

## **Innovation in Learning: Assumptions about Teaching in a Virtual World**

*The Instructional Technology Program at Appalachian State University has moved significant components of the program, including course experiences, into a 3D virtual world. The process of developing this world and interacting with students through this medium raises some fundamental questions about teaching and learning, particularly as it relates to distance education. This paper describes the effort and explores some of these questions.*

### **Innovation as Transformation**

The emergence of nontraditional instructional delivery systems has generated considerable debate within the higher educational institution community. Education is moving rapidly from a traditional face-to-face setting to an Internet-enabled one. Research clearly shows that distance education courses and enrollments have proliferated in recent years – a transformation facilitated by the myriad inventions leading to computers, networking, and the Internet (Lewis, Alexander, and Farris 1997; Lewis et al. 1999; Waits and Lewis 2003). But the question of how education uses these inventions -- and whether truly innovative practice will result -- is open to question.

In an interview with the Association of Computing Machinery ([ACM](#)) online magazine, Peter Denning defined innovation as follows:

An innovation is a transformation of practice in a community. It is not the same as the invention of a new idea or object. The real work of innovation is in the transformation of practice. In this definition, community can be small, as in a workgroup, or large as in the whole world. A transformation of practice in the community won't happen unless the new practice generates more value to the members than the old. Value may not be economic; it may be pride, reputation, health, safety, freedom. Many innovations were preceded or enabled by inventions; but many innovations occurred without a significant invention. (Denning 2004, 21-27)

Is a course or a program that is offered fully or partially online innovative -- or is it simply doing the same things with different tools? Is recording and posting a lecture on the Web for students to listen to an innovation? Are multiple choice tests on a web page more innovative than congregating students in a room for a fixed period of time? Is a discussion board an innovation or simply an attempt to do what we have always done but without having to be in the same room to do it?

These may be examples of innovations. They do change important aspects of the way education is conducted. They do have the potential to generate more value, by making education more readily available to more people and under different circumstances. But real innovation requires more than simply using new inventions to do the same things in a different context. Real innovation requires exploring our core beliefs of what teaching and learning are, discarding rigid adherence to the ways we have done it in the past, and seeking processes that help us accomplish our educational goals in ways that may not look familiar.

### **A Lesson from Cinema**

There are lessons to be learned by looking at the development of other technologies that we now take for granted. For instance, movies and plays are an accepted part of our culture. But that was not always true.

A movie is a distinctly different art form from a play--now. Yet the moving picture camera was in existence for some fifty years before the movie, as a unique art form, was invented (Kay 1992). Before then the moving picture camera captured a variety of vignettes and presentations that more resembled a recorded play than what we would call a movie. The technical limitations of the moving picture camera and other equipment associated with capturing and replaying motion were among the many reasons for this. However, it is likely the greatest impediment to early innovative filmmaking was that those who first

possessed moving picture cameras were using them to solve problems that existed before the ability to capture and record motion was invented.

Before the moving picture camera, people were aware of events only through the words and sketches presented in newspapers or other publications. Often these sketches were done by artists who had not witnessed the event first-hand. Readers' understanding was constructed primarily by a single snapshot view presented through one interpretation and perspective. A person could read about a daredevil walking a tightrope across Niagara Falls and perhaps see a still sketch of a man captured in the process of taking a step on a narrow wire, but could not see that person walking and balancing over the roaring and foaming waters. If a person wanted to see a play as performed by the great actors of the day that person had to go to the place of the play and attend a performance. When the moving picture camera was invented it was first used to solve these kinds of problems. However, watching a play recorded from the center seat in the fifth row by a moving picture camera is a poor substitute for experiencing that same play live in a theater.

