / GtC or $L = P + Q_n + R_n$ / GtC.

As discussed the purpose of dividing by GtC is to gain a deeper understanding into why a problem was either not solved, or solved so quickly that players lost interest in the learning derived. By developing benchmarks for problem solving leaders can also see if work pressure has influenced how time has been allocated towards the action learning environment. By investigating GtC, under normal processing conditions, I will be able to develop benchmarks for certain problem flows. This allows me to verify if enough time is being allocated when engaging action learning groups, who may organise their thinking in different ways.

An understanding of how long problems generally take to resolve allows the GtC variable to provide programmers with temporal parameters that can be designed into scenarios that allow real-time engagement of problems to be solved in game time. As I have discussed above, the gaming environment provides an open environment where many different and un-associated solutions can achieve the same goal using the action learning equation. This equation used in the gaming environment, allows any scenario, with guidance, to be programmed or developed onto the MMO simulation. Further, in the virtual world of gaming, game time can represent several days that in real time, only takes a few hours allowing learning to be done at greater speed without loss of quality. In addition, reflection can be programmed into the environment as an unavoidable and testable variable. In addition, where the refection element is required to be more in depth, or the issue is complex, the environment can be programmed to take several days without the learning extending into years of real time. However, this does not mean that GtC variable is usable in all situations, and extremely complex and emotionally charged issues may require a more interpersonal approach over a greater length of time. Accordingly, the primary purpose of dividing by GtC is to provide a variable useful in designing action learning timetables in virtual world.

What is most exciting is that, by breaking the formula down into its learning steps, the gaming environment can be used to produce stories for learning from any number normal human interactions. These can be as simple as my TV example above, or complicated learning like law, communications, and physical sciences. Issues that relate to severe impact can also be simulated as well as the reality of not solving the problem. Large issues such as nuclear war, and environmental issues - from clean drinking water to climate change - can be given graphical impact and give virtual worlds a voice to engage any age group and train any idea.

This is achievable already because of algorithms already present within the MMO game development engines. In addition, a number of elemental Artificial Intelligence scripts exist to control interactive non-player characters that enhance reality within the world's interactivity. Even pre programmed MMO games developed around specific genres (fantasy, war), provide worlds that can easily be adapted to train all manner of leadership, team building and communication theories. As my research shows, the world of online gaming provides a host of possibilities for action learning and the learning equation.

So far, I have reviewed the action learning framework that informs this paper. In the next section, I will examine how the learning equation can be applied to the gaming environment to develop individual, group and organisational learning.

Gaming Action Inquiry

This section discusses how that framework is adapted for use in learning, within the gaming environments. By further extending the learning equation discussed above, any issue can be programmed into the virtual environment. As Torbert et al. (2004) explain, every action and every inquiry is implicitly action inquiry, which they argue, provides a special power to transform (p. 9). This, they suggest, is because of action inquiry's ability to open our minds to look inwards towards our intentions and shared visions. When this is done, we become alert to gaps among vision, strategy, performance and outcomes within ourselves and others (p. 9). This insight, then paves the way for leadership roles to develop for organisational or social transformation, both internally and externally (p. 9).

In the gaming world, players are faced continuously with their own reality. The virtual environments open them up to limitations of play, which, unless guided, are often blamed on hardware limitations and internet bandwidth issues. However, when players are encouraged to reflect on their play styles, many achieve improved performance through modification of behaviour and tactics developed from this internal review of limitations and experiences during play. Followers then begin to become leaders as the knowledge gained is passed on and shared with other players who practice, improve and refine the techniques in an ever-increasing upwards learning spiral. This self-assessment behaviour is a principle of action inquiry (Torbert et al., 2004, p. 7) and helps to develop core relationships in the group. Further, this inquiry can be passed back into the clan or guild, as discussed in the introduction, and so can encourage the whole organisation to learn. Once the clan or guild has begun to learn in this fashion, the group is then primed to allow for open learning at work due to cross-functional teamwork (Hamel, 1991, p. 98 cited in West III & Meyer, 1997, p. 41). The result is more proactive engagement with problems and innovative solution development through a world of role-play that is acted out in an assisted self-reflection process that was learnt, practised, and refined, while gaming.

Torbert et al. (2004) discusses how role-play increases the individual's ability to improve quality of awareness and experience. The role-play, they suggest, develops leadership skills for greater vision and balance. The ability to role-play is considered an important step in the development of interpersonal skill as well as helping others transform into leaders (pp. 20-21). When players interact with the gaming environment, the ultimate role-play is developed. Here players must become fully engaged with the role-play of their character, which is visual and interactively stimulated through programmed engagements. Additionally, through guidance and interaction with the learning equation, leaders can provide learning activities that build on role-play techniques.

This is possible because the gaming world is designed to open the player to a fully immersive experience rather than just looking at the problem from a theoretical top down approach (Willingham, 2007, pp. 374-381). Further, the range of experience gained from dealing with current issues in game, then develops cognitive schema (Domke, Shah, & Wackman, 1998, p. 53) or background knowledge (Willingham, 2007, p. 381), which is then used by the individual to handle similar problems in the future (pp. 144-381) either in the real world or in games. By guiding a player through the game using role play techniques, leaders can develop this schema for handling organisational concerns, team building and staff interactions. The learning equation can also be mobilised to help train communication skills and social networking skills for use in marketing or customer relations. These are just some of the possibilities that the gaming world offer with action learning. However, to do so I must investigate the formula further to develop a greater understanding of the steps required to program such environments.

In Revans (1980) formula, the gaining of background knowledge is expressed as P, which represents past programming. This past programming, I suggest, requires deeper examination to take full advantage of action learning within the gaming world. As I discussed above, the past programming in action learning is the sum of education, parenting and other influences (Revans, 1980). Revans (1980), however, considered past programming to be of less importance than a focus on what we do not know, so that the right questions can be asked to solve the problem (Peile, Buckle, & Gallen, 2003, p. 127). While I agree that Q plays a more important role than P in the real world for solving problems, P holds the same level of importance when it comes to programming a simulation. This is because past programming plays a significant influence on how we logically engage with a problem and our decision making process (Holtgraves & Kashima, 2008, p. 74). Further, the developed logical process may differ significantly from western ideals (Vourlekis, 2008, pp. 147-151; Yoshino, 1995, p. 9; Kasulis, 2002, p. 17).

Therefore, to program the correct parameters into the gaming world, I must first engage with how the player will logically understand the imagery and messages I am portraying. This can only be determined when a basic understanding of the cultural, educational, and social biases that form P is considered. The best way to approach this is to look at where the simulation is to be released and to undertake an overview of the language, media and basic cultural interactions. In communications and marketing, this is developed from a semiotic analysis of the current media environment. This semiotic analysis, I suggest, is the best way to gain a basic overview of the culture to be engaged and further helps in the development of appropriate, culturally logical steps that lead the player to engage with the simulated problem.

However, to understand how to recognise formed logic, a deeper comprehension of how human beings solve problems is required. This is because P is informed by the repeated engagement with cultural understanding, social and media engagement, and questioning that forms the knowledge within P. Therefore, in this next section I will review how cognitive science understands the way human beings solve problems and how this interacts within the learning equation.

How Human Beings Solve Problems

I discussed above the formula for action learning, the importance of P, and the use of role-plays within the gaming world. Now I will examine, cognitive problem solving and how it interacts within the learning equation.

In the world of psychology, problem solving is considered to mean open-ended problems in which, the person knows the goal but the problem has nothing within it to describe how to accomplish the goal (Willingham, 2007, p. 373). Willingham (2007) discusses that, every day individuals are faced with problems; from wanting a pizza but not having one, to being inside a classroom whilst wanting to be outside (p. 373). Yet these are not generally considered problems by most people, not because they are not, but because the individual has faced them so many times the answer is automatic and therefore, not considered a problem (p. 373). This, Willingham (2007) explains, is the continuum of relevant experience that comes to bear to help shape our resolution of the encountered problem (p. 373). However, these experiences can create a mental rut when an individual is faced with solving an issue previously un-encountered. This is because, appropriate or not, the problem is approached in the same way as old problems (pp. 373-374). This is the concern of P in the learning equation.

Growing up individuals learn a number of operators through education, parenting and puzzles that help develop background knowledge that informs P. Most people can remember the education toys such as the Tower of Hanoi, a toy involving three pegs and there different sized blocks that had to be moved one at a time until all three blocks where on the end peg. The difficulty was that larger blocks were not allowed to be on top of a smaller block. Other toys involved placing the correct shape within the correct shaped hole. Puzzles and critical thinking of this nature are intended to help toddlers develop logical thinking and build problem-solving skills through play (Booth Church, 1993, pp. 9-11). However, this logical processing does little to enhance creative problem solving and forms rigid constructs within an individual's reasoning. This type of development is referred to as cognitive schema or background knowledge in cognitive science (Willingham, 2007, pp. 144-376), which is what Revans (1980) refers to as past programming in his action learning equation.

These logical operators are selected by an individual whenever a problem is encountered. The selection process begins with the question: which operator will move me through the problem in the most efficient manner to achieve the goal? Obviously, as Willingham (2007) suggests, randomly moving through the problem with the possibility of accidentally stumbling on the answer, provides no certainty you will reach the goal and the mind avoids this, by activating the background knowledge of the operator (p. 376). Cognitive science suggests, that the activation of these operators gives an individual a greater chance of success in solving the problem (p. 376). In education, individuals are subjected to pre-constructed operators developed by education boards that decide the best way to approach learning. These operators are defined by the principles of logic and rarely

take into consideration knowledge gained through experience (Kelly, 1990, p. 93). In addition, educational toys, parenting and peers also play a significant role in adding to our schema of operators (Domke, Shah, & Wackman, 1998).

Willingham (2007) provides a number of operator examples, of which he explains their interaction with problems in some detail. He begins with an explanation of the *brute force search* operator that, put simply, examines every possible answer in logical progression until the right one is found. Willingham (2007) cites as an example, using a crossword puzzle where the letters of the alphabet are simply followed in sequence until the right answer is discovered (p. 376). He continues with the *combination explosion* operator, which builds on the brute force search to work on filling in all the gaps in a logical progression until the answer is found. As with the crossword example, the individual begins at the first letter of the alphabet and uses the letter to fill all gaps in the crossword progressively until the answer becomes clear. Both of these operators are proficient at solving some puzzles and provide the stepping-stones to our logical progression through problems. However, the slow methodical nature of these operators makes them impractical in solving problems that require immediacy (p. 376). Accordingly, the mind has developed its own series of survival operators that provide greater speed in solving problems. After all no one wanted to be eaten by a dinosaur while they were working out the best way of getting away.

These operators are part of *heuristic analysis*. This efficient operator steps through a problem from one problem state to another. Using the example of the Tower of Hanoi puzzle, discussed above, this heuristic encourages a step-by-step approach through concentration on solving the immediate step first and then progressing. In this way, the individual can move to solving each step in sequence until the problem goal state is reached. However, a disadvantage to this operator is that no single step can be missed or avoided; each state within the problem space must be moved through to gain the answer (Willingham, 2007, pp. 374-376) otherwise the problem state will collapse. This can be time consuming and result in frustration if the time to solve the puzzle is not long enough. To compensate the mind developed additional heuristics to aid in speeding up problem solving.

One such heuristic is known as *hill climbing.* This heuristic, allows the individual to move closer to the end state in the problem space often shortening the steps required to achieve the goal (p. 376). To use hill climbing, the individual imagines the goal as a hill with the goal state sitting on the top. Each step up the hill is a change in the problem space that brings the individual closer to the goal to be achieved. As the individual progresses, each step must be considered, while not necessarily having to be engaged, to see if it takes the individual closer to the goal state or not. This allows the individual to discard steps that do not help with the climbing of the hill (p. 377) but can still take considerable time if the learner's background knowledge is limited on experience. This gave rise to another heuristic to aid in problem solving where such limitation exists.

In this situation, individuals may employ the heuristic of *working backward*. As its name suggests, this heuristic starts at the goal and then works backward to the starting state to fill in the gaps. This heuristic is useful when the goal state is known but the initial state is not (Willingham, 2007, p. 377). However, this heuristic is limited in helping the learner gain the knowledge of how they learned to achieve the goal. This is because working backwards may connect the learner to a step that solves the problem but does not connect the learner with the identification of the true problem through requisite investigation.

In response to these limitations, the mind has evolved a multi faceted heuristic to solve the problems discussed above. This heuristic is probably the most tested and broadly applied, and is known in cognitive science as the *Means-ends analysis*. This heuristic, uses a combination of forward and backward strategies to uncover the true problem state and its resolution. This can be seen in Willingham's (2007) example on page 379 where he steps through the process engaged by the means-ends analysis. Means-ends analysis steps through each of the following steps:

1: Compare the current state with the goal state, and if they are the same then the problem is solved.

2: If a difference exists, 1) set a goal to solve the difference; or 2) if there is more than one difference, set a gal to solve the largest difference.

3: Select an operator that will solve the difference identified in step 2.

4: If the operator can be applied do so; else set a new goal to reach a state where it can be applied.

5: Rinse and repeat with the new goal in step 4.

This has been named by psychologists as the *General Problem Solver* and is generally accepted as they way human beings solve every day problems (Willingham, 2007, p. 380). This general problem solver should sound somewhat familiar as it follows a similar process as that in action learning and action inquiry. Accordingly, to solve the learning equation L = P + Q within action learning inside the gaming environment, the general problem solving heuristic must be incorporated into the questioning element or the learning equation. However, before this can be achieved I must first return to our discussion on background knowledge.

As I have discussed, Revans (1980) considers that past-programmed knowledge is produced from educational toys, parenting and formal education that inform an individual's cognitive schema. I suggest, however, that the cognitive schema is also informed by experiences and peer engagement as I have discussed above. Further, I argue that the combination of parenting, experience, social engagement, peer influence, and education is the heart of what forms the Background Knowledge discussed in cognitive science. I argue this, as researchers all point to the same influences when discussing how reasoning is formed (Domke, Shah, & Wackman, 1998, p. 53; Willingham, 2007; Scull, Kupersmidt, Parker, Almore, & Benson, 2010). Accordingly, background knowledge cannot be excluded from the learning equation without influencing the results. Further, a greater understanding of what informs our understanding of the problem helps to delineate the true issue to be resolved. Therefore, in order to develop a complete understanding of learning in the gaming world, background knowledge must be included within the learning equation. This next part is a brief discussion of how this was achieved.

