

**SUCCESS FACTORS FOR INCORPORATING
VIRTUAL INSTRUCTION INTO TRADITIONAL
UNIVERSITIES**

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ABSTRACT:

The present paper addresses success factors that facilitate the incorporation of virtual Instruction(VI), into traditional universities. Absdor's and Sachs' concept of the level of readiness of faculty and organization to the adoption of instructional innovation is adapted. Major Faculty Development (FD), Organizational Development (OD), and Instructional Design/Development (ID) factors related to VI are discussed from a system's point of view, and a number of such factors are identified.

INTRODUCTION:

Educators have long sought to maximize educational opportunities for those in need as well as to improve student learning. As the rise of computer mediated communications (CMC) in the 90's broke new grounds through its powerful tools (e.g. Intent, www, etc), true and great opportunities are now in the hands of educators. Ryder and Wilson (1996, p.643), foresee "dramatic changes in the way we learn and teach". Wang and Cohen (1998, P. 455), consider the internet "one of the most powerful tools ever invented in human history", and Maddux (1996, P. 70), regards the word wide web (www) as the "most important development in modern history of spoken and written communications". Surely, the endless and rich resources on the internet have excited many educators about its potentials to teaching, learning, and research. Consequently, CMC is gaining wide acceptance as both an instructional delivery medium and a learning tool. More universities are offering more of their resources (e.g. class schedules, curricula, etc.) through the web and more faculty are using the web to provide resource based learning (course syllabi, assignments, and links to appropriate resources). Further, in 1995, the number of host computers has increased 2000% since 1991, with more than 200 countries expected to have access to the internet in the current year of 2000 (Maddux, 1996, P. 63), and in 1995, a third of U.S. post secondary schools offered distance courses (Powers et al., 1999, P. 553). While virtual universities are already in space, some countries (e.g. Korea) are seriously considering incorporating virtual instructions into traditional universities (Kwon, 1999, P. 74); and the Arabian open university is expected to start in 2001.

Motives behind these developments are many, including increased student population and scarce resources, change in manpower skills needed to cop with job market, recent development in cognition about learning and consequent shift in teaching-learning paradigm, and inability of the

teaching- centered school to respond to the pressures brought by the information revolution (Branson, 1997, P. 14). In sum, high expectations of CMC have made it a viable alternative approach to educational reform. However, away from optimism and hopes, educators have always indicated that success of technology adoption and integration is much more than hardware dimension, reminding us of past frustrations of innovation failures. What is more important are the multifacets of factors related to such complex phenomenon as distance learning and virtual instruction. Ely (1999), Wilson (1996), Powers et al.,(1999), to name but a few, all have emphasized the significance of issues related to implementation, pedagogical, technological, ethical, organizational, psychological, motivational etc. factors.

Purpose of the study:

The major purpose of the study is to identify key factors and sub-factors and or guidelines that facilitate successful incorporation of virtual instruction into traditional universities.

Research Question:

The study attempted to answer the following major question: what are the key factors and sub-factors and or guidelines related to instructional design/ development (ID), faculty development (FD) and organizational development (OD) that facilitate successful incorporation of virtual instruction (VI)into traditional universities.

Significance of the study:

Many research studies, literature reviews, and theoretical papers have addressed the issue of technology adoption and integration into education. However, most of such efforts tend to deal with certain aspects(s) of the issue. As Means et al., (1993, P.2) indicate “ the experience of the past decade tells us that serious reform efforts must look not just at the classroom but at the whole system within which education takes place. To Ertmen et al., (1998, P. 133), one should not address technological or pedagogical needs separately, rather, they should be developed simultaneously. The researcher beliefs that little work has been done to consolidate the many facets of technology integration particularly as it relate to the incorporation of VI into traditional universities. Isolated research findings and implications can be maximized when synthesized into a holistic and coherent framework. This study was an attempt to do so.

Procedure:

The present study reviews related literature through a deliberative inquiry approach and synthesize research results and implications into a coherent and practical sets of factors related to VI. In doing so, a narrative and visual framework composed of three major categories, (ID), (FD) and (OD) was developed. Within each category, key factors and sub-factors and or guidelines are discussed.

Virtual Instruction: A system's view:

VI is a multifacet and multidimensional phenomenon for several reasons. First, it is composed of various interwoven variables (resources, multiple communication channels, different levels of support, etc). Second, as a system, it does not operate in isolation, rather it is a sub-system within layers of larger and supra-systems. Third, it is not static or one shot effort, but an ever changing and ongoing process with multi-interrelated and interdependent factors and sub-factors. Fourth, system's concept clearly indicates that change in one part of a system implies change(s) in other part(s) of the system. Departing from traditional instruction to on line VI implies rather a radical change in teaching traditions. Such change touches the nerve of the individual faculty member's philosophy, beliefs, and attitudes toward teaching and learning as well as structure and policy of the organization in which change takes place. Thus, looking at VI from one perspective (e.g. faculty development, resource allocation, or instructional design) does not provide a comprehensive view of the multitudeness nature of the problem. The above argument, then, provides a rationale to look at VI from a system's view, a view that looks not only at the innovative product(VI) but at the underlying ground that makes it work in an effective and efficient manner as well.

