Blending on-campus and online experiences through the use of virtually immersive technologies

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Abstract -- **Recently, there has been a great deal of attention put toward efforts to integrate teaching methodologies and strategies between face to face and online classrooms looking to maximize learning by combining delivery modalities. Studies point to students not only learning more when online capabilities were added to traditional courses, but also increasing their level of interaction thereby improving the students' sense of satisfaction with the courses taken. However, these studies tend to isolate deliveries to either all online deliveries or to all on-campus classes and students, without taking into account the more recent movement of blending teaching methods that look to cross over the barriers between online and face to face students.**

To meet some of the collaborative requirements for blending instruction, virtually immersive environments are beginning to show promise as an interactive communication media that can facilitate the needs of several communities including e-learning, distance education and corporate training. So the question was posed - what happens when online students are given the opportunity, through the use of virtually immersive technologies, to engage with students attending traditional on-campus sessions? Thus, the purpose of this case study is to evaluate the use of virtually immersive technologies as a platform for the conduct of synchronous and asynchronous classroom activities. This article also presents the framework for conducting an undergraduate level 'Technology Project Management' course that includes delivery approaches to students from both online (Distance Education) class offerings and on-campus (Face-to-face) class offerings.

Index Terms—**Virtual Worlds, Blended Learning, Virtual Teaming, Project Management, Distance Education**

I. INTRODUCTION

The basis for virtually immersive technologies today found much of its origin in the late 1950's with many forms of virtual technologies existing today in the form of games, exhibits, sales presentations, and aerospace simulators [1]. However, more recently educators and other business professions have begun to explore the value and possibilities that these technologies provide. The ability to communicate with students in a more geographically dispersed environment is challenging; add to that the need for academics to interact with students in both group and singular one-on-one sessions and you have a technologically daunting challenge. Early synchronous and asynchronous efforts to communicate with distance students have been limited mostly to audio/video broadcasting and teleconferencing, computer-aided instruction, and computer broadcasting/webcasting.

The blending of various learning modalities allows for the inclusion of both traditional face-to-face classroom delivery approaches with the various available online, computer-mediated activities allowing the classroom facilitator to present an integrated instructional approach to their course offering. Most often, the objective of a blended approach is to bring together the most effective pieces of both face-to-face and online instruction. According to Garrison and Vaughan (2008), blended learning provides academics with a vision and roadmap to understand "the possibilities of organically blending face-to-face and online learning for engaging and meaningful experiences" [2].

Isolating the right blend of online and face-to-face is a challenge, and that challenge is exacerbated by the ever-increasing options online, and computer-based solutions being presented to academics. At present, there is no real consensus on a single agree-upon definition for blended learning. The terms "blended," "hybrid," and "mixed-mode" tend to be used interchangeably in current research literature, however, for this effort the term 'blended' will be used [3]. Classroom time can be used to engage students in advanced interactive experiences while affording students with the opportunity for increased scheduling flexibility by providing online portions of the course content that can be accessed anytime.

Creating a high-quality blended instructional experience can present considerable challenges. Foremost is the need for resources to create the online materials to be used in the courses. Materials development is a time and labor intensive process, just as it is in any instructional medium. In addition, blended instruction is likely to be a new concept to

many students and faculty. It is this setting that led to the presented case study.

II. CASE STUDY BACKGROUND

Several factors, have surfaced in recent years to help prompt this effort. First, the need to facilitate course delivery to both on campus (face-to-face) and online sections of the same course inspired the need to evaluate the use of virtually immersive technologies as a common delivery media. Secondly, having utilized these technologies in online sections prior to this and observing the many synchronous and asynchronous advantages it gave to online students it appeared to be a viable delivery option for on-campus students as well. Finally, the opportunity to offer online students the opportunity to interact with on-campus synchronous sessions appeared to be a plausible option for multiple, geographically dispersed students to interact.

From a functional perspective, early VW efforts within academia have taken advantage of the technology's capabilities including social presence, persistence and the visual presentation of the virtual environment. Emphasis has focused on the visual presentation or building out these environments for pedagogical deployment in an effort to develop virtual classroom and meeting spaces that not only replace the actual real world academic experiences, but also maximize the inherent unique functionalities that the new VW provides. Yet once the spaces are in place there comes the need to communicate course content; there inlays the impetus behind a growing interest in the use of VW environments as delivery media for presenting content both synchronously and asynchronously.