As discussed earlier, background knowledge informs the way we interact with problems. This is because of the influence that these schemas exert when trying to match the current issue with an appropriate operator for its resolution. To engage with and solve the issue, the individual draws upon their range of experience with similar issues. They choose operator that they think best fits from knowledge obtained through education, knowledge from parenting, and so on, until the required information is found to solve the problem. This can be expressed mathematically as **B**ackground **K**nowledge = **P**rogrammed **E**ducation + **E**xperience or BK = PE + E. This expansion of P, in Revans (1980) equation, allows for a more in-depth understanding of how a player engages with problems within the gaming environment. This is because I can now see how the player is stepping through the issue and any gaps in the knowledge brought to bear for its solution. This can be combined within the learning equation and expressed as follows: **BK** = ((L = P + Q_n + R_n) / GtC) which forms **K**nowledge) + (Putting Knowledge into Action, which forms **E**xperience) or BK = ((P + Q_n + R_n) / GtC) + E. The astute will have noticed that BK is also informed by P, and that P includes some form of experience developed from the originating BK. This is correct. For knowledge to grow, BK will always inform itself and includes experience as a variable of the learning journey. Further, experience develops from reflection and reimplementation of new action from journeys already taken within the learning equation. The result is BK continuing to combine the past knowledge with new or additional knowledge to extend itself (Willingham, 2007). In this way, we learn and grow to learn more.

Returning to our discussion of Q and the general problem solver, in order for the gaming environment to be a true role-play and individuals to gain an understanding of what, how and when they learnt, BK cannot stand along. It must incorporate an understanding of eth way we question, reason and problem solve. Therefore, I have added these elements into the structure of the learning equation. The result is a learning equation that includes both cognitive problem solving heuristics, background knowledge and Marquardt et al.'s (2009) reflection extension. This can be expressed as follows: **L**earning = (**P**rogramming ⊦ {informed by} Background knowledge + (**Q**uestioning looped until requisite understanding of the problem is achieved$_{\mathbf{n}}$ ⊦ {informed by} **G**eneral **P**roblem **S**olving **H**euristic) + **R**eflection looped until requisite goal is achieved$_n$ / **G**iven **t**ime to **C**omplete) + **E**xperience gained from putting into action or L = ((P ⊦ BK + Q_n ⊦ GPSH + R_n) / GtC) + E.

It is this completed equation that I introduce into the gaming environment to test learning. In this next section, I will explore the methodology used to test the validity of action learning and the learning equation within existing MMO environments.

METHODOLOGY

"In order to form an immaculate member of a flock of sheep one must,
above all, be a sheep."

Albert Einstein -- Essay to Leo Baeck, *The New Quotable Einstein* (1953).

Having discussed above how the theoretical framework for action learning can be adopted for use within the gaming environment (with an adaption of Marquardt et al.'s (2009) extended action learning equation), this section discusses the methodology that best serves action learning within the gaming space.

When employing research methodologies within the gaming environment, not all will provide understanding. In fact, many methodologies take away from the ability to complete the action learning equation due to restrictive methodological requirements that disallow input from the researcher. Accordingly, discussion of the methodology employed is imperative to provide clarity into the research design and its purpose. This allows the reader, marker, or other scientists to see how the research was conducted, whether the conclusions have credence (Clough & Nutbrown, 2012, pp. Preface, IX), and if the claims hold significance (p. 4).

To date much of the research within the gaming environment has employed methodologies that fulfilled old scientific methodologies requiring replication and testing, but have understood little about the environment under test. This has caused a lack of true understanding of the gaming world (Boellstorff, 2008, pp. 67-86) and has reduced much of the research to individualistic understanding. It is argued that this is due to an interest in the subject of the gaming environment, but a lack of knowledge as to how the gaming community actually works. This lack of understanding has seen a number of researchers struggle to adapt and find answers to their research undertaking. One such example comes from the writing of Frank Schaap (2002) who discussed how he found it impossible to adapt a character within MMO gaming worlds such as World of Warcraft and Everquest, to play an anthropologist (cited in Boellstorff, 2008, p. 67). For Schapp (2002), the requirement to fit the anthropologist or researcher into the theme of the world became the sole focus of his methodology (p. 67). I suggest that this is the wrong approach. It is not character that must be moulded to the theme of the gaming world, but the researcher creating the character. When approaching the gaming environment the researcher must respect the environment that has attracted the players. To change this would be to change the very nature of the game that the researcher has chosen to study. This in turn would produce a bias within any results.

To avoid this bias the researcher must respect that the simulated gaming world's dynamic and immersive culture is as real as the real world itself (Rowlands, 2012, pp. 77-80). The sense of immersion is further increased within the world of MMO gaming due to players being drawn into the sense of community and the fulfilment that provides them a sense of somewhere they fit in. When asked, the 700 players who have maintained active positions within the gaming guild created for my previous work and this paper; all replied that they have stayed with the guild due to the community it provides. Further, some that left in search for a better guild, as they put it, returned to the guild

after several months claiming that they felt a sense of loss as no other guild provided the same sense of community. Therefore, if researchers are to study the MMO environment, the researcher themselves must become a part of the community under investigation. To do otherwise simply creates a lack of true understanding of the dynamics that are taking place and undermines the research conclusions.

I therefore, suggest the following guide to allow a researcher to understand how to invest themselves within the gaming community while providing a way to reduce bias in their research. It is based on my experiences, which evolved into my role as guild leader, within the community. As I will show this is no easy task. It involves long hours, dedication, and focus that literally takes every moment of the day. I say this as anyone funding or undertaking a true investigation of the MMO environment must understand the time and investment needed to develop the community required. However, it is also prudent to note that the level of time investment will depend largely on the MMO world chosen. Worlds such as World of Warcraft, require time and effort to rank up characters which follow with the guild demanding specific input time for raids and other missions. Others will simply demand input from community-scheduled events, while others still, will demand time towards helping new members and development of guild projects. In my community, the time required is substantially increased due to multiple time zones and the number of games played within this guild. At the time of writing this paper, my guild is represented within 11 gaming MMO's directly, and five others through the members providing presence but without my direct involvement. Moreover, two other guilds had joined as sister communities, which are represented in a further 15 gaming environments. This created a global community, representing the guild in some form, within 31 online games, five countries and holding a combined membership close to 1800 members.

Understandably, maintaining communication between all these environments takes some effort, and in the beginning, became difficult using traditional forum software methods such as PHPBB. To solve this I implemented a Facebook-like community site as I discuss later. This allowed for the integration of all forms of communication from wall based to instant messages including video chat rooms, which allowed the communities to work together in real-time. Further, it allowed for development of discussions that engaged the community personally, not just as gamers. This personal level of engagement allowed players to develop friendships that were not centred on the games played. Further, as the researcher, once I was embedded within the community, the doors opened to investigation of social dynamics, communication, leadership and discourse within traditional scientific methodologies. This, I believe, was due to my own clarity of understanding around the environment being observed, which was developed from building the community staging areas.

This understanding provided me insight to the world being investigated that led me to choose observation as the governing methodology. McCall (1984) tell us that structured observation provides more reliable information about events than interviews and questionnaires; greater precision regarding an events timing, duration and frequency; greater accuracy in the time ordering of variables; and more accurate and economical reconstructions of large-scale social episodes (cited in Bryman & Bell, 2003, p. 183). Yet most researchers have been slow to employ this method, preferring instead to focus on adapting the gaming world to their research (Boellstorff, 2008, pp. 67-69). Observation on the other hand, provides the researcher with the ability to interact within the environment without changing its course and, therefore, reduce participatory bias on the outcome.

Further, it allows leaders to see how things are unfolding, and when combined with action inquiry, intervention can be timed and measured appropriately to guide action learning.

The use of action inquiry allows for employment of the dual methodology while leaving the action inquiry coach and mentor roles (Belasen, 2000, pp. 287-290) intact. These roles can be engaged at appropriate times to guide individuals and groups to solve the learning equation. This enhances learning of the group and opens the door to transformation. Further, the guild develops skills as a learning organisation that brings the community closer and allows for organisational growth.

However, while the coach/mentor role can be separated to apply instruction without investing direction towards a given result, some tensions exist between the two methodologies that can increase introduced bias. These tensions derive from our human drive to help. This drive often sees researchers providing input that gives direction, rather than guidance to the group to find its own answers. Accordingly, this form of input must be avoided at all costs. In order to break down the tension the practitioner needs to approach each scenario from two specific angles. One, a coded scheme for observation executed during times when the group is engaged in the learning equation; and two, a guided set of interactions as mentor and coach when the group runs into trouble. Above all the researcher must not try to solve the problem. To do so will prevent completion of the learning equation by the group and the practitioner will become a manager rather than a facilitator of learning.

In the gaming environment the tension between observer and action inquirer is even more prevalent due to the fast-paced decisions needed within the game. Accordingly, the practitioner must be cautious not to allow a defeat within the action to develop into frustration where the practitioner takes control. The practitioner can avoid this by stopping the group at the frustration interval, and encouraging reflection before engaging the problem scenario again. This execution of reflection within the learning equation during an engagement provides clarity to the group while maintaining the practitioner's professional independence, even if the practitioner is taking part in game play. The result is the group gaining greater understanding of how and why the frustration occurred, as well as a way to move forward. This builds confidence within the group and develops stronger schemas for problem solving without the practitioner stepping out of the observer/action inquirer roles.

In addition to the observer and action inquiry approaches, the gaming community environment allows for the addition of questionnaires and surveys, which create data sets for correlation on any given result. This provides a greater level of reliability for the results observed and removes the potential for practitioners to invalidate findings through non-concurrence of inter-observational data (Bryman & Bell, 2003, pp. 183-184). With the use of video technology provided by tinychat and other providers, face-to-face interaction and conference group meetings can also be used to add data to the research. Methods such as discourse analysis and semiotics can be used on forums and other guild sites similar to Facebook to add a wide range of testable data to the research. I have therefore used a mix of data collection methodologies to gain a full insight into how gaming can be used to develop learning using the learning equation. Not all of these data collection methodologies have been detailed within this section due to the length constraints of this paper. Instead, this section is focused on methodologies employed that are new, or complicated, and require more detailed explanation. However, where data has been validated by additional methods such as surveys, I have endeavoured to mention within the results, the standardised methodology used.

In this next part, I will review what environments I employed for my research and how the above methodologies were used.

Technologies employed for this paper

I have investigated above, the implementation of two root methodologies, namely observation and action inquiry, for use in the gaming environment to help players solve the learning equation. I have also outlined that a number of other methodologies have been used to develop validation of data to aid in my understanding of the gaming world. Now I will explain the technology that has been useful to me in undertaking this research and my testing of the learning equation within virtual worlds.

THE GAMES

To undertake this research a number of virtual worlds had to be selected from the games the guild was playing. These could not be chosen at random, as some simply did not provide enough community interaction space to allow valid data collection. I, have therefore, chosen six that provide a range of challenges and community engagement to allow for cross validation of data. The games chosen all vary in size, complexity and challenges so that a broad range of tests could be administered. Each game was invested with the aim of confirming or invalidating the hypothesis that the MMO environments could provide a suitable place for action learning. In the next paragraphs, I will describe the games used and my reasons for choosing them.

BATTLEFIELD 3 ("BF3")
http://www.battlefield.com/battlefield3

Battlefield 3 is an immersive environment that places players into the role of an elite US marine. These marines are sent into hostile lands where they face a simulated war environment. The aim of the game is to think fast, move quick and work as a team to gain objectives on server map sizes of up to 64 players. At last count the number of servers available around the world numbered over 11,000 providing a gaming space of approximately 704,000 players. These players engage every battle as player versus player action. Developed by Electronic Arts, the game also sported a new concept in the gaming world called the battlelog. Here players could see real-time updates of their friends' achievements as well as their own while sending messages to the community in a Facebook type setup. The battlelog also provides a place for the BF3 community to hang out with its own friend following system and allows players to submit personal status updates. Players engage in the community space via guilds known as platoons. Within the platoon page, outsiders can see how the members are doing with achievements, even if they themselves do not play. While limited in the sense of a true gaming community, the battlelog still gives players a way to share experiences and come together to play. However, the game supports no inbuilt chat systems requiring players to have an external voice or text chat service, which limits internal community development.

BF3 Game play

BF3 sports three main modes, Player versus player ("PVP"), CO-OP, and Campaign. In campaign mode, the game provides an interactive storyline for the player to complete. During the story, the character is taken through the world undergoing missions to achieve a set paradigm. This mode is single player and provides a number of weapon unlocks that can be used at later ranks within the PVP environment. However, the campaign provides little room for self-expression as achievements can only be reached by following the pre-structured steps for completion. I have therefore, discarded this mode for use in solving the learning equation.

CO-OP mode, on the other hand, provides players with the ability to stand shoulder to shoulder with their friends to complete a set of predetermined stories. Here players must guide each other to stay alive while completing the steps unfolding within the story. While the steps are predefined, the players are able to make choices regarding how they resolve the situation. However, while this mode provides ability for Q and R to be engaged within the learning equation, it does little to challenge the players to take different routes to solve the story. Further, this mode is limited to two players and, while I have seen minor changes when played with different players, is not constructive in solving the learning equation. Therefore, I have also discarded this mode for use in data collection.

The most constructive and energetic environment for solving the learning equation and developing transformation through action inquiry, is that of the PVP mode. Here players are pitted against other real world players in an ever increasing, changing and fast-paced game of strategy. Here players are required to think as a team, working together to achieve the mission objectives. Further, no two game plays are the same due to constantly changing strategies from other players requiring players to constantly think on their feet and adapt, within the ever-changing action.

During game play, players can choose from Assault (Medic), Recon (Sniper), Engineer and Support character types who each have their own skill sets to help teammates. A number of kits are provided, that include weapons and tools specifically designed around the class chosen. Each weapon has a further set of unlocks that allow additional equipment to be fitted, increasing the characters chances of survival. Further, each time a player dies they are returned to the deployment screen where enhancements can be adjusted or a different class chosen to combat against the cause of death just encountered. For example, an engineer may initially spawn with a SMAW (rocket launcher) and be faced with players only using aircraft which he cannot successfully shoot down. Upon death, the player can modify his or her experience by deploying with an anti-aircraft launcher. The deployment screen also provides players the ability to join a team or squad, which comprises up to five members. This allows team interaction to achieve the mission goal.

