

# Virtual, Immersive, Translational, Applied Learning: The VITAL Project

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**Abstract.** The VITAL Project is an interdisciplinary project that uses teams of students from multiple courses in a single semester to investigate a health-related topic, propose programs or therapies to ameliorate the health issue and deliver a presentation at a virtual three-day health conference held in Second Life. The purpose of VITAL is to provide opportunities for the students to gain a better understanding of the multifactorial nature of many public and individual health issues, as well as exposing them to technologies that enable them to virtually collaborate. The teams are composed of students from each of the four courses participating in VITAL in a given semester so that the content area of each course is represented on a given team. All team activities, such as meetings and presentation practice, are conducted on the department's island in Second Life.

**Keywords:** Health · Virtual worlds · Second Life · Education · Collaboration

## 1 Introduction

The department of Health and Human Performance at the University of Houston is devoted to the understanding, development, and promotion of a healthy lifestyle. As such, the department offers a number of graduate and undergraduate degree programs that can be considered health-oriented, including degrees in exercise science, motor behavior and nutrition. Given the multifactorial nature of many public health issues, the department has adopted an integrated curriculum that includes required courses in the scientific disciplines mentioned above. The multidisciplinary approach provides the students with the optimal preparation for both understanding the nature and consequences of many health issues as well as preparing them for entry into their professional life.

Paralleling the tremendous gains in computing power in the last 20 years, the development of virtual worlds has increased exponentially. Corresponding with the

gains in computing power, the use of virtual worlds for employee [1], medical training [2, 3], education, [4, 5], rehabilitation [6], and business functions [7, 8] has expanded. The instructors involved in the VITAL project believe that exposure to virtual worlds is an essential component of the preparation necessary to be successful in the current marketplace, regardless of a student's particular academic discipline. Providing the opportunity to work in a virtual world in a structured and collaborative manner to complete an academically relevant project enables our students to experience success beyond the boundaries of the environment that typically operate in.

## 2 Departmental Environment

In addition to the interdisciplinary nature of the curriculum, students in the program also experience multiple opportunities to interact with educational technology. Many courses are delivered exclusively online while others utilize the hybrid model with content being delivered on online with class time being used for demonstrations, explanations and content reinforcement. Several instructors require their students to complete video projects that are shared with their classmates while others make use of Second Life to provide virtual demonstrations and 'hands on' learning experiences. A well-equipped computer lounge provides students who lack the required technology to access the required educational technologies. The department was also the first at the University of Houston to offer a fully online degree when it launched an online Masters of Physical Education in 2003.

Today's students, the so-called "net generation," [9], use a variety of technology in their everyday lives and can be disenchanted by traditional face-to-face classrooms and even 'traditional' online learning environments that fail to engage them as a result of offering only one way content delivery. Outside of the classroom, students play games in virtual worlds, spend hours following the activities of friends and classmates on Facebook, and use text and Instagram messaging as an alternate to telephone calls. The department's faculty embrace these aspects of students' lives and incorporate a variety of learning technologies to meet the unique needs to today's college students. For many years, the faculty have been utilizing 'clickers' in the face-to-face classrooms as well as a variety of digital 'game-like' quizzes and activities that promote student engagement and content reinforcement. Currently, departmental faculty are developing massive open online courses (MOOCs) some of which will be taken by the department's degree seeking students. It is in this educational technology-rich environment that the VITAL project was developed as the instructors felt confident the students' varied experiences have adequately prepared them for educational technology and the innovative use of a virtual world.

During the exploration and implementation of various educational technologies, it has been found that regularly collecting feedback from the students is an important form of engagement. Additionally, student feedback provides insight to make needed changes in course content and delivery methods. Having found that mandatory end of term course evaluations do not provide sufficient information to evaluate the effectiveness of the introduction of new technologies into learning environment, instructors increasingly rely upon Survey Monkey and anonymous Blackboard discussion boards

to solicit feedback regarding what students like most and least about their courses and new technologies. Much of what has been learned over the past several years from student responses is incorporated into the VITAL project.

