Action Learning with Second Life – A Pilot Study

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ABSTRACT

Virtual worlds, computer-based simulated environments in which users interact via avatars, provide an opportunity for the highly realistic enactment of real life activities online. Unlike computer games, which have a pre-defined purpose, pay-off structure, and action patterns, virtual worlds can leave many of these elements for users to determine. One such world, Second Life (SL), is frequently used as platform for revenue generation, information and knowledge sharing, and learning. As a learning environment, Second Life appears to be particularly amenable to action learning, where learners are not simply observers, but plan, implement, observe, and draw conclusions from their actions. We tested the usefulness of SL as an action learning environment in a senior course for management information systems students. The findings demonstrate learning in the SL environment contributes to the students' perceived value of learning through the Action Learning steps.

Keywords: Action learning, virtual world, Second Life, social software, Web 2.0

1. INTRODUCTION

An often-heard criticism of today's business schools is the high level of theoretical knowledge taught, and the possible corresponding lack of real world value (Pal, 2007). Even when students undergo a 'business game' experience, the game is often restricted to manipulating quantitative parameters (e.g., level of advertising spending) in a highly abstracted simulation environment (cf. Faria, 2001). In response, some business schools have moved to providing their MBA students with innovative action learning activities, such as consultancy projects at MIT, Yale, or Duke (Bisoux, 2006). For students in undergraduate programs, the opportunities to take on real world challenges are less plentiful as few companies are eager to let inexperienced students tackle their real business problems (cf. Gardiner, 2008).

Virtual worlds offer a unique opportunity to fill this void, providing an action learning environment where students can enact real business ideas and generate considerable value, in an environment where failure has relatively few and inexpensive consequences. In light of these insights we present the outcome of an action learning assignment for management information systems students, where participants built businesses within Second Life. The assignment, completed in late 2008, extended a similar exercise in 2007, yet raised the number of students and enhanced the theoretical framework. From our prior work (Wagner, 2008), we knew that students would be able to complete their assignments to build on-line, revenue generating businesses with modest financial investments (provided by the instructors / researchers). From past student reports, we also observed evidence of multiple forms of learning, about business, systems development, and IT management. Hence the focus of this study was to determine whether students, after completing the exercise, would report action learning and would report a learning experience whose value justified the considerable effort involved.

Answering these two questions is the purpose of this article. To do so, the article is organized as follows. The background of action learning, virtual worlds, and learning in virtual worlds will be provided in the next section, then, followed by the description of the application of action learning approach in designing one group assignment tasked for building an online store in Second Life. Our research framework, research methodology will then be described, and followed by the discussion of the findings. Finally, conclusions will be drawn.

2. BACKGROUND ON VIRTUAL WORLDS

2.1 Action Learning

Teacher-centered approaches have existed in university curricula for hundreds of years: academics lecture and students gain the delivered knowledge through attending lectures, completing exercises, and preparing for exams, with more enlightened approaches also employing case studies, or experiential learning activities (McGill and Beaty, 1992). Having been used for centuries, teacher-centered type classroom teaching techniques have also been criticized for considerable time (Dewey, 1938). For example, this type of teaching has been attacked for seldom relating to actual, real-time business predicaments directly, and for not testing the always unpredictable consequences of managers' actions. Traditional classroom teaching deals with past solutions to past problems. For example, case studies often demonstrate to students one of the "best practices" to solve a particular problem at the time the case situation occurred (Corey, 1976). However, in the dynamic world of business, problems are always changing. Furthermore, learning and working

should not be separated, but intertwined, because learning aims at changing attitude and behavior, and the changes can and should be gauged in work practice. Students must be able to cope, in real life, with problems which they may not have encountered or even thought of before. Therefore reflection about past experiences and the ability to take meaningful action is one of the critical success factors to survive in our environment. In addition to individual capability, groupwork capability is crucial to an individual's success in their future career. Learning practices that allow students such an action-oriented approach are thus apparently important to enrich students' task relevant capabilities.