The world itself provides three main simulated mission types; conquest, deathmatch and rush with each type having its own specific goals imitated as real life through a first person shooter environment - this is where players are looking through the characters eyes. In conquest players fight to obtain a series of marked points, which they must hold in order for the opposing teams tickets to be depleted, resulting in match win. Each conquest map also carries two jets, four tanks, one mobile anti-aircraft tank, one apache attack helicopter and either, one troop helicopter or a little bird machine gun attack chopper. A number of machine gun jeeps are also included and with recent upgrades to the game, four-wheeler all terrain motorcycles have been added as well as tank destroyers.

The game itself is not realistic. Its armaments and weapons, while resembling the real thing, are designed around the game mechanics. This has caused frustration for some players until it is explained. EA, however, do not communicate well on the game mechanics leaving players to figure out the frustrations for themselves. This, however, is good for this research as it allows leaders to engage to deal with the frustration. The game is free to play and only requires a modest investment to purchase the game and upgrade packs required. Servers are freely available and a business can purchase their own dedicated server for around $20 USD per month. This allows for full control over the level of guidance and training the organisation wishes to pursue.

On its own the PVP environment provides basic interaction with the learning equation due to the interaction of P - past action programming which was successful or unsuccessful, and Q - questioning ones actions to develop new strategy. However, to engage the full learning equation developed above, the environment must be guided. This is where action inquiry takes on its role as I discuss later in this paper.

STARTREK ONLINE ("STO")
http://sto.perfectworld.com/

Startrek Online mixes interactive engagements from space and ground combat, puzzle solving and mission engagement in both Player Versus Environment (PVE) and PVP, to create the fantasy world envisioned within Gene Roddenberry's Television series Startrek. In this MMO, players take on the role of ship's captain and must develop ship and ground weaponry to survive the never-ending attack from enemy races. Further, the game adds to the challenge by mixing in diplomacy missions that require certain criteria to be met before the player succeeds. Players can choose from three main character types tactical, Engineer, and Science. Each class has a sub class where players can specialise such as a medic. The environment also sports a guild engagement system known as a fleet. This system allows for leaders to grow internal communities and take on community events such as building a starbase. The community is encouraged to get together and play to earn rewards to be spent on building starbase accruements as well as engaging races to prevent war. This provides an additional element for leaders to engage training of community team interaction.

STO Game Play

The game supports a number of single player as well as group missions. The group entanglements provide challenge to players as no single player can complete the task without teamwork. One particular scenario involves taking down the Borg, a cyborg race made-up of biped species from all over the galaxy assimilated with machine parts into the borg collective. These Borg have become aggressive in nature and the group must work to find a way of taking down the borg leader and stop assimilation of the alien race known as klingons. To begin players will join a group with the chosen class. Usually the group leader will make demands for a medic and mix of engineers and tactical for firepower. Once set the group are transported into ground combat within the borg assembly room. Here they must fight their way through assimilated drones to get to the main objective, shutting down the assimilation chambers. Players are required to work together to stay alive. Those who run off ahead usually are swamped by drones and killed. Once dead the player must re-spawn and catch-up to the group. A good leader will keep the group together developing strategies for the destruction

of each drone attack. This group scenario provides the perfect place to train leadership skills and engagement of the learning equation.

For community engagement, that game supports its own inbuilt voice and text chat system allowing players to stay in constant communication. The game is free to play which makes it an inexpensive system for guided training.

DC UNIVERSE ONLINE ("DCU")
http://www.dcuniverseonline.com/

In the world of DC universe online, players become the superhero, fighting for justice against the villains, or for the villain's sense of justice against the superheroes of the simulated world. Here players meter out justice in a world filled with villains on every street corner. The world is so full of Non Player Character ("NPC") villains as well as PVP environments, that it pushes players to work together in all aspects of the game to solve the overwhelming challenges present. Based upon DC comics superheroes, the world allows players to model themselves after their favourite super hero or villain. Superman, Batman, Wonder Woman, Lex Luthor and the Joker are ready and willing to be mentor to the newcomer. In addition, guest appearances from Bain, Robin and other characters provide entertainment as missions stack up for completion. The landscape has been developed on the premise of Gotham City, home of Batman, and Metropolis, home of Superman, where players strive to earn the skills and traits that help them survive in the cesspool of crime.

DCU Game Play

The story unfolds with the player gaining their super powers from a set of nanobots brought back to the past by a future Lex Luthor. After presenting his story of the worlds end to the justice league, the parties have a differing opinion on how best to attack the oncoming threat. This leaves the villains and heroes at each other's throats as well as some combined efforts, where the differences are temporarily put aside, to battle the oncoming threat.

To start players select a mentor, then the new hero chooses a weapon skill type that comes from magic, technology, brute strength or firearms. Naturally, each of the weapon skill is based upon the main hero arch types - Superman, brute strength; Batman, technology and so forth. To start the player must battle their way through Braniac's fortress - Braniac is a super villain from Superman's homeworld krypton, and is a computer based life form. in the fortress players are faced with a number of battle challenges to overcome as an introduction to the keys and skills they will be using. Following this, the player is delivered to their chosen sides' local city safe house, where they can learn more about skill traits and weapon development.

As the missions unfold, players must think carefully about their surroundings. Further, players learn quickly that an all out attack is an approach that will get a player killed. This engages the learning equation with the development of planning. Further, the game requires building on team skills to resolve many of the mission challenges. This is because every battle has a swarm of villains and if players are not careful they can attract large numbers of enemies that overwhelm a single individual. With the inbuilt morality system, this game provides an environment that allows for the testing and development of an individual's core values and assumptions, and their ability to work in a team.

LEFT 4 DEAD 2 ("L4D2")
http://www.l4d.com/blog/

Left 4 Dead 2 is developed by Valve as a First person Shooter. It takes place with five pre-determined characters, the survivors, armed with set weaponry set to face off against a world that has been taken over by zombies. The environment immerses the player in co-operative action horror where the teams must work together to survive and reach each maps safe house. Once the players arrive at the final safe house they are whisked to safety by survivors residing out of the infected zone.

The game itself is not a MMO as it only sports four players, and a maximum of eight in versus mode. Yet I have included it in the test environment as it provides an element for leadership that no other MMO's do, the possibility of sacrifice. Through the course of the game, and in one map requiring a sacrifice, the leader may have to face leaving a member behind for the good of the group. No other game currently provides the morality test this brings to the learning equation and team building. This provides a bench mark for testing player reactions when faced with the unwinnable challenge.

L4D2 Game Play

To start players meet within a lobby and have a choice to select the character to play. Four characters are provided as the survivors, Nick, Rochelle, Coach and Elis. Once chosen the game launches and the survivors must weapon up and grab medical supplies. Weapons come in a range of assortments from firearms to melee weapons such as a chainsaw, hatchet, ninja sword, crowbar and an axe. Using the assorted weapons players are then faced with the unrelenting horde, an assorted range of zombies that just keep coming.

In versus mode where players pit themselves against the survivors in randomly chosen special zombie characters. These five special zombies have been given specific traits designed to attract the horde and slow the survivors down allowing the horde to unleash death and destruction. The most destructive of these zombies is the tank. A supercharged muscular zombie that can pick up cars and toss survivors across the map with one hit. The game is very fast paced and requires players to think fast to avoid the onslaught. They must play as a team and interact quickly to avoid being overwhelmed.

The learning equation interacts nicely with left 4 Dead 2 as players test hypothesis and action to get to the safe zone. Further, action inquiry methodology can be employed to bring out leadership skills in those who previously considered it impossible.

STAR WARS THE OLD REPUBLIC ("SWTOR")
http://www.swtor.com/

Star Wars, the Old Republic provides a unique level or morality and character development from a time set 3000 years in Star Wars past, before the rise of Darth Vadar. In this multi level MMO, players can make the choice to become pure evil, pure good or some mix in-between. Further, players are encouraged to make choices to solve political problems that not only sway the course of their personal story, but has a profound effect on the universe unfolding around them. Each choice has a range of consequences and changes the characters story path throughout the game. Based on the movie genre, players must choose to follow either the light or dark side of the force and as each light or dark choice unfolds, their allegiance to the Jedi or Sith is developed.

SWTOR Game Play

Players begin by choosing their character's race, designed straight out of the star wars genre, to which they can customise the basic look of the face, sex, hair and weight. Once complete, players choose from bounty hunter, Jedi Consular, Jedi Knight, Sith Agent, Sith Inquisitor, Imperial Trooper, Smuggler or Sith Warrior. Each has its own unique story and begins their journey at a planet that is called home until level ten.

As players progress, they are able to meet companions which join their crew. As each light or dark choice is made, the player will gain or lose the affection of their chosen companion. While a companion will never leave the players side, they can become stubborn and unhelpful to the players cause, making the player engage another companion to aid in their fight. With companion choices from Droids, other races, and male or female characters, there are plenty of choices to keep the story twisting and winding within the players chosen path.

Another sporting advantage this MMO employs is the fact that no two player experiences are the same. Each story unfolds differently depending on choices chosen, so learning how to solve problems to aid players is not easily transferable to someone else. In team mode, the answers to story questions, does not change a player's individual light or dark allegiance. However, it does change the outcome of the specific stories result so players must work closely together if they wish to achieve the specific outcome. In addition, players are rewarded social rewards for interacting and solving problems together reinforcing the wish to do so. This twist on the standard MMO environment, allows for easy engagement of the learning equation as players are rewarded for trying. As with most MMO's, Star Wars the Old Republic uses combat scenarios to fight for what the character believes is right. Using pistols, light sabres, blasters and other weaponry, player's tour the galaxy doing the bidding of their chosen masters.

I chose this game specifically because of the range of choices each scenario had available. No two answers would yield the same result leaving the world open to a wide range of goal setting that engaged the learning equation for each player even when acting in teams.

RIFT
http://www.riftgame.com/en/

Rift supports a truly massive environment to enchant players. Based on the traditional fantasy world design, rift extends the play state by providing worldwide battles that bring every player together to stop the attacking hordes. When players first start, they are given six character choices, three from the Guardians (good) and three from the Defiant (evil). Each of these races has their own unique look and traits. However, Rift also adds to these a range of callings that provide a range of different skill sets depending on the class selected. With 32 class choices, players can develop the traits they like best. Rift supports both PVE and PVP engagements centred on a world constantly facing invasion through dimensional tears. As the class story unfolds, players are pulled into world battles where priests and other scholars strive to discover the secrets of the dimensional tears. These stories happen randomly and enhance the player enjoyment of the game. In RIFT, players are one of the Ascended, a Telaran soul slain during the great Shade War and resurrected to combat the forces of Regulos. As an Ascended, players have access to special powers, the greatest of which is Soul Attunement, the ability to commune with, and embrace, the souls of Telara's ancient fallen heroes.

Rift Game Play

Players choose an Ascended Soul from one of the four callings Warrior, Cleric, Mage, and Rogue. Each class has a range of specialist abilities that can be used to help groups defeat often-overwhelming hordes that attack the world regularly. The play style itself is designed around ground warfare that involves traditional swords, magic and other forms of weaponry. However, Rift provides a unique game play, where everyone must combine forces to battle against forces in worldwide invasions. This provides a unique engagement level for players requiring them to work on a grand scale with people they have never met to drive the invaders from the land while solving the puzzle built into the invasion storyline.

This MMO provided valuable data to the learning equation on how teams interact when separated by learning differences. Further, it provides insight into the interactions of players outside the test group.

Gaming Learning

These games were used to develop the research project within the community due to the range of engagement with the learning equation. Further, they provided a similarity in style that allowed for cross data collection during engagement of action learning. These gaming environments allowed for the creation of specific engagements to test leadership, teamwork and learning, through simple adjustments in player activities within preset game parameters. For example, if I wished to train teamwork with a view to command ability, players could be informed to play within specific rules or face consequences like timeout or penalties. Individual learning goals could be tested on a problem that a player must achieve as well as the team goal that must be completed.

Players could also be tested on their ability to communicate solutions to problems, with one player lead the novice player, similar to a person leading a blindfolded individual through an obstacle course. The range of choices provided by each game environment provided a range of data that could then be crosschecked and used to validate the usefulness of the gaming environments to the learning equation.

In this next section, I will expand on social interaction with a review of the development of the community space that was used to bring players together.

The Community Space

As I have discussed, the gaming environment allows for the engagement of action inquiry and the learning equation. Each game chosen provides valuable insight into player reactions and allows for crosschecking of data collected. However, these games cannot provide data without a way to coordinate and interact with community members. Therefore, the development of a community site is imperative to good data collection within MMO space.

The community space is the staging area for players to stay in touch. What is generally forgotten by game creators is that players move around between games. No matter how fantastic a game or virtual world is, players will still investigate and move around to others. Players get bored, especially if they have reached the end of the game before you add more content. They want to try new things, and the industry generates more and more games every week. Trying to maintain a community in this sea of turbulence is an impossible task with current inbuilt guild environments. Therefore, the keeping players together in a community, requires a separate system for the development of social interaction. By having a space where players can discuss anything and everything, not just the current developer's game, connection to players is maintained. This is why Facebook is so successful, no constraints on what is talked about. There must be space to see what is happening in other environments, games, genres and people's lives otherwise players simply move on and the community connections are lost. This is important as gaming communities and business grows on knowledge of trends and changes in activity.

Therefore, traditional thinking towards community websites is an important factor in building a sustainable online community. This sustainability is one of the tests I undertake through the methodology of action inquiry. To achieve a sustainable community website traditional thinking towards forums has to change. In the old world forums where used to create feedback for developers to learn from. This self-centred approach to developing causes a number of problems, such as changes to the game for balance and one-way communication. This one-way communication results in developers adjusting game mechanics based on a few comments by those who dominate the forum environment and results in a breakdown of organisational learning that sees reaction rather then questioning (Torbert, et al., 2004, p. 5). The result is a few happy players who hated the original game mechanics and a much larger number being annoyed and moving to another game.

The interactive community environment, however, allows for greater communication dynamics to occur. These dynamics provide better insight into the real issue and allow developers to adjust the environment for greater balance. This was recently seen, when a new weapon was introduced into the gaming environment of Startrek Online. This new weapon had created an imbalance within the

game that saw a minority group of 3% become heated about the power of the weapon. An exchange of angry words were created on the forums from the group, who had not adapted their characters to defend against the new weapon. In responding, developers, without further investigation, immediately adjusted the weapon. The result was immediate and then saw 60% of the population, who had worked to obtain the weapon, quit the game for several months. To my mind, a better strategy would have been to add a counter acting item or skill for the weapon.

