Virtual world technologies provide platform for interaction between on-campus and online students: A case study

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Abstract

There has been a great deal of attention paid to efforts by educators to integrate teaching methodologies and strategies between face to face and online classrooms in an effort to maximize learning by combining delivery modalities. Recent 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. These studies tend to isolate deliveries to either all online classes and students or to all on-campus classes and students, without taking into account the more recent movement of blending teaching methods and crossing over the barriers between online and face to face students. So, what happens when online students are given the opportunity, through the use of virtual world technologies, to engage with students attending traditional on-campus sessions?

The purpose of this case study is to evaluate the use of virtual world technologies as a platform for the conduct of synchronous and asynchronous classroom activities. A framework for conducting an undergraduate 'Technology Project Management' course is presented that includes delivery approaches to students from both online (Distance Education) class offerings and on-campus (Face-to-face) class offerings. Stand-alone, asynchronous, or synchronous learning modalities are incorporated into the framework.

To evaluate the framework, a composite evaluation of survey, responses, and assessments analysis are examined. Discussion includes the challenges of developing and presenting this framework as well as managing the instructional complexities involved in the planning and execution of virtual world interactions in the classroom setting. Further discussion includes 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. The data indicates, surprisingly, that the learning curve for students was not as steep as expected and that overall the students felt reasonably comfortable with the introduction of this technology into their learning environments. Finally, there is little evidence, beyond pedagogical preference, of adverse effects in using this framework while there were some initially positive small gains in the online students' performance related to learning objectives using the virtual world technologies.

Introduction

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" [1].

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 [2]. 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.

Case Study Background

Over the past few years, several factors have surfaced to help motivate 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 virtual world (VW) technologies as a common delivery media. Secondly, having utilized the VW 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.

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 1 provides a breakdown of online verses on-campus students for this case.

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

Table 1: Population numbers for Case

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 virtual world 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.

Methodology

To evaluate the effectiveness of the virtual world 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 world environment Second Life and specifically the population background, initial learning curve students experienced, avatar interaction, and perceived effectiveness of the virtual world 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 [3] [4].

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 virtual world 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.

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.

Figure 1: Virtual Classroom Space

The second virtual space that was created was a virtual interactive lab building (see Figure 2). 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 Building

Figure 3 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 Interactive Lab Modules

The final virtual space that was created consisted of a series of Virtual Team Studios (see figure 4). 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.
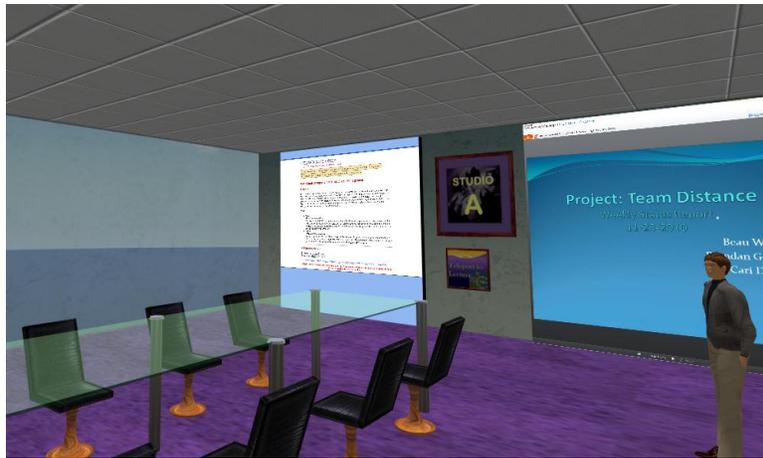

Figure 4: Virtual Team Studios

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 world, 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 [5].

The intent of the survey was to collect student opinion data following completion of their first course experience with the Second Life virtual world 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 [6]. The survey population consisted of (71) students that were registered for the course with (65) students actually completing the survey. Table 2 provides a detailed breakdown on the survey population and also indicates section and total population return rates.

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%

Table 2: Initial Second Life Survey Population and Return Rate

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 world environment that was presented to them.

First Concept Area - Population Background: The overall results of the first four statements (see Table 3) 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.