The need for action-orientation was first addressed during the 1940s, when Reginald Revans developed the Action Learning Method, which focuses on learning through actions and experiences (Revans, 1998). Action learning has been widely used in organizational training, mainly for leadership and executive development (Horan, 2007; Kramer, 2007). The method is defined as a continuous process of learning and reflection, usually with an intention of "getting things done" (McGill and Beaty, 1992), and a means of developing intellectual, emotional, or physical techniques to handle real and complex business issues (Marquardt, 1999). It also focuses on achieving changes in the business issues as well as changes in the behavior of the individuals through these practices (Marquardt, 1999), therefore, it is a valuable learning process linked with and even embedded in the business (Horan, 2007). Action learning is envisioned to help students to transfer what they have learned in the process of solving problems today to solve other more complex workplace problems in the future (Kramer, 2007). Many organizations had adopted action learning in training their managers and executives, such as Dow Chemical (Marquardt, 2004), LG Electronics (Marquardt, 2004), Walt Disney Company (Asia Pacific) Ltd. (Horan, 2007), and university teaching such as at Ohio University or Case Western Reserve (Kramer, 2007).

Action learning is based on the relationship between reflection and action. It usually involves a group of people working together for a concentrated period of time. Nevertheless, it can also be applied at the individual level. Through action learning, individuals learn from each other by working on real problems and reflecting on their own and team members' experiences. The learners have to take action and be responsible for their action. The approach therefore encourages learners to develop, apply and reflect on innovative problem solving strategies. Employing the doctrine that "no action is meaningful without learning and no learning is significant without action" (Kramer, 2007, p. 42), the action learning process consists of four stages: *Planning*, *Action*, *Experience*, and *Understanding* (Pedler et al., 1986), as depicted in Figure 1. The process definition focuses on action but also includes exploration (planning), and reflection (experience and understanding). Reflection may not be a distinct step of the process but rather an activity carried out in the context of the other three steps.

2.2 Virtual Worlds

Virtual worlds are usually classified as massive multiplayer online environments (MMO), or online immersive "game-like" environments where the residents can engage in socialization, entertainment, education, and commerce (Bates, 1992).

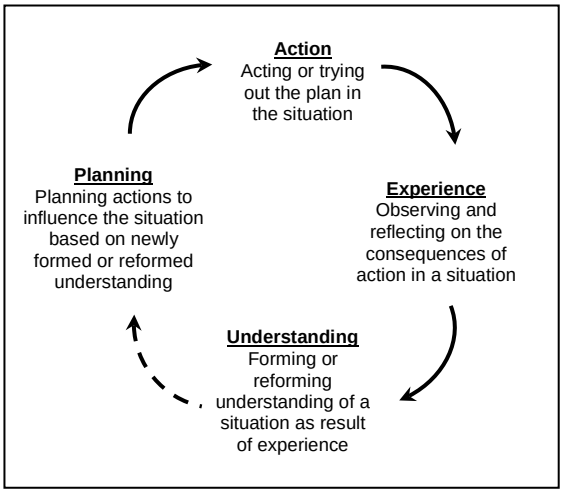

Figure 1. Action Learning Process (Pedler et al., 1986)

Identifying additional virtual world characteristics, Lui et al. (2007) emphasized the interactivity of virtual worlds as "fast-growing internet-based simulated environments where users can not only interact with each other, but with products and services provided by businesses and individuals" (p. 77). Boulos et al. (2007) focused on the characteristics of virtual worlds and defined them as a "computer-based, simulated multi-media environment, usually running over the Web, and designed so that users can 'inhabit' and interact via their own graphical self representations known as avatars" (p. 233).

Thus, within the scope of this article, virtual worlds are understood as immersive, three-dimensional (3-D), multi-media, multi-person simulation environments, where each participant adopts an alter ego and interacts with the world in real time. World activity persists even if a player is off-line.

2.2.1 Evolution of Virtual Worlds: Virtual worlds were not originally prototyped as three-dimensional and multi-media environments. They evolved from networked text-based virtual environments to desktop virtual reality simulations, and now immersive three-dimensional simulated environments (Boulos et al., 2007; Johnson et al., 1998). 3-D virtual worlds extend traditional classroom teaching and have already become a medium for constructivist learning for distance education (Dickey, 2002; 2003).

2.2.2 Purposeful vs. General Purpose: Game-Focused and Social-Focused Virtual Worlds: Virtual worlds can be categorized into two major types: purposeful, i.e., usually *game-focused* versus general purpose, *social-focused* (Mennecke et al., 2007). Game-focused virtual worlds rely mostly on fantasy and role playing, such as World of Warcraft (WoW), the most successful online game (Hanep.org, 2007), EverQuest, Final Fantasy, and the like. These kinds of virtual worlds generally follow similar paths regarding ties to the real world and business models. Their (game-winning) goals are pre-determined, pay-off-structures defined, and activity flows relatively pre-structured as well. Purposeful game worlds require the user (player), to fulfill a set of objectives, usually rising in difficulty and complexity