Nearly fifty years after the moving picture camera was invented, D.W. Griffith and others began to experiment. Griffith moved the camera to give different views of the scene. He interspersed close-up shots among the longer shots of the scene, introduced cuts to different locations to show action that was taking place simultaneously, and used flashbacks to show action across time. Through his experiments with cinematic staples we take for granted in today's movie theaters, De Mille was one of the innovators that help develop the modern movie. As he did, the old problems cinematographers were trying to solve with the new technology disappeared -- and new problems emerged.

### **The Moving Classroom**

We find ourselves now in a similar situation in education. We have powerful new computing and networking technologies that support innovative ways to teach and to "do learning." But in the process we more often recreate what is familiar to us using these technologies than creating anything truly different. Most of our distance education settings look like traditional face-to-face classes transferred to the web, or to video, or to whichever medium that may be employed. But they are not the same; just as watching a play recorded with a moving picture camera clearly is not the same as attending a play.

As educators, we want to reach out to populations who need and who desire an education and we see these new tools as a means for doing so. Unfortunately, we often find that using distance education to support learning just makes learning more distant. Instead, educators should look for opportunities to use new technologies to make education more meaningful, not simply more available.

Simply transferring educational practices from one setting to another is a trivial effort likely to continue disappointing those organizations that support and engage in it. Educators must spend less time employing new technologies toward solving existing problems. Instead, we should focus upon educational goals and their underlying assumptions about teaching and learning as we develop distance education environments. Educators must skillfully calibrate the goals that reflect our current and emerging missions -- and the technologies we have available to help us get there. We must understand the relationship between our assumptions about teaching and learning and the technologies we use to manifest them from a distance.

Both a movie and a play exist to tell a story. However, the difference between them lies in the processes of creating the story-telling environment, and in the underlying goals and objectives each producer brings to the process. In the same light, distance education should not be treated as a new solution to an old problem. It is a solution for contemporary times that brings about problems of its own, and at the same time makes old problems irrelevant.

### **Analyzing Distance Education Systems**

Watkins and Kaufman (2003) provide us with a way to consider distance education as something new rather than an adaptation of traditional teaching and learning (chart 1). They put conventional or traditional classroom-based instruction next to historic distance education (correspondence study), current distance education, and what distance education might be in the future. They then analyze each of these modes of instructional delivery by its focus, what drives it, how needs are identified, etc.

As we can see from their analysis, current distance education has more things in common with traditional classroom-based instruction than it does with what distance education can become. That leads us to suspect that current distance education is more a case of using new inventions (e.g. web pages, online chats, video streaming) to solve old problems than it is an innovation that comes with its own goals and problems.

It is with this perspective in mind that the faculty of the Instructional Technology/Computers program at Appalachian State University decided to explore their assumptions about teaching and learning and the way the program is conducted, including the needs and interests of the students before moving elements of the program online. From this effort and the consideration of the Reich College of Education Conceptual Framework the faculty decided to put online elements of the program into a 3D virtual world.

**Chart 1**  
**An Analysis of Distance Education Delivery Systems<sup>1</sup>**

	<b>Conventional Instruction</b>	<b>Classic/Historic Distance Education</b>	<b>Current Distance Education</b>	<b>Future Distance Learning</b>
Is it learner, teacher, organization, or society focused?	Teacher and organization focused	Learner focused	Learner and organization focused	Society, organization, and learner focused
Is it content driven or driven by the usefulness of what is learned?	Content Driven	Content Driven	Content Delivery Driven	Usefulness Driven
Are needs identified?	Needs assumed	Needs assumed	Needs assumed	Needs determined
Are the courses/programs linked to external usefulness?	Usefulness assumed	Usefulness assumed	Usefulness assumed	Usefulness linked to external value added
Location of course/program delivery	Institution	Remote site or home	Remote site or home	All sites possible
Course/program delivery mechanisms	Conventional means with some audio-visual support	Video, telephone, correspondence materials/books and workbooks	Computer, web, some video	All means possible
Frequency of Interaction between learner	Some of the time	Rarely	Some of the time	Often