The introduction of the new virtual item, or skill, allows the upset players to earn the requisite defence and kit it when they encounter the new weapon. The advantage is players balancing for their engagement within game, new content and a virtual world that ever evolves that keep players coming in for more. This is what the community site can achieve. Through open discussion on every manner of topic, not just the developers world, the organisation can see what needs fixing as well as see what the community likes and dislikes based on their daily activities. Further, it allows developers to see what is trendy and what is not, engaging new content as the society evolves. This keeps the environment fresh and ever changing, just like the offline world.

However, the real challenge here is choosing the right medium. Traditional forums such as phpbb and bbpress are designed for the interaction on specific topics, which results in the kind of new weapon problem described above. Threads for topics are created by users on a random basis and on large boards; the number of threads can number in the thousands with many being lost in the ether due to badly formatted subject lines. Further, many threads are restarted, as users did not realise that, at thread 955, the problem was already being discussed. The result is a lot of time being used to wade through forums, lost communication, misunderstood threads and time organising the forum. Accordingly, choosing the right community software is as important as developing the virtual space. In addition, when designing the community site, open policies need to be developed to allow for the free exchange of ideas that open the door to creativity, learning and innovation (Li, 2010, pp. 109-141). However, finding the right mix often poses some significant challenges.

When I started this project, I needed to find a way to solve the interaction problem. With the size of my membership and the number of games chosen for this paper, I needed to develop a way to keep everyone in contact while maintaining the freedom of exchange. To solve this I began with a page built into Facebook called the fiftey eighth - http://www.facebook.com/lgnch. First thing you will notice is that fifty is spelt wrong. This is because our name was already taken and I had to modify it for Facebook to allow it. Despite this, we told people where it was and they happily signed up. After a few weeks, I added a number of groups focused around specific issues, and discussions began to flow. The real-time updates provided on gaming activity allowed interaction with players on a completely new level than had been experienced with the forums I had originally tried. I was now able to see what players were looking to do, and what games had taken their fancy each week. In addition, using transformational leadership theories, I was able to entice discussion regarding any manner of subject and develop a dialogue to solve issues that had arisen in using the game.

I was also able to see how players liked to spend their money. As Li, (2010) discusses how the ability to capture this knowledge in real-time provides insight that results in increased productivity and improved operations. Further, this open-mic approach allows people to share their ideals and help improve customer relationships and develop better products (pp. 26-37). Unlike traditional forums,

Facebook allowed me to track information and conversations with ease. This started me thinking about how to import this level of communication directly into our community and evolve it inside.

To begin this evolution I developed a custom-built forum system linked to a main website called www.58th.lgrtech.com. This site included a number of extensions like leaderboards and directed news information, not previously available in the fiftey eight's Facebook page. The customisation also allowed me to connect users to information on how to find the guild in games. It was secured behind a formal login procedure that also immediately connected members to the forums, so information was held securely. The page was also linked to our Facebook page and advertised within each games guild information section so that members did not feel a sense of loss. Here members could also review our rules of conduct and our guild philosophies and policies. The page provided access to upcoming events, new information on games the guild was beta testing, screenshots, videos and other media to bring community members together.

This resulted in the page becoming the central hub for members to connect and share information. Further, the leaderboard allowed members to see how they were progressing compared to their friends and followed the ideas discussed by Zichermann (2010). The leaderboard was also developed to show only those friends just ahead and just behind the viewing member's current position to create a sense of rivalry and competition. Not satisfied with this I also wanted to reward member participation and extended the leaderboard to include a rewards system that allowed members to gain credits for activity. These credits could be spent on anything within the game environment, or via Adonis Technology, the company formed to undertake this research.

Almost immediately, a number of difficulties began to appear. It became increasingly difficult to allocate points for interaction on the forums and members found it difficult to see how to spend points they were earning. Further, some members found it difficult to understand how to use the multi threaded forum I had created due to its non-standard interface design. While I had developed a forum that made it easier to find information, members were used to the all on one page-listing environment that had the drawback of burring information. I therefore had to consider revising the design.

After reflecting on our community success with Ffacebook, due to its ability to show threaded information in status updates, I began to consider how to use this idea with all of the leaderboard and reward systems I had designed. However, having a law degree, one of the first things I had to consider was how to develop the Facebook system without breaching any intellectual property of copyrights. After a search of the web, it seems that a number of developers have already solved this problem and created several web site systems saving me designing one from scratch. Accordingly, a deal was struck with one such developer and the site was purchased for deployment. After getting the site up and running I worked with programmers to implement a number of adaptions that allowed the integration of the leaderboard and credits systems. After installation, it was a simple task to send messages to the community to say we had moved to the new space at http://my.gamaspace.com. Not soon after, the site was populated by members who loved the ease of use the new system provided. Quickly they started to fill the space with conversations and began to earn reward points.

I was still conscious, however, of the problems members had faced with spending the reward points earned and spent several days integrating Adonis Technologies web store into the site. I also added a gift shop where users could purchase gift cards, discount coupons and virtual items to give to themselves or other community members.

For me this validates the learning equation for organisational learning. This is due to the community feedback obtained that helped me, as a leader, to learn what issues where faced and how to adapt to them. Further, it confirms the need for community interaction, rather than one-sided communication akin to the kind in the Startrek Online example. Only through this honest open discourse, was I able to develop the community environment that worked for everyone. This is in line with Li's (2010) assessment of the benefits of open dialogue (pp. 82-84). If I had rushed into fixing the problem, or been prideful about my creation, before the true issues faced by the community where understood, the community may very well be continuing to struggle in the old forum technology.

As I argue above, the need for a strong, open and honest community space that encourages dialogue is an important factor in developing organisational learning. In this next section, I will expand on this argument with an investigation of how the community site can further engage individuals, as well as community learning.

THE COMMUNITY SITE AND THE LEARNING EQUATION

I contend above that, the need to develop a strong community environment that supports player interaction, plays a pivotal role in community, individual and organisational learning within gaming structures. The community site extends interpersonal communication into the virtual space, that brings players together in one place to share ideas, problems, and game information, 24 hours a day (Thimm, 2008, pp. 343-344). The community space allows players to coordinate game times when they will all be playing, and provides a space where friends can stay in touch. When players invest themselves within the community they begin to build social skills, increase social capital, and build relationships (Wankel & Wankel, 2011, pp. 4-5). Moreover, I suggest, contrary to the opening ideas in Wankel and Wankel (2011), that, if guided in conjunction with the learning strategies discussed in this paper, the social community can increase learning and communication skills.

This is because, when community members engage with the learning equation through action inquiry in the community space, they begin to formulate stronger communication skills to develop resolutions to the problem. In traditional gaming space, players have to communicate their ideas within a verbal space that does not provide an opportunity to show examples before the next attack arrives. This often leaves players floundering to explain the details of the situation faced. These problems are exacerbated because players often have an inability to explain what they need to achieve. This can be due to a lack of verbal ability or lack of knowledge from peers regarding the exact situation faced, or a mixture of both. In the community space, however, this level of communication is extended to allow for images, video chat with whiteboards and recorded video to help with the explanation of the problem. Once community members gain access to this extended information, gaps in processes can then be filled to help the player along. This allows community members to provide feedback and teaches players how to better define their question for more useful responses.

This is the essence of the learning equation. Through each inquiry in the game space, players learn, through feedback, how to refine the communication of their question with input from community members that develops Q. This knowledge then forms background schema to help refine the next question before posting and so informs a better P. Players then reflect on the knowledge and repost within new action. This process fits the description of "having no action without learning and no learning without action" and so goes to the core of action learning. In addition, the learning process is accelerated through the development of background knowledge gained through reading others posts, and how they asked their question. With appropriate questioning, peers help to refine the issue being faced, give guidance through appropriate questions, and develop open communication that teaches the player better ways to communicate (Belasen, 2000, p. 298).

Of course this learning can only exist if proper openness policies and guidance are provided. These are needed to keep the communication flowing and accountable (Li, 2010, pp. 106-153) and to prevent conflict through inappropriate behaviour. To assist with this, my gaming community website was extended to include voice and video conferencing technology as well as detailed behaviour policies to guide and facilitate learning. Further, the use of a moderator was incorporated into the site to facilitate progress and keep the communication on track (Torbert, et al., 2004, pp. 287-290). In this next section, I will discuss how I approached using games to develop the online training environment, and the coordination with the social networking discussed above.

DEVELOPING THE ONLINE TRAINING ENVIRONMENT

The social network environment helps bring players together in the freedom of learning exchange. This thesis contends that, when this is combined with the gaming environment, action learning is given an opportunity to thrive. This section discusses what theories informed my development of the training environment.

Over the past few years, many businesses have begun to incorporate internal education departments to help teach their way of thinking to upcoming students looking to work in their industry. Some have called this the corporate university (Jarvis, Universities and Corporate Universities: The higher learning industry in global society, 2001, p. 111). These departments are responsible for the training and development of staff according to well-established education guidelines. In fact, some corporations have gone so far as to collaborate with existing universities to provide industry accepted diplomas and bachelor degrees that follow the corporations suggested requirements (Jarvis, Universities and Corporate Universities: The higher learning industry in global society, 2001, pp. 111-128). Others, such as Cisco and Microsoft, have developed industry certifications that help technicians on their journey towards industry accreditation. However, as Mark Allen (2007) explains, the corporate university is often used as merely a marketing gimmick. This, he explains, is inappropriate and the learning department must strive to provide education and learning with the acceptance that some problems may not have a solution right now (pp. 4-9).

For Allen, (2007), the corporate universities of today exist to generate staff to create profit, which is of no threat to the university environment (pp. 4-9). This, I consider to be a mistake. The focus on education to deliver profit-seeking staff takes away from the purpose of education, which is to

drawing out the best in child and human - body, mind and spirit (Seetharamu, 2004, p. 12). Through the provision of education in all forms, the poor become wealthy and the wealthy even more so. This is because education brings people together in a shared vision, one that cares for people. When this happens, profits soar as individuals flock to like-minded ideology (Li, 2010, pp. 243-264). Therefore, I suggest, that a company can exist as a profitable entity while developing an education environment that has a sole purpose towards learning. To do this, I suggest, that businesses, which are looking into providing training departments, must do so by splitting itself into two departments, one focused on the goal of education, while the other is focused on sales and profit.

These two departments should act independently so that there is no interference with the education department's pedagogical credibility. This will result in collaboration that sees both departments gaining a strategic advantage from feeding knowledge into each other. In this exchange of ideas, the education department can develop real-time adjustments to core competency based on industry movement, while the corporation gains benefit from new ideas and innovation from student discussions. Further, the corporation gains access to the next generation of well trained and innovative employees that can be easily placed into the corporation's workforce.

The idea of learning and profit separation is nothing new. Up until the early 17th century, lawyers were trained on the job by observing the Court in action (Stein, 1981, p. 432) while the barrister was focused on client goals in business income. This observed learning environment provided the student with the requisite knowledge to argue before the Court with the appropriate language. At this time, the language was most important, as it was believed that God would tangle the tongue of the guilty, so students were expected to learn through the environment under study.

This separation of departments, where the student was able to learn and not be focused on business profit, allowed the student to develop mastery. This form of action learning engaged students with what really mattered, the care of their client. Further, it allowed the student to gain experience in the ideology of the Court and the law, without the distractions that a focus on finances brings. This type of training was also present for most craftsman skills and physicians through apprenticeship, until the early 19th century when legislation was introduced in England, the United States and New Zealand for formal education to take over (Jacoby, 1991). This form of training is arguably still present in education today through the universities use of internships. Therefore, I argue, that the development of a separate department to develop learning through action inquiry brings individuals back to apprenticeship style learning. Further, the separation of departments allows the credibility of education to be maintained.

With the departments running as separate operations, they are free to develop their core focus of education and profit for the benefit of the entire organisation. Accordingly, this paper includes the development of such a corporate structure in order to test the validity of starting this type of learning organisation. However, to do justice to the data collected a brief discussion is needed of the developed theory that informs the income strategy I have used.

The learning/income approach

I argue that, the separation of learning and profit must be considered in order to provide credibility to the corporate learning environment while maintaining income for operating expenses and shareholders of the profit centred corporation. However, the development of this separation can be a costly exercise if done poorly, and leaders must consider carefully how much money they wish to spend. This is because a virtual world environment can drain substantial resources in servers, bandwidth, development and time. This is less of a concern for the small operator who is likely to use an existing Free MMO game and adapt it, than it is for the multi-layered corporation looking to create a full corporate university to train large numbers with a view to custom problem solving. I have, therefore, undertaken the launch of such an organisation and included an introduction to the strategy I have used.

THE LEARNING DEPARTMENT

When developing the learning department, it is important to maintain focus on the core value of education centred on people. Failure to observe this core value will result in the education department being viewed as a marketing gimmick (Jacoby, 1991) rather than an education institution. To do this, the learning department must focus on the traditional values of education, which have been developed over many decades. These traditional values are built on the foundation that the university is a not-for-profit organisation and a guardian for high standing values like justice, democracy, ethics and freedom (Halachmi, 2011, pp. 39-41). Recent developments towards the university as a commercial seller of knowledge (Halachmi, 2011, pp. 40-46), arguably damages these values and should be considered carefully.

This is not to say that knowledge should not be available for sale as this is a valuable income source (Wilson, 2009, pp. 98-104; Duncan, 2008, pp. 26-29; Bok, 2003, pp. Preface, VII). Nevertheless, the principle focus of the learning department should not be knowledge resale. In this way, the learning department will maintain its credibility while developing a healthy income stream from student fees, selling knowledge and research grants. To do this, the learning department must not focus on what needs to be researched so that people will want it, but to focus on what needs to be researched because it has not been done. No one knows exactly what a generation wants. Nor does anyone understand what knowledge will be needed in the future. Accordingly, focusing on the work and not the flow of income will bring the core value of education home to rest. To do otherwise, my research suggests, will cause failure to produce income altogether due to perceptions of research bias (Wilson, 2009, pp. 98-104; Duncan, 2008, pp. 26-29; Bok, 2003, pp. Preface, VII).

This lead me to focus on research first, then place it on the website for sale and let sales occur when those who want the knowledge were ready. All I had to do was tell them it existed and get on with the next project. However, as I have discussed servers, space and bandwidth all cost money. So how do I fund these needs so that the knowledge can be made available to those who want it?

There are several ways to reduce costs for knowledge delivery, and in my research, I developed a number of methods that may be of some use. Let me begin by explaining the methods employed within the traditional organisational model and how I extended it into the gaming environment.

