Strategic Aspects of E-Commerce Related to V-Commerce, V-Learning, and Disaster Relief

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ABSTRACT

Virtual worlds are network based and technology driven environments with real world elements/objects such as landscapes, weather patterns, gravity, cities, cars, clothes, and people. The use of virtual world technology is steeply on the rise for entertainment purposes, but is definitely underutilized in business and learning applications. In terms of business, virtual world technology can be used both as a marketing tool, and as a means to gain competitive advantage through a virtual store. When coupled with Agent technology it is also an effective way of improving supply chain efficiency and resilience, especially in the face of disasters. In terms of learning applications virtual world technology has the potential to enhance the learning experience for both classroom and web based users through better collaboration and realistic simulations. This paper addresses the benefits and pitfalls of virtual world technology, and explains the influencing factors for consumer adoption of the technology.

INTRODUCTION

Standard Applications of E-Commerce

E-commerce is manifesting itself in virtual worlds through e-commerce, V-learning, and disaster relief; understanding these virtual worlds will become critical in dealing with C2C and B2C relations and in part B2B relations. "E-Commerce can be described as the process of buying, selling, or exchanging products, services, or information via computer networks"; especially the Internet (Kwun, et.al, 2010). Although computer networks have existed since the late 1960's, the e-commerce craze didn't really begin until the Internet became popular in the mid-to-late 90's and early 00's. Conservative estimates of internet spending today show figures in the hundreds of billions and other estimates well over a trillion USD. With so much potential to tap into, it is no wonder that in 2005 over 75% of companies employed some form of e-commerce (Kumar et.al. 2005) and today that value is likely even higher. Besides adding to a company's sales channels, e-commerce has also traditionally been employed within supply chains in e-manufacturing setups to lower operational costs and in customer service applications in order to increase customer satisfaction. In e-manufacturing setups e-commerce (i.e. ERP combined with RFID) has been used to help horizontally integrate members of a supply chain. This sort of

integration can provide real time data of sales, forecasts, and inventory; allowing for all parties in the supply chain to react accordingly and efficiently. This implementation of e-commerce helps a company to run leaner and allows for a streamlined process, which can result in massive cost savings.

The other traditional employment of e-commerce mentioned is customer service. In terms of customer service, e-commerce has provided a way for customers to find information/answers for themselves and at a time that is convenient for them. Instead of calling or visiting a store to get pricing info, check the status of an item, or ask a common question; consumers can simply log onto a website and gain immediate access to all of this information, without having to worry about calling hours or waiting for the next representative. This makes for higher customer satisfaction and saves a company money by reducing the costs of its customer service department.

UPS is a great example of a streamlined process utilizing e-commerce. With 41 million website hits every day and over 14 million package tracking requests on peak days of the holiday season, I can only imagine the size of the customer service department that UPS would need in order to deliver customer satisfaction. Obviously a system as complicated and robust as UPS's is expensive to establish, but the traffic the website sees is testament to the cost savings UPS realizes in terms of customer service (2005). Finally, e-commerce has allowed for more consumer involvement in product/service selection by allowing for mass personalization and mass customization. This was unfeasible with a brick and mortar setup because a store can only stock so many products, and it must cater to an entire market. E-commerce has allowed stores to showcase a wider range of products and configurations (take Dell for example, with their unlimited combinations of computer configurations), and to offer unique versions of their websites tailored to a consumer's particular tastes, for example Amazon (Schubert et.al. 2000).