<sup>1</sup> Adapted from Watkins, R. and Kaufman, R (2003). Strategic Planning for Distance Education. In M.G. Moore & W.G. Anderson (eds.), *Handbook of Distance Learning* (p. 515). Mahwah, NJ: Lawrence Erlbaum Associates.

and instructor and between learners				
Is return on investment evaluated?	Return on investment assumed	Return on investment assumed	Evaluation of return on investment for learners and sometimes the institution	Evaluation of return on investment for all

### The Virtual World

AppEdTech is the name of the virtual world that is running on an ActiveWorlds (<http://www.activeworlds.com>) Galaxy Server at Appalachian State University. The Galaxy Server is running on a modest hardware setup (450 MHz Pentium with a 10 GB hard drive and a 100 Mb network interface card). The Galaxy Server comes with a customized ActiveWorlds browser that connects directly to AppEdTech. The browser presents the user with four distinct areas (see figure 1):

1. A central 3D view of the world, either in first person view or a third person view from behind the user's avatar.
2. A text-based chat space below the 3D view that allows users to interact with other users.
3. A web space to the right of the 3D view that presents the user with web pages that connect interactions of the user with objects in the world.
4. A utilities space to the left of the 3D view and chat space provides the user with access to help files, telegrams sent by other users, teleports (similar to bookmarks on a web browser that allow the user to go directly to a place in the 3D environment), contacts (a listing of people the user wishes to interact with that provides information on the contact, such as whether the contact is online, and contact resources such as the ability to send telegrams or join others where they are in the 3D world).

As they enroll in our program, students are provided with a username, password and web site that provide a download link for the AppEdTech browser.

Users can choose the view they would like to use (first person or third person), what avatar they would like to use to represent them in the 3D world, and how they would like to control their movements (mouse or keyboard).

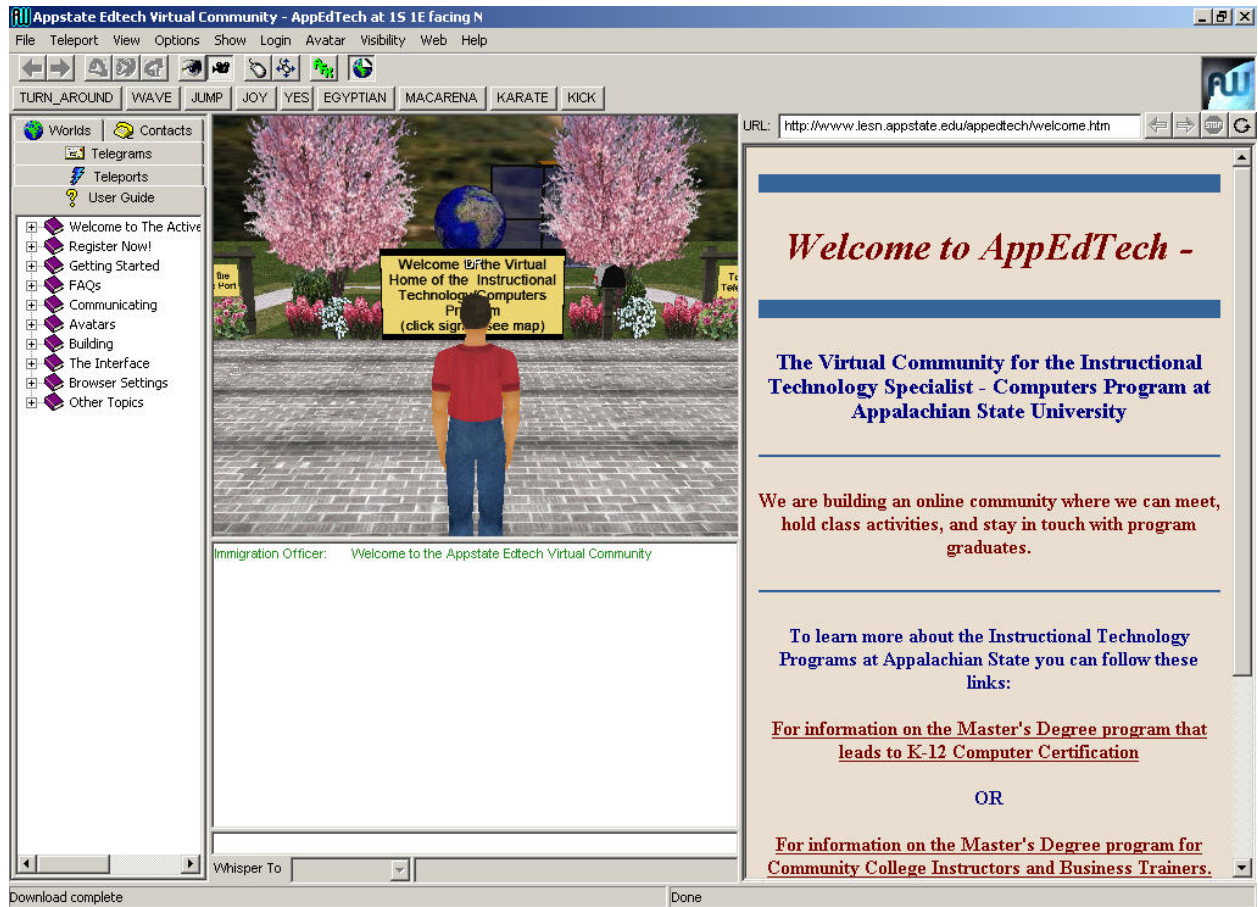
Web pages can be brought up in the space to the right of the 3D view by clicking on objects that are associated with web pages or by entering areas that trigger a web page (somewhat like passing through sensors that open automatic doors in a department store). Web pages can also be opened in a new, full screen window if the page does not display well in the limited space provided by the AppEdTech browser.