(Wagner, 1997). Although these objectives can be quite abstracted from real life (e.g., slaying of monsters), the learning experiences can be very practical, such as the impact of altruistic behavior or the benefits of separation of duties and team work (Hagel and Brown, 2009). Not all purposeful worlds are game-oriented. Some are used for job training or military simulations, as well as other non-entertainment focused skill development. Social-focused, general purpose virtual worlds, in contrast, have been designed to enable socialization and to possibly function as realistic trading areas (through the addition of a payment mechanism). The addition of an in-game payment mechanism has helped to increase the economic value of general purpose virtual worlds and to allow participants creating their own "games" or transaction systems within the virtual world's structure. Consequently, general purpose virtual worlds are in many ways more suitable for the classroom environment, in that the instructor does not have to overlay his or her own objective system over one implemented within a game, nor has to compete with game objectives that might prove to be distractive. A typical representative of social-focused virtual worlds is Second Life (SL).

2.3 Learning with Virtual Worlds

Virtual worlds have several characteristics that facilitate learning, as defined by Rotter (1954). Users can exercise new behaviors, repeat them to gain experience, observe the outcome (e.g., based on virtual world pay-offs or feedback from other participants), and adjust based on the outcomes. All this is enabled by a stimulating multi-media environment that potentially leads to significant, lasting behavior changes, if desired (Brown and Thomas, 2006). Users thus create their own experiences and construct their own knowledge. Different from much of classroom learning, the experience is immersive and action-based. Participants can furthermore acquire tacit knowledge (Polanyi, 1967), demonstrated by the ability to complete tasks without being able to describe how to do so (Ju and Wagner, 1997). In addition, participants can explore extreme situations in simulated environments. The simulated catastrophic consequences of potential failures intensify the learning experience (Brown and Thomas, 2006).

Studies have been conducted to investigate the applications of virtual worlds in education (Boulos et al., 2007; Hughes and Moshell, 1997). The computer-simulated environment of a virtual world, embedded with real world rules and regulations, makes it a good platform for collaboration and co-creation that cannot be easily experienced in other computer platforms (Boulos et al., 2007; Hobbs et al., 2006). A virtual world is thus a good candidate of being used in education as it offers opportunities for experiential and action learning and construction.

The value of virtual worlds for student learning can be viewed as triadic. Firstly, students can develop their skills and interact with other people via customizable avatars, so virtual worlds make the distance and remote learning realistic and feasible (Hobbs et al., 2006). Secondly, virtual worlds facilitate information and knowledge sharing and learning. For instance, the virtual world residents can browse documents easily in 3-D virtual libraries (e.g., SCULAIR digital library in Second Life), which offer multiple and vivid methods for students' learning activities. Thirdly, virtual worlds provide business platforms for their residents. Buying, selling, advertising, and providing services in the virtual environments thus are good practice activities for students to demonstrate their business skills. Learning by doing can thus be enhanced with such environment and is particularly valuable in teaching business students (cf. Alavi, 1994).

2.4 Second Life

Second Life (SL), is one of the major social-focused virtual worlds. With over 15 million registered accounts and an average of 38,000 residents online at any particular moment (Wapedia), Second Life is currently one of the most popular general purpose virtual worlds. SL's built-in payment system has helped to create an in-game economy with a turnover of US$120 Million during the first quarter of 2009 (Second Life Q1 2009 Economic Report), thus making it a considerable economic entity. As a general purpose virtual world, Second Life (SL), comes without predefined objectives or a pre-built world, but contains relatively easy-to-use building and scripting tools, through which users can shape structures and interactivity. Subscribers are then free to develop online structures and activities according to their own will. SL consequently provides a simulation environment that allows its participants to see, hear, attempt new behaviors, use and create objects (Hughes and Moshell, 1997). In doing so, participants can create their own individual experiences and construct their knowledge, therefore, students' constructive learning ability can be developed and their enthusiasm of engagement can be stimulated as well (Rovai, 2002b). These special characteristics make SL a desirable platform to engage students in actively creating their own learning activities and experiences, rather than just being passive consumers of learning (Maher et al., 2005). It is thus suitable to the fourth generation of computer-based education (Winn, 1993), in which knowledge is constructed by students themselves, rather than by the courseware. Prior generations of computer-based education, according to Winn, incorporated models of learning, but did not realize the learning experience through virtual reality.