TABLE I.
POPULATION NUMBERS FOR CASE

Timeframe	Online Students	On-Campus Students	Total Population
Beginning of Semester	47	24	71
End of Semseter	44	21	65

This case covered the course delivery involving three separate sections of undergraduate students. The undergraduate course was a junior (3000 level) course titled: 'Technology Project Management'. The total population of three sections at the beginning of the semester was (71) students and at the end of the semester there were (65) students. Table I provides a breakdown of online verses on-campus students for this case.

III. RESEARCH OBJECTIVES

The objectives and assessment criteria for the Technology Project Management course typically involves not only lecture and case study presentations, but also provides an opportunity for teaming and sharing interaction amongst students. From that reasoning, the overarching objective of this research effort was established to gain a better understanding of the practical challenges associated with the integration of virtually immersive technologies into an undergraduate course. Additionally, given the growing need to deliver similar course content to both on-campus and online students the study looked to assess not only changes in student perceptions of the both the use of virtual world technologies as a delivery media, but also to assess their perceptions and reactions to the merging of both online and on-campus sections.

IV. METHODOLOGY

To evaluate the effectiveness of the virtually immersive media and the merging of both online and on-campus delivery efforts this study sought to assess the effect these activities had on the student's perception of both in the learning process. This research addressed three main objectives with the first two incorporating survey assessment tools:

1. First, an online, anonymous 'Initial Second Life Experience Survey' was used to evaluate the early interactions of the students with the virtual environment Second Life and specifically the population background, initial learning curve students experienced, avatar interaction, and perceived effectiveness of the virtual medium.

2. Secondly, an online, anonymous 'End of Semester Survey' was used to assess use and effectiveness of the virtual interactive labs, effectiveness of Second Life as a collaborative site, and value of integrating online with on-campus sections.

3. Finally, general observation was incorporated into this study, where appropriate, to evaluate challenges associated with course delivery and management [4] [5].

V. COURSE STRUCTURE FOR THIS CASE

Students were instructed at the beginning of the semester that this course was being offered both to on-campus (face-to-face) students as well as online (distance education) students. They were also told that the course would utilize several forms of communication throughout the semester and that online student's would have two delivery options to choose from. The primary modes of communication for the online sections were Blackboard (the institution-wide online learning management solution), Second Life (a virtually immersive solution used for both synchronous and asynchronous delivery) and Centra (an online course meeting tool used fairly extensively at the institution, and email (if needed as a backup). On-campus students met in a multimedia classroom on campus. The students in the multimedia classroom had access to laptops or the option to bring their own laptops with them to class.

Online students were given two options for attending class lectures. Since the on-campus section was using Second Life to teach from, online students were given the option to attend the on campus lectures by logging into Second Life. Those online students unable to attend during the on-campus session were given a second option to attend evening lectures via the Centra online meeting tool. Both on-campus and online Centra sessions were used to go over lecture material, review case study assignments, and discuss quiz results. The students were allowed to complete all other activities on their own time throughout the course week including reviewing interactive lab lessons in Second Life and completing online quizzes in blackboard as well as case study assignments.

Figure 1: Virtual Classroom Space

Within the institutions already existent virtual campus setting, three distinct virtual spaces were created to provide virtual space to conduct the Second Life activities. The first virtual space created was a virtual classroom space (see Figure 1). This space provided an initial meeting room for all synchronous sessions. Students logged in here and through an activity bot (a proximity counter program) attendance was automatically collected. The auditorium style seating gave plenty of space for all and provided visibility to three separate boards in the front. Having multiple presentation screens allows the instructor to present several aspects of the course at once, including: class agenda, case study, reading assignments, video clips, and presentation slides.

The second virtual space that was created was a virtual interactive lab building. This space contained a lobby floor with access to four floors above it. Each of the first three floors above the lobby housed eight learning modules. Each learning module consisted of four viewing stations that the student completed with the fourth station being a review station. The viewing stations presented a series of 12-18 slides, on a timed

presentation with each slide presentation lasting approximately 4-6 minutes each. Each week students were assigned two of the learning modules to complete and were quizzed on the material.

Figure 2: Virtual Interactive Lab Modules

Figure 2 is a depiction of one of the lab modules showing the first three viewing stations. Students were able to access the lab modules at any time throughout the week with the online quiz being available through the course blackboard site. Each station allowed up to four students at a time to view the material. Students had the ability to control the presentation by stopping, starting, advancing or backing up the presentation as required.