### **3 Rationale Underlying VITAL**

As mentioned, the various degrees offered by the department are all multidisciplinary in curricular approach. The VITAL project builds upon the idea that many health-related issues are multidimensional and therefore requires a multidisciplinary approach to their understanding, treatment and possible prevention. Health issues that impact millions of individuals, such as obesity or depression, are often consequences of complex interactions between lifestyle, genetics, public policy, laws and environmental factors [10]. Delivering a compartmentalized education to students, that oversimplifies health problems by dividing them into distinct scientific or curricular areas, compromises student success as future investigators, clinicians and health-industry employees [11]. An educational approach to an issue that is comprehensive and translational produces graduates with a broader foundation of health knowledge, advanced critical thinking abilities, and creative problem solving skills [12]. The VITAL project bridges the gap across distinct courses to foster students' understanding of the comprehensive nature of any public or personal health issue. The innovative use of educational technology provides the opportunity to integrate multiple courses into a collective project with students from various health-related classes bringing their unique perspective to address the health issue in question. By doing so, students' knowledge about a particular health problem is improved by promoting a multidisciplinary approach to learning. Today's graduates will work in environments that require them to interact with a variety of professionals who have received formal training in many different health-related fields. It is therefore important to develop a comprehensive curricular network approach to learning such that graduates are well positioned to excel in the workplace.

Given that departmental degree plans are already integrated with courses from multiple disciplines included within the plans, VITAL has been conceived to implement curricular integration at the individual course level. The within course integration enables students in different courses to work together on a health-related issue in a way that students from each individual course contribute a unique set of knowledge about a given health issue to the project. In this way, students from multiple classes begin to understand the multidimensional challenges associated with a health issue and develop a multidisciplinary solution.

### **4 Health and Human Performance's Island in Second Life**

In 2007, the department rented an 'island' in the virtual world of Second Life (SL). Although the use of an avatar within SL is free to both students and university personnel, the ability to control and develop the department's own site was critical to realizing the vision a virtual world presented to the faculty. Early development activities included branding the island with both University of Houston and Health and

Human Performance (HHP) department signage and flags, separate buildings associated with each degree program, a common green space pond and park, an alumni, a research and advising center, and an SL orientation building. The orientation building provided directions and opportunities to practice controlling an avatar. The intent was to create an environment the students were familiar with in the hopes they would become comfortable exploring our island and then branch out into the wider world of SL. In parallel with this effort, several faculty worked with a SL designer to develop demonstration activities specific to their courses. These activities were located in the levels above the island itself, essentially in the ‘sky’ and could be reached through activation of labeled teleporter poles. Several faculty members involved in the VITAL project have previously published articles concerning innovative uses of virtual worlds to promote healthy behaviors [13] and student persistence [14]. Once the VITAL project was conceived, it was necessary to remodel the HHP island to create more favorable spaces for team activities. The remodeling of the island included building multiple gazebos that can be reserved using the VITAL Services system, an avatar tracking system, and an orientation ‘path’ around the island. This orientation path contained 20 different activities or skills that are essential for reasonable avatar functioning within SL. Generally the path’s activities are arranged from most critical, for instance, controlling avatar movement to more sophisticated skills such as simple building principles. This path is a tremendous improvement over the original orientation building and allows the island to accommodate many students at one time all while developing avatar skills early in the semester. Map stands are placed throughout the island to aid in navigation around the island. An outdoor coliseum structure in which the virtual health conference is held has also been also built (Fig. 1).

A critical feature of the coliseum is the presentation stage that allows avatars on the stage to navigate their presentations on the coliseum’s projection screen. Only avatars on stage have access to the virtual technology that controls the presentations, a critical feature that prevents unnecessary distractions by audience members. After the initial semester in which the VITAL project was conducted, a gazebo containing exemplar VITAL presentations and practice stage was built. The technology on the practice stage was identical to that used during the students’ actual presentations at the virtual health conference. This enabled the students to become familiar with how the microphone and navigation features of the presentations worked, as well as practice their presentations in front of a small audience or their teammates.