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%

Table 3: Survey Results for First Concept Area: Population Background

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 world 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.

Second Concept Area - Initial Learning Curve: The second group of statements (see Table 4) 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 world environment.

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 4: Survey Results for Second Concept Area: Initial Learning Curve

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.

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 5) 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.

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%

Table 5: Survey Results for Third Concept Area: Avatar Interaction

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 students 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'.

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 6) indicate that approximately one-third of the population deems the medium effective following their initial experience with the virtual environment.

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%

Table 6: Survey Results for Fourth Concept Area: Perceived Effectiveness of the Medium

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.

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 6 provides a detailed breakdown on the survey population and also indicates section and total population return rates.

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 7: End of Semester Survey Population and Return Rate

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.

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 8) 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.

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%

Table 8: Survey Results for First Concept Area: Perceived Effectiveness of the Medium

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.

Second Concept Area - Second Life as a Collaborative Site: The second area canvassed in this survey (see Table 9) focused on the use of Second Life as a collaborative site. Student responses to the first surveyed statement in this area displays a 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.

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 9: Survey Results for Second Concept Area: Second Life as a Collaboration Site

Third Concept Area - Online & Campus Students and Open-Ended Statement: The final group of statements presented in this survey concentrated on the perceived value added to the experience by bringing together both on-campus and online students. To accomplish this, the survey included two statements: one close-ended statement with ordinal responses and the other an open-ended statement. The results of this concept area are summarized in Table 10 below. The first surveyed statement in this area sought to gain an overall perceived value of the educational experience that the students received by incorporating both on-campus and online students together. The student responses indicate that a large segment of the on-campus students (44.4%) agreed that the experience added value to their course with four students (22.3%) of the students not seeing any value in the interaction. Of the seventeen online student choosing to use Second Life verses Centra for class sessions, twelve of them (70.6%) agreed that the involvement added value to their educational experience.

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%
9. Please provide any thoughts or ideas you may have regarding the use of Secondlife in the classroom or combining the study efforts of both online and on campus students.	Open-Ended Statement	[Comment]	36	58.1%	26	59.1%	10	55.6%
		[No Comment]	23	37.1%	15	34.1%	8	44.4%

Table 10: Survey Results for Third Concept Area: Value of Online & Campus

The second surveyed statement was open-ended with (58.1%) of the students making some comment. Of the study population, there were ten responses from on-campus students (see Table 11). Although there were three responses that generally expressed favor towards the Second Life experience, the majority of the on-campus students expressed concern for the technical issues faced while using the environment in class. The range of responses went from "Secondlife is terrible, and I never want to see it in a college classroom again" to "I liked second life when studying. I used the interactive modules to study for the quizzes and I believed it helped me. Even though some of the students were online, using secondlife it was like they were here. Got a lot from our secondlife sessions."

	On-Campus Student Responses to Open-Ended Question
OC1	I dont think second life was beneficial for on-campus students. I think its only useful for online students but on-campus students dont get much out of it.
OC2	Secondlife was different than anything I have used before. At first I didn't think It would be effective but as time went on it served as a great tool and study method.
OC3	At first I was skeptical about it but overall I think it has potential for online classes.
OC4	I believe if the virtual classroom did not have the issues it presented this semester (blackboard clicking back, etc.) it would be a great tool to conduct meetings. However, I do not feel it was an effective way to study outside of the classroom.
OC5	They need to fix the issues with viewing documents on the screen. When not in class the documents won't pull up on the computer or scroll up or down when you scroll up or down.
OC6	I feel second life isn't the best for using as an academic tool. It's a really cool concept, but I feel that web chatting could be more effective. I believe it could be more effective because there were several times where second life crashed on me and I couldn't get back on for hours. This never happened to me when I have web chatted with someone.
OC7	Secondlife is terrible, and I never want to see it in a college classroom again. I found it ridiculous to sit in a classroom on campus while also sitting in the virtual classroom. It was a hindrance to learning.
OC8	Improve screens in the virtual classrooms. They were all glitchy at times and what was supposed to be looked at on the screens would not work correctly most of the time.
OC9	Seemed to create technical difficulties, plus the slide video ran poorly in Second Life on my computer.
OC10	I liked second life when studying. I used the interactive modules to study for the quizes and I believed it helped me. Even though some of the students were online, using secondlife it was like they were here. Got a lots from our secondlife sessions.