Evolution of E-Commerce into Virtual Worlds

Virtual Worlds are a growing trend on the internet today. These worlds are technology created virtual environments that attempt to replicate portions of the real world either in a realistic style or in a mystical style. People interact in these worlds through their virtual selves; these virtual embodiments are known as 'characters' or 'avatars' and are typically humanoid figures. Some examples of avatars include a human being, races resembling humans like elves or dwarves, and even humanoid animals like wolves with opposable thumbs (Kock 2008). Many of these virtual worlds are part of a gaming platform like World of Warcraft or League of Legends while others are part of a social or educational network like Second Life or River City. They often feature interactive objects and environments like chairs, trees, weather, cars, gravity, superpowers, cities, fluctuating economies, and currency that can be converted to USD. With the collaboration and social contexts that surround virtual worlds, they make the perfect

environment for C2C and even B2C trade, which makes them excellent candidates for exploration with regards to e-commerce, dubbed as v-commerce (Shen et.al. 2009).

Expanding E-Commerce through Virtual Worlds and into E-Learning

Keeping in mind that the definition of e-commerce presented earlier not only includes the transfer of products and services through a network, but also the transfer of information; it is obvious then that e-learning is a form of e-commerce. E-learning began in the 1960s and 70s and has continued to grow in popularity. It has proven to be a successful medium for education, exemplified by the highly popular and fully online University of Phoenix. Many other universities also utilize e-learning in order to provide working professionals, geographically isolated individuals, and disabled peoples with a convenient medium through which to learn. With increasingly busy and demanding schedules, frequent traveling, and special needs, many people are unable to participate in a standard classroom setting and e-learning provides greater flexibility and more control over an individual's schedule. In more recent years, universities are looking at the social, collaborative, and realistic nature of virtual worlds as a means to enhance e-learning (Kock 2008). The acceptance of this technology has been assessed with multiple models in order to better understand the acceptance factors. These models include Technology Acceptance Model (TAM) (Kwun et.al. 2010), Diffusion of Innovation (2010), and Unified Theory of Acceptance and use of Technology (UTAUT) (Fetscherin 2008). The use of virtual worlds to enhance e-learning has been dubbed v-learning (Shen et.al. 2009).

BACKGROUND

Turning E-Commerce into V-Commerce through Virtual Worlds

Evolution of Virtual Worlds

As mentioned earlier, virtual worlds are digital versions of the 'real' world with varying stylizations, sometimes realistic looking and other times fantastical. The first virtual reality technology was actually developed in the 1950's and called Sensorama. It not only immersed the user in visual and auditory effects, but also was capable of simulating odors (Kock 2008). There are many different types of virtual world, and each one introduces different levels of complexity. One of the earliest types of virtual world is a Multi-User Dungeon (MUD), which first appeared in the 1970's. MUDs are text based, multiplayer, real time gaming platforms; meaning that words rather than images are used to describe the environment and actions that are occurring within it; and the people must be connected via a network. As primitive as the technology may sound, MUDs are capable of supporting virtual communities, some of which are still active and even thriving today; displaying characteristics of traditional communities, such as comradery, love, anger, and betrayal. The image below shows an image of a popular MUD.