## 5 Operationalization of VITAL

The basic approach used to operationalize the vision underlying VITAL is to form teams of students from four different classes, have them chose either a public health issue or personal disease, for example, Parkinson’s disease, explore the features of the issue and ultimately present their findings and recommendations in a virtual health conference within SL. Although different courses are included in the project in different semesters, VITAL teams always consist of students from four different classes that allow multidisciplinary exploration of the health issue (Fig. 2). For instance, one semester students from the Motor Learning and Control, Physiology of Human



**Fig. 1.** Aerial view of the VITAL island. The coliseum is the round structure in the middle of the island at the top portion of the figure. The white circular structures are the meeting gazebos. The orientation path can be seen in the bottom left hand corner.

Performance, Seminar in Nutrition Research, and the Urban Fitness Programming course participated in VITAL. Other semesters a psychology of sport and exercise, design and evaluation of physical activity programs, or a nutrition seminar course may substitute for one of the above courses (Fig. 3).

The grouping of courses results in team members from the various disciplines encompassed within the course they are enrolled in to focus on exploring and submitting material to the team that is directly related to that particular course. For example, a student enrolled in Motor Learning exploring Parkinson's disease submits information about the etiology of the disease and related movement characteristics, students enrolled in the Designing and Evaluating Physical Activity Programs course may submit information about physical activity programs that can be implemented with individuals with Parkinson's disease. Likewise, students on a team addressing adult obesity and enrolled in the Exercise Physiology course may submit material about the physiological impact of obesity while those students enrolled in a Public Health course are responsible for providing information about the prevalence and the annual cost of obesity to the economy.



**Fig. 2.** An example of one of the gazebos that students used for virtual VITAL meetings.

All instructors participating in VITAL within a given semester provide identical information about the project in their syllabi. This information includes a description of VITAL's purpose, a template of what aspects of the health-issue need to be addressed, for example, incidence rate and diagnosis, milestones to be met during the development of their final presentation, use of Second Life, peer evaluation form, and a grading template. All instructors equally weight the value of VITAL project towards the students' final grade in their course. Most semesters, the value of the VITAL project is approximately 25 % of the final grade. In addition to the information in the syllabus and in-class discussion, three face-to-face orientation sessions are held in the student computer lounge. The orientation sessions include information about VITAL as a process, including the expectation of a first class virtual presentation as the final outcome of the process and information and hands on experiences with SL. Although these orientation sessions are optional, they are generally well attended.

Once students download SL and created their avatar, printed and online class material directs them to the HHP island in SL. Once they teleport to the island, a large billboard directs them to enroll in the VITAL tracking system. This system requires that they provide their actual name and their avatar name. The tracking system allows the instructors to monitor the overall avatar usage on the island and determine which areas of the island, for example, the orientation path, receive the most traffic during different times of the day.

Each semester the students from two of the four VITAL courses are assigned the role of Team Leads with the students from the other two courses being assigned the role of Team Members. For logistical ease, the students in the courses with the smaller number of enrolled students are assigned as the Team Leads. The number of students in



**Fig. 3.** The VITAL coliseum during a presentation.

these courses determines the number of VITAL teams that are formed. If the smallest classes still have a large number of students, two students from those classes are assigned a co-Team Lead role. All team leads have at least one student from the other two courses. Each team ranges between four and six students, depending upon the enrollment of the courses participating in VITAL in a semester. Depending upon the size of the other courses contributing team members to a project, a particular team can have up to three students from a particular class, although this is rare. The team leads or co-team leads are responsible for choosing the VITAL team's health-related topic from a list provided by the instructors.