Frantz and King (2000) applied the system's concept to suggest a system's model of distance learning. They wrote:

The interface of educational technology distance education and change is very complex. As we examined the arena of distance education, we realized the usefulness of a system's approach as a powerful tool to connect and interrelate people, goals, organizations and technology in the educational playing field (P. 33).

Frantz and King (2000, P. 35) reported works of distance education systems models done by Moore (1993), Moore and Kearsly(1996) and Twitchel (1988).

In the same token, Hirumi et al., (1994, P. 260) emphasized system's view of education:

Many factors contribute to the inadequate use of computer technology: Insufficient resources, incompatible hardware, top down initiation, fear of change, lack of rewards, in adequate software, and insufficient time or training. Together, these factors suggest one basic underlying problem: failure to view education as a system, a set of interrelated components that must work together to achieve a common purpose. (P. 260).

Banathy (1993) and Salisbury (1996, P. 17) emphasized the need to apply system's thinking to the problems of education.

Key factors to the success of virtual instruction:

The author suggests that an appropriate approach to the incorporation of VI into traditional universities, should address at least three interrelated major factors: organization development (OD), faculty development and instructional design/ development(ID). Readiness of faculty and organization is a prerequisite to successful ID through which instructional innovation (VI) is produced. The concept of level of readiness to the adoption of instructional innovation was introduced by Abedor and Sachs in 1978 and 1984. They explained the relationships among OD, FD, and ID:

FD, OD, and ID are integrally related to each other within the larger process of bringing about the adoption of instructional innovations having the potential for improving teaching and learning.. We suggest that there is a spiral relationship between FD, OD, and ID because FD and OD can create readiness for the instructional innovation produced through ID.. It is a combination of individual and organization readiness that facilitates the ID process and the adoption of instructional innovations(1984, P. 395).

Before going any further, a definition of FD, OD, ID, and VI is warranted.

FD: "activities which increase the faculty member's knowledge, skills, sensitivities, and instructional techniques, so that they are better able to fulfill their teaching responsibilities" (Abedor and Sachs, 1984, P. 395).

OD: " activities which seek to change the structure, policies, and organizational environment in which instruction takes place in order to make that environment more supportive of instructional change" (Abedor and Sachs, 1984, P. 395).

VI: “ an innovative approach for delivering instructions to a remote audience using the internet’s World Wide Web as an instructional delivery system” (Khan 1997, Cited in Liaw and Huang 2000, P. 42).

It is worth indicating that different terms are used to denote VI, e.g. Web –based instruction (WBI), online instruction, internet-based learning etc.; further, these terms are very often used interchangeably. Khan’s definition stated above, was used by him to define WBI (Liaw and Huang, 2000, P. 42).

applying the system’s view of VI helps us to:

- refocus the organizational structure, policy, and functions to support VI;
- define system’s goal: the overall goal of VI is to enhance and improve faculty teaching and students learning; and
- distinguish input components (FD &OD), process component (ID), product component (VI), and output component (faculty teaching and students learning).

This paper adapts Abedor and Sachs concept of faculty and organization readiness mentioned previously to the adoption of VI. Figure 1. depicts a system’s view of the relationship among FD, OD, ID, and VI.