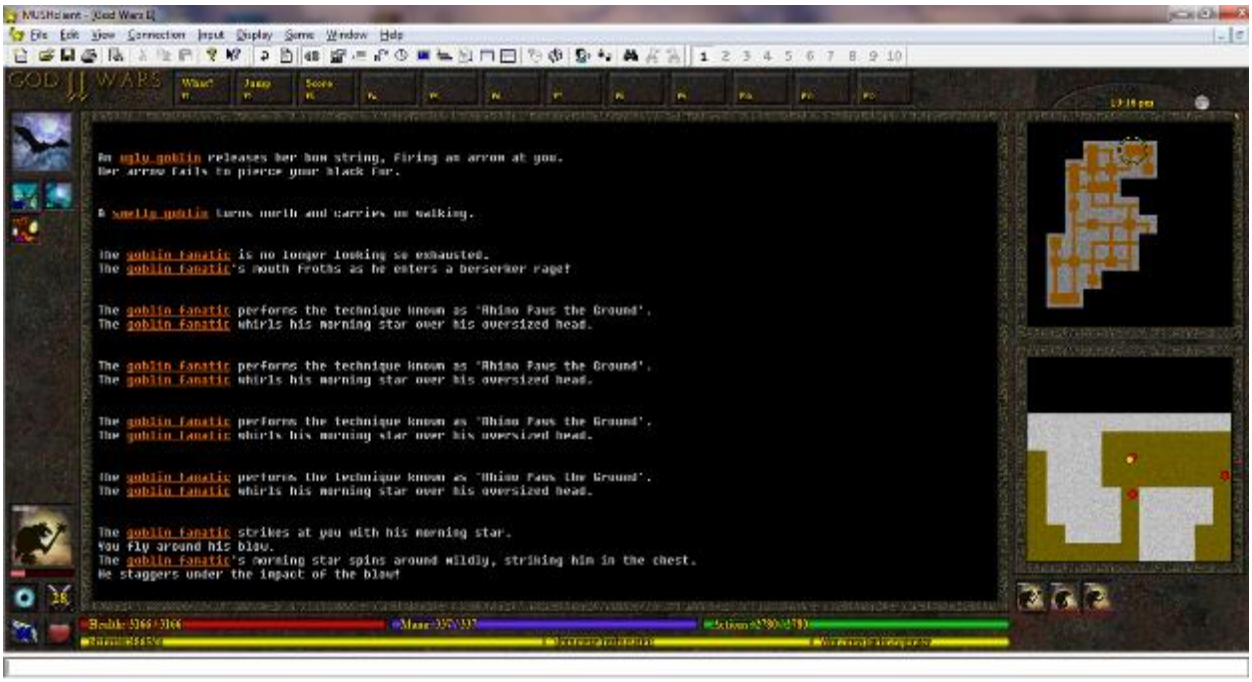

Figure 1: Screen shot of a popular MUD

As technology improved through the years MUDs became object-oriented (MOOs), although still text based. Continue on a few years further and Multi-User Virtual Environments (MUVEs) developed featuring three dimensional graphics, for example River City; these MUVEs evolved into the Massively Multiplayer Online Role Playing Games (MMORPGs) that we have today, for example World of Warcraft (Dieterle 2007).

First Steps of V-Commerce

Many virtual worlds today feature hundreds of thousands and sometimes millions of people who are regularly active. The first two parts of e-commerce within virtual worlds are trading and virtual currency. Virtual currency is established in a virtual world by the creators and its value fluctuates depending on the virtual economy. This currency often has a direct exchange rate to USD. Many users spend real world currency to gain virtual currency in order to purchase virtual items to enhance their environment/experience. These purchases include different skins for an Avatar (meaning different outfits, new hair style, etc.), or on things like an in game house or car. This type of exchange highlights B2C e-commerce, but is obviously limited to users and the game creators. Trade is common enough as well where two users can exchange items (or currency) with one another, sometimes at a cost to the seller (like ebay). This style of exchange highlights C2C, but again does not show much opportunity for a firm to profit on. The next step in e-commerce with regard to virtual worlds has been to add product placements and virtual advertisements. Walk your Avatar around in Second Life or World of Warcraft and you may just find a Pepsi machine or an advertisement on a wall in a virtual city for IBM. Clicking on

these product placements will often minimize the virtual world and open up a URL that leads a user to a purchase window. This style of product placement has improved B2C in virtual worlds, but is only the beginning. With the collaboration and relationship forming in virtual worlds there is heated debate that they could become the next Amazon or Ebay, the presumption being that one is more likely to make exchanges with somebody he knows, rather than with somebody he doesn't know (Kock 2008).

Anthropologists generally support this view arguing that trade is a key element of all human cultures. Looking at history, this idea of trade, especially face to face, helped to strengthen relationships between communities which led to less violent conflict between them and an increased ability to reproduce. Communities who did not trade as much suffered much more violent conflict and through natural selection a 'trade' gene established its dominance within the human race (2008). Regardless of whether or not a trade gene exists (I am no geneticist, but I question it), the idea that a virtual world is the same as face-to-face is a bit of a stretch, however, I do agree that a virtual world would provide a platform for trades which more closely resembles real life than current popular platforms like Amazon or Ebay. I personally think that v-commerce will head in a bit of a different direction though, as outlined in the next section.

