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**Factors Affecting Faculty Technology Adoption
of Online Teaching in Higher Education – Literature Review**

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Report

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Factors Affecting Faculty Technology Adoption of Online Teaching in Higher Education – Literature Review

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Online teaching and learning has grown rapidly in current educational contexts. Whereas once, the role of faculty was primarily a classroom instructor, in online classrooms, the role has been expanded to one of facilitator, organizer, and supporter. The more efficiently that faculty can adopt online technology and apply it to their teaching and instruction, the better students academic results will achieve (Goktalay & Huguet, 2006). The purpose of this literature review is to help faculty members to adopt new online technologies more effectively and successfully. This literature review identifies important factors that contribute to faculty members' adoption of technology in higher education. Among these factors are: reliability of online technology, faculty's perceived usefulness of technology, institutional support of online technology, time constraints in implementing online technology to instructional methods and developing effective goals for the use of technology, and then provides recommendations based on these affecting factors.

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Chapter 1: Introduction

With the rapid advancement of online technology, online courses have become an important alternative mode of teaching and learning in every education space. In this technological learning environment, the learning/teaching model has produced a fundamental change: teaching methods have evolved from “teacher-centered” to “student-centered” pedagogy: the teachers’ role has become increasingly focused on guidance, and the students’ role has transformed from passive learner to active collaborative learner. Every year, the number of students who are enrolling online courses increases(Allen & Seaman, 2007). For example, in fall 2007, over 3.9 million college students enrolled in at least one online course, which means that over twenty percent of all U.S. higher education students are enrolling at least one online course (Hussar & Bailey, 2008). The 2010 Analysis of the Department of Education showed that online learning is just as effective as face to face learning, but more cost-effective (“National Education Technology Plan 2010 | U.S. Department of Education,” n.d.). A recent longitudinal study among the presidents of 1,055 two-year and four-year private, public and for-profit colleges and universities, asked the presidents to predict growth in online learning: 15% said that most of their current undergraduate students have taken a class online, and 50% predicted that, 10 years from now, most of their students will take classes online (Parker, Lenhart, & Moore, 2011). Based on the study of Zemsky and Massy (2004), a governmental educational program was launched in Europe, and in

Switzerland in particular, aimed to exploit the potential of educational technology and keep pace with developments in countries where English is the main native language. From this study we can learn that sustainability of a pure project-funding approach and the need for institutional strategies regarding educational technology is very important. The search for such strategies at U.S. research universities was the starting point for this literature review. I have found that a critical issue among the current research papers and studies is the challenges that faculty face in adopting technology and/or resistance of technological adoption across the higher educational institutions (Al-Senaidi, Lin, & Poirot, 2009; Gong, Xu, & Yu, 2004; G. Walker & Johnson, 2008).

Emerging technologies associated with online learning and teaching can offer educators more advantages and opportunities to achieve their teaching goals through online instructions and related educational activities (Wang & Wang, 2009). Online learning has also been strongly recommended by the administrative team, peer institutions and colleagues, potential and current students, because it can offer students another convenient learning channel, so many educators are moving towards online teaching innovations or integrating new online technologies into their classrooms (Baltaci-Goktalay & Ocak, 2002).

On the other hand, faculty and staff members' concerns regarding integrating online technologies into their instructions is a critical condition to be considered, and also adds a personal dimension to the variables necessary for successful adoption of online technologies in higher education settings. Georgina and Olson

(2008) have pointed out that teaching online is difficult for many instructors, mainly because of challenges and outside society pressures from the new online teaching environment. Since online technology usually is implemented into classroom instruction without sufficient introduction or training, it can cause a lot of apprehension for faculty members. It also creates unnecessary obstacles for using online technology's fullest potential to achieve the best learning results. The more concerns and pressures faculty have, the more likely they would be to resist adopting of the online learning technologies (Al-Senaidi et al., 2009; Zhen, Garthwait, & Pratt, 2008). Therefore, it becomes very important to identify the factors that can cause faculty and staff members' concerns in order to gain valuable information to improve the quality of online learning technology implementation and increase its use.