Figure 3: Virtual Team Studios

The final virtual space that was created consisted of a series of Virtual Team Studios (see figure 3). Students were able to move to (teleport) to their assigned studio by using assess links located in the lobby of the virtual interactive lab. A total of eight studios were created so that the class could

be broken into small virtual teams of 6-8 students each for open group discussions. Time was allotted each week (usually during the last 20 minutes of the second class session of the week) for the students to move to their assigned studios and interact with their respective virtual team. The primary topic of discussion was usually the case project assignment for the week but students were open to discuss any course related topic of interest.

VI. INITIAL SECOND LIFE EXPERIENCE SURVEY

During the first week of the course, students received basic instructions on Second Life setup with short online videos that took the students through the process of creating an avatar account, logging into the Second Life environment, learning how to move, interact and communicate in the virtual environment, and how to locate the virtual classroom site. All students (both on-campus and online) were required to create accounts. Following their initial Second Life exercise, all students in the three sections were presented with an online, anonymous survey of (15) close-ended statements collecting ordinal-level data as responses [6].

The intent of the survey was to collect student opinion data following completion of their first course experience with the Second Life virtual environment. This same survey had been used and pretested in a previous case study involving a smaller group of online graduate students a year prior [7]. The survey population consisted of (71) students that were registered for the course with (65) students actually completing the survey. Table II provides a detailed breakdown on the survey population and also indicates section and total population return rates.

Specifically, the survey instrument was designed to focus on four key concept areas. The first area surveyed focused on gaining a foundational understanding of the surveyed population's background with respect to this type of communication media. The second was to assess the initial learning curve experienced by each student and the third focused on the early avatar interactions and mechanics associated with the utilization of the avatar as a personal proxy in a real world communication forum. The final area was to glean feedback from the students on their experiences with the Second Life virtual environment that was presented to them.

TABLE II.

INITIAL SECOND LIFE SURVEY POPULATION AND RETURN RATE

Survey	Total Population			Online Students			On-Campus Students		
	No. Students	Completed Survey	Return Rate	No. Students	Completed Survey	Return Rate	No. Students	Completed Survey	Return Rate
Initial SL Survey	71	63	88.7%	47	42	89.4%	24	21	87.5%

A. First Concept Area - Population Background

The overall results of the first four statements (see Table III) indicate that the majority of the students had past experiences with online courses and various online delivery tools but little virtual world experience. Specifically, the first surveyed statement indicates that the majority (76.2%) of the students had taken online classes for credit. What was interesting

to note here was that (81%) of the on-campus students had taken online courses indicating that the vast majority of the student base is becoming more comfortable with both course delivery modalities. The second surveyed statement coincides with the first statement indicating a strong familiarization with basic online collaborative tools.

TABLE III.

SURVEY RESULTS FOR FIRST CONCEPT AREA: POPULATION BACKGROUND

Statement	Concept Being Canvassed	Responses	Total Population		Online Students		On-Campus Students	
			No.	Percent.	No.	Percent.	No.	Percent.
1. Prior to taking this course, had you ever taken an online distance education course for academic credit?	Population Background	1. YES	48	76.2%	31	73.8%	17	81.0%
		2. NO	15	23.8%	11	26.2%	4	19.0%
2. Prior to taking this course, had you ever utilized online collaboration tools such as or similar to: Centra (online meeting), or Blackboard.	Population Background	1. YES	59	93.7%	38	90.5%	21	100.0%
		2. NO	4	6.3%	4	9.5%	0	0.0%
3. Prior to taking this course, rate your frequency of use with Second Life or other similar virtual worlds.	Population Background	1. Never	50	79.4%	34	81.0%	16	76.2%
		2. Seldom	6	9.5%	5	11.9%	1	4.8%
		3. Sometimes	6	9.5%	3	7.1%	3	14.3%
		4. Often	1	1.6%	0	0.0%	1	4.8%
4. Did your computer have any hardware or software compatibility issues with Second Life?	Population Background	1. YES	12	19.0%	10	23.8%	2	9.5%
		2. NO	51	81.0%	32	76.2%	19	90.5%

The results from the third statement are indicative of the newness of Second Life as an academic tool with nearly (80%) of the students indicating that they have never operated in the virtual environment before. However, that said, at least one in five students have had some prior experience with Second Life either as a social or academic application. The final statement in this concept area addresses hardware and software compatibility issues. The results indicate that (19%) of the students had some issue; however, it should be noted here that by the end of the course week that this assignment was given, all students indicated that they were able to overcome their technical issues and were able to log into Second Life and complete their assignment.