Agents and the Future of V-Commerce

Many large retailers today are creating virtual worlds of their stores. A user can navigate through this world and look at different items, often times as an avatar who can walk around and pick up items. The focus of these worlds is to make the shopping experience more natural and enjoyable for a consumer. With so much environment interaction within these worlds, it can be difficult to balance a sufficient amount of product information, with keeping a user from being overwhelmed. To keep a user from being overwhelmed, certain data and graphic details become clearer to an avatar the closer it gets to the object. Also, when a mouse pointer is phased over an item for sale, the item will highlight and zoom, providing a more detailed picture and information pertaining to the item; for example, a pair of jeans may show sizes, colors, price, etc. These virtual stores give the user a more familiar experience and still afford the user the flexibility to purchase from home and at any hour (Chittaro et.al. 2000).

In a horizontally integrated supply chain, these virtual stores can show real time product availability and represent out of stock items as 'grayed' out or absent from the world. They could even provide a buyer with lead time information. Two of the major difficulties with virtual worlds are that the learning curve is usually quite steep and the computer resource requirements are usually quite high. Virtual stores are relatively small virtual worlds in comparison to most and although they have high quality images, they can be run with minimal computer resources. The firm must work hard to ensure that the site interface is intuitive and easily learned. One way firms help users to navigate virtual stores is through the use of Agents. An agent is basically an artificially intelligent piece of software that is sometimes manifested as

an avatar and is able to interact with and help the user and his own personal avatar. The most basic agents function as navigational aids and typically either help somebody to navigate through a virtual world, or provide useful tips for use within the virtual world. The more sophisticated agents are capable of learning, processing data, advising, and taking action.

Think of JARVIS, the artificial intelligence within the suit from Iron Man, only a slightly less sophisticated version. These sophisticated ones are sometimes used within air traffic control towers. The agent processes all of the data much quicker and more efficiently than a person could and ensures that planes are on schedule for take offs and landings. As an air traffic controller works the agent gives him advice on how to proceed based on large amounts of processed data. The user can choose to listen to the avatar, or ignore it and proceed his own way; in some cases the user can even have the agent complete the task. It is important to note that this relationship is known as the coupling of 'agent and principal' and although an agent can suggest anything it wants to, it cannot act unless given authority by a principal (Bagdanovych et.al. 2005). With regard to v-commerce the basic agents could be used to help a user navigate through a store and could even potentially remember things a user has bought in the past, sizes, favorite styles or colors, etc.

With regard to standard e-commerce, the more sophisticated agents could be used to monitor the entirety of the supply chain and help make recommendations to the users who oversee the ERP system and materials planning. When considering implementing a v-store or any kind of virtual world technology, it is important to consider consumer acceptance (and potentially business acceptance in B2B applications) in order to ensure success. A number of factors in determining user acceptance of technology are explored later in the paper.

Turning E-Learning into V-Learning with Virtual Worlds

Enhancing E-Learning through Virtual Worlds

E-learning is about anytime/anywhere teacher and learner interaction through the internet. What e-learning lacks though is collaborative learning and a sense of teamwork. In many cases it also lacks question and answer sessions and general discussion that could occur in a classroom environment because communication is limited to a few emails. As somebody who has taken many classes both in a classroom setting and online, I have found the lack of collaboration and general discussion detrimental to my learning experience. To add to the learning detriment, all but one of my online classes have been 'cut and dry' and quite frankly boring. The unique and entertaining one actually employed a virtual world with video chats, breakout groups for team projects, and flexibly scheduled online meeting times. Virtual worlds are able to help even the playing field between an experience in the physical classroom and an experience in the virtual classroom. They provide a means for collaborative and engaging learning and open up the possibility of question and answer sessions and general discussion. They also make an online learning experience feel more dynamic, exciting, and unique and