This literature review aims to address the questions: what are the key-factors affecting faculty's technology adoption of online teaching in higher education? What recommendations can be provided based on the affecting factors? The main theme are divided into five key factors: the reliability of online technology, faculty's perceived usefulness of technology, institutional support of technology, time constraints in implementing technological applications to instructional methods and developing effective goals for the use of technology. The literature review is divided into four major chapters sections. In Chapter 2 is the literature review method I have used. Chapter 3 presents 5 major factors affecting faculty technology adoption. Chapter 4 explores the recommendations for the 5 major factors affecting faculty

technology adoption. Furthermore, the discussion and conclusion chapter is included.

Chapter 2: Method

I conducted a literature review in order to identify studies that examine faculty and technology adoption, with a particular focus on new online teaching technology. Therefore, faculty technology adoption is the major research interest for my study. The adoption by students and pupils is also important but is outside of the scope of this literature review.

I broadly reviewed literature for this report on the topic of faculty online technology adoption. The scope of my literature review included the following: the major international conferences in this area, which including World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education (eLearn), Review of Education Research (RER), Society for Information Technology & Teacher Education International Conference (SITE), and Association for Educational Communications and Technology International Convention (AECT). In addition, the following professional and peer-reviewed electronic journals were reviewed: Online Journal of Distance Learning Administration (OJDLA), The Journal of Educational Research, The Sloan Consortium, and Research in Higher Education (RHEJ). Google Scholar searches with keywords faculty, online technology adoption, online teaching and learning, higher education, universities and colleges and combinations of these terms were used as well. I reviewed conference proceedings and journal papers that focused on or related to faculty' experiences with new online technology adoption from different perspectives. Among these perspectives were: faculty members'

experiences in the online classroom, and faculty technology adoption theories and models. I read through a large number of articles, and abstracts. My first round of screening included selecting all texts that were published after 2005. There were some exceptions if some papers were very important and authoritative in the faculty technology adoption field, i.e.. books which introduced the faculty adoption models (Hall & Hord, 1987; Rogers & Rogers, 2003). In my second round of screening I kept all the valuable text that related solely to the higher education environment, and excluded the others including K-12 education or business education and training. In my third round of screening, I was guided by the research purpose of this literature review. I investigated the key factors with in the faculty online technology adoptions and related recommendations.

One thing that needs to be pointed out is that the literature review includes some studies that are not specifically focused on online technology user adoption, but broadly covered in general technologies in educational fields. This literature search was not limited to publication in peer-reviewed journals or conference papers rather it was only limited to publications dated from 2006 until the present. The reason I conducted literature review in these areas was based on my desire to review the most up-to-date literature: this would not have been possible to complete such a review if my literature review was not limited to specific publication date.

Chapter 3: Technology Adoption Models

There is a long history of technology adoption research. Several technology adoption models have been developed in order to better understand user technology adoption process (Al-Senaidi et al., 2009; Sahin & Thompson, 2007; Surry, Ensminger, & Haab, 2005; Yi, Jackson, Park, & Probst, 2006). According to Rogers (2003) research, in general before people adopt a new technology, he/she needs to collect necessary information of the new technology, practice and test the technology, and then consider whether it's worth his/her time and energy investment or not. Similarly, when faculty is confronted with a new online technology for teaching, he/she basically would go through the same process as well: from gathering knowledge of the new online technology to implementation of online technology into instruction. Cavanaugh (2005) found that it is commonly believed by the faculty that adoption of new teaching technology is equal to time consuming and new skill development.

Some researchers believe that faculty's technology adoption can be treated as an adoption of innovative framework (Dooley, 1999; Rogers, 2003). By further discuss these technology adoption models, it would help to facilitate understanding of faculty adoption process and categorizing the affecting factors addressed later in this literature review.

The following table was created based the table from Grunwald (2008, p.8) paper. It illustrates that models are similar to each other and they usually divide the

technology adoption process into several stages from the beginning to the final technology adoption stage. Among these models, Hall and Hord's concerns-based model and Rogers Learning/Adoption Trajectory model are most influential and popular (Al-Senaidi et al., 2009; Goktalay & Huguet, 2006; Sahin & Thompson, 2007; Surry et al., 2005). Here I will discuss these two technology adoption models in order to better understand the faculty technology adoption process.