B. Second Concept Area - Initial Learning Curve

The second group of statements (see Table IV) presented in the survey focused on gaining an understanding of the initial learning curve that the students were tasked to complete. The study's concern here is that the introduction of any new delivery medium to the course should not limit the learning process. Overall, the results of the next four statements indicate that the vast majority of the students had little to no difficulty in learning to interact within the Second Life virtual environment.

The fifth survey statement focused on the difficulty of changing the avatars appearance. Although changing the avatars appearance is not a required skillset for setting up an account or interacting in the Second Life environment, it is a skill that is covered during the initial setup phase of the avatar account, thus its inclusion in this survey vehicle. The results indicate that approximately one quarter (25.4%) of the students felt that changing the avatars appearance was difficult. It should be noted here, that results from the original survey pretest indicated two interpretations from this statement; some felt that the question was asking if changing the appearance inferred making the avatar mimic the students own appearance while others felt it just dealt with the mechanics of making basic changes. Although the statement was not reworded following pre-test for this study it may be worth reconsidering this decision for subsequent evaluations.

Specifically, responses for the eighth statement of the survey indicate that most students (92.1%) took less than an hour to practice within the Second Life environment before moving on to their first virtual world assignment. There also was a discernable difference between online and on-campus students; the majority (33.3%) of the online students took less than 10 minutes to complete practice verses (19%) of the on-campus students. Basic communications and avatar movement within the virtual world environment were addressed in the sixth and seventh statements with survey responses indicating that less than (10%) of the students felt that it was difficult to move and communicate within the virtual world.

TABLE IV.

SURVEY RESULTS FOR SECOND CONCEPT AREA: INITIAL LEARNING CURVE

Statement	Concept Being Canvassed	Responses	Total Population		Online Students		On-Campus Students	
			No.	Percent.	No.	Percent.	No.	Percent.
5. Changing your avatars appearance was difficult to accomplish?	Initial Learning Curve	1. Strongly Agree	2	3.2%	1	2.4%	1	4.8%
		2. Agree	14	22.2%	10	23.8%	4	19.0%
		3. Undecided	20	31.7%	14	33.3%	6	28.6%
		4. Disagree	26	41.3%	16	38.1%	10	47.6%
		5. Strongly Disagree	1	1.6%	1	2.4%	0	0.0%
6. Moving your avatar (to include walking, flying, and sitting) was a difficult skill to learn?	Initial Learning Curve	1. Strongly Agree	0	0.0%	0	0.0%	0	0.0%
		2. Agree	6	9.5%	3	7.1%	3	14.3%
		3. Undecided	8	12.7%	5	11.9%	3	14.3%
		4. Disagree	43	68.3%	29	69.0%	14	66.7%
		5. Strongly Disagree	6	9.5%	5	11.9%	1	4.8%
7. Communicating in Second Life (to include Local Text Chat and Voice Chat) was a difficult skill to learn?	Initial Learning Curve	1. Strongly Agree	1	1.6%	1	2.4%	0	0.0%
		2. Agree	5	7.9%	4	9.5%	1	4.8%
		3. Undecided	18	28.6%	13	31.0%	5	23.8%
		4. Disagree	31	49.2%	17	40.5%	14	66.7%
		5. Strongly Disagree	8	12.7%	7	16.7%	1	4.8%
8. How much time did you take to practice in Second Life prior to your first class session?	Initial Learning Curve	1. Less than 10 minutes	18	28.6%	14	33.3%	4	19.0%
		2. 10 to 29 minutes	18	28.6%	11	26.2%	7	33.3%
		3. 30 to 59 minutes	21	33.3%	15	35.7%	6	28.6%
		4. 1 to 2 hours	4	6.3%	0	0.0%	4	19.0%
		5. More than 2 hours	1	1.6%	1	2.4%	0	0.0%

TABLE V.