THE BUSINESS END

I discuss above, the need for organisations to separate learning and profit in order to cultivate credibility. This does not mean, however, that the organisation must be a non-profit entity. As I argue, the organisation can generate a healthy profit, while maintaining credibility. This is achieved through the separation within the organisations structure of the business department, focused on profit, and the learning department, focused on education. In this next section, I explain the business department I developed for my research and how income was generated.

Like all corporations, the business department is focused on supply of products for sale. Its primary aim is the purchase of goods at wholesale from distributors for retail resale within a storefront to the consumer/end customer to generate profit via cash flow. Accordingly, when I designed this department it was important to focus on my existing strengths rather than develop a completely new skill set that would take more time to market than the paper allowed. As I had been a computer engineer for over 20 years, it made sense to design this department to sell computer products and technology services. With careful planning and automation, the department was developed to resell services and hardware from leading manufacturers through the US, UK, and Asia pacific regions. The principle idea was not to spend money on large infrastructure and staff but to put sellers in touch with buyers using my gaming community network. In this way, the suppliers with the infrastructure simply shipped directly to the customer under my banner after the purchaser had completed the sale through my automated website. I then took the profit of the top moved on to the next sale. This simple structure allows for low cost operation without large capital investment.

Unsurprisingly, this approach is not new. Wholesale suppliers already do this when supplying the retail store where a customer makes their purchase. The retailer orders from the wholesaler, who in turn orders from the distributor, who ships to the wholesaler, who then ships to the retailer, who delivers to the customer. All I have done is cut out the shipping and warehousing costs by ordering through the distributor and having it shipped directly from the distributor to the customer. This is the same type of model used by Amazon.com, except that they use retailers and take a sales commission. However, my model also has an additional number of elements. First, it also allows the community to sell to itself, and second it allows competitors to sell through my automated systems. Let me deal with the second element first.

The idea of allowing competitors to join into the supply chain, instead of cutting them out, was to connect with my business' core value of looking after people. By allowing, competitors to sell on the network, income can be created for everyone to be able to feed their families and pay their bills. While this does not return high profit quickly, it does return profit, which quickly mounts up as relationships are formed through customer loyalty, and prices are reduced through volume. The second element is to allow community members to sell goods, which places members in the driving seat of supply. This approach allows members to use their skill sets, which may or may not be recognised in their jobs, to fulfil a need. This system of supply works because users are able to see a need then spring up to fill it (Li, 2010, p. 144). However, it is also true that buyers can feel fragmented by this experience (Li, 2010, pp. 144-146), which is why I implemented a coordinated structure.

The coordinated structure is built on the principle of centralised communication and control. By allowing sellers to supply through the website they act in the same way as the wholesaler supplying the organisation. This way the customer deals only with the organisation for payment and the organisation act as the retailer to the customer. Everything must come through the organisation so that buyers and suppliers do not get lost in procedures, legal issues, importation, shipping and so on, that they may not yet have learnt or fully understand. Any issues, complaints or delivery tracking is all handled by the organisation who communicates fully with the client at every step. In this way, the organisation is seen to earn its profit and develops credibility and trust with clients.

In this next part, I will expand on how the learning department operates and how it makes its income.

THE LEARNING END

Developing the learning department was no easy task. First, I had to consider how the games could be used for learning without being drawn into profit arguments. Second, I had to develop an income stream that was not focused on traditional profit motives, but could generate sustainability without too much of a resource drain. As the learning department was centred on games, it made sense to look at how current developers were generating income and the pitfalls that they had encountered and how this could be adapted to this model.

Most online games derived income from either, a sale then a subscription system or purchasable virtual items within the game itself. Some developers had gone as far as combining both systems, but player feedback did not seem to give this much support. When asked, many of the research subjects discussed how they had full time work or study, which inhibited their ability to play a game regularly. This resulted in dissatisfaction with a subscription game model as players felt they were not getting value for their money through their inability to get time to play enough to take advantage of the subscription.

Therefore, creating value for money was seen as an important consideration for players when choosing the game they would play regularly. Players also expressed, that they would rather pay a larger one-off sum to get a lifetime subscription rather than be forced to pay month by month. At the time of writing this paper, Star Wars online, developed by EA, continually required players to take reoccurring subscriptions. This has resulted in many players, even high-income ones, turn away from the game. Many, who play a number of MMO games to stay close to community friends, have expressed their annoyance at the restrictive nature of the subscription models preferring free to play models instead. In one situation, the player advised me that if he continued to subscribe to all the MMO's his friends were in, he would be paying $250 USD per month in reoccurring subscriptions. This, for him, was untenable with the free time he had available to play. He stated, that he preferred playing free to play games and supporting the developers though the in-game store. This, he said, allowed him to get items he wanted that had tangible ownership and felt like value for his money.

Further, they stated that even if they could not play for a while, this tangible purchase of a virtual item gave them a feeling that their money was well spent, as the virtual item was waiting for them when they could return. Others, who worked overseas due to military employment, felt the same as the virtual good was better than a subscription that was going to waste though an inability to play.

These players also agreed with lifetime subscription systems, as they were happy to support the start of a company. They also advised that they would still buy items in game as well as they liked having the toys to play with.

Some game developers have chosen a partial free to play model where players are encouraged to play until a certain level whereby they then have to pay a subscription to continue with their characters. This limited free to play assumes that players will become hooked by the environment and purchase subscriptions. These developers are convinced that players will pay, which players see as nothing more than their own egotistical focus on how good the game is. In my research, these companies simply believe their own press, as players have made it clear that they refuse to pay subscriptions when there are so many other subscription-free games to choose. Players have further stated that they would rather play to the character limit introduced, then drop the game rather than pay a monthly subscriber fee. Whereas, in fully free to play environments, players have returned over and over again recording thousands of hours of in game time. My conclusion to this is that players are not duped by the marketing enticement of the developer and that this partial free to play model is doomed to failure.

In stark contrast is the fully free to play MMO. This MMO does not charge an initial upfront fee or a subscription, preferring instead to focus solely on income from the in game store. This model has proven to be effective in generating substantial sums for companies such as Perfect World Entertainment and Wargamming.net. However, as Perfect World Entertainment discovered, even this can prove to be a minefield if generating income becomes the games sole focus as the following example shows.

Earlier this year, Perfect World Entertainment ("PWE") purchased Cryptic Studios, developers of Startrek online. Following the success of the Cryptic store PWE decided to introduce lock boxes that required the purchasing of keys from the online store to unlock them. The developers advertised the lockboxes as valuable commodities that could provide players new ships and gear. What they did not tell players was that this was only a chance to obtain the item in a form of a lock box lottery. Further, players were not told that the chance for success was one in 10,000. After several people spent $500 USD on lockboxes to gain the ship advertised, many players stopped purchasing from the game store altogether in protest. However, this did not deter the company as they had generated a substantial sum, estimated at around half a million dollars in just a few months. PWE, seeing the dollar signs, began to roll out lock boxes every few months, which resulted in a number of players writing to CBS, the copyright holders, in protest (Udon, 2012; Mavgeek, 2012). Furthermore, the revenue produced began to become a concern to legislators as much of the money was generated through gambling minors. This saw the purchase of Zen, the in game currency, banned in Europe and flocks of parents cancelling subscriptions.

This does not mean, however, that virtual stores can only generate income from PWE's model. Many free to play MMO's generate substantial income from online stores such as World of Tanks, Command and Conquer online, Age of Conan, DC universe Online, The Lord of the Rings online and many more, showing that the virtual goods store is viable for making income. In fact, the online virtual goods market is expected to generate 2.9 Billion US dollars in 2012 alone (Inside Virtual Goods report, 2011, cited by Eldon, 2011). Accordingly, income streams can be easily generated from virtual goods in the gaming world leaving little need for subscription-based models.

This teaches me that the learning department can generate income from the commodity it holds dear, knowledge. Why, because knowledge is a virtual good. Kindle, eBooks and other written documents, are all-electronic in nature and are easily converted into virtual goods. In fact, we do this now by adding them to databases and repositories that students and professionals pay access fees to obtain. However, as this shows, this also creates a risk of returning the education to a profit centred focus.

Accordingly, the only way to maintain the education departments focus on pure education is to separate its income streams by making someone else responsible for it. As I have proposed, the learning department and business must be conducted independently of one another to maintain education credibility. To do this I suggest that the learning department must become nothing more than a supplier of its knowledge goods to the business department. The relationship must be one of pure supply with no input from the business department as to what is to be created.

The business arm, provides the space to hold the goods for delivery and takes an equitable right in such goods to maintain a exclusive contractual relationship at no cost to the learning department. When an item is sold, the business arm receives a commission on each sale, which provides compensation for the space. This creates a business relationship between the learning department and business department similar to that of the traditional relationship between writers and publishers. However, an additional bonus is provided to the business through the use of the virtual space developed for the learning department. Here, the business arm can also supply virtual goods such as advertising space, gift cards, greetings, costumes, weapons, upgrades and other virtual goods through the virtual learning environment. This creates enough income generation to sustain the business and support the virtual learning space.

Above I have suggested ways in which virtual space can be used to provide income to the business department while maintaining purity of the education department's focus. In this next section, I will discuss how the data was collected to validate the organisational structure, engagement of action learning, and the learning equation for use in the gaming environment.

Data Collection and Coding

Now I will discuss how I collected the data, with the above structures and strategies, to test the viability of using gaming for learning and sustaining the business.

To collect the data, each day involved six to twelve hours of interaction within the game world under study. Each involvement allowed me to build relationships and develop teams to gain understanding of how to approach, code and collect the required data. Following this, I began to engage with the community members so that the research teams could be created as follows. Each team consisted of eight people chosen at random from that days participants, who were part of the seven hundred community members. The need for large random samples in observational study is to prevent over representation of a select class of individual (Bryman & Bell, 2003, p. 94 & 182). Further, the time of day played was varied over the eight months between 9 am NZST and 6 am NZST so that a greater group of people could be sampled from the different time zones within the gaming community to prevent mismatched results due to player fatigue (p. 182). All participants were informed of what

their participation involved and how the data would be used. Further, each participant signed a policy waiver and ethical notice, which they read upon signing into the community website.

Further, as the business model had at its heart the core value of caring for people, I instigated a further requirement for participants. This was that study group members had to assent to the rule that schoolwork, family and work came first. This actually resulted in a heightened sense of respect for the study being undertaken through the realisation that the players and their families were valued. On rare occasions, this resulted in some minor substitutions, but played no significant role in the results. I believe that the respect that they were given played a significant role in study members not dropping out of the research. This, I suggest, is because they felt valued as members of the community, which produced within participants a sense of obligation to help see the study through so that I was not left wanting for data. This was confirmed through comments made to me by members during the debriefing session at the conclusion of the data collection phase. I therefore, highly recommend this approach for this type of study.

Once they had agreed, the tests began and were conducted every second game day to take advantage of relationship building on the alternate day. On the testing days, data was collected for analysis through the instigation of team activities. The team activity would consist of a predefined game mission, chosen at random from one of the games listed above. I would then add the goal I intended to be observed and informed players upon their login to the game. In the beginning, the goal was derived from the mission objective already programmed into the games set missions.

As the group under study took charge to solve the mission, data was collected and coded based on their interactions. The first of these codes was recorded as L1, which was correlated from the specific learning obtained from completing the goal. In addition, it included a subset of data that derived from the specific learning that took place between the teams when they tried to achieve it. These were developed from notes made on members who were able to understand how they had worked out the problem, coded as L2, and individuals who had used that knowledge to extend the team learning, coded as L3.

Sometimes, I would make an effort to advertise specific missions with advanced notice via the community site. This was usually due to the complication of the mission chosen or due to the developers releasing a new mission in game that would make a great test. Where this occurred, often a frenzy of discussion on the community site would begin and develop into hypotheses of how to achieve the goal based on previous interactions on similar missions. Where this happened, the data was collected and coded as P1, as it introduced past programmed knowledge into the learning equation. As each learning activity unfolded, specific note was taken when people engaged in action inquiry. This was coded as AIN1 and when an individual took charge as a leader for the solving of the problem, the interaction was coded as lS1. Further, if a problem caused frustration to which the leader found resolution, this was coded as AF1 and where the challenge became frustrating and difficult to the point where the leader suspended the game for community reflection, this was coded as R1. These steps are expressed graphically in figure 1. If the mentor or coach, in this case myself, had to become involved to provide guidance in resolving the frustration, this interaction was coded as C1.

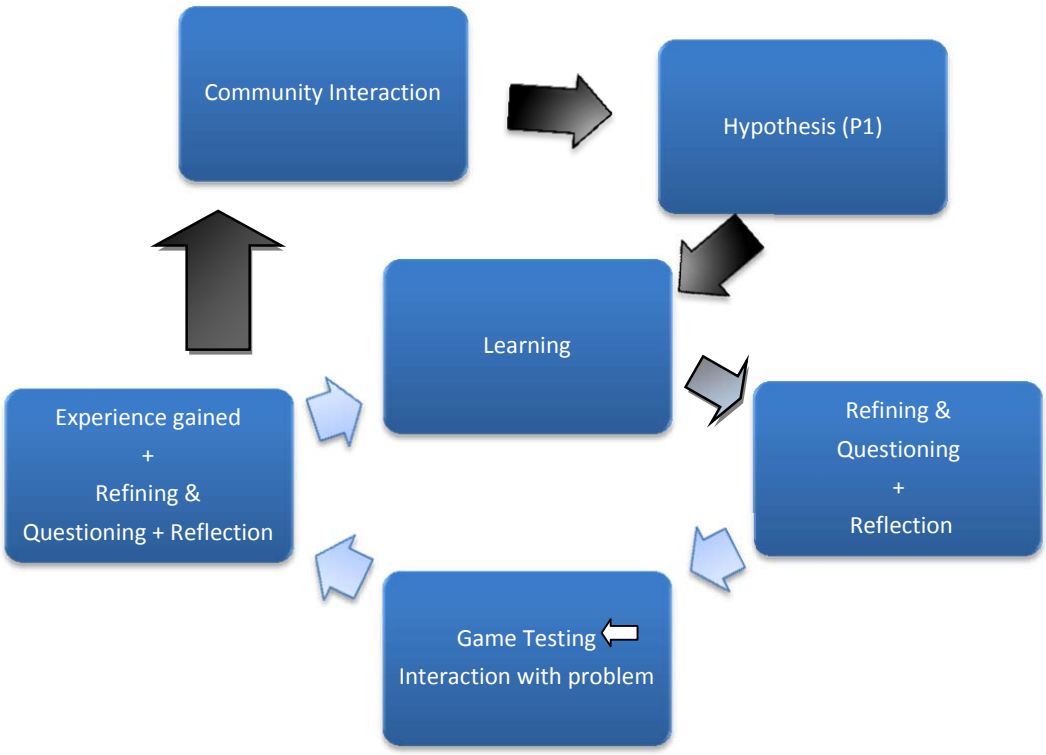

Figure 1.