Chatting is as simple as typing in the space provided below the 3D view and pressing the enter key. Chat entries go to all users located within a certain distance (within the virtual world) of the person (avatar) initiating the comment. There is a whisper option for communicating with one other person rather than a group. All users within a certain distance are listed in the whisper part of the chat space. The user wishing to communicate with a single person simply selects that person's name and types the message into the whisper area.

### The Entry Plaza

AppEdTech is far from complete. Currently there is an entry plaza (see figure 2) that has three buildings around it. To the left of the user, upon entry, is a student services building. This building houses space for general information (such as information on how to forward Appalachian State email to personal email accounts and on the listserves that are available for students in the Instructional Technology program) and offices for the Graduate School, Registrar, Distance Education and Extension Studies, Licensure, and

Leadership and Educational Studies Department (the home department of the Instructional Technology program). These offices will hold information and resources important to students in the program.



**Figure 1**  
**The AppEdTech Interface (3<sup>rd</sup> Person View)**

Behind the user, upon entry, is the library building. This building holds connections to many of the online research databases found in the Appalachian State library. Collections of information relevant to students in the Instructional Technology program, organized by topic and by course are also found here. Students may chat directly on –line with university research librarians. On the right side of the entry plaza is the Alumni Center building. Though not yet completed, this building will house links to Appalachian State Alumni resources and will have resources designed specifically for graduates of the Instructional Technology program.

In front of the newly entered user is a park. On the other side of the park is the Tele Port. The Tele Port provides access to courses that are located in AppEdTech. Each course has a gate (much like at an airport) through which the user walks. The user is then teleported (flown) to the site of the course. Courses have been placed at a distance from the entry area and from each other to allow for expansion without overcrowding.