Although the Horizon report of trends in higher education identified the increasing uses of online game environments for teaching and learning purposes (Consultants, 2006), not all virtual worlds are fit for educational uses. In purposeful virtual worlds, as pointed out earlier, many world characteristics are as much out of the participants' control as they are in the real world. Therefore, typical game-based virtual worlds, such as World of Warcraft (WoW), are not easily adapted to educational purposes because of their pre-defined structure (Livingstone and Kemp, 2006). Contrarily, social focused MMOs are more suitable. Given SL's popularity and impact, and its adaptability to our learning objectives, we chose Second Life as the implementation platform for our project.

3. APPLICATION OF ACTION LEARNING IN DESIGNING A COURSE ASSIGNMENT

3.1 Action Learning Components

The usefulness and benefits of action learning are optimized when it integrates these components (Marquardt 2004)

- ***Problem*** – the problem should be significant, urgent, and be the responsibility of an individual or a team to solve, and the solution should be of high importance to the individual, the team, or even the organization.
- ***Action learning group*** – one of the core entities in action learning is the action learning group. Among the interactions between group members, an individual can gain multi-perspective views and can reflect on oneself or other members' experiences.
- ***Process that emphasizes insightful questioning and reflective listening*** – action learning emphasizes questions and reflection. It focuses on what one doesn't know as well as on what one does know (Marquardt, 2004, p. 28). The process should begin with asking questions to clarify the nature of the problem. Thereafter group members (individually and collectively) should start to reflect and identify possible solutions, and finally move toward the consideration of proper actions to solve the problems.
- ***Power to act upon the problem*** – members of the action learning group or the individual must have the power to take action, or be assured that their recommendations will be implemented.
- ***Commitment to learning*** – the group members (individually and collectively) must be willing to learn through the process of solving the problem. It is desirable that the outcomes of the learning can be applied in the future.

There are numerous ways to support learning with technologies. Any technology or technologies used ideally has a high degree of fit with the task (Goodhue and Thompson, 1995; Goodhue, 1998), thus enabling all phases to take place, and enabling the recording of what has been learned. In a virtual world, the world itself becomes the "memory" of the problem solving task, demonstrating in 3D structural form, its interactivity, and the (financial) performance, the quality of the problem solving process. With its relatively easy to master modeling tools, and the ability to incrementally design, learners can adopt a prototyping approach and learn iteratively.

We designed a course assignment accordingly. With the concept of action learning embedded in the assignment design, students had to be able to *experience* (the students have to visit the virtual world, "play" with the features, and observe the actions taken by other virtual world residents), be able to *understand* (able to organize their experiences gained through virtual world visits and observations of other residents' actions, so as to form a deeper understanding of the virtual world business environment), to *plan*, and *act* (putting their plans into action).

3.2 Action Learning Assignment

The course Virtual Organizations and Global Teamwork is an information systems course that prepares students for virtual work environments, developing their skills in technical and non-technical areas. In September 2008, students were tasked to use Second Life as part of their learning experience in this course. The course assignment required students to build and run an online business in Second Life (Assignment detail refers to Appendix A). Students were free to build any type of (legal and ethical) business. However, they had to start from the ground up, beginning with the selection of a suitable plot of land, and the creation (or purchase) of a physical structure for their business. This assignment was similar to the previous year's, with some improvements in the instructions and resources allocation.

3.2.1 Assignment Characteristics: The four-week group assignment required five-student teams (***action learning groups***) to build a virtual organization inside SL for the purpose of economic gain (***problem***). Given a limited amount of resources (Linden$1,000 = US$4 per team) as well as a piece of real estate, they were asked to generate revenue through the in-world economy (***action taken***). The experiential portion of the assignment required them to select the real estate, develop a service or build a product, and attract customers in order to generate revenue (***process***). Students also had to report on the experience, both as a business project and a system development project. On the development side, they had to create artifacts (either to sell or to furnish their online stores) and had to program using a scripting language (LSL – Linden Scripting Language) which would give the created artifacts properties with which to respond to events. The evaluation criteria were: implementation contributed 30%, business case and design concept contributed 30%, assessment of usefulness (in terms of the revenue generated and the number of visitors) contributed 10%, executive summary and overall impression contributed the rest 30%. As it was a piece of assessment contributable to the course final grade, we believed that students were ***committed to learn*** new knowledge as well as to apply what they had learned previously to complete the task. Furthermore, the experience was both virtual and real. In SL, students are able to engage in action learning through the steps of experiencing, understanding, planning, and finally implementing (act) an online store. While the business as well as the goods and services were virtual, buyers and sellers were real people, and transactions were quite similar to other, "real" online transactions, such as buying on eBay.