The study was conducted over a period of eight months, and involved a total of 1,416 hours of scheduled game play. In reality, my own gaming enjoyment took over and the hours came closer to 1,888 hours of play, around 8 hours per day. Obviously some days where heavier on the hours than others, but these are the averages for the eight months. This was because of the community atmosphere, which had been created through the website discussed above, which encouraged pleasurable interaction with members. The community spirit was further heightened by Voice over IP technology, which all members of the study group were required to have. This allowed for real-time interaction and communication over internet bandwidth.

During data collection, each game started with players being placed into the appropriate teams and advised on their objective. Leaders' were not chosen at this point. Instead, I allowed the leader to evolve based on their own recognition of their abilities to handle the evolving situation. This form of empowerment provided players with an ability to lead or follow depending on their knowledge strengths at the time. In addition, this gave the freedom for the leadership role to change during the problem and allowed others to take the leadership as necessary for each stage of the inquiry. Kouzes and Pozner, (2007) describe this, as encouraging people to act through empowerment to lead themselves (pp. 41-50 & 190). When a leader evolved this was noted and coded as LSR1, and when the leader was switched this was noted as LSS1. To prevent false positives in LSR1, LSR2 was used to code the rise of the new leader and when the leadership switched back to the original leader, it was recorded as LSRS1.

The importance of following the leadership transition is to provide insight into how players developed skills for social interaction. This plays a significant role in how they approach discussions within the community. Indeed, I hypothesised that those who interacted within the gaming environment as role switching leaders and followers would be better able to discuss problem-solving techniques and engage in actual solution creation on the community space. To test the hypothesis, I started with the creation of base line data using problem solving techniques developed by Adams, (2007). The individual's current ability to solve problems was recorded and they were then introduced to the gaming interactions discussed above. The individual's results were recorded and coded as RS1 and compared to those who had not interacted within the community game days who were recorded as NRS1. Further, where multiple individuals had engaged in trying to solve the problem, either through role switching of leaders within the game, or discussion leaders on the community site, the results were recorded for comparison.

Players continually interacted with the learning equation at each stage of interaction with the community and game space, using the process outlined in figure 1. Moreover, during the reflection stages of the learning equation, players were encouraged to provide feedback on what they had learnt and how they had understood each step of the learning equation. This provided players with knowledge of how to engage the learning equation and how learning was achieved in action inquiry - arguably, the learning how to learn phase. The results were noted as LEQ and the activity re-engaged with adjustments according to what was learnt. Bingfang, (2001) explains, that this is the essence of the action inquiry approach; achieved knowledge developed from the learning equation is taken into new action, and the learning process is re-engaged (pp. 186-187).

The result provided new understanding for players in how to approach the problem. In addition, players came to understand how to reduce frustration by learning the limitations of the pre programmed gaming world and how to overcome it. In the next section, I will discuss the results of my study, and what this may mean for adult learners and future business.

RESULTS

So far, I have discussed the theories, strategies and methodologies that inform this paper. Now it is time for me to discuss my findings from the observations of players within the test environment. I will start with the community engagement and move systematically through each learning environment and end with assessing the significance the results have for learning.

Limitations

Before I begin, it is important to understand that a number of constraints where present in the undertaking of this research. Most of these constraints existed due to limited time and paper requirements. For example, it was not possible to generate a virtual world to test directly what players could achieve if the world was custom designed around the problem. Despite this, however, I believe the results show the viability of the learning equation and action research and suggest that such research be conducted in the near future.

Further, the results have not been extended for the addition of a learning department onto an existing business. While I have made some statements about this being possible, it is not yet tested as this environment was developed on a new business created primarily for this research. Therefore, I suggest that adding a learning department on the principles discussed above, is research that should be considered by future researchers.

A further limitation, concerning the general application of the results, is that most participants within the gaming community were based in the United States. While some players came from Canada, Germany, Australia, New Zealand and the United Kingdom, the study does not include cultural differences beyond these limitations. In addition, while this did not pose a great threat to the business results discussed within this paper, the business was designed to engage with these markets and results may differ slightly in other locations due to differing cultural backgrounds of reality. I suspect, however, that these differences will be minor due to the globalisation that is occurring worldwide and the convergence of gamers around gaming cultures.

With this understanding of the papers limitations, I will now discuss the results for each arm of the research project. Let me begin with the gaming world itself and work towards the effects of community involvement.

Gaming the Learning World

As I have discussed, the world of online gaming provides an open-ended environment for the engagement of learning. Moreover, despite the limitations of this paper, the research shows considerable improvement in players reasoning as they progress through the learning equation, reproduced here for convenience.

> **L**earning = (**P**rogramming ⊦ informed by Background knowledge + (**Q**uestioning looped until requisite understanding of the problem is achieved$_{n}$ ⊦ informed by **G**eneral **P**roblem **S**olving **H**euristic) + **R**eflection looped until and requisite goal is achieved$_{n}$ / **G**iven **t**ime to **C**omplete) + **E**xperience gained from putting into action.

$$L = ((P \vdash BK + Q_n \vdash GPSH + R_n) / GtC) + E.$$

When players entered into the gaming environment, they were provided with explanations and given an understanding of the goal requirement for the days play. In each scenario players were given a task to complete and their interactions were observed. As each player began the task they were first asked to undertake the scenario alone. This was to help with base line development to see how difficult the problem was, how long it should take to complete, and what personal learning would be gathered. I also undertook the mission privately in my off hours so that I could compare the results against my own understanding of the challenge. My understanding was then compared to developer notes from the developer logs on the given games website, to see what difficult level they had set for challenge. The following are the results on the individual tests as compared with problem solving base line.

Individual results

To begin the collection of the individual base line players were asked to complete the problem solving tasks discussed in the methodology section. This was then stored for later comparison and collation with the later results. Players began by loading into the environment and engaging with the problem mission. As the players progressed along the given task individually, they were asked to note at what stage they were along the learning equation. If they were drawing on experiences from past games or past problems of a similar type, they were instructed to circle P. Once they engaged with the problem itself, they were instructed to circle Q and as they progressed into solving the problem, they were instructed to circle Q_n ⊦ GPSH. Each time they had to engage with the problem, through failure or at each step, they were asked to add a number forming n of the Q_n exponent in the learning equation. This was then compared with the base line from my own interaction with the problem.

At each stage of inquiry with Q, players were asked to reflect on what was learned and to devise a better way to solve the problem. This formed R of the learning equation and players were instructed to try out their new hypothesis. This looped players back into P ⊦ BK + Q_n ⊦ GPSH + R_n of the learning equation and helped in the development of more proactive problem solving heuristics. This process is represented graphically in figure 2.

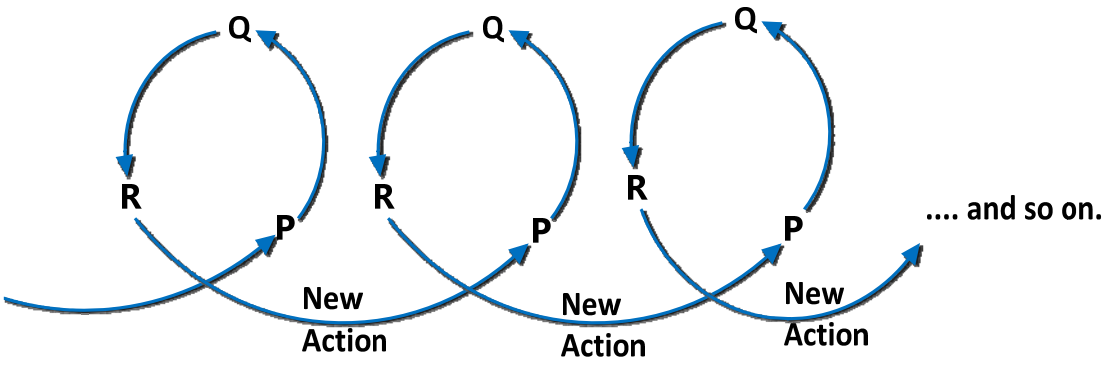

Figure 2.

As each new action was implemented, the experience gained feeds into the background knowledge that attaches to P of Ravens' (1980) action learning formula. The resulting action inquiry loop develops into the next hypothesis, which is then executed as the next round of action. This confirms the action inquiry approach suggested by Bingfang (2001) at page 186. Further, the experience quotient enhances the cognitive understanding of the problem. This in turn feeds the general problem solving heuristic to identify and break the problem down into bite size steps (Willingham, 2007, pp. 374-376). These steps are developed through the question portion of the action learning loop until a general hypothesis is formed through reflection on the problem. This new hypothesis is then turned into action and the whole cycle begins again until the problem is solved. This is expressed graphically in figure 3.

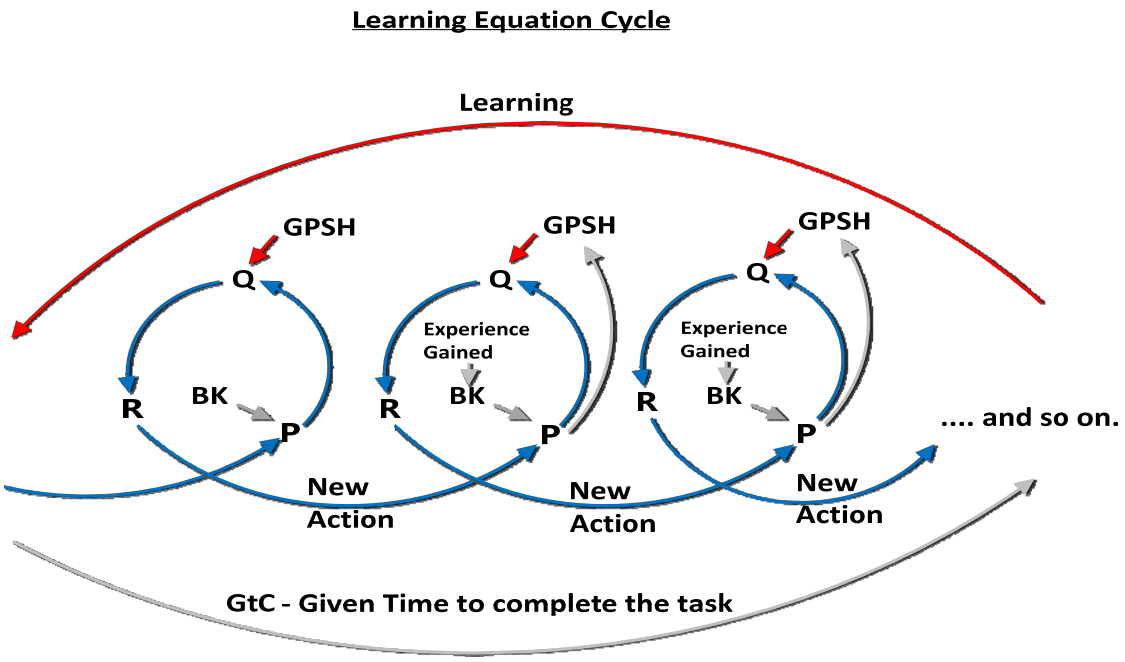

Figure 3.

However, players did not fare as well on their own as when interacting with the community. Following, discussions with players it was decided that this was due to the lack of discussion that tested assumptions about the activity. In the self-orientated exercise, players only had their own past experiences to draw from. In some cases, this was limited to only one type of MMO. The lack of background knowledge created a vacuum of programming that left the individual having to repeat the scenario several times to gain understanding of what was expected. This produced some frustration from repetition that slowed and stunted learning growth.

Further, the learning from the specific goal became less important to players as frustration set in. This frustration was caused by poor communication of clues that were indecipherable within the time given by the programmers to complete the puzzle. Players advised that the developers had made assumptions that the players knew what the programmers were talking about, and left great holes in steps that were required before the puzzles solution would become clear. This ultimately provided little to no learning growth, as shown in figure 4. The results show the importance of providing enough time to solve the problem based on the standard of communication of clues or the need for greater development of background knowledge around the type of problem faced.

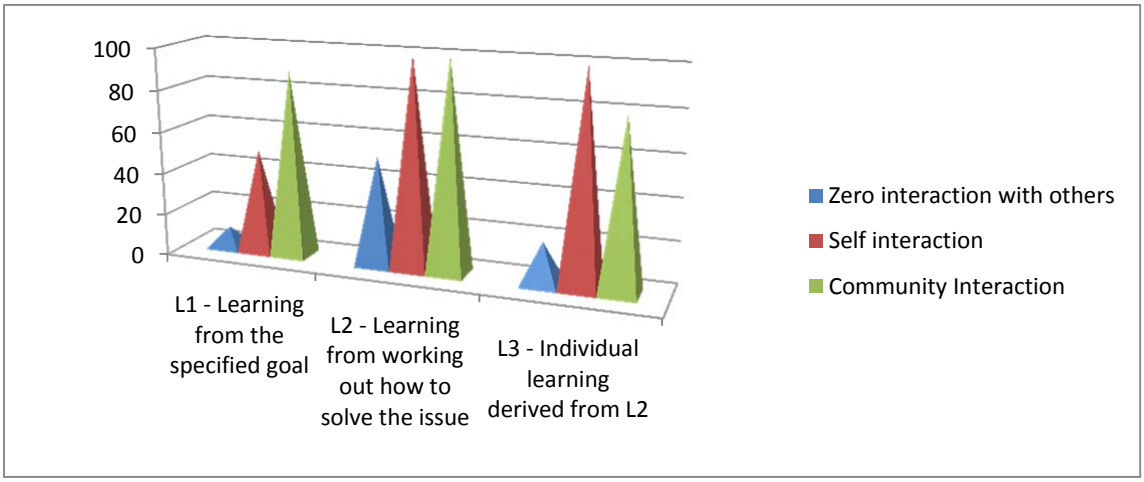

Figure 4.

In contrast, however, the difficulty faced in solving the problem without community interaction did spark greater learning of how to use the general problem solving heuristic (GPSH). As figure 7 illustrates, an individual player's problem solving ability was increased by 40% above the base line test after interacting with the game's puzzle. This significant increase in GPSH learning suggests, even if gamers do not interact with a community, problems encountered each day will be more manageable due to cognitive increases in GPSH schemas. To validate this, I asked players to read the community discussion, but did not interact with them by asking questions on new problem provided for test. In this way, I would be able to test if the community engagement made any greater increase on GPSH than direct game interaction. This test was coded as self-interaction.