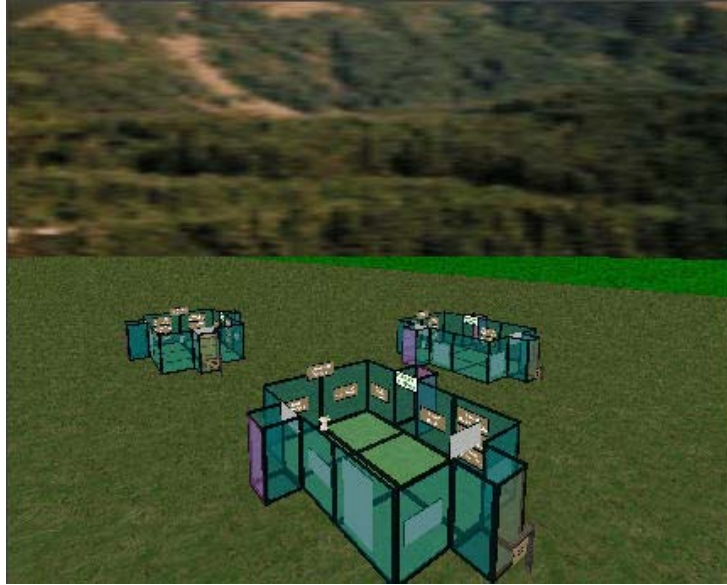
**Figure 2**  
**An overhead view of the entry area for AppEdTech showing the locations of the Library, Student Services Center, Alumni Center and the Tele Port that takes individuals to class areas.**

## Courses

There are currently seven courses that have been constructed in AppEdTech. Each is unique in appearance and operation according to the nature of the content and the form of interaction that is desired in order to meet class goals.

A course on hypermedia is modernistic in appearance. It presents students with “hypermazes” (see figure 3) that allow them to choose to their own path through information and resources and a discussion area that links to a threaded discussion web page where specific questions are presented based on the students’ experiences in the maze. A course which explores telecommunications in education is organized around four distinct areas that are represented by four modern buildings located around a plaza (see figure 7):

1. One that focuses on a book the class is reading and a providing a format for interactions connected to the book
2. Another focuses on an opportunity to walk through a network, either from the Internet to the computer or vice versa, providing the student information about the components of the network.
3. An area that focuses on various telecommunications tools that can be and are used in educational settings and connections to the class discussion board to share thoughts, ideas, and questions about these tools.
4. And an area that explores the uses of telecommunications tools to enhance a classroom or as distance education media.



**Figure 3**

**Three main rooms develop the Hypermaze. Each room represents a node of information and contains links to other nodes of information. The explorer is teleported from room to room according to the choice he/she makes after exploring a room.**

The organization of these areas allows students to move to them and between them in a non-linear fashion according to their needs and interests with timelines for projects, sharing (discussion, brainstorming entries, etc.) establishing the flow of the class.

A course on web design is organized in a futuristic environment that provides levels up which students progress. Each level represents a set of skills encompassed by the course. Each set of skills is dependant on the skills of the previous level.

A course of the integration of computer technology into instruction begins with a path around a lake. On this path students begin to address key questions and issues associated with the integration process. Later, a new path is opened that goes into a forest. In the forest, students are asked to build their own area (in glades set aside for the purpose) that demonstrates what they have learned in the earlier parts of the class.

The course on planning for computers in education is a street with side streets (see figure 4). As the student moves down the street different tasks are presented that prepare them to engage in a planning and grant writing project.

And a class that is, in essence, a seminar on the various issues that confront educational institutions when trying to use computers as a part of learning is a Roman forum (see figure 5) with teleports that take the students to a school building in which various characters present their point of view on a particular situation (see figure 6).

All classes have discussion boards, forms for entering information to be shared with classmates for discussion, links to resources and readings and audio chat areas where small groups can meet to discuss projects they are working on, etc.



**Figure 4**

The main street of a class for planning for technology in schools. As the student moves down the street different web pages with activities and readings are triggered.