Table 1: Different Technology Adoption Models Summary Table

Author	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7
Hall & Hord's (1987)	Awareness	Information Gathering	Personal	Management	Consequences	Collaboration	Refocusing
Rogers & Rogers(2003)	Teachers are treated as learners	Teachers are the learners	Teachers are the co-learners	Teachers are reaffirmers or rejecters	Teachers are the leaders		
Rogers & Schumacher (1983, 1995)	Knowledge	Persuasion	Decision	Implementation	Confirmation	Reinvention	
Havelock (1973)	Awareness	Information Seeking	Evaluation	Trial	Adoption	Integraton	
Hamelink (1984)	Awareness	Acceptance	Participations	Ownership			
Prochaska, DiClemete & Norcross (1992)	Precontemplation	Contemplation	Preparation	Action	Maintenance		
Fung (1992)	Awareness	Attitude Formation	Adoption	Adoption	Action	Application	
Knuetel (1995)	Awareness	Conceptualization	Decision	Implementation			

Faculty concerns around integrating online technology is one critical condition to be considered among various personal dimension variables for successful adoption of online technologies in higher education settings. Hall and Hord's (1987) concerns-based adoption model (CBAM) is a widely applied theory for

studying educational change phases. There are three phases of concerns: pre-teaching phase, early teaching phase, and late-teaching phase. During the pre-teaching phase, faculty are not concerned about the new teaching technology. During the early teaching phase, faculty have concerns about themselves as instructors, and during the last phase, their concerns are focused on the students. The findings and results from this model are also clustered into 4 categories: unrelated, self, task and impact. Unrelated concerns focus on the pre-service teachers who had no experience or expectations about teaching, but they may focus more on the things going around them. Self-concerns relate to faculty feeling inadequate to teach. Task-concerns characterized teachers who become more confident in the teaching setting and they have some preliminary teaching experiences already. Impact-concerns focus on the students and teachers' help and impact on the students. CBAM (Concerns-Based Adoption Model) also developed 7 stages to describe the teachers' concerns when they adopt a new technology: Awareness (teachers have little concern or involvement with the technology), Informational (teachers have a general interest in the technology and would like to know more about it), Personal (teachers want to learn about the personal ramifications of the innovation. They question how the technology will affect them), Management (teachers learn the processes and the tasks of the technology. They focus on information and resources), Consequences (teachers focus on the innovation's impact on students), Collaboration (teachers cooperate with other teachers in implementing the innovation) and Refocusing (teachers consider the

benefits of the innovation and think of additional alternatives that might work even better) (Hall & Hord, 1987). Besides Stages of Concern (SoC), there is another concept from CBAM, Level of Use (LoU). SoC is more focused on the teachers' feelings, thoughts and needs when they adopt a new technology into their instructions, and LoU is more focused on the pattern of their teaching behaviors. The first 3 levels (0-2) are for non users, level 3-6 are for users: level 0 nonuse, level 1 orientation, level 2 preparation, level 3 mechanical, level 4A routine, level 4B refinement, level 5 integration and level 6 renewal (Goktalay & Huguet, 2006)

The second adoption model, the Learning/Adoption Trajectory Model (Rogers & Rogers, 2003), is similar to the CBAM model. This model has five stages: in stage 1, teachers are treated as learners, whose major responsibility is to gather information and learn the knowledge and skills in order to engage the new technology into their classroom; in stage 2 teachers are the learner. They experiment with technology, trying out in their online classrooms, and sharing their experiences with their colleagues; in stage 3 the teachers are the co-learners. They usually develop a relationship between the new technology and their own curricula rather than concentrating on task management aspects; in stage 4, teachers are reaffirmers or rejecter. They have their own awareness of intermediate learning outcomes and try to evaluate how the technology would work for their students: in another words how the technology is impacting student learning; in stage 5, teachers are the leaders. They can fully understand and manage the technology and become leaders where they are reflecting their practices and sharing improvement

with their colleagues. In this model, adopting the new technology is described as a continuous process for faculty. One thing I need to point out here is this technology adoption model is referring to general technology which teachers are using in the classroom, not specific online technology. But online technology should be able to be included into this model domain.