3.2.2 Learning Outcomes: The project offered opportunities for a broad range of learning experiences. Students demonstrated many of these in their project reports and presentations. Four types of learning experiences emerged: e-business insights, systems development insights, virtual work insights, and IT planning insights. As e-business proprietors, students had to make decisions on locations, products, and such. Insightful teams used in-world business intelligence, such as visitor frequency (reported in SL) to facilitate such decisions. Consequently, one team even opted out of obtaining a free parcel and instead rented a parcel elsewhere. Several teams cooperated and coordinated their businesses, for example, a temple site (replicating a well known, real local temple site) collaborated with another Hong Kong promotional site, demonstrating synergy and additional learning insight (the screen shots of these and other projects are shown in Appendix B). As systems developers, students had to learn a 3-D modeling language and learn basic LSL scripting concepts. Most student groups focused on modeling, but usually copied or purchased object

scripts instead of scripting themselves. As virtual workers, students had to learn to operate in the virtual world, build relationships and carry out tasks. They had to meet the instructors at regular intervals, had to receive cash through the in-world cash transfer system, and had to form SL registered groups. Furthermore, they had to self-learn about the environment using online resources such as YouTube videos. One team had its members even place themselves at strategic locations within SL, so as to direct traffic to their business. With respect to IT planning, students had to make choices related to technology use (e.g., how to capture video of their site) or make "make vs. buy" decisions concerning artifacts and scripts.

While students were not necessarily aware on an abstract level that they made these decisions and created these insights, their project reports and presentations clearly demonstrated them. The sample projects in Appendix B illustrate the range of business ideas teams engaged in. Teams focused mostly on service provision, with some also selling (virtual) objects. Characteristically for action learning projects, teams exhibited considerable creativity. For example, one team built its business (Kungfu training) in the sky, which lowered real estate costs but also reinforced the spiritual nature of the service. Project work also demonstrated action learning. For example, as teams acted by building their businesses, they frequently experienced the inability to continue, as they exhausted the maximum number of primitive building objects. This led to an inquiry and understanding of system constraints. Thereupon groups had to re-plan their designs and then rebuild their businesses in less complex ways.

4. RESEARCH DESIGN

4.1 Research Framework

According to Pedler et al.'s (1986) four-stage action learning process model (planning-action-experience-understanding) we expected insights to be developed along the entire process. In other words, we expected planning leading to action (P->A), actions generating experiences (A->E), and experiences resulting in understanding (E->U). Given that we considered only a single cycle of action learning for this four-week assignment for a single building task, we did not measure the feedback from understanding to planning (U->P), and so on. We also expected that action learning overall would lead project participants to have a valuable learning experience. Correspondingly, we sought answers to the following two research questions:

H1: Does the use of Second Life promote action learning?

H1a: Does the use of Second Life promote plan-based implementation (P-> A)?

H1b: Does the use of Second Life promote implementation-based experiencing (A-> E)?

H1c: Does the use of Second Life promote experience-based understanding (E-> U)?

H2: Does action learning in Second Life lead to valuable learning experiences?

To test hypotheses H1a-H1c and H2, we administered a 10-item questionnaire with two items to capture each action learning phase and one item each to assess value and effort. Responses were collected along a five-point Likert scale. H1 was not tested *per se*, but through its components H1a to H1c. The questionnaire is attached as Appendix C.

4.2 Exercise and Data Collection

As previously mentioned, the exercise lasted for approximately four weeks and was preceded by two weeks of instruction in the basics of development in Second Life. Students thus knew how to create objects, how to write simple scripts, and how to obtain resources inside Second Life using their financial resources. The actual project duration (four weeks) was used for planning (each student group needed to provide a business idea within one week), implementation, and business development, plus report write-up.

The questionnaire, whose data is analyzed in this article, was administered after course completion, so as to avoid students' perception that positive feedback was required to please instructors or to achieve a good grade. An anonymous questionnaire was used to encourage truthful responses without fear of reprisal. The questionnaire design was based on a literature review with corresponding phrasing of the instrument items, as this was a pilot study. An invitation email was sent to students explaining the goals of the survey and the URL of the online questionnaire, available through an open document website. The reason of using this survey medium is its allowance of anonymity. Due to the condition of anonymity we were not able to prevent possible manipulations such as multiple responses by the same participant, nor were we able to coerce students into answering. Participation was purely voluntary. 42 out of 113 course participants completed the survey. There was no evidence of replication of identical answers, and little incentive for students to do so.