enable a teacher to customize the material to cater to the class, instead of forcing students through the standard cookie-cutter molded material one typically gets with online classes. Another issue that affects e-learning (and classroom learning as well) is the gap between a theoretical concept and its physicality. It is one thing to tell me how sales channels and marketing campaigns work, it is another to have me operate a simulation and experience it; I would argue that the latter of the two is the better learning experience. Given the media rich and immersive nature of many virtual worlds, their reality can be augmented to anything a creator can imagine, making them an excellent medium through which to run a simulation. The bottom line here is that not only are virtual worlds relevant to online learning, but they can also be extremely beneficial to classroom learning as well. A final issue with v-learning is user acceptance of the technology (Shen et.al. 2009).

CONCLUSIONS

Addressing the Goals of the Paper

The goal of this paper is twofold; first, it is to increase knowledge of v-commerce, v-learning, and disaster relief and their interrelationships with C2C, B2B, E-Commerce, and the supply chain; second, it is to explore the advantages and pitfalls surrounding the implementation of virtual worlds. This paper addressed the first goal by providing the history for each topic, and then followed up with exploring its context in today's society. It addressed the second goal by going through the various adoption factors and their influence on a consumer, and by addressing both the negatives and positives associated with implementing a virtual world. From a v-commerce standpoint there is at the least 'minor potential' with small investments into current virtual worlds such as Second Life or World of Warcraft to establish product placement and URL linking to sales sites. The major success from a v-commerce stance will be in implementing virtual stores and agents. Virtual stores offer a consumer a more realistic and enjoyable shopping experience and provide a competitive advantage to firms who implement them. The upfront costs will be high, but the long term savings will be a payoff. Paying close attention to the adoption factors will be critical for v-commerce to succeed. Utilizing basic agents as navigational aids for B2C within virtual worlds will help users to overcome the learning curve more quickly. More advanced agents can be used in the 'agent and principal' coupling in order to provide greater efficiency and resilience in the supply chain. There is huge potential in v-learning for both classroom based and web based courses. V-learning promotes collaboration and provides an environment where pseudo real-life simulations can be experienced and learned from. The same is true for simulations to determine behavioral responses, as in the glitch that occurred with the Corrupted Blood Plague. Firms should be well aware of the high costs associated with implementing virtual world technologies and should be sure to assess the unique costs and gains for themselves to see if the technology can provide them with a competitive advantage.

Future Development and Research

It is amazing to think that virtual world technology began in the 1950's with the Sensorama, a machine that most people have never even heard of, and now, over 50 years later, virtual world technology is everywhere and businesses are utilizing it as part of their e-commerce strategies; moreover, virtual world technology (through the use of virtual stores and agents) has the potential to become the defining characteristic of e-commerce systems and a useful tool in improving supply chain resilience. Schools have already begun to adopt v-learning into the curriculum; I have already experienced it multiple times at both Penn State University and Kent State University. And many large firms are at the beginnings of implementing v-commerce, with Pepsi and IBM already utilizing virtual world product placements, and other firms beginning to create full virtual stores. Future research in virtual world technology is needed to understand how specific firms have succeeded and failed at the implementation. From these case studies of both success and failure, researchers can learn how to better assist firms with the implementation of virtual world technologies.

REFERENCES

Bogdanovych, A., Berger, H., Simoff, S., & Sierra, C. (2005). Narrowing the gap between humans and agents in e-commerce: 3D electronic institutions. *E-Commerce and Web Technologies*, 128-137.

Bonera, M. (2011). The propensity of e-commerce usage: The influencing variables.

Management Research Review, 34, 821-837.