To this point in the process, communication about the VITAL process and development occurs through email using the university's course management system (Blackboard) or in class announcements, depending upon whether the class was fully online, hybrid or face-to-face. Once the teams are formed, each team member is placed within a separate course shell within Blackboard. This important step allows the team to communicate exclusively with each other using Blackboard's email, discussion board, and document upload features. The next step is the team lead contacts his or her team members to schedule a virtual meeting on the HHP island and use the VITAL

Services reservation system. The use of the reservation system ensures a particular gazebo is available to conduct the team meeting. Each team leader is required to virtually meet five times across the semester and each team member is required to attend at least three of the five meetings. The team lead is responsible for tracking the attendance of each team member and reporting it to the instructor as part of a team meeting summary report. To allow the instructor to determine the overall quality of the meetings and make sure each team is on track towards the development of a final presentation, both the team leads and team members copy the chat log from within SL and submits it as a text document as part of their meeting summary report. The chat log contains a record of when and where the meeting took place, each team member's avatar's name, and contribution to the meeting, including what was discussed. The chat log provides important documentation of attendance and level of team member participation should any disputes concerning these two issues arise.

As the semester progresses, the team is required to accomplish milestones designed to ensure continued progress toward the development of their final presentation. A brief description of each milestone is presented in Table 1.

The culmination of the VITAL experience is a three-day virtual health conference held in the coliseum on the HHP island. Each team lead provides a 15 min presentation while on the virtual stage using the SL microphone feature. This feature allows the audience to hear the presentation through their computers while viewing the presentation on the virtual screen contained in the coliseum. Five minutes are allowed for audience members to ask questions of the presenters. Students enrolled in the courses participating in VITAL within a given semester are required to attend at least five presentations and provide a written summary report of each presentation. In their summary report, the students are to answer what they found interesting about the presentation, at least one new fact they learned, what areas of the presentation they would improve, and any suggestions for additions to the presentation. Each semester the virtual health conference is promoted using hallway posters, the department's Facebook and web page, and in the student newspaper. Anyone with a SL avatar is invited to attend the conference regardless of if they are currently enrolled or not in the VITAL courses. It is not uncommon for avatars with no affiliation with the university but interested in health-related issues, to attend the conference. The number of presentations at the conference range from 35 to 55 depending upon enrollment and the number of teams within a given semester. Although the presenter can physically be anywhere there is access to the internet, as a convenience, the department provides an isolated room with internet access and a large screen monitor that the team leads can use to make their presentations. Instructors are also present to monitor the room during the presentations and support staff assisted with any technological problems.

## **6 Lessons Learned and Development of VITAL Support Methodologies**

As the VITAL methodology developed it became increasingly clear that to realize the full potential embedded within the VITAL experience, we needed to provide the students with a great amount of specific information. Given that only a small percentage of



**Table 1.** Listing and description of VITAL activities required to be completed by the participating students.

Activity	Purpose
Face-to-face Second Life Orientation (optional)	Introduce VITAL project and SL to students
Second Life Quiz (Blackboard)	Learning tool to determine that students have begun using SL
Enroll in Vital Services (SL)	Provides avatar tracking & meeting reservations privileges
Introduction of assignment (Blackboard)	Students provide introductory information to their teammates (names, class, one interesting fact about themselves)
Virtual team meetings (SL)	Working team meetings required for the development of final presentation. Each of the 5 meetings must be completed by an instructor provided deadline
Submit meeting chat logs (Blackboard)	Provides instructor with information about attendance & relative contribution of each team member to meeting
Submit reference articles (Blackboard)	Each team member submits two pdf articles relevant to the presentation topic. Articles contain information about aspects of the topic based upon the course they are enrolled in. Example – students enrolled in nutrition courses submit articles about nutritional aspects of the presentation topic, those enrolled in the physiology course submit information about physiological aspects of the topic
Submit sample presentation slide (Blackboard)	Each team member submits a slide with summarized information from the submitted articles for inclusion in final presentation
Upload final presentation (SL)	Required only of team leads; provides instructors a culminating record of the teams' assignment
Deliver virtual presentation (SL)	Required only of team leads; provides instructor an opportunity to evaluate presentation skills of team lead
Virtually attend 5 VITAL health conference presentations (SL)	Submit a written summary of each presentation attended using an instructor provided template, provides student accountability
Submit peer evaluation of each team member (Blackboard)	Provides instructor information and reinforces team member accountability through the VITAL process
Complete VITAL follow up survey (SurveyMonkey)	Provides instructors information about the overall VITAL process and strength and weakness of the process

our students had done anything other than play games within a virtual environment, it quickly became apparent they were having a difficult time grasping the concept of working collaboratively and ultimately presenting material in SL. This finding is

consistent with the report that even students who are relatively sophisticated users of technology are slow to embrace new uses for educational technology [15]. As mentioned above, after the first semester in which VITAL was employed, examples of high quality presentations were provided to the students. This enables them to gain a sense of what their final presentations are to look like. Feedback indicated that the ability to 'see' examples of the final presentations early in the semester provided a level of comfort and confidence that they also could be successful in the virtual world.