As for the higher education field, implementation of online learning innovations, introduction of new teaching initiatives, or integrations of new technology into teaching instructions, not only are similar to the concept of organizational change but also are very likely to make the teachers felt challenges and pressure (Al-Taneiji & McLeod, 2008; Georgina & Olson, 2008). It also would subsequently lead to teachers' resistance to change (Konings, Brandgruwel, & Vanmerrienboer, 2007; Peck, Gallucci, Sloan, & Lippincott, 2009; Stigmar, 2008). Some research also further pointed out that the teachers' resistance to technology in higher education field would be one of the major obstacles to the future development of online learning (Al-Senaidi et al., 2009; Gong et al., 2004; G. Walker & Johnson, 2008). By discussing the technology adoption models in this chapter, it helps to ascertain change and growth of faculty members through the process in order to get further comprehensive understanding about the process. In next chapter, I will categorize the key affecting factors for faculty technology adoption, along with related recommendations to it. This result will be very necessary and important to current and future online teaching and learning in higher education field.

Chapter 4: Key factors affecting faculty online technology

adoption

Beyond how to really use the online technology in the classroom, it's also very important to help faculty members effectively adopt and integrate online technology into their classrooms. One of the most important research areas is to identify primary affecting factors of it (Suebsin & Gerdri, 2009). In this section, the five key-factors of faculty online technology adoption are discussed, which are derived from the review of studies. They are reliability of technology, faculty's perceived usefulness of technology, institutional support of technology, time constraints in implementing technology applications to instructional methods and developing effective goal for technology use.

The Reliability of Technology

Online technology creates a new way of encouraging multiple types of learning activities (Keengwe & Kidd, 2010). Based on the literature review, the following activities are the most common used in the online classroom: sharing, offering personalized materials, developing collaboration skills, and appealing to digital natives (Georgina & Olson, 2008). The following online technology are summarized by Hamid, Chang and Kumin (2005), which are commonly used in the classroom to support the variety activates: blog, wiki, photo sharing, video sharing,

podcast, social bookmarking, online discussion board, instant messaging and social network sites. Some research reveals that the reliability of technology plays an important role in the faculty technology adoption process and also is treated as the biggest concern from the faculty's perspective (Al-Senaidi et al., 2009). Additional cited concerns connected to the reliability of the online technology include: software incompatible with office and home, mistakes by support services, software malfunctions, slow Internet access and out-of- date software.

Faculty's Perceived Usefulness of Technology

Online technologies that can potentially support the learning activities can be blog, wiki, photo sharing, video sharing, podcast, social bookmarking, online discussion board, instant messaging and social network sites (Georgina & Olson, 2008). For example, blogs can be an ideal platform for students, where students easily create their own content and share it with one another. Using online technology cannot create too much learning anxiety for students, because most college students have a strong familiarity with it (Georgina & Olson, 2008; Keengwe & Kidd, 2010; Wang & Wang, 2009). But how the faculty view this technology, how satisfied they are with the outcomes of online technologies is a different story and plays an important role at the early stage of adopting this technology (Polančič, Heričko, & Rozman, 2010). The Technology Acceptance Model (TAM) (Davis, 1989) was broadly adopted by several instructional technology related researches,

which are used by exam users' technology adoption and usage (Gardner, 2011; Gong et al., 2004; Park, Lee, & Cheong, 2007; Roca, Chiu, & Martínez, 2006; Wang & Wang, 2009). TAM points out that there is a high and positive correlation between the user awareness and feeling of ease toward technology and how the faculty can adopt the technology. Because the daily teaching and research workload, the faculty regularly feel time pressure, so the faculty are understandably concerned about the time it takes to learn new technologies. Based on previous suggestions and work by Davis (1989) and Knezek and Rhonda (2008), a teacher's perception of usefulness toward online technology is described as the extent to which a teacher believes that using online technology would enhance his or her teaching performance. A teacher's perception of ease of use toward the online technology is described as the extent to which a teacher believes that using online technology would be free of effort. According to Gibson, Walker and Park, there was a positive association between the technology's perceived usefulness, ease of use, and teachers' motivation to embed the new online technology into their instructions (Gibson, Harris, & Colaric, 2008; Park, Lee, & Cheong, 2007; Greg Walker & Johnson, 2008). Similarly, Polančič et al. (2010) found that if faculty perceives an increased sense of usefulness and awareness of ease of use toward online technology, they could have higher motivation to adopt the online technology into their classrooms.