Chittaro, L., & Ranon, R. (2000). Adding adoptive features to virtual reality interfaces for e-commerce. *Proceedings of AH2000: International Conference on Adaptive Hypermedia and Adaptive Web-Based Systems*, 85-96.

Dieterle, E., & Clarke, J. (2007). Multi-user virtual environments for teaching and learning. *Encyclopedia of Multimedia Technology and Networking*, *2*, 1033-1044.

Eid, M. I. (2011). Determinants of e-commerce customer satisfaction, trust, and loyalty in Saudi Arabia. *Journal of Electronic Commerce Research*, *12*, 78-90.

Evans, P., & Wurster, T. (1999). Getting real about virtual commerce. *Harvard Business Review*, 84-94.

Fetscherin, M., & Lattermann C. (2008). User acceptance of virtual worlds. *Journal of Electronic Commerce Research*, *9*, 231-242.

Lee, C. S. (2001). An analytical framework for evaluating e-commerce business models. *Internet Research: Electronic Networking Applications and Policy*, *11*, 349-359.

Kock, N. (2008). E-collaboration and e-commerce in virtual worlds: The potential of second life and World of Warcraft. *International Journal of E-Collaboration*, *4*, 1-13.

Kumar, S., & Petersen, P. (2005). Impact of e-commerce in lowering operational costs and raising customer satisfaction. *Journal of Manufacturing Technology*, *17*, 283-302.

Kwun, O., Nickels, D., Alijani, G., & Omar, A. (2010). The perceived strategic value of e-commerce in the face of natural disasters: E-commerce adoption by small businesses in post-Katrina New Orleans. *International Journal of Entrepreneurship*, *14*, 71-81.

Mamaghani, F. (2009). Impact of e-commerce on travel and tourism: An historical analysis.

International Journal of Management, 26, 365-374.

Menneke, B., Hassell, B., & Triplett, J. (2008). The mean business of second life: Teaching entrepreneurship, technology, and e-commerce in immersive environments. *MERLOT Journal of Online Learning and Teaching*, *4*, 339-348.

Schafer, B., Konstan, J., & Riedl, J. (2001). E-commerce recommendation applications. *Data Mining and Knowledge Discovery*, 5, 115-153.

Schubert, P., & Ginsburg, M. (2000). Virtual communities of transaction: The role of personalization in electronic commerce. *Electronic Markets*, *10*, 45-55.

Shen, J., & Eder, L. (2009). Intentions to use virtual worlds for education. *Journal of Information Systems Education*, *20*, 225-233.

Smith, A. D., & Lias, A. R. (2005). Identity theft and e-fraud as critical CRM concerns.

International Journal of Enterprise Information Systems, 1(1), 17-36.

Srinivasan, S., Anderson, R., & Ponnavolu, K. (2002). Customer loyalty in e-commerce: An exploration of its antecedents and consequences. *Journal of Retailing*, *78*, 41-50.

Van Weele, A., & Van Raaij, E. (2014). The future of purchasing and supply management research: About relevance and vigor. *Journal of Supply Chain Management*, 50, 1-29.

Viboonthanakul, S. (2009). Smuggling via e-commerce: Effect on tax revenue. *Journal of International Trade Law and Policy*, *8*, 272-288.

Keywords: Agent technology, B2B, B2C, C2C, E-commerce, V-learning, virtual worlds

Relevance to marketing Educators, Researchers and Practitioners: This paper deals with strategic aspects of e-commerce related to V-learning, e-commerce and its application to a variety of advertising and marketing promotions.

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Questionnaire:

STRATEGIC ASPECTS OF E-COMMERCE, INCLUDING V-COMMERCE, V-LEARNING, AND DISASTER RELIEF.

E-commerce is manifesting itself in virtual worlds through V-Commerce, V-learning, and disaster relief; understanding these virtual worlds will become critical in dealing with C2C relations and in part B2B relations in the near future.

Please spend a few moments to answer the following questions regarding e-commerce as it pertains to virtual worlds, v-learning, and disaster relief.