The first semester that VITAL was employed, the instructors focused on the VITAL process and the difficulties our students were having using the unfamiliar technology. What we failed to realize early on was that many of our students were lacking in organizational skills and the 'soft' skills often required for assembling and directing a team. This oversight was revealed to us as we, in the form of our avatars, virtually attended a number of team meetings. Almost none of the team leads had prepared any sort of meeting agenda or had a clear goal for what they hoped to accomplish in the meeting. The first meetings of the semester tended to quickly veer off into complaints about why they had to participate in the group project, let alone a virtual group project. We intervened at this point with each instructor speaking to their class about how to conduct meetings and established some assignments with due dates. This helped to provide some structure for the students and ultimately led to more successful experiences.

To ameliorate some of the difficulties the students were having in conducting productive meetings, example scripts were developed. These scripts were transcripts of well run, productive meetings conducted by the instructors with other instructors and VITAL staff serving in the roles of team lead and teammates. Scripts of poorly run meetings were also developed and provided to the students. Both the 'well run' and 'poorly run' meetings were filmed in SL, uploaded and the students were provided a link so they could watch the meetings.

Another early oversight was the assumptions that the team leads would choose a spot on the department's island to serve as meeting place for his or her team. For example, 'meet by the duck pond at 6:00 pm on Thursday'. Instead, all of the teams tried to conduct their meetings very close to the island's landing pad. Students would teleport to the island, wander around to a group of avatars, and listen to the conversation trying to determine if they were in the correct team meeting. This was a concrete example of our student's inability to properly organize a meeting. This problem was solved by building five gazebos designed as team meeting spaces, each with a unique name. Using the VITAL Services system, team leads were able to reserve a particular gazebo at a particular time. This reservation system completely solved the problem of students wandering the island in search of their team.

During the first implementation of VITAL, we also learned that not having standardized assignments with common due dates across the different courses was an invitation to chaos. Teammates from different classes would inform other team members of assignments and due dates that were not relevant to those students' particular classes, leading to difficult class management issues for the VITAL instructors. To resolve this issue, the instructors developed standardized assignments and due dates and made sure they were emphasized within the class syllabus for each of the classes participating in VITAL that semester.

Another lesson learned was that many of the students were unable to assemble a high quality presentation or present it in a professional manner. As mentioned above, this issue was addressed by providing examples of good presentations from previous semesters and providing the students a template of what elements need to be addressed in their presentation. For example, a particular disease's characteristics, incidence rate, etiology, nutritional factors that may exacerbate or assist in the management of the condition, physiological functioning and therapeutic protocols and technologies are examples of items that are required for inclusion in a presentation concerning a particular disease condition. Public health issues, such as childhood obesity or teen depression, have their own template of required elements. Eventually, VITAL manuals for team leads and team member were developed that contain all of the information necessary to participate in a successful VITAL experience. These manuals are available for download and contain text, pictures and valuable links to online material that served as an effective student resource. A VITAL manual was also developed for faculty that enables relatively smooth incorporation of new faculty into the VITAL project.

We learned that the relative value in terms of a student's course grade must be very similar across classes. It is important that each team member has the same relative externally provided incentive to contribute to the group project. During the inaugural use of VITAL, different instructors gave the project a different relative weight of the student's final grade. In retrospect it was not surprising to discover those who efforts would more strongly influence their final class grade contributed more than those whose efforts counted less. Eventually, the instructor team decided that VITAL counts approximately 25 % towards a student's final grade regardless of which class they are enrolled in. This seems to be a reasonable number that indicates to the students that the instructors view VITAL as an important component of their particular course while at the same time, not overwhelming the other assignments in the course.