Table 11: Survey Responses from On-Campus Students for Open-End Statement

	Online Student Responses to Open-Ended Question
OL1	As an experiment I felt SL had some mixed results, but I think it is worth pursuing. As an addition to the test evaluation of SL in the course, I would suggest one case study with mandatory collaborative elements conducted in SL.
OL2	It was a new experience for me. At first I wasn't that into it but I really ended up using Secondlife and I think more and more classes will use secondlife. I enjoyed Secondlife and got a lot out of the modules.
OL3	It's difficult to comment on the how effective SL is for a couple of reasons: first, it may have been too complicated for me to hit the ground running with it. I found it difficult at first to navigate. Second, I think my laptop was just barely able to run SL so it was a slow process. Overall I think that it has a lot of potential and at first I didn't give it enough of a chance, but the key may be to make it a little more easy to find where the labs/modules are and where the classroom is located. So I would certain continue using SL and if I have any future classes that use SL I'll be ahead of the curve.
OL4	Not everyone's system will support the video without hashing. SL should not be made a requirement for this reason.
OL5	The only problems that I had this semester was preparing for the quiz. If there was an outline available that showed information that could be on the quiz it would be very helpful. There is often a lot of information given in the Second Life interactive modules and in the reading, and to answer a 20 question quiz based off of that information is sometimes difficult.
OL6	The use of Second life should be optional, not required. While the collaborative aspects are beneficial, the overall use adds an unnecessary layer of complexity.
OL7	Module images or videos are slow.
OL8	I think the Secondlife seesions would be better if there were more formal guidelines about meetings. Sometimes not much was accomplished because some were trying to figure out how to use the program and others were just not participating. After it is used more I am sure it will be a great tool.
OL9	Though I was not able to attend all of the classes in second life I can see where it would be very helpful. I think that it would be very feasible to teach the DE classes in Second Life only. The only problem might be administering the quizzes. Second Life is not being used to anywhere near its capability. I enjoyed using Second Life, I found it a little challenging at first as I normally don't play video games on the computer. This was my fiirst time in this kind of a setting.
OL10	SL or other Virtual environments are the way of future business. This style of interactive teaching allows for true usable learning. Knowledge is not can you pick the right answer it is synthesis of real time data and building usable relationships. I believe that building curriculum devoted to this style of teaching would make complete use of the technology. Assigned group projects and presentations, virtual meetings, collaborative work products. Developing a classroom devoted to the media to include a mic'd room so that we could hear the classroom discussion allowing the online student to participate fully in discussions with out the distraction of interrupting. A better classroom view so the VL student can interact with the class and the black boards. Currently when you magnify in to a white board the sound on SL becomes mono from stereo. The integration of windows live will allow a more interactive class experience. I believe in the extraordinary future that this platform delivers both in academia and in the "real" world. a true pleasure.
OL11	Use a single station for the 'interactive' modules. The ones I saw looked like a PowerPoint slide show that was broken into 3-5 slide pieces. If you want interactive modules make them interactive. Something like the exercises they have on the Cisco Networking Academy sites. (Match terms, short ungraded quizzes, etc...) Put actual PowerPoints on the Blackboard site. Being able to download the file, review in full screen and print it out is helpful. This may be possible in second life but the controls are not intuitive. Students have been using MS Office (or the equivalent) for some time. It looks like whoever created the building and modules in second life did a great deal of work. I don't want to disparage that but I found the overall interface to be distracting

Table 12: Survey Responses from Online Students for Open-End Statement

There were a total of twenty-six responses (see Tables 12 and 13) to the open-ended question from the online students with eleven of those responses generally expressing a positive experience to the use of Second Life throughout the course. Most of the remainder of the responses focused on some of the technical issues faced during the course of the semester.