SURVEY RESULTS FOR THIRD CONCEPT AREA: AVATAR INTERACTION

Statement	Concept Being Canvassed	Responses	Total Population		Online Students		On-Campus Students	
			No.	Percent.	No.	Percent.	No.	Percent.
9. How would you rate the importance of maintaining a Code of Conduct for holding academic sessions in Second Life environments?	Avatar Interaction	1. Unimportant	1	1.6%	0	0.0%	1	4.8%
		2. Of Little Importance	5	7.9%	3	7.1%	2	9.5%
		3. Moderately Important	8	12.7%	7	16.7%	1	4.8%
		4. Important	25	39.7%	19	45.2%	6	28.6%
		5. Very Important	24	38.1%	13	31.0%	11	52.4%
10. The general appearance of most avatars was distracting?	Avatar Interaction	1. Strongly Agree	1	1.6%	1	2.4%	0	0.0%
		2. Agree	7	11.1%	6	14.3%	1	4.8%
		3. Undecided	16	25.4%	8	19.0%	8	38.1%
		4. Disagree	34	54.0%	24	57.1%	10	47.6%
		5. Strongly Disagree	5	7.9%	3	7.1%	2	9.5%
11. It is important for avatars to closely resemble the human they represent?	Avatar Interaction	1. Strongly Agree	0	0.0%	0	0.0%	0	0.0%
		2. Agree	17	27.0%	11	26.2%	6	28.6%
		3. Undecided	14	22.2%	10	23.8%	4	19.0%
		4. Disagree	28	44.4%	20	47.6%	8	38.1%
		5. Strongly Disagree	4	6.3%	1	2.4%	3	14.3%
12. The presence of avatars enhanced group communication and interaction?	Avatar Interaction	1. Strongly Agree	2	3.2%	1	2.4%	1	4.8%
		2. Agree	13	20.6%	8	19.0%	5	23.8%
		3. Undecided	35	55.6%	23	54.8%	12	57.1%
		4. Disagree	9	14.3%	6	14.3%	3	14.3%
		5. Strongly Disagree	4	6.3%	4	9.5%	0	0.0%

C. Third Concept Area - Avatar Interaction

The third group of statements presented in the survey focused on avatar (virtual world) student interactions. Unlike real world interactions, the interaction of students as they progress through a virtual world session can present some real world situations for the student with a unique twist to them in a virtual setting. Overall, the results of this concept area (see Table V) indicate that students expected that the general conduct of the avatar as the student's virtual world 'proxy,' be similar to that of the real world where a code of standard behavior is expected. Specifically, statement nine responses find that (78.7%) of the students find it important for virtual world sessions to maintain a code of conduct. Also of note here, only one student in the population indicated that maintaining a code of conduct was unimportant.

Statements ten and eleven focused on the appearance of the avatars. In statement ten students were asked if the general appearance of most avatars was distracting. Only (12.7%) indicated that general appearance was distracting with over a quarter of the students (25.4%) being undecided at this early juncture in the course. The responses for statement eleven indicate a strong tendency toward a lack of concern for avatar resemblance to the student it represents with over half of the students (50.7%) either disagreeing or strongly disagreeing. It should be noted that in the student's instructions for creating their avatar account, students were instructed that: 'avatars must dress and look appropriate for you [the student] in class and meet ECU dress code standards'.

D. Fourth Concept Area - Perceived Effectiveness of the Medium

The last group of statements presented in the survey focused on the perceived effectiveness of the Second Life virtual environment that was presented to the students for use in the class. The overall results of this concept area (see Table VI) indicate that approximately one-third of the population deems the medium effective following their initial experience with the virtual environment.

The first statement in this concept area (statement 13) assessed the students view toward the use of Second Life as an effective platform for conducting academic meetings. The responses to this statement showed some significant differences between online and on-campus students. Only (14.3%) of the on-campus students felt that the environment was not an effective platform compared to (38.1%) of the online students. The second statement in this area (statement 14) considered the motivational aspect of the Second Life and whether the virtual world environment encouraged the student to collaborate online. Nearly a third of the students (31.7%) indicated that following their initial exposer to the virtual environment made them more motivated to conduct online collaboration. The third and final statement (statement 15) in this concept area sought to gauge the student's early motivation towards follow-on use of Second Life. The results of this statement showed a significant distribution of responses with (20.6%) students indicating that following their initial experience, they were likely to use the virtual environment again. That said, a strong component (34.9%) felt that they would not use the environment at all.

TABLE VI.