Finally, acceptance of VITAL became greater as those that were teammates in their sophomore and junior level courses eventually enrolled in senior level courses where they served as team leads. Having previously gone through the VITAL experience prepared them to take leadership roles that led to successful final presentations.

## **7 Student Feedback**

The feedback provided by the students indicates general acceptance of the VITAL process with some students thinking that it was an innovative and exciting use of technology while a small number are unhappy being forced to participate in a team project that requires them to learn a new technology. As technology improved, particularly the video cards used in laptops, the students experienced fewer technological problems with the use of SL. Early on, complaints about SL itself were quite prevalent. These types of complaints abated over the years.

The other area that initially drew of criticism was that of collaborations with teammates. These generally took the form of teammates complaining that 'my team lead ignores my input regarding when the team meetings should be and he or she is disorganized'. Conversely, team leads complained that their teammates did not show up for the virtual meetings, provide the requested information and were generally

nonresponsive to the team lead's requests. These issues were dealt with through the development of formal, graded assignments with common deadlines across class and the development of extensive VITAL manuals. Additionally, a team member and team leader peer evaluation form was developed. The team lead(s) complete a survey rating their team members and team members complete two surveys, one rating their team leads(s) and the other rating their fellow team members. There is also a self-evaluation section on the form. The results of these surveys are factored in to the student's course grade. The peer survey provides an increased level of accountability across the students and has resulted in fewer complaints about unequal effort across the student teams.

Finally, acceptance of VITAL became greater as those that were teammates in their sophomore and junior level courses eventually enrolled in senior level courses where they served as team leads. Having previously gone through the VITAL experience prepared them to take leadership roles that led to successful final projects.

In the most recent VITAL survey, 60 % of the students rated the VITAL experience at either 'excellent' or 'good'. A strong majority of the students indicated that VITAL should continue to be incorporated into the curriculum. The examples below are representative of the type of feedback that is received on the surveys administered after the completion of the VITAL project.

In response to the question 'What did you like MOST about VITAL?' comments included the following representative statements.

'My VITAL experience truly showed how people from different curriculum areas could be integrated within the unique environment of Second Life to develop a high quality presentation. Until VITAL I had never experienced such a unique learning experience.'

'The interactive nature of the group project and its 'global' perspective. You work with students from many other classes, which is quite amazing in fact.'

'It taught me how to lead better.'

'The opportunity to attend class mates presentations (my course was online).'

'Participating in something entirely new, presenting a presentation virtually, and witnessing presentations virtually.'

'The array of projects and ideas that were presented. Some of the projects were well thought out and seemed very professional like they could be carried out as they were, I was very impressed by level of projects.'

'The outside of my comfort zone experience.'

'The assignments that students in each class had to complete that uniquely contributed to the final project. That made me feel that I was still learning the information that I needed to learn in 'home' class but was also contributing information to a larger project without any of the team members duplicating effort.'

In response to the question 'What did you like LEAST about VITAL?' comments included the following representative statements.

'Technical difficulties are inevitable but it is definitely a big issue.'

‘Giving the presentation through Second Life. I had a lot of technical problems even on the computer at campus.’

‘There are too many glitches and technical issues associated with the program.’  
 ‘A few team members did not attend meetings or did not provide any feedback.’  
 ‘A project like VITAL requires a lot of communication.’

In response to the question ‘What would you recommend to improve the VITAL project?’ comments included the following representative statements.

‘Have more tutorials for Second Life with an instructor present to help students in person.’

‘Meet once in person before the project begins.’

‘Instructors involved with the VITAL Projects should hold introductory meetings in Second Life.’

‘Maybe a tutorial of how to use the program.’

‘Set clear guidelines of what is expected of each student.’

Finally, the next two student quotes provide extended commentary about two interrelated issues concerning ‘soft’ skills and leadership skill development that were inherently imbedded within the VITAL experience. These quotes are representative examples of students who clearly gained knowledge beyond just that of health-related content.