Ease of use is a very important factor that can deter faculty from adopting online technologies, especially when they have little experience with using these technologies in their traditional classroom or they have figured out a way to get

around these technologies (Tabata & Johnsrud, 2008). On the other hand, as mentioned in the previous section, Davis (1989) pointed out that there is a high and positive correlation between the user's ease of use and their technology adoption process. Some researches have clearly indicated that if faculty have increased awareness of ease of use toward online technology, they could have higher motivation to utilize the online technology (Gibson, Harris, & Colaric, 2008; Park, Lee, & Cheong, 2007; Greg Walker & Johnson, 2008; Huang, Deggs, Jabor, & Machtmes, 2011). There are several other situations that could contribute to resisting the use of technology: classrooms' hardware and software can be different, so the faculty have problem in adopting them; or faculty do not have the equipment or technology they need for their teaching.

Institutional Support of Technology

According to Wang and Wang study of 269 university faculty members, there was a high correlation between faculty members' online technology adoption and institutional support (2009). Furthermore, some researches show a negative correlation between the impact scores and instructor evaluation, which means that the more students experienced technical problems, the lower they rated their instructors (Davies, Howell, & Petrie, 2010). This result demonstrates a need for technical support for faculty and online courses. More and more higher education institutions want to promote and strengthen their use of online teaching technology.

In order to achieve this goal, a satisfactory framework for educational technology support is very necessary, because faculty usually do not only rely on specific instructional technology support teams, but also rely on the work of IT units, teaching and learning centers, and libraries (Moser, 2007). Therefore, the efficient and real-time technology support should be provided from variety fields and locations all across the campus. Al-Senaidi and Lin's (2009) research conducted a faculty survey and found that they complained that there was no sufficient technology support from the campus side. The report also showed that the reason why some faculty members are unsatisfied with technologies is due to the technological problems not being fixed in a timely fashion. Others said that the support personnel behaved nonchalantly and did not take the problem seriously, or that support personnel only sometimes fixed the problem (Surry, Grubb, Ensminger, & Ouimette, 2009). As a result, many faculty members treated slow response time to technology difficulties as a sign of lack of institutional support. According to Cavanaugh (2005) many faculty members would use online technologies into their classrooms if they can get necessary and appropriate technology training and support.

Time Constraints in Implementing Technological Applications

Another major concern that faculty and staff member noted was a lack of time in incorporating technology into their instructional practices (Cavanaugh, 2005;

Huang et al., 2011; Zhen et al., 2008). In Surrey’s survey study, lack of time was the first concern of 236 faculty members (2009). In Cavanaugh’s (2005) case study, a group of experienced teachers compared traditional teaching and online teaching in order to investigate the time-consuming issue. Four themes emerged in the study and a summary table showed the details:

1. Course preparation time (including technology adoption time)
2. Time spent on teaching
3. Office hours
4. Final tasks

Table2: Summary of Total Time Spent (Cavanaugh, 2005, p5)

Summary of Total Time Spent (Hrs.)		
Activity	Online	In-class
Preparation	35	3
Teaching	73	27
Office Hours	44	32
Final Tasks	3	0
Total	155	

This study's finding clearly indicated that generally the teachers spent 150% more time preparing for the online classroom than the traditional face-to-face classroom. Furthermore, the time faculty spent on adopting these online technologies, or developing/teaching the online courses was not as highly regarded as it was then it was spent in the face-to-face classrooms. According to Kim and Bonk (2006), 62% of faculty indicated that "the main obstacle to using the web interacting was the preparation time required."

Developing Effective Goal for the Use of Technology

Online technology has great potential and ability to help educators create interactive, real-world learning environment, which, in turn, respect students' needs, foster collaboration, promote engagement, and support higher order thinking of the students and enhance the course quality (Stigmar, 2008). But the technology cannot be transformative on its own. It requires faculty to fully understand the technology and master it before it can be used effectively. According Ertmer (2005), most faculty member, regardless of their own computer experiences, have limited understand and experience of how to use the online technology to facilitate their teaching, enhance students' learning, and then cannot achieve their learning goals. Therefore, the faculty need to set up an appropriate and effective teaching goals based on a full understanding of both the teaching material and the technological capability.

Chapter 5: Recommendation to Technology Adoption of Faculty

In order to help faculty members effectively integrate online technologies into classrooms, I group recommendations, based on the primary five affecting factors, from the literature review in this chapter.