In addition to survey data, we also had access to course evaluations in which students could report on the course workload. Yet due to survey anonymity, we were unable to match responses to assignment results, which were, however not a core aspect of this particular research.

5. FINDINGS

Of the 113 students taking part in the course, 42 responded, yielding a response rate of 37.17%. Two of the responses were incomplete, and thus removed.

Partial least square analysis (PLS) was used to evaluate the data. PLS was a useful analysis tool given the sequential structure of the model (P->A->E->U), while also being suitable for the relatively small number of 40 observations. Table 1 summarizes findings from the analysis. It presents the items with corresponding survey questions, indicator loadings, Cronbach's alpha, and the composite reliability. We used Cronbach's alpha as the measure of convergent validity. The minimum loading of all the two-item independent variables was 0.846 (all loadings > 0.707), thus explaining more than 70% of the variance present, thus demonstrating good composite reliability (Kahai et al., 1998). The lowest composite reliability value of any construct was 0.842 (> 0.7, thus indicating adequate reliability). Each construct had an average variance extracted (Fornell and Larcker, 1981), of more than 0.727 (> 0.5),

indicating that the amount of variance in the items attributable to errors was less than the amount attributable to the construct.

A problem arose with respect to discriminant validity. We conducted an analysis using the items and the constructs with no relationships specified between the constructs to determine item construct loading. The result showed that there were high correlations among all items (all collapsed into one component with scores between 0.688 and 0.852), indicating a lack of discriminant validity for the items.

	Cronbach's Alpha	Composite Reliability	Average Variance Extracted	Loading
Planning	**0.835**	**0.923**	**0.858**	
Planning1 (Q1)				0.925
Planning2 (Q2)				0.928
Action	**0.624**	**0.842**	**0.727**	
Action1 (Q3)				0.860
Action2 (Q4)				0.846
Experience	**0.800**	**0.908**	**0.832**	
Experience1 (Q5)				0.896
Experience2 (Q6)				0.929
Understanding	**0.801**	**0.909**	**0.834**	
Understanding1 (Q7)				0.901
Understanding2 (Q8)				0.928

Table 1. Convergent Validity

The results of the PLS analysis are graphically depicted in Figure 2. The results show the causal relationship within each pair of activities in the action learning process. While H1, H1a, H1b, and H1c all appear to be supported, we nevertheless caution to make this conclusion, given the lack of discriminant validity in the model.

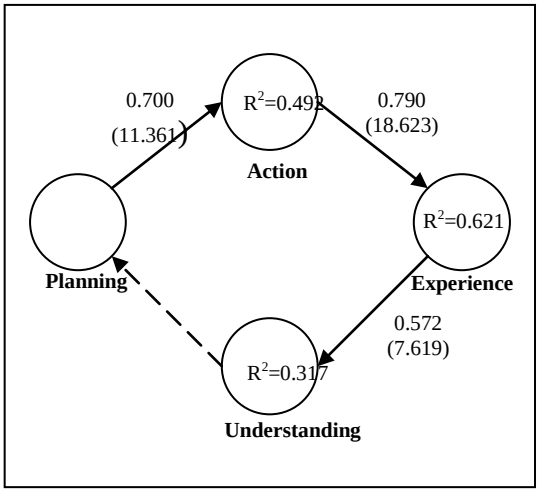

Figure 2. PLS Action Learning Model

To study the overall effect of action learning on the value of learning (H2), we conducted a second PLS analysis. An "ActionLearning" construct was generated by averaging the value of all four action learning items, letting this construct represent the entire action learning process. The PLS result (Figure 3) showed the R^2 to be 0.838 and the path coefficient 0.952 with a t-value of 9.848 ($p < 0.0001$). In other words, action learning, in aggregate, contributed statistically significantly to the perceived value of the learning.

We finally added one additional independent construct "Effort" to measure whether effort changed perceptions about the value of the learning process. The R^2 of the model including effort increased slightly to 0.842, with a path coefficient for effort of -0.073 and a t-value of -0.927 ($p = 0.360$), indicating no significant impact of effort on perceived value.