In the self-interaction phase, players reviewed community discussion within the gaming forums then proceeded to interact with the predetermined puzzle. This interaction is illustrated in figure 5 below and noted as path 1. At this time, players were not allowed to engage in questions of how the puzzle was formed or how it was solved. In this way, players only became aware of issues or theories that other players had taken to try to solve the problem faced. Players where then free to engage the learning equation to develop their own hypothesis for resolution. This is illustrated under the heading *Testing community and self generated hypothesis* in figure 5.

Learning Equation Cycle

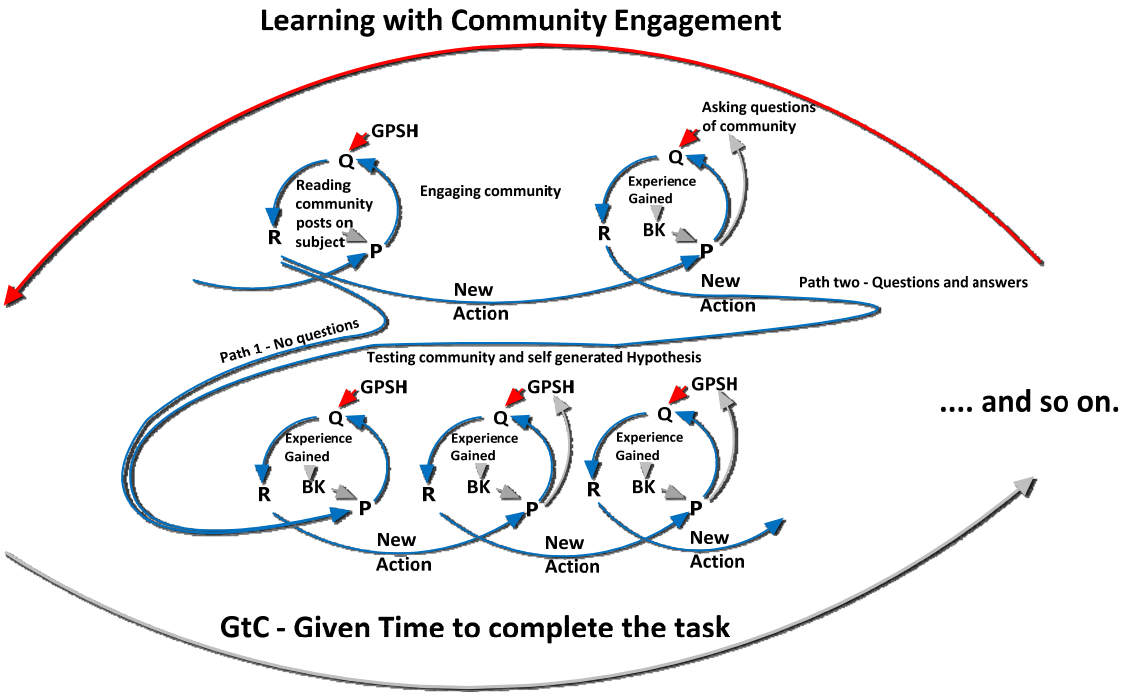

Figure 5.

As the results in figure 4 show, when players act on their hypothesis their learning towards the problem increased. This action learning from the community space provided a 40% increase in learning from the problem itself, compared to not interacting with the community at all, which only provided moderate learning. Further, both L2 and L3 learning saw an increase of over 50%. When debriefed, players felt that they had a greater understanding of how to approach the problem due to the way others had approached it. Further, they felt that they were able to break the issue down into smaller steps, due to the understanding of how others had engaged with the problem space. Torbert, et al. (2004) suggests, that this is due to the breakdown of predefined assumptions that action inquiry allows to become visible (pp. 148-175). Further, players become exposed to their own and others actions, that highlight potential mistakes and wrong turns (p. 150).

The community interaction provided insight into the players own construct assumptions based on present interpretations of the universe around them. This insight allowed the player to review and adjust these assumptions by subjecting them to revision or replacement. Zuber-Skeritt (2001) suggests that this is due to how people understand themselves and their environment. Further, he argues that this understanding allows individuals to anticipate future events by constructing tentative models or personal theories based upon these events (p. 7). This view is shared by many researchers in cognitive science (Kukla, 2000; Stewart, 2008; Samovar, Porter, McDaniel, & Roy, 2012) and is confirmed in my findings from the action learning process shown in figure 5.

In addition, my research indicates that these assumptions become much more flexible when exposed to action learning. As shown in figure 4, both self interaction from community engagement, L2, and full community immersion, L3, provided substantial increase in learning. While figure 6 indicates that a players personal assumptions where broken down only after interacting in the community environment. As can be seen, players believed they were open books and ready to change any beliefs they may have, yet when tested, these players held fast to their assumptions until challenged by community members. Moreover, when action inquiry theories where thrown into the mix, players began to drop assumptions more quickly due to the interaction of community members to fully engage with the problem.

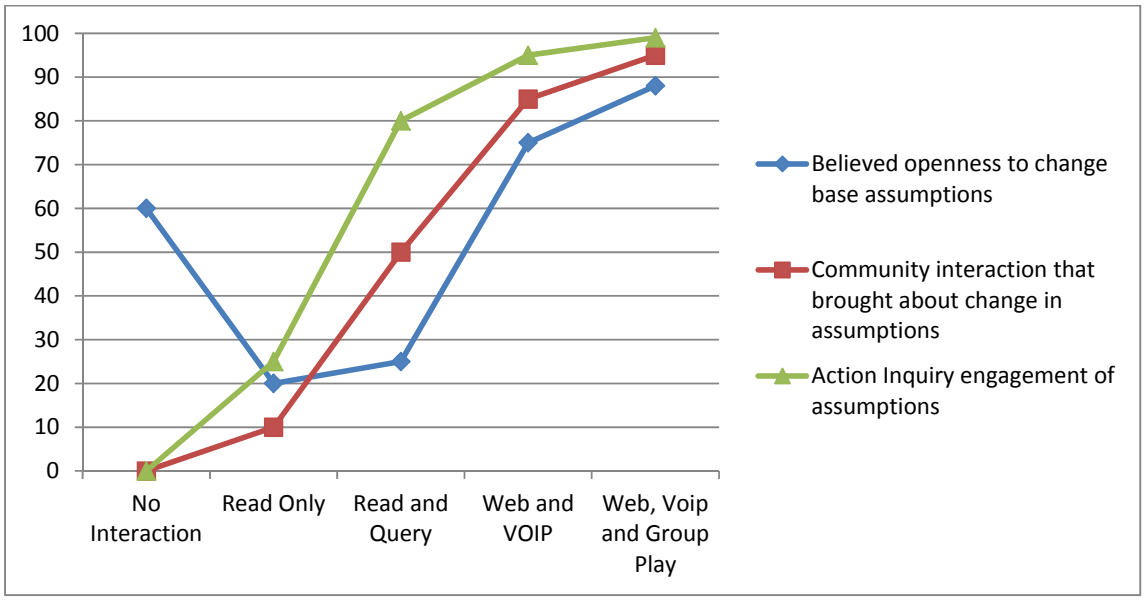

Figure 6.

This is arguably because of the dynamics of the group-learning environment where peers help through active listening and questioning to bring the individual closer to understanding the problem faced (Marquardt, Leonard, Freedman, & Hill, Fundamentals of Action Learning and How it Works, 2009).

As figure 7 indicates, players who were engaged with action learning within the community developed on average 10% or more problem solving schemas when the action learning included game interaction than with traditional action learning strategy. I suggest this is due to the role-play characteristics of the gaming environment. In role-play, logic is redefined by interaction with others. Assumptions that we make on assumed logical paths (Willingham, 2007, pp. 358-361), break down when subjected to questioning and discussion within the action inquiry space. This is because action inquiry forces us to face the realities of the individualist action-logic that we have adopted through society and education that is used to exert power (Torbert, et al., 2004, pp. 91-103). In facing these action-logics (roughly equivalent to schema), individuals become aware of the comfort zones they cling to (Passfield, 2001, p. 35) and begin to develop confidence to step out. This development occurs because of the dynamic relationship the community provides in supportive challenge, relationship

building and group awareness (Passfield, 2001, p. 35) which is enhanced in the open safe environment that gaming provides. Players feel a sense of freedom to challenge themselves knowing that the consequences in game provide no permanent loss. With guidance, this confidence can then be translated into the ability for individuals to challenge themselves in the real world.

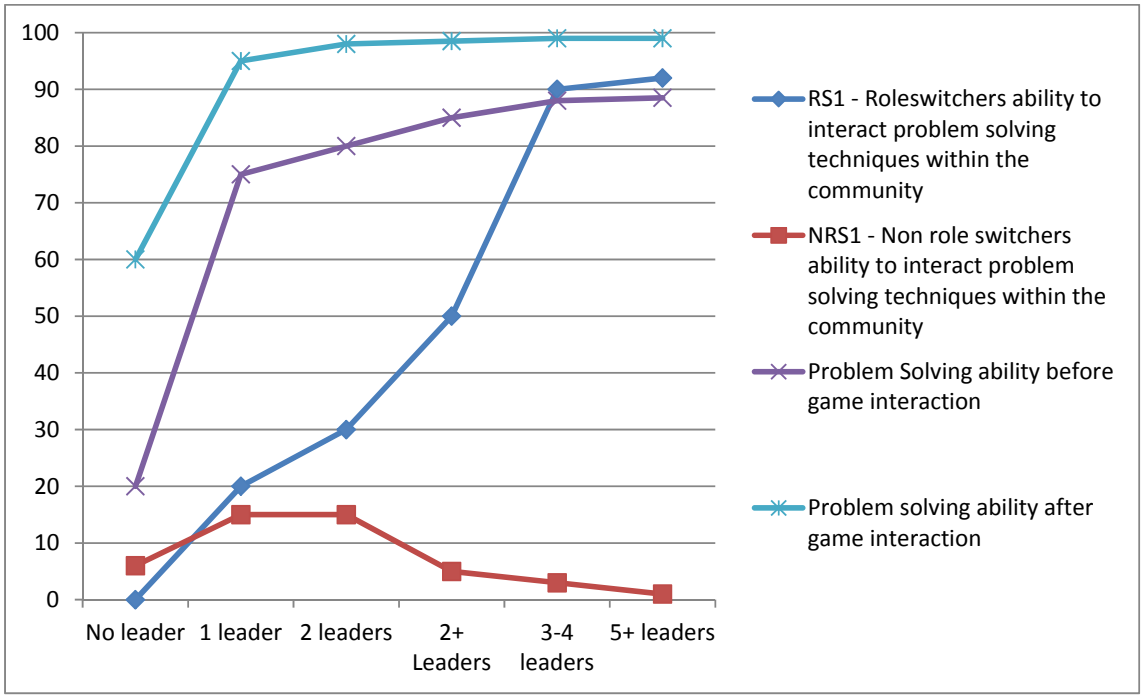

Figure 7.

This confidence is further increased through an understanding of how the problem was tackled. While action learning and action inquiry do not directly submit the learning equation to the individual, the community interaction provides individuals with a greater understanding of how problems are reasoned - the learning how to learn within the action learning environment.

Zichermann and Cunningham (2011) argue that, playing games produces dopamine levels in the brain that makes an individual want to play (Zichermann & Cunningham, Gamification by Design: Implementing game mechanics in web and mobile apps (Kindle Edition), 2011, p. 476). My data suggests that, dopamine is increased further by social interaction and the engagement of action learning. This is confirmed by players repeatedly and regularly returning to play in my community environment and their reported comments of how much fun it is. Further, players exhibit greater recall of information after one week than experts and novices studied in cognitive problem solving experiments (Willingham, 2007, pp. 398-399). This gives players distinct advantages over standard cognitive engagement with GPSH, as their background knowledge is searched and compared with schema at much faster rates. The result is greater engagement with the world around them, an ability to multitask, greater observation skills and faster object recognition. In cognitive science, this is argued as a prerequisite for being good at solving problems. This is because the prominent role for working memory in problem solving is the ability to use operators simultaneously to move through the problem space (Willingham, 2007, p. 404).

When players were subjected to the gaming environment through community interaction and engagement of my extended action learning equation, players exhibited 100% learning engagement. Further, the community members engaged in the interaction discussed above, also exhibited 100% learning engagement as shown in figure 8.

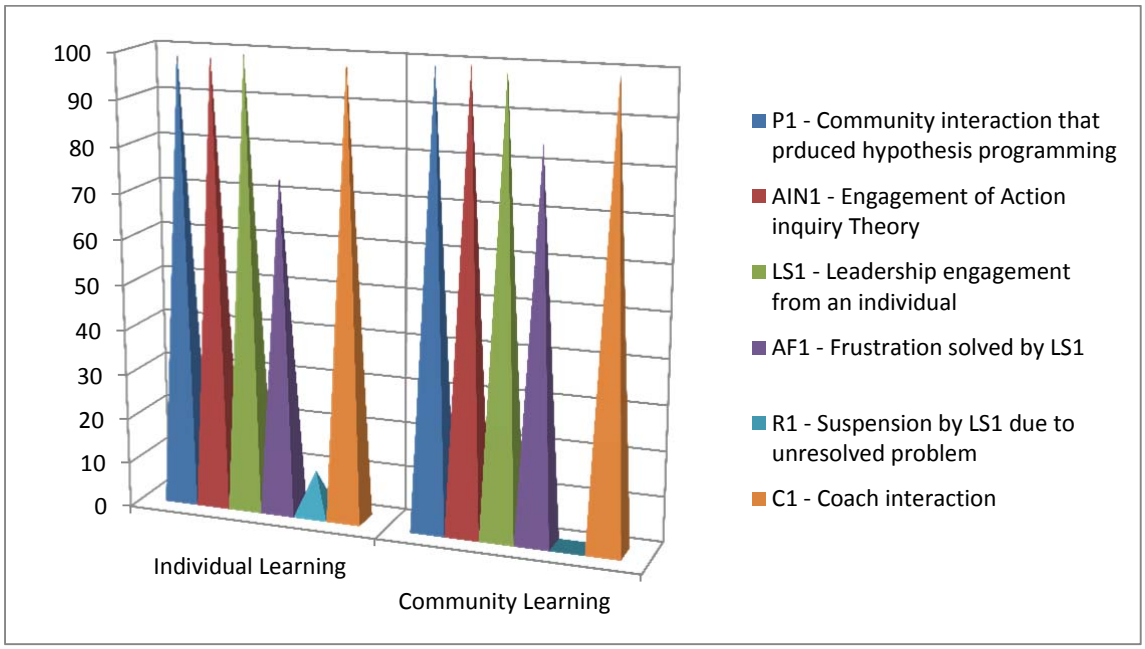

Figure 8.