Recommendation for the Reliability of Technology

There are some recommendations here in order to achieve reliability of the technology used to support faculty's online teaching classrooms.

1. Appropriate online teaching technology training workshops for faculty should be set up. These workshops should help the faculty familiarize themselves with technology, address their questions and build their confidence and improve their motivation regarding the application of online technology (Al-Senaidi et al., 2009; Georgina & Olson, 2008).
2. High reliable software that has high reliability should be first priority when higher education institutions select software for faculty (Keengwe & Kidd, 2010). We cannot always pick up the cheap software. The cheap software always would need more expensive maintenance, frequent repair and so on. As a result, the cheaper with lower reliability software would easily kill the faculty's enthusiasm of using it.
3. Routine and more frequent technology equipment checking and maintenance should be set up in order to avoid unexpected situations in

online classrooms. The regular checking and maintenance should be as detailed as possible, such as checking the batteries in the remote controls, software upgrades, light bulbs, and so on. It is especially important to inform faculty of where they can seek technological support (Georgina & Olson, 2008; Goktalay & Huguet, 2006; Sahin, 2006).

Recommendation of faculty's Perceived Usefulness of Technology

Perceived usefulness of technology plays an important role of successfully technology integration (Roca et al., 2006). Several research studies emphasize faculty's perceptions of the usefulness of technology and aim to give recommendations to faculty members in order to help them achieve more efficient online technology adoption (Goktalay & Huguet, 2006; Huang et al., 2011; Polančič et al., 2010; Sahin, 2006; Wang & Wang, 2009). This factor represents two important questions for faculty members: why do I need this online technology to support my teaching? How am I going to use this technology in my classroom and in the future? Gardner (2011) showed that faculty acceptance of technology use significantly increased after faculty participated in specially designed technology training courses to demonstrate them what they could do with the online technology in their classroom. Therefore, special training courses or workshops are highly recommended at the beginning stages of introducing the technology to the faculty. In addition, based on several studies, before the faculty technology training, the

individual department cultures should be indispensable, and most effective training would happen when it becomes collaborative and cooperative among the faculty ((Ertmer, 2005; Mayo, Kajs, & Tanguma, 2005). Some research suggests that the university should set up computerized classrooms as consistently as possible. Roca et al. (2006) indicated that faculty member prefer reliable, user-friendly, ease of use and visually appealing technologies during technology adoption process. According to other studies, if the classrooms have to be different and then they should be simply and well designed and tested (Davis, 1989; Gibson et al., 2008; Sahin, 2006; Zhen et al., 2008). In addition, according to Ertmer and Mayo (2005), faculty members should participate more on technological infrastructure in order to be more motivated and get ownership in the technology adoption process, and then better enhance the effectiveness of new technology.

Recommendation for Institutional Support of Technology and Time Constraints in Implementing Technological Applications

Universities should pay more attention to the faculty concerns regarding insufficient technological support (Georgina & Olson, 2008; Huang et al., 2011). First, universities need to identify those attitudes and behaviors that are seen as poor or inadequate support, and closely work with technology staff to reduce these. A survey can be conducted to investigate faculty's perceptions of new online technology. Second, universities should restructure institutional support programs

on campus to make them as responsive and effective as possible in order to support online classrooms (Al-Senaidi et al., 2009). Park et al.(2007) highlighted the importance of institutional support in his research “in other words, the more instructors believe that school/departmental policy is an important reason to adopt electronic courseware, the more likely they are to highly evaluate the functions of the system. This means that electronic courseware could be considered a valuable system insofar as it is beneficial for instructors to manage classes and perform their teaching, regardless of whether the adoption of the technology is driven by their own desire or pressure from administration”(p.179).

A rapid response system must be in place that can deal with a wide range of problems for faculty (Maguire, 2005). Monetary incentives can offer incentives and may serve as another effective type of institutional support. According to Schifter (2002) research, monetary support, including stipends, continuing education, increased salaries, or overload pay, can motivate faculty desire to adopt technology. Cavanaugh (2005) claims that, the recommendation for the “lack of time” issue would be relieved by institutional support as well, because the institutional has the ability to set up the release schedule for development and maintenance of online courses. Faculty and staff members would be better appreciated if the supervisor or administrative team could understand their pressure and job requirements, and then be willing to offer them more time when initiating the new online technology in their classrooms. In addition, if faculty have tight time constraints, institutions

should offer in-time instructional design and development support for them (Huang et al., 2011; Maguire, 2005; Sahin, 2006).