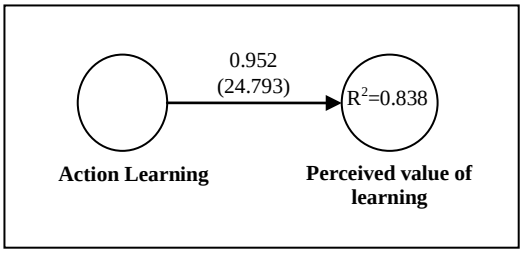

Figure 3: PLS Analysis for Value of Action Learning

6. DISCUSSION

The findings as shown in Figure 2 and Figure 3 revealed an interesting picture of students' perceptions regarding action learning. First and foremost, students recognized the value of action learning, associating the learning process of planning, action, experience, and understanding with overall learning benefits. Interestingly enough, the effort students had to expend in completing the assignment seemed to not matter in their value assessment. Effort reduced overall value assessments insignificantly, and improved the model (variance explained) minimally. This does not mean that students did not care about the workload. On the contrary, high workload was a frequent criticism, which also was reflected in student evaluations of the course. However, effort as a determinant of overall value of the learning experience was not significant.

It remains to be answered whether student perceptions of learning are good indicators of their actual learning. We measured perceptions, not actual learning outcomes. This is a common practice in learning research (e.g., Glass and Sue, 2008), and prior studies suggest that measures of perceived learning are an adequate substitute actual learning (e.g., Rovai, 2001a). Nevertheless, perceptions can differ from reality, as has been demonstrated for instance by Ertmer and Stepich (2004).

Furthermore, students appeared to have some difficulty in differentiating the phases of the action learning exercise (indicated by a lack of discriminant validity). All four phases, planning, action, experience, and understanding appeared to be part of the same, single learning concept to our students. There are several explanations for this phenomenon. First, our survey design may have not reflected the different phases of action learning accurately. And yet, the wording of our questions oriented itself closely at the definition for each learning phase, employing multiple questions (two items) to identify each phase of action learning. A follow-up study should address concerns about the operationalization of the action learning concepts and should provide needed further validation of the items.

Assuming no operationalization problems, students could have been careless in completing their questionnaires, marking each item with (almost) the same score. Or, students may have felt there was little to differentiate between the phases, as in their minds, the learning activities all took place at the same time. After all, students frequently engaged in prototyping which combined planning with action, and possibly also blended experience with understanding. As we will not be able to find an explanation from the current data set, a future, more structured development approach with contemporaneous data collection could overcome this problem, albeit at the cost of creating an unnatural development environment whose value might thus be downgraded.

7. CONCLUSIONS AND OUTLOOK

Second Life enables students to carry out assignments that are otherwise difficult to undertake. Students can complete real-world tasks, such as building a business or parts thereof, in an environment where failure costs little, but success can be very rewarding. The learning that occurs, from planning to understanding, is perceived as valuable, despite the considerable effort required to develop meaningful structures and activities in a virtual world.

In future it will be important to further raise student awareness of the different phases within action learning. Especially as future information systems practitioners, students must be able to separate plans from actions, and actions from evaluation (experience and understanding). This discipline of thought is important for the successful completion of systems development projects.

Our project also reveals new applications and re-use opportunities. For example, it is often difficult for students studying customer relationship management to explore real systems or real customer relationship interfaces. Businesses created in Second Life potentially offer an attractive environment for students to explore such interfaces and experiment with them. One student group's development assignment can thus later become another group's evaluation target.

Overall, virtual worlds such as Second Life provide a rich environment for learning and exploration that engages students' imagination, draws their interest, and leads to positive learning experiences. At the same time, we view Second Life not as the ultimate virtual world environment. Student frustration with platform stability, or restrictions on the numbers of objects ("prims") that can be used, are among the factors that limit the experience. Furthermore, while most of our students are avid users of social software outside of the classroom, few ventured into Second Life for social interaction. Not surprisingly then, the world of Second Life remains relatively sparsely populated. At the same time, the overall success of Second Life has sparked great interest in virtual world software development, including open source solutions, such as OpenSimulator. Such environments where user can take control of the entire application show great promise both for future application development and use as highly adaptable action learning platforms.

8. ACKNOWLEDGEMENT

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APPENDIX A: ASSIGNMENT DESCRIPTION
IS3000 (Semester A 2008-2009) - Assignment 2: Organizational Use of Second Life

During the course we have seen that Second Life is a clever environment for creating objects and transactions in a virtual world of high realism. Companies and other organizations are already taking advantage of this medium in a variety of ways to improve their performance. We will explore such beneficial uses in assignment.

Task: Your task will be to invent and prototype a use of Second Life to help an organization (invented by you) to perform better. The organization can be commercial, government, or a non-profit. You will need to think of the competitive advantage of SL, such as use in training, virtual application development, or similar. Thereafter, you should build a prototype for the application and describe your design ideas for the application, as well as your assessment of its usefulness. You can best demonstrate the usefulness by earning money with your SL organization. You are expected to complete this task in groups of about 5 (+/- 1).