	Online Student Responses to Open-Ended Question
OL12	I found the Interactive Modules to be very helpful and easy to use. Due to my schedule, I was not able to attend many of the online meetings, and found it odd that we had to have a meeting time considering that its an online.
OL13	Second Life was awesome. I liked the interaction with other students as well as the interactive learning labs. Very cool way to learn.
OL14	While I think Secondlife is a valuable tool to aid with course delivery and I would have liked to participate more, it wasn't a good fit for me personally. I am an IT professional that works 60+ hours per week. To get the most out of SecondLife requires additional time that I just did not have available in my schedule. The Secondlife experience that I did get by way of Interactive Modules, was very useful.
OL15	Personally I did not get that much value from the Second Life sessions. Prefer text methods in Second Life but its not realistic to use them because the majority of people prefer spoken text. As for the interactive lessons, going online to Second Life to view the powerpoint slides was just another step, I would have prefered to just review them locally on my pc.
OL16	The secondlife platform did provide a unique experience and I personally thought it had potential. I do believe that it can be a powerful platform and give students a sense of presence, however I wouldn't make it a mandatory requirement.
OL17	I think the secondlife sessions we're great. The only thing I would have liked, was to be able to print the labs. I like to print them and use them to take notes on.
OL18	At first second life seemed like a pain. I couldn't understand why we did not just have powerpoint slides available. As with anything, people tend to resist change. Once i got accustomed to it because of the quizzes, i started to meet every week on Thursdays with a couple other classmates and teamed up for case studies. I would say it is very beneficial, and a great way to collaborate and interact with others. I would recommend this way of learning for future students.
OL19	I thought the Secondlife interactive lessons where are great idea and I found them useful to study each week. I was always going back and reviewing them and I feel that was helpful. I can see Secondlife being a great effort to combine students online and on campus but I didn't have the time to utilize it much at all.
OL20	Secondlife offered a great opportunity for distance education students to meet and discuss class material. However, the course material accessed through SL should also have been provided on Blackboard to allow students with very little time the ability to print off the material for reference and study away from a computer. SL, in my opinion, should be made available to students for an alternative method of meetings or class meets.
OL21	Secondlife was a very helpful tool and great interaction with other students
OL22	Initially, I had considerable technological difficulty with Second Life. Although the ECU team was very responsive to my questions, it took considerable effort on my part to diagnose and then solve the problem.
OL23	I thought the class' use of Secondlife was very 'neat'. It was definitely helpful in collaborating with other students in the class. It also gave a more personal feel to the course; instead of being all by myself at a computer/laptop. I really enjoyed my experience on Secondlife, and would not mind it if there were a bit more to do via SL.
OL24	I personally prefer reading my online material via a document or presentation. I did have some problems staying connected to Secondlife at times which proved to be an additional aggravation.
OL25	I enjoyed the Second Life sessions and thought they provided good information. I also listened to the recorded Centra Sessions each week, in addition to the Second Life session. I wish that we had availability to download slides presented as this contained some great info. Thanks,
OL26	The secondlife powerpoint presentation were helpful to a degree but once you started taking the quiz the notes and information i took in were not very helpful. When you are an online student it is helpful in getting the teacher more involved instead of having so many powerpoint presentations to lecture from.

Table 13: Survey Responses from Online Students for Open-End Statement (continued)

Case Findings and Recommendations

To date, one of the most common methods for learning centers on reading about a specific subject and then letting the words become similes for future physical (real) experiences. The challenge then for academics is to improve on that scenario. Virtual worlds provide us with direct experiences that can challenge our senses bringing us closer to a 'real world' experience. According to Heiphetz and Woodill (2010), the "more realistic the virtual world or simulation, the more we learn from the experience" [7].

Training students in project management tools, methods and techniques often necessitates the use 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 development and delivery of the course, the following findings and recommendations are presented:

(1) The 'Initial Second Life Experience Survey' provided great deal of information regarding the early interactions of the students with the virtual world environment Second Life, 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 'End of Semester Survey' was assessed the effectiveness of the virtual interactive labs, Second Life as a collaborative site, and 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) Finally, 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.

As a final observation, 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 on-campus students, as a whole, 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. Although beyond the scope of this current study, one might ask the question why and evaluate the blending of on-campus and online students further? Also, as more tools become available to us, are students going to demand more options/variety to match their own preferences?

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