SURVEY RESULTS FOR FOURTH CONCEPT AREA: PERCEIVED EFFECTIVENESS OF THE MEDIUM

Statement	Concept Being Canvassed	Responses	Total Population		Online Students		On-Campus Students	
			No.	Percent.	No.	Percent.	No.	Percent.
13. Second Life is an effective platform for conducting academic meetings?	Perceived Effectiveness of the Medium	1. Strongly Agree	5	7.9%	3	7.1%	2	9.5%
		2. Agree	15	23.8%	9	21.4%	6	28.6%
		3. Undecided	24	38.1%	14	33.3%	10	47.6%
		4. Disagree	12	19.0%	10	23.8%	2	9.5%
		5. Strongly Disagree	7	11.1%	6	14.3%	1	4.8%
14. Does a virtual environment such as Second Life make you more or less motivated to conduct online collaboration?	Perceived Effectiveness of the Medium	1. More Motivated	20	31.7%	12	28.6%	8	38.1%
		2. No Difference	26	41.3%	16	38.1%	10	47.6%
		3. Less Motivated	17	27.0%	14	33.3%	3	14.3%
15. How likely are you to use Second Life again?	Perceived Effectiveness of the Medium	1. Not at All	22	34.9%	16	38.1%	6	28.6%
		2. Very Little	11	17.5%	2	4.8%	9	42.9%
		3. Somewhat	17	27.0%	13	31.0%	4	19.0%
		4. To a Great Extent	13	20.6%	11	26.2%	2	9.5%

VII. END OF SEMESTER SURVEY

During the final week of the course all students in the three sections were presented with an online, anonymous survey of that contained (8) close-ended questions and one open-ended question that were related to their course experiences with the Second Life virtual world environment and their interactions with fellow students – both online and on-campus. Similar to the Initial survey, pretesting was conducted prior to issuing the survey; the pretesting involved presenting the surveys to (12) students in the form of respondent debriefings. Based on the results of the pretest, minor adjustments were made to the survey statements to ensure clarity of meaning and intent.

The intent of the End of Semester Survey was to collect student opinion data following completion of their course experience utilizing the Second Life virtual world environment. The survey population consisted of (71) students that were registered for the course with (65) students actually completing the survey. Table VII provides a detailed breakdown on the survey population and also indicates section and total population return rates.

Specifically, the end of semester survey was designed to concentrate on three key concept areas. The first area of concentration surveyed, focused on gleaning feedback from the students regarding their use of the Second Life Interactive labs. The second area of concentration was to assess the use of Second Life as a collaborative suite. The final concept area contained two separate statements: one survey statement looked to evaluate student opinion as to the value of integrating online students with on-campus students; the other statement, an open-ended statement, sought general feedback from the students on their experiences with the Second Life virtual world environment.

A. First Concept Area-Second Life Interactive Labs

The first concept area focused specifically on the interactive labs that were created specifically for this course. Responses from the first surveyed statement (see Table VIII) shows a distinct difference between the online and on-campus students with (64.5%) of the online student agreeing that the interactive modules proved helpful versus (38.9%) of the on-campus students agreeing.

TABLE VII.

END OF SEMESTER SURVEY POPULATION AND RETURN RATE

Survey	Total Population			Online Students			On-Campus Students		
	No. Students	Completed Survey	Return Rate	No. Students	Completed Survey	Return Rate	No. Students	Completed Survey	Return Rate
Final Course Survey	65	63	96.9%	44	40	90.9%	21	17	81.0%

TABLE VIII.

SURVEY RESULTS FOR FIRST CONCEPT AREA: PERCEIVED EFFECTIVENESS OF THE MEDIUM

Statement	Concept Being Canvassed	Responses	Total Population		Online Students		On-Campus Students	
			No.	Percent.	No.	Percent.	No.	Percent.
1. Throughout the course, weekly assignments included Interactive Modules in Secondlife; these asynchronous modules proved helpful as study aides?	Second Life Interactive Labs	1. Strongly Agree	15	24.2%	14	31.8%	1	5.6%
		2. Agree	25	40.3%	19	43.2%	6	33.3%
		3. Undecided	11	17.7%	6	13.6%	5	27.8%
		4. Disagree	5	8.1%	1	2.3%	4	22.2%
		5. Strongly Disagree	6	9.7%	4	9.1%	2	11.1%
2. While reviewing the Interactive Modules in Secondlife, did you ever collaborate with other students?	Second Life Interactive Labs	1. Never	18	29.0%	11	25.0%	7	38.9%
		2. On one or two occasions	14	22.6%	9	20.5%	5	27.8%
		3. On three to five occasions	9	14.5%	5	11.4%	4	22.2%
		4. On six to ten occasions	15	24.2%	13	29.5%	2	11.1%
		5. Eleven or more occasions	6	9.7%	6	13.6%	0	0.0%
3. Interacting with other students while reviewing the Interactive Modules helpful in your studies?	Second Life Interactive Labs	1. Strongly Agree	8	12.9%	8	18.2%	0	0.0%
		2. Agree	12	19.4%	10	22.7%	2	11.1%
		3. Undecided	8	12.9%	6	13.6%	2	11.1%
		4. Disagree	1	1.6%	1	2.3%	0	0.0%
		5. Strongly Disagree	1	1.6%	0	0.0%	1	5.6%
		6. I did not interact with others	32	51.6%	19	43.2%	13	72.2%

Responses for the second surveyed statement coincide with results from the first statement indicating more usage and interaction from the online students than those from the on-campus section. A full one-third of the online students (34.1%) had six or more virtual collaboration with other students compared to only two students (11.1%) from the on-campus section.