INTERNET USAGE

How frequently do you use the Internet for personal use?

ϒ Never ϒ Rarely Monthly Weekly Daily

How frequently do you use the Internet for work-related use?

ϒ Never ϒ Rarely Monthly Weekly Daily

How many days a week do you use some form of mobile technology for personal purposes?

0 to 1 ϒ 2 to 3 4 to 5 6 to 7

How many hours per week do you spend using mobile technology for work purposes?

0 to 5 6 to 10 11 to 15 ϒ 15+

How frequently do you shop online?

ϒ Never ϒ Rarely Monthly Weekly Daily

How often do you use a credit or debit card to make purchases?

ϒ Never ϒ Rarely Monthly Weekly Daily

VIRTUAL WORLDS

How often do you engage in and interact with virtual worlds?

Never ϒ Rarely Monthly Weekly Daily

Which virtual worlds, if any, do you utilize?

Second Life

World of Warcraft

League of Legends

River City

Other _____

None

Do you think that virtual worlds could contribute positively to e-learning?

□ Yes ϒ No □ Not Sure

Would you ever make a purchase in a virtual world?

□ Yes ϒ No □ Not Sure

How much real world money have you spent on purchases within virtual worlds?

ϒ Zero USD ϒ $0-100 □$100-250 □ $250-500 □ >$500

V-LEARNING

How often, if ever, do you engage in online learning?

□ Never ϒ Rarely □ Monthly □ Weekly □ Daily

Do you feel that online classes are an effective replacement for in-person classes?

□ Yes ϒ No □ Not Sure

Have you ever taken an online class before?

□ Yes ϒ No □ Not Sure

What is your preference for learning? [Select the best answer]

□ In-Class learning only
□ Online classes only
□ A mixture of online and in-person classes
□ None of the above / Not sure

What factors do you think are important in relation to online learning? [Check all that apply]

□ Written Communication
□ Verbal Communication
□ Interaction with Classmates
□ Computer efficacy
□ Interactive Simulations
□ None of the above

Do you have anxiety about using a computer for e-learning?

□ Yes ϒ No □ Not Sure

What do you think is crucial to v-learning?

□ Comradery among classmates
□ Verbal Communication
□ More realistic interactions
□ Computer efficacy
□ Learning curve of virtual world
□ A fun and interesting environment
□ None of the above

COMPLICATIONS AND CHALLENGES OF E-COMMERCE

For the following questions, please check the appropriate response concerning the importance. Please note that the questions should be answered on a 1-4 scale.

Strongly Disagree Disagree Agree Strongly Agree

I think that online communication can be misleading or misconstrued.
ϒ ϒ ϒ ϒ

Online transactions are not always trustworthy due to the potential for personal and financial information to be abused.
ϒ ϒ ϒ ϒ

I am hesitant about providing financial information through the internet due to concerns about identity theft and e-fraud.
ϒ ϒ ϒ ϒ

The high availability of online goods is having a negative impact on government sales tax revenue.
ϒ ϒ ϒ ϒ

I would be hesitant to make a purchase in a virtual world for fear of theft and e-fraud.
ϒ ϒ ϒ ϒ

I think v-learning could add to the level of education received through online learning.
ϒ ϒ ϒ ϒ

DEMOGRAPHIC INFORMATION

Gender status.

□Male □Female

Education level.

□High school □Associate's Degree □Bachelor's Degree □Professional Degree

□Post-Professional Degree

Age.

□18 to 25 □26- to 30 ϒ□31 to 35 □36 to 40 □ 41to45 ϒ46 to 50

□50+

Gross Income Level

□Below $20,000 □$20,001-$30,000 □$30,001-$40,000 □$40,001-$50,000

□$50,001-$60,000 □$60,001-$75,000 □$75,000+

Race

□Caucasian □African American □Asian/Pacific Islander □Hispanic

□Other