Deliverable: You will write a document of about 2,000 words explaining your idea, its implementation, and its benefits. In doing so, make use of outside resources that can explain the potential success of your application. You will also create an interactive application, e.g., a **video** that demonstrates how your idea is implemented. Your team will also have the opportunity to present its assignment deliverable in the classroom.

Evaluation: Your assignment will be evaluated as follows:

Executive summary / statement of purpose	10%
The "business case" – explanation of the leverage point, where your idea can help the organization perform better	15%
Design concept	15%
Implementation	30%
Assessment of usefulness	10%
Overall impression	20%

The best assignments will be those with a high level of application value, e.g., those where the business or organizational benefit is clear. If you can demonstrate that you have made money from your idea, it will help you demonstrate usefulness.

Resources (tentative – situation may change): Recognizing that you need a place to operate your business, you will be given limited financial resources. Each team will receive some financial resources from the instructor. If you spend wisely, you should have resources left over for other purchases, as needed.

Due Dates: You will need to provide an idea for the 'project' you wish to undertake by October 15 (Wednesday class) or 16 (Thursday class), 2008, providing also a list of your group members (changes at a later date will require instructor approval). The assignment will be due on November 19 (Wednesday class) or 20 (Thursday class). Presentations will be held on the same day.

Potential Uses of Second Life (partial list):

Visualized organizational knowledge repository	Meeting room	Simulation of new products or services
Market research	Product (virtual) sales	Service sales
Education and training	Virtual collaboration	

Examples of previous SL projects

Christy's Ring	Fantasmic Resort	Forever Flower
Heroes Travel Agency Company	ISU Center	Let's Go Party
Star Wealth Gallery	Super Store	Theme Park

APPENDIX B: SAMPLE PROJECTS

Business	**Business Model**	**Marketing Approach**		
		Within SL	**Beyond SL**	
Religion Promotion	**Non-profit making organization**	**Promotion in SL partnered shops**	**Personal networking** **SL forums**	

Hong Kong Tourism Promotion	**Non-profit making organization**	**Promotion in SL partnered shops**	**Personal networking**	
Resort	**Membership fee**	**Promotion in SL partnered shops**	**Personal networking** **Forums** **YouTube promotion with video showing the resort facilities**	
Chinese Culture Promotion	**Virtual Chinese Kungfu Training Sale of (virtual) weapons**	**Promotion in SL partnered shops**	**Personal networking** **Broadcast in IM tools Forums** **YouTube promotion with video showing Kungfu training**	
Boutique	**Retailing** **Beauty advice**	**Promotion in SL partnered shops** **Promotion in advertising malls**	**Personal networking** **Forums**	

APPENDIX C:

An Anonymous online Survey – Learning experience of the Second Life Project

This survey contains 10 questions about your experiences of our IS3000 Second Life Project. It may take 5 minutes to complete it. Please feel free to express your feeling toward our SL project, and it is very useful for me to improve this assignment for the coming batches.

No.	Questions	Average Score
1	The Second Life assignment has given me an opportunity to think of new business ideas and explore those ideas further. 1-strongly disagree, 3-neutral, 5-strongly agree	3.475
2	The Second Life assignment has given me an opportunity to link my experiences and business knowledge to plan new business proposals. 1- strongly disagree, 3-neutral, 5-strongly agree	3.375
3	The Second Life assignment has given me an opportunity to put my ideas into action. 1-strongly disagree, 3-neutral, 5-strongly agree	3.725
4	The Second Life assignment has given me an opportunity to practice running a business (Examples: effective advertisement). 1-strongly disagree, 3-neutral, 5-strongly agree	3.225
5	The Second Life assignment helped me to observe outcomes of business actions I or others have taken. 1-strongly disagree, 3-neutral, 5-strongly agree	3.125
6	The Second Life assignment helped me to reflect on the consequences of business actions. 1-strongly disagree, 3-neutral, 5-strongly agree	3.05
7	The Second Life assignment helped me to understand more real business practices. 1-strongly disagree, 3-neutral, 5-strongly agree	3.15
8	The Second Life assignment helped me to turn my experiences into new insights. 1- strongly disagree, 3-neutral, 5-strongly agree	3.3
9	My learning value of the Second Life assignment was 1-very low, 3-average, 5-very high	3.375
10	The Second Life assignment was 1-very demanding, 3-reasonably challenging, 5- not demanding at all	2.7

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