**Figure 5**

The “Forum” in the issues class



**Figure 6**

Getting the perspective of a group of teachers in the issues class

Students can enter AppEdTech from any Windows computer connected to the Internet through the AppEdTech Browser. All students in the Instructional Technology program are provided with access to the browser and a username and password combination. Because the ActiveWorlds Galaxy Server does not place high demands on the connecting computers or their connections to the Internet, students can readily access and participate in AppEdTech with a modem.



**Figure 7**

**An overview of the class area for the telecommunications class, consisting of four buildings grouped around a central plaza. The building on the right has no roof. It is a virtual tour of a network as students are encouraged to “fly” to see it parts of the network from above.**

Students who are in different courses can see and interact with each other as they can with graduates of the program and the instructors of the various courses. Students can be provided with opportunities to build their own areas in AppEdTech or they can simply use AppEdTech as their interface with the courses they are taking and as a way to meet with others taking the same courses.

### **The Experience So Far**

Before purchasing and beginning developmental work on our own server, one class was developed in free space provided by Active Worlds on one of their servers. The students were given surveys in which they could share their thoughts on the experience and were interviewed at the end of the class. From this beginning there was enough promise indicated to make it worthwhile to purchase a server and begin putting classes on it.

### **Building Classes**

The faculty members in the Instructional Technology program have decided to coordinate the building of classes in AppEdTech. This provides a basic setting for all classes but still allows each faculty member to customize the class to his preferences by changing the web pages used for the class. This presents us with excellent opportunities for collaboration and making sure our program is doing what we think it is doing. Of course, with only three full time members this is much easier than it would be with a larger program.

One thing that has emerged from this process has been that the faculty has begun thinking about classes differently. In the past we have found ourselves thinking of classes as a series of sessions that are held on certain days. Even our web supported classes have tended to follow this pattern. But by putting the classes in a three dimensional world we have found ourselves thinking differently about how students might move through them. We still find ourselves providing resources and activities but leaving more opportunities for the students to take their own paths through those resources and activities.

We still may present the class as a linear series of experiences, such as in the web design and planning classes, but we find ourselves more open to providing more choices for the students and often use the 3D

world to present those choices by providing different paths through the class site (as in the class on integrating computer technology into instruction and the class on hypermedia) or by presenting a plaza that allows the students to move in any direction (as is the case for the class on telecommunications, see figure 7).

### Developing a Course

Planning often starts with a discussion of what metaphor might best represent a class. This discussion facilitates our further discussion of what the class is really about and what we hope our students will gain from taking it. Sometimes the metaphor may be implemented in the design of the class, as is the case of the class on issues (using an open Roman Forum as the meeting place) or in the case of class on planning (using a street down which the students progress with side streets representing further exploration and/or a place to introduce further skills).

We have found ourselves thinking very differently about the classes and the way we interact with each other and our students. We have begun working toward cross-class collaboration. Each of us has stopped thinking of students in one section of a class as “my” students but we interact with all students across sections and across classes. Our students are currently meeting other students who work in different parts of North Carolina (and now from Mexico since we have added 5 students from Puebla, Mexico to one of our cohorts) and learn what they have in common and what is different. We have students just beginning the program interacting with students who are nearing graduation. We have students in a school administration program or a reading program who are taking a class from us as an elective interacting with each other and with instructional technology majors. AppEdTech has become a focal point for a learning community that reaches far beyond what our normal classroom settings have been and which, we believe, is moving our distance education efforts toward what Watkins and Kaufman suggest it might become.

### **A Community of Learning**

In Building Learning Communities in Cyberspace, Rena Palloff and Keith Pratt (1999) argue that the development of community in online settings is critical to the success of distance education. And they argue that the online community must pay careful attention to human needs that extend outside the specific course content. Gibson (2003) also notes the growing interest in the development of learning communities in online settings and introduces several forms that a community may take. But the question that remains for planners of online courses is what their community looks like; what kinds of interactions are necessary to develop a successful learning community?