‘As a team lead, I initially was only concerned with the content of the presentation I was scheduled to present. However, I very soon realized that I was being presented with learning opportunities embedded with the VITAL project that I hadn’t previously considered. For instance, I quickly learned that there is a skill involved arranging and conducting productive meetings, how to effectively manage team members who don’t fulfill their assignments and how to develop informative presentations. I quickly learned that these are all skills that require practice and VITAL provided those opportunities to learn those professional skills. I am sure these ‘extra’ skills will be valuable in my future professional life.’

‘The next semester, I was in Dr. Layne’s motor learning class and served as a team lead. Up to that point at UH I had not been asked to serve in a leadership role for my classmates. I quickly learned that I would need to improve my organizational skills if I was going to lead a successful project. Having been a team member previously gave me a much needed perspective on how to be a more effective team lead. Serving as the team lead made me realize that one of the strengths of the VITAL project was that because it involves multiple classes, the students in the department would eventually serve in both the team lead and team member roles and in that way gain a larger perspective about how teams work to complete a project. Those types of lessons extended beyond the basic content I learned about the topic.’

## **8 Expansion of the VITAL Methodology**

In its essence, VITAL is a learning management system that can be utilized by any combination of courses whose content can be logically integrated. The methodology, with its seamless integration between Blackboard (or any learning management system) and SL (or any virtual world), has evolved to the point that the full potential of a virtual

world can now be utilized. For instance, professors from various academic departments can use the VITAL methodology to develop a class that demonstrates relationships between various disciplines that at first blush might seem unrelated. For example, VITAL can be used to link a motor learning class, a dance class, and an art class that featured paintings of human physical actions. The VITAL methodology can also be used with students in classes from civil, mechanical and electrical engineering to develop a simulated building within a virtual world. Essentially, any group of instructors, located anywhere in the world, can implement the VITAL methodology to provide their students a unique and engaging learning experience that emphasizes the integrated nature of our world.

## **9 Potential Barriers to the Use of VITAL**

Two barriers that may prevent widespread adoption of VITAL include cost and associated staff resources. The cost of renting an island in SL can be prohibitive for many institutions. However, as open SIM technologies become more prevalent, the cost of maintaining a site on which to conduct virtual activities will decrease. The development of a functional virtual world can also be quite expensive, as most institutions currently do not have staff members capable of building relatively sophisticated virtual structures. Generally, more elaborate SL construction needs to be subcontracted out to professional designers whose compensation rates can vary. The development of the VITAL Services reservation and tracking system revealed itself to be essential to conducting VITAL and such a system required relatively high level programming. The current VITAL methodology involves a number of assignments that require some level of 'grading'. Most of the grading is relatively cursory in that it primarily involves confirming the teammates have completed the required assignment by the due date. For example, graders determine if the team members submit their required articles on time. However, the grading of some activities requires a significant time commitment, for instance, scanning the chat logs to determine who was actively participating in a team meeting or assessing the final presentation. At the University of Houston, we are fortunate in that teaching assistants are available to assist the instructors with the lower level assignments thereby freeing up the instructors to grade the more involved assignments. Our instructor teams also benefitted from competitive university-level programs that provided modest levels of funding to support the development of VITAL materials and SL island improvements. Finally, for VITAL to be an optimal learning experience, a team of like-minded instructors who believe in the value of integrated, cross disciplinary learning utilizing non-traditional approaches, is needed. As students complained about VITAL, particularly in its development stage, it was important to present a unified and consistent message to the students as to why we believed VITAL was an important part of their education.

## **10 Conclusions**

To date, over 1000 students have participated in VITAL, over 22,000 h have been spent in VITAL activities on the department's SL island and over 250 health-related

virtual presentations have been made. These metrics provide a snapshot of the reach of the VITAL project into our study body. The high quality of many of the presentations combined with much of the feedback we receive indicates the goals of fostering a positive, collaborative experience in a virtual world are being accomplished through the VITAL project. We feel confident that the VITAL experience has provided our students with a level of curiosity and confidence to further explore virtual worlds and other innovative technologies as they embark upon their professional careers.

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