The third statement in this concept area assessed whether the students virtual interactions with other students were helpful in their studies. Although over half of the online students indicated they choose to have no interaction with other students, nearly one-third (32.3%) of the online students agreed that the interactions were helpful. Five of the students (27.8%) in the on-campus section choose to interact with others virtually with only two of those students (11.1%) indicating that they felt that the virtual interactions with the other students were helpful.

TABLE IX.

SURVEY RESULTS FOR SECOND CONCEPT AREA: SECOND LIFE AS A COLLABORATION SITE

Statement	Concept Being Canvassed	Responses	Total Population		Online Students		On-Campus Students	
			No.	Percent.	No.	Percent.	No.	Percent.
4. Throughout the course, several optional virtual team sessions were conducted that included students from both On-line and On Campus sections; these virtual team sessions proved helpful as study aides?	Second Life as a Collaboration Site	1. Strongly Agree	12	19.4%	12	27.3%	0	0.0%
		2. Agree	10	16.1%	8	18.2%	2	11.1%
		3. Undecided	23	37.1%	16	36.4%	7	38.9%
		4. Disagree	8	12.9%	4	9.1%	4	22.2%
		5. Strongly Disagree	9	14.5%	4	9.1%	5	27.8%
5. Through the course, did you ever take part in unscheduled or impromptu Secondlife collaborative sessions with one or more students in the course?	Second Life as a Collaboration Site	1. Never	15	24.2%	9	20.5%	6	33.3%
		2. On one or two occasions	16	25.8%	9	20.5%	7	38.9%
		3. On three to five occasions	12	19.4%	9	20.5%	3	16.7%
		4. On six to ten occasions	10	16.1%	8	18.2%	2	11.1%
		5. Eleven or more occasions	9	14.5%	9	20.5%	0	0.0%
6. Outside of scheduled class activities, did you used Secondlife to meet with other students during the semester?	Second Life as a Collaboration Site	1. Never	45	72.6%	29	65.9%	16	88.9%
		2. On one or two occasions	8	12.9%	7	15.9%	1	5.6%
		3. On three or four occasions	5	8.1%	4	9.1%	1	5.6%
		4. On five or more occasions	4	6.5%	4	9.1%	0	0.0%
7. Second Life is an effective platform for conducting academic meetings?	Second Life as a Collaboration Site	1. Strongly Agree	12	19.4%	12	27.3%	0	0.0%
		2. Agree	20	32.3%	11	25.0%	9	50.0%
		3. Undecided	6	9.7%	2	4.5%	4	22.2%
		4. Disagree	8	12.9%	5	11.4%	3	16.7%
		5. Strongly Disagree	4	6.5%	2	4.5%	2	11.1%
		6. Not Applicable, Online Centra	5	8.1%	5	11.4%	0	0.0%

TABLE X.

SURVEY RESULTS FOR THIRD CONCEPT AREA: VALUE OF ONLINE & CAMPUS

Statement	Concept Being Canvassed	Responses	Total Population		Online Students		On-Campus Students	
			No.	Percent.	No.	Percent.	No.	Percent.
8. Throughout this semester, online (distance education) students were given the opportunity to have synchronous class sessions with on-campus students. Including online students in an On-Campus Class through Secondlife added value to your educational experience?	Value of Online with On-Campus	1. Strongly Agree	10	16.1%	8	18.2%	2	11.1%
		2. Agree	10	16.1%	4	9.1%	6	33.3%
		3. Undecided	8	12.9%	2	4.5%	6	33.3%
		4. Disagree	4	6.5%	3	6.8%	1	5.6%
		5. Strongly Disagree	3	4.8%	0	0.0%	3	16.7%
		6. Not Applicable, Online Centra	27	43.5%	27	61.4%	0	0.0%

B. Second Concept Area - Second Life as a Collaborative Site

The second area canvassed in this survey (see Table IX) focused on the use of Second Life as a collaborative site. Student responses to the first surveyed statement in this area displays an obvious divide between the online and on-campus students with regard to the usefulness of the virtual team sessions with (45.5%) of the online students agreeing that the virtual team sessions proved helpful, while only two of the on-campus students (11.1%) indicated that the sessions were helpful.