This results from reflection of the community when discussing the problem that raises awareness and understanding of both the process and the problem (Passfield, 2001, p. 41). As figure 8 shows, the result for learning engagement is the same regardless of whether a single leader, coach or multiple leaders guide the interaction. What is important, however, is that the community must communicate honestly and clearly. Failure to do this, results in frustration that reduces learning engagement.

The community engagement with the learning equation gave rise to the birth of natural leaders. These leaders rose up to help the group in game when problems arose and returned to following when players engaged with solving the problem did not need additional guidance. This leader to follower and follower to leader rotation helped players to generate confidence in their ability to solve the equation. It also helped to reduce the possibility of frustration as the leaders engaged in time out reflection to reduce the problem into easily manageable steps without losing sight of the system it dwells within, as shown in path two of figure 5.

Interestingly, as players wrestled with each step of the problem, leadership was sometimes different with each new action. This resulted in role switching players (RS1) being better able to communicate how to approach the problem and give guidance to problem solving than non-role switching players (NRS1). This is illustrated in figure 7.

This multi contribution leadership allows for greater creativity and draws on the combined cognitive reasoning and knowledge of the whole community (Amabile & Khaire, 2008; Torbert, et al., 2004, pp. 172-173; Marquardt, Building the Learning Organisation, 1996, p. 35). Further, as the community learned together, they exhibited greater propensity for clear communication through open engagement of things they found offensive, personal and in game difficulties they were having, and engagement with conflict that was resolved through a focus on the issue not a personal attack on the individual. The result is combined learning, closer relationships and integrity that results in the whole community growing closer together and forming unbreakable trust through personal sharing.

In short, player gaming experiences with community interaction provided a significant increase in their ability to problem solve GSPH, willingness to change assumptions, and learning how to learn. Further, players developed leadership skills that had previously been dormant as well as an ability to communicate their findings to help other community members. In the next section, I will discuss the how this has helped the learning department developed for this research.

Benefits for organisations

In the gaming process described above, the development of interpersonal learning skills helps individuals to gain confidence and increases problem solving skills. Engagement with the learning equation also opens the way for individuals to understand the process and increase cognitive skills and memory. In this next section, I will discuss how this benefits organisations regardless of the existence of a learning department.

As discussed in my earlier unpublished work, *Gaming Change: Lessons for Leadership through an appreciative inquiry and action learning approach* (2012), (submitted to the University of Waikato as part of the Masters program), gaming environments provide a resource for leadership development. They provide an area where teams can be harmonised regardless of their geographical dislocation. In the MMO environment, twists and turns combined with engagement of the learning equation open individuals to work together as communities rather than goal seeking independent individuals. This community approach helps to stimulate systems thinking, which allows holes to become visible and interrelationships to be seen.

Once seen, these interrelationships begin to emphasise patterns for change that organisations can easily tap into (Marquardt, Building the Learning Organisation, 1996, p. 43). Leaders can then engage with change by introducing the idea into the community formed around gaming who will engage with the idea working out pitfalls and tensions. Once this is complete, the organisation can follow the refined action plan for implementation with little or no encountered resistance. This is because the introduction of the idea was filtered through the safe environment of the gaming world. Players will have been able to discuss the issues and air any grievances in the confines of the gaming environment before the organisation actually starts implementation. Problems and resistance are dealt with at this level, which allows the organisation to adjust its implementation plans, or scrap the idea, before expense investments are made and/or ill will is caused.

In this way, a shared vision for the organisation can be fostered and created that allows the organisation to become closer to its employees, customers and suppliers who want to learn and grow with it (Marquardt, Building the Learning Organisation, 1996, p. 46). This interaction in turn, develops greater partnerships and involves everyone in learning for success.

Learning for success is nothing new, research conducted in the late 20th century showed that organisations that valued teamwork and inter-business coordination were more likely to turn personal learning into corporate learning than organisations that valued individual contribution (Hamel, 1991, and West & Myer, 1997, cited in Belasen, 2000, p. 295). Further, companies that allowed employees to take command of their careers and contributions to the organisation found that transformation and change came a lot easier than those organizations that did not (p. 295). Therefore, I suggest, that to allow employees to engage in game learning enhances their ability to take control over their work lives and gain learning skills that ultimately translates into organisational learning as shown in figure 8.

In addition, organisations benefit from individual development of leadership skills such as storytelling, which allows leaders to frame events to help followers understand the world themselves, as well as to identify or solve problems (Harvey cited in Hackman & Johnson, 2009). This storytelling allowed for clearer communication within the community space that flowed into feedback and learning for the entire community. Further, by narrating the story within the website, players were able to return, reflect and add comments for greater improvement in what Hackman and Johnson (2009) describe as after-action review (p. 25). The result is a community that cultivates the culture of trust and openness, that is to say one that plays together and learns together in the process.

Another aspect that develops within the community through the engagement of learning is the community's ability to adapt to new technologies and situations. This is fostered through the learning cycle as individuals and the community engaging with the learning equation. Organisations engaged in action learning gain the benefit of insight, innovation and staff who change quickly with the movements of the market. The ability for staff to adapt saves the organisation investment in training and develops staff confidence in the company's ability to succeed (Hackman & Johnson, 2009, p. 249). This is what gaming action produces for the organisation with minimum investment. In fact, if done correctly, the environment generates its own self-sustaining income that reinforces the company's survivability.

To test the validity of this statement, I engaged four technology companies in a side study to see how profits were developed from community interactive spaces. Business one had Facebook and twitter pages which they used regularly to communicate with customers. Business two had only a Facebook page while business three had no community space at all, or at least none being actively used. These businesses provided two monthly reports on their income streams for comparison with the business developed for this research, Adonis Technology. Each business provided a detailed report of the interactions taken with the community spaces chosen and any profit increases gained in the normal course of business, which was then compared with the same interactions within the community space developed for this paper.

As figure 9 shows, each business had moderate increases in profits over their normal yearly takings for the 2012 year sampled. However, those using community space sites had a greater profit increase than the business who did not engage with customers outside their normal routine. In the test I hypothesised that Adonis Technology would have a moderate increase of around ten too fifteen percent as it was a new player and had to build credibility within the community. What was visible, however, confirmed that the community space developed around learning in the game environment gave greater credibility at a much faster space. This is because the gaming community space brings business leaders onto an equal playing field with customers. The customers no longer feel the goliath company taking their money for goods, but friends providing them with what they need. These customers engage more with the core values of the business and see it as looking after them. Any problems they encounter they know can be brought to the attention of the company through the leader playing with them in the game space. The result, as shown in figure 9, is a sharp rise in profit compared to traditional community engagement practices.

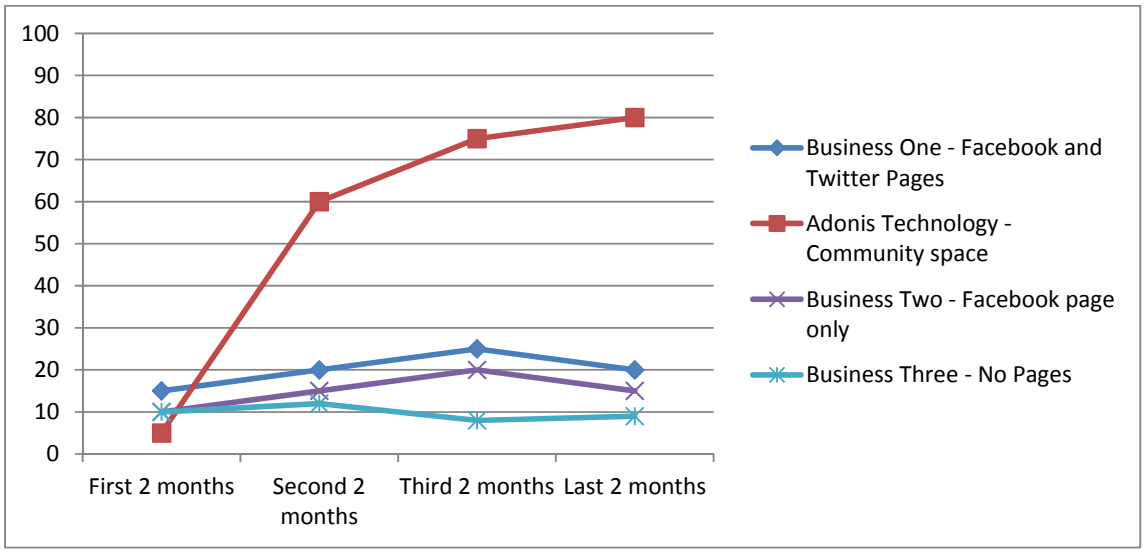

Figure 9.

I must note, however, that as a senior partner of Adonis Technology, I had the authority to take immediate action on a problem the customer was facing. Accordingly, the leader engaged within the gaming community space must have authority to act on problems without second-guessing from management. This authority is what keeps the trust relationship strong and prevents ill will festering within the community.

Therefore, in a world of shrinking education budgets and misdirected government regulation, the corporate education department that is invested in virtual technology has a lot to offer. Its ability to educate through action learning and engagement with the learning equation brings the principles of education back into knowledge creation. In addition, with well-structured business strategies, income is assured without knowledge becoming the prostitute of corporate pimping. This provides a brave new frontier to get educate innovation and bring people back into the driving seat of the future.

Conclusion

The world of online gaming provides a number of unique possibilities to train tomorrow innovators. Using a combination of action learning, and action inquiry techniques, games can provide a plethora of learning nutrition for any individual age group or organisation. Further, as the results show, the world built in MMO games can improve development of how to learn as well as knowledge of how to engage with and solve problems.

To show how this could be achieved, I set out at the start of this paper to provide a detailed explanation of the learning equation through its expansion. This provided greater understanding for how the learning equation worked and allowed for the introduction of guided education within the virtual world of gaming. I then endeavoured to test the learning capabilities of the game world by introducing action inquiry methodology and providing situations within game for data collection using observation methodology. I chose to test the MMO gaming world, due to the fully immersive environment it creates. Further, the development of computer generated physics and artificial intelligence within the MMO environment provided optimum conditions to test the reality of in game learning and if it was translatable to the real world. Using the in-games pre-defined missions and objectives, tests where run on both individuals and community interaction using the learning equation to provide the process with an aim of seeing how individuals would engage with learning. These where then re-tested in different simulations to compare the results and community interactions.

As the data shows, individuals developed an increased understanding of learning and leadership skills. Further, individuals showed heightened awareness of how they learned and greater skills in problem solving, the GPSH within the learning equation. These learning combinations then provided greater insight into future engagements as they increased the background knowledge that could be recalled to help with potential solutions. Individuals where then able to cycle through the learning equation to further develop their learning and improve learned schema. In this ever-engaging cycle of learning, individuals generated more and more learned schemas that resulted in less stumbling around to find answers, more confidence and increased self worth.

In the community setting, this confidence began to show through clearer engagement of problems, clarity of communication during the presentation of issues and tighter community relationships. Individuals also developed greater skills for teamwork, collaborative inquiry and honesty that developed trust within the community environment. This allowed the community to share its shortcomings and develop strengths for GPSH engagement. This resulted in community learning as well as individual learning.

Further, the engagement by the group, both individual and community, helped to break down past learned assumptions and free the mind to explore new possibilities. This in turn, created innovative thinking and new ways to approach difficult problems. Leadership skills where engaged by individuals that saw team participants learn and resolve issues previously found to difficult to engage with. As the community learned together, they exhibited greater propensity to share and work through issues that caused offense or conflict that was resolved through a focus on the issue not a personal attack on the individual. This community closeness developed into a strong bond of loyalty and commitment towards each other's learning. Further, this commitment to learn then flowed over into

the organisation through innovation and acceptance for change. The ability to communicate with clarity and work within teams provided increases to productivity and saw players take charge of their own destiny for learning and self-improvement. This in turn resulted in benefits for the organisation through faster adoption of new ideas and a drive to succeed. In addition, the trust formed within the community through openness, spilled over to customers, which saw sharp rises in profit.

Therefore, I conclude that the gaming environment provides the perfect way to train individuals and organisational communities to learn how to learn. Further, it allows them to create new problem solving schemas and leadership skills that help with every-day solutions. This learning then allows clearer communication, resolution of problems and increased productivity both within the organisation and for customers through self-confidence to handle conflict. This translates to greater profit and return customers. The data further confirms the hypothesis that leaders, communication skills and social interaction can all be successfully trained through the gaming environment. It also confirms the strength of the learning equation combined with action inquiry methodology to train leaders in tomorrow's business organisations. I would also argue, that it confirms the need for openness in business as discussed by Li (2010) and greater social interaction. Accordingly, gaming offers businesses a unique way to engage staff and customers in a form of social engagement that helps to improve the self, the organisation, and the business.

Above, I have discussed a number of concepts to do with education and learning. I have moved through the expansion of the learning equation with the aim of testing the validity of gaming and virtual worlds to expand the borders of education. I have, explained the results of my data and how it develops the minds of players to learn. Now I a drive to see a virtual world created that bring these concepts and an unbridled world of creation into reality for the benefit of future generations, as I explain in future work.

Future Work

In this paper, I have engaged with the idea of using existing gaming worlds to encourage learning using action inquiry and the learning equation. Now I suggest, undertaking research to use the learning equation to develop an all-immersive virtual world that centres on education. This world would be at the centre of a collaborative network of universities, libraries, and businesses all located within the structure of the internet. My aim is to combine learning with technologies that connect everyone through a 3D environment that is translatable on any device. It will connect MMO games, universities and social interactive environments like modules that plug into the central core. Moreover, unlike traditional business, it will be designed on collaboration of specialties that see all involved generate income, not on traditional monopolisation of market control.

This world will be designed to bring people together to share, play, learn and grow together in an environment unbounded by educational politics and a drive for profit. It will be designed on transformational leadership methodology and the methodologies discussed in this paper. It will focus on education as a principle goal with business design to create self sustainability. It is an idea that I consider worth the investment and have already begun its development and secured trademarks and copyrights for the business. I now undertake this research as I move into the later quarter of 2012, in my drive to develop open education available to everyone.

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