Recommendation for Developing Effective Goals for the Use of Technology

In order to help faculty achieve effective goals for technology use (instead of focusing on isolated, skills-based uses of technology) higher education institutions and organizations should promote the use of various technologies for sophisticated problem-solving and information-retrieving purposes (Gahala, 2001). Since advanced online technologies can be a very appropriate vehicle to achieve meaningful and engaged learning, it has the potential to build up authentic, meaningful, and challenging problems that are similar to tasks performed by professionals in various disciplines (Zhen et al., 2008). Therefore, an efficient, well-supported technology plan is very important, as it could ensure that faculty realize the full potential of new technology, and actually use it.

This chapter detailed lists the recommendations for faculty technology adoption process based on the five affecting factors I have grouped from the literature review in the previous chapter. As a new online technology is integrated in to faculty's instruction there is a variety of needs have to be considered in order to make this happened effectively.

Chapter 6: Discussion and Conclusion

Higher education institutions and organizations must integrate new online technologies to support faculty teaching. If faculty do not successfully adopt new online technology, it does not matter how great the technology is unless it can have tangible results in the online classroom. Furthermore, the more quickly faculty adopt the online teaching/learning technology, the better they will be able to use it to facilitate their teaching. In the online technology embedded classroom, whether pure online teaching or within a face to face blended teaching environment, the faculty member play an essential role in the teaching process: not only because faculty performance is highly associated with the quality and final success of online learning, but also because provide fresh impetus to the implementation of teaching innovations, introduction of new teaching initiatives, and integration of new online technology into instruction (Bakkenes, Vermunt, & Wubbels, 2010; Chen, 2008; Tabata & Johnsrud, 2008; Wang & Wang, 2009).

The literature review is focus on the process of faculty technology adoption as an individual/personal development process rather than on special properties of development of socialization or cultural influences regarding faculty online technology adoption. Peng and Mu (2011) researched the impact of social network structures on online technology adoption. They argued that the social network centrality and network brokerage can contribute positively to online technology adoption, and the closure of an ego network has the negative impact. I did not

include this within my literature review because the studies in this area were limited.

Another area worthy of more attention is the extrinsic motivators or pressures for faculty online technology adoption. For example, universities and colleges administrators are key players in efficiently helping faculty and staff members to adopt online teaching technology. Further, the long-term direction of IT in education development needs to be addressed, make specific planning and the determination priority, and then collaborating with faculty to make appropriate changes in new teaching trends. In addition, peer pressure and student pressure should be taken into serious consideration as well, which can be a motivator or barrier for faculty online technology adoption. Because limited researches can be located, these issues have not been included into this literature review.

Based on Zhen (2008) research, faculty members would be more motivated to adopt the new technologies for their classrooms if they have strong beliefs about the unique advantages of online teaching and are confident using them. In order to achieve this goal, besides faculty new technology training, it's also important to help faculty members build their beliefs about effective technology integration, effective online teaching and learning, and appropriate curriculum design for new technology integrated online classroom (Chen, 2008). By grouping the variety factors that can affect faculty technology adoption for online teaching in higher education, I learned that there are always barriers to overcome within faculty online technology adoption processes in higher education institutions and organizations in general,

since integrating a new technology into existing instruction and pedagogy is very challenge and requires a lot of time, effort, changes and updates for the faculty members. How to motivate them to effectively and efficiently adopt the new technology, understand their concerns and barriers in order to help them is the goal for this literature review. It is very useful for now and for the future: since as long as online technology keeps developing, improving, and advancing, as well as online teaching instruction and curricula, there will always be new challenges emerged for faculty and students to conquer and digest.

In addition, successful online education actually deeply relies on computer hardware, software, faculty and staff member training, student training and computer system security and college administrative policies to be fully integrated. Every part is very important affecting faculty's willingness to adopt new technology into their online classrooms. In this literature review five factors affecting faculty online technology adoptions and related recommendations for them have been summarized, including the reliability of technology, faculty's perceived usefulness of technology, institutional support of technology, time constraints in implementing technological applications, developing effective goals for the use of technology. This literature review can help higher education institutions and organizations improve faculty and students technology use within online classroom.

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