The second and third surveyed statements in this area further demonstrate this division between on-campus and online students. Responses indicate that only two students in the on-campus section took part on unscheduled virtual sessions compared to seventeen students (27.5%) from the online sections with nineteen of the students (30.6%) engaging six or more times throughout the semester. Results of the fourth surveyed statement is of significant interest here; with over half of the population (51.7%) agreeing that Second Life is an effective platform for conducting academic meetings.

A final statement surveyed (see Table X) directly sought for student perceived value of blending online with on-campus students. Of the online student respondents who used Secondlife, (70.6%) of the them agreed that there was value; however, only (44.4%) of the on-campus students perceived value in the blending of the two class types.

VIII. CASE FINDINGS AND RECOMMENDATIONS

The purpose of this case study was to evaluate the use of virtually immersive technologies as a platform for the conduct of synchronous and asynchronous classroom activities. The research question we posed upfront was: 'What happens when online students are given the opportunity, through the use of virtually immersive technologies, to engage with students attending traditional on-campus sessions?'

Training students in project management tools, methods and techniques often necessitates the incorporation of multiple delivery approaches to meet established course objectives. Lectures, case studies, practical exercises, and teaming activities are all common elements; then couple that with the need to present the course to two distinctly unique student populations [online and on-campus] and the effort can appear insurmountable. But in this complexity can dwell a solution. Today's project managers are having to work in a more globalize environment with team members more often than not geographically dispersed from each other requiring team members to collaborate virtually [8] [9]. The ability to collaborate virtually is not limited to the online learners but is required of all project management students.

The preparation and structuring of this course delivery poses several challenges in developing and presenting a viable blended course framework [10]. The use of virtual teaming sessions and self-paced online case studies; incorporation of in-world interactive learning modules; assessment of impromptu, in-world, e-learning sessions in the form of informal student interactions; and use of online text and voice chat capabilities appeared daunting at first but eventual came to fruition. Based on the results of the survey's and the collective observations throughout the delivery of the course, the following findings and recommendations are presented:

1. The initial survey provided great deal of information regarding the early interactions of the students with the virtual world environment: their background, initial learning curve, early avatar interactions, and thoughts regarding the effectiveness of the virtual world medium. Overall, the initial learning curve did not appear too steep to gain the needed skills to conduct basic interactions within the virtual environment with only a select few students taking more than an hour to train prior to their first virtual world session. Avatar appearance did not appear to be distracting and resemblance to the student was not deemed essential to the whole interactive process. With regards to a code of conduct, student did expect some level of appropriate conduct within the virtual world. Finally, over half of the students indicated they were likely to use the second life environment in the future.

2. The second survey assessed the effectiveness of the virtual interactive labs, Second Life as a collaborative site, and the value of integrating online with on-campus sections. Responses regarding the interactive labs were mixed at best with the biggest complaint being the desire to have the slide presentations in hard copy rather than online in a video format. To minimize lag, audio was stripped from the slides which may have accounted for part of this concern since the students were left with just a visual presentation verses one with audio and video. The online students appeared more willing to collaborate with virtual teams than the on-campus students did, with many of the on-campus students questions why the need for virtual interaction in the first place. A small percentage of the students utilized the virtual environment on their own outside class yet over half of the students felt the site was effective for conducting meetings.

3. From a course delivery and management perspective the challenges were huge. This was a first time effort at the institution with regard to blending both online and on-campus sections utilizing this type of technology. Development of the interactive lab as well as the teaming and lecture labs took significant effort over the course of the semester prior to delivering this course but the real win here is that the virtual environments, tools and techniques are now available for easy replication and incorporation into other course efforts. Although many of the document presentation glitches in Second Life that surfaced throughout the course of the semester were rectified, their very presence most assuredly had an impact on the student's final survey responses.

4. It became very apparent throughout the semester that students had their own preferences for what tools and online communication channels they were comfortable with. Clearly, the majority of on-campus students did not see value in bringing online students to their classroom. Yet on the other side, many online students were eager to engage and interact with their on-campus counterparts. Evaluating this issue in the future could be crucial for both academics and institutions looking to offer more blending of course deliveries.

5. The student perceptions in this study provided a broad-stroke picture to the basic research question; however, further study and long range comparison including extended case observations and results analysis are needed to more clearly understand the impact of blending both online and face-to-face students.

6. A final question to consider here, as more collaborative virtually immersive tools become available to academics, are students going to demand more options/variety to match their own preferences?

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