The conceptual framework for the College of Education at Appalachian State University speaks to the social construction of knowledge and the need to develop a community of practice. Thus, any effort to develop distance education in the College of Education must consider the ways in which the participants become part of the community of practice and are able to construct knowledge in a social context. In Chart 2 we explore five key premises of this conceptual framework and compare them to conventional, classroom-based instruction and to current distance education formats.

When looking at the conventional classroom it is clear that most of the focus is on the course and the meetings held to conduct the course. The community most closely related to that experience, the classroom group consisting of instructor and students, tends to be isolated from other courses and is limited in its range of community members. That is, there is an expert in the room but the other members of the community for that course are expected to be novices in area of study for the course. There are opportunities for members of that course to interact with members of other courses through informal contact on the college campus, but such interactions are usually completely informal and accidental.

There also may be contact between individuals who are novices in a particular area of study and those who have gained a slightly higher degree of expertise through having had other course experiences but these again are not a normal part of the conventional classroom environment.

These constraints are more highly exacerbated in the typical web-based distance education setting. In fact, it is very possible that students taking a course may have extremely limited contact with each other,

possibly working on the same things at the same time as others without being aware the others are also engaged in similar activities. And, because the distance education student is typically geographically isolated from the instructor and other students there are virtually no opportunities to interact with others in the same course even by accident. And that is even truer of meeting others who are more experienced in the program of study. Thus, the distance education student is greatly constrained from working in a rich and varied community of learners.

**Chart 2**  
**Analysis of the Principles of the RCOE Conceptual Framework**

	<b>Conventional Instruction<sup>2</sup></b>	<b>Current Distance Education<sup>3</sup></b>	<b>AppEdTech<sup>4</sup></b>
<b>Knowledge is socially constructed and learning is social in nature</b>	Usually only within the context of each individual class	Rarely and if so within the context of an individual class	Within the entire virtual world community
<b>Learning occurs through participation in a Community of Practice</b>	Usually only within the context of each individual class	Rarely and if so within the context of an individual class	Regularly throughout the entire virtual world community
<b>The development of educators proceeds through stages from Novice to Expert under the guidance of more experienced and knowledgeable mentors in the community of practice</b>	Rarely; contact with mentors usually limited to the course instructor	Rarely; contact with mentors usually limited to the course instructor	Exposure to and interaction with a wide range of mentors throughout the virtual world community
<b>An identifiable knowledge base emerges out of the Community of Practice that is both general for all educators and specific to specialties and content areas</b>	Limited by lack of exposure to the broader community of practice	Limited by lack of exposure to the broader community of practice	Regular contact with the broader community of practice develops a full and shared knowledge base

In AppEdTech, however, participants are afforded many and frequent opportunities to interact with others who are in the same course, even if they are not in the same section of the course, with instructors from

<sup>2</sup> Typical context is one teacher with many students meeting in a classroom for a finite amount of time and in a class that is not necessarily connected with other classes or other experiences.

<sup>3</sup> Typical context is one teacher with many students who are in many different locations and in a class that is not necessarily connected with other classes or experiences.

<sup>4</sup> Students and instructors of many classes intermingle at many different times and locations. Alumni and other experts are available throughout the virtual world and at many different times.

other sections of the course they are in, and with students who are at different stages of their program of study, creating a more natural and richer community in which to participate.

Our conclusion from this analysis is that we have the potential to more fully live up to the goals of the Reich College of Education than might be possible in other contexts. It may be that we have an innovation that transforms our practice in such a way that generates more value than the other ways of educating.

Certainly we know that we interact with our students differently and that they express their appreciation of those interactions. We know that our students interact with a wider group of individuals than those who are in a particular class with them or who are in their cohort.

As the Chart 2 indicates, the virtual world environment offers a unique learning opportunity for those interested in social constructivist pedagogy. It may offer the development of broader communities of learners than those found in traditional classrooms. It may also provide innovative alternatives to web-based instruction as we currently know it.

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