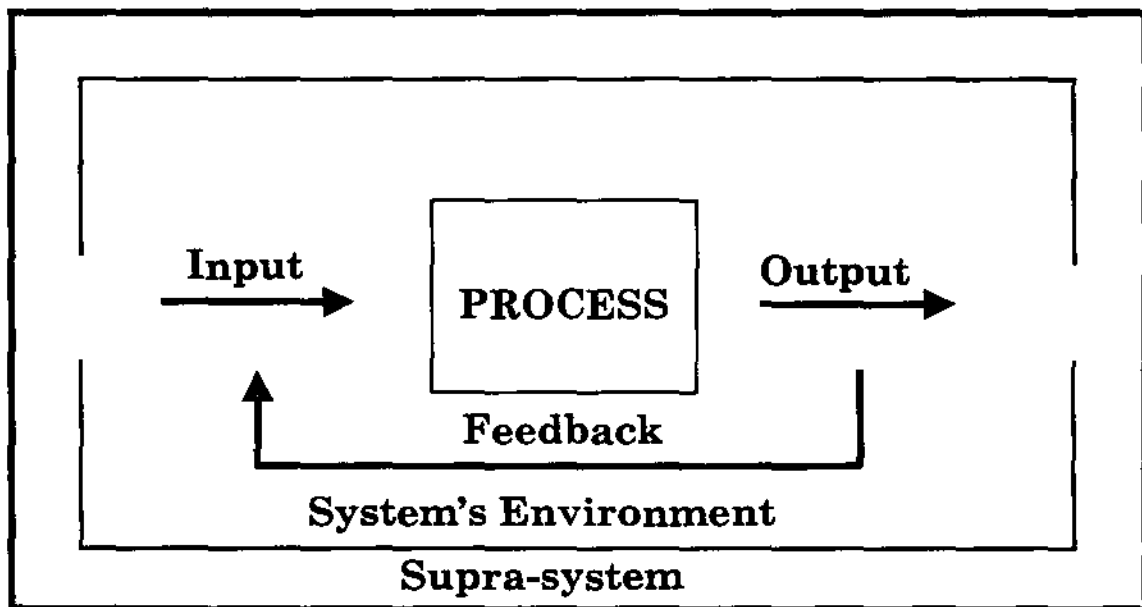


Figure 1. System’s Concept

Figure 2 shows that the adoption of the target system (VI) is facilitated by ongoing interaction and interdependency of FD, OD, and ID and VI activities.

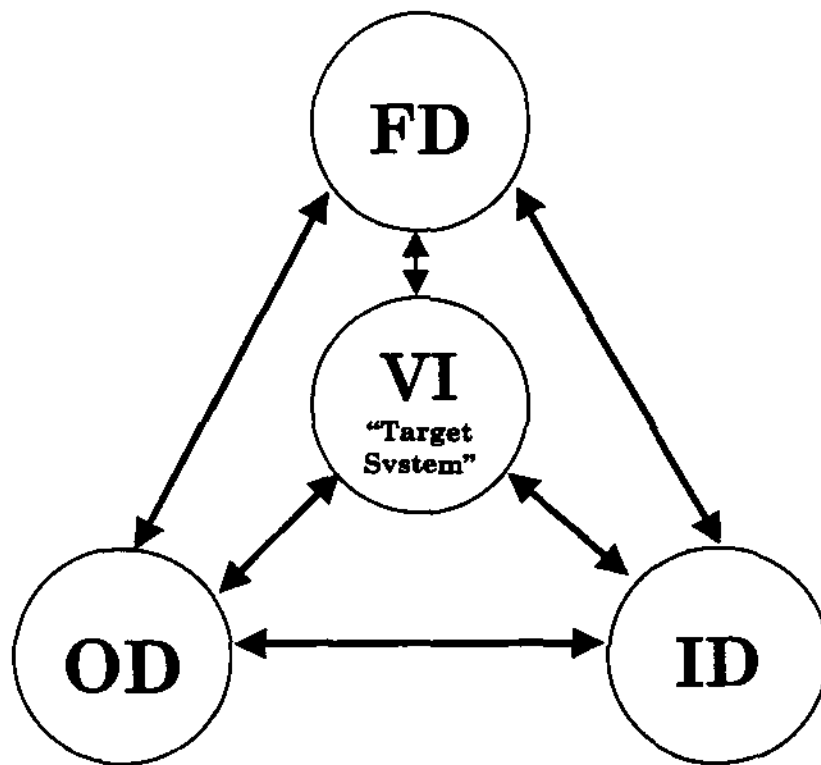


Figure 2. Ongoing Interaction and Interdependency of FD, OD, ID, and VI

Based on the above argument, figure 3 suggests a system's model for the incorporation of VI into traditional universities. As can be seen from the figure, out put of FD and OD processes constitute the inputs (readiness) needed for ID process which results into VI (product); further, VI is not an end in itself, it is expected to improve students learning and faculty teaching (output); because shifting from one system (traditional) to another (VI) can be very costly (when failed) in both economic and psychological measures. Therefore, continuous evaluation of the effectiveness and efficiency of system's components must be a routine procedure, to support the adaptive nature (or self-renewal characteristic) of open systems. Needless to say that FD, OD, ID, and VI each constitutes a system with its own inputs, processes, and outputs components. Also of significant importance is the level of support given to FD, OD, ID, and VI activities. These activities should have support at three levels: university, college, and department levels. Danielson and Burton (1999, P. 101) report about the experience of their college of human resources development at Virginia Tech University which indicated that the technical support office located at the university level, was not enough to support integration of technology by faculty at their college; faculty who did not find technical support at the time they need it and on the working site abandoned

computer use; thus, the authors concluded that a technical support office should be located at the college level to provide face-to-face assistance. Further, FD, OD, ID, and VI need planned diffusion and adoption activities at these three levels of support because FD, OD, ID, and VI each implies a change, hence, activities related to raising awareness and arousing interest about these efforts and the attributes of their targeted system (VI) need to be carefully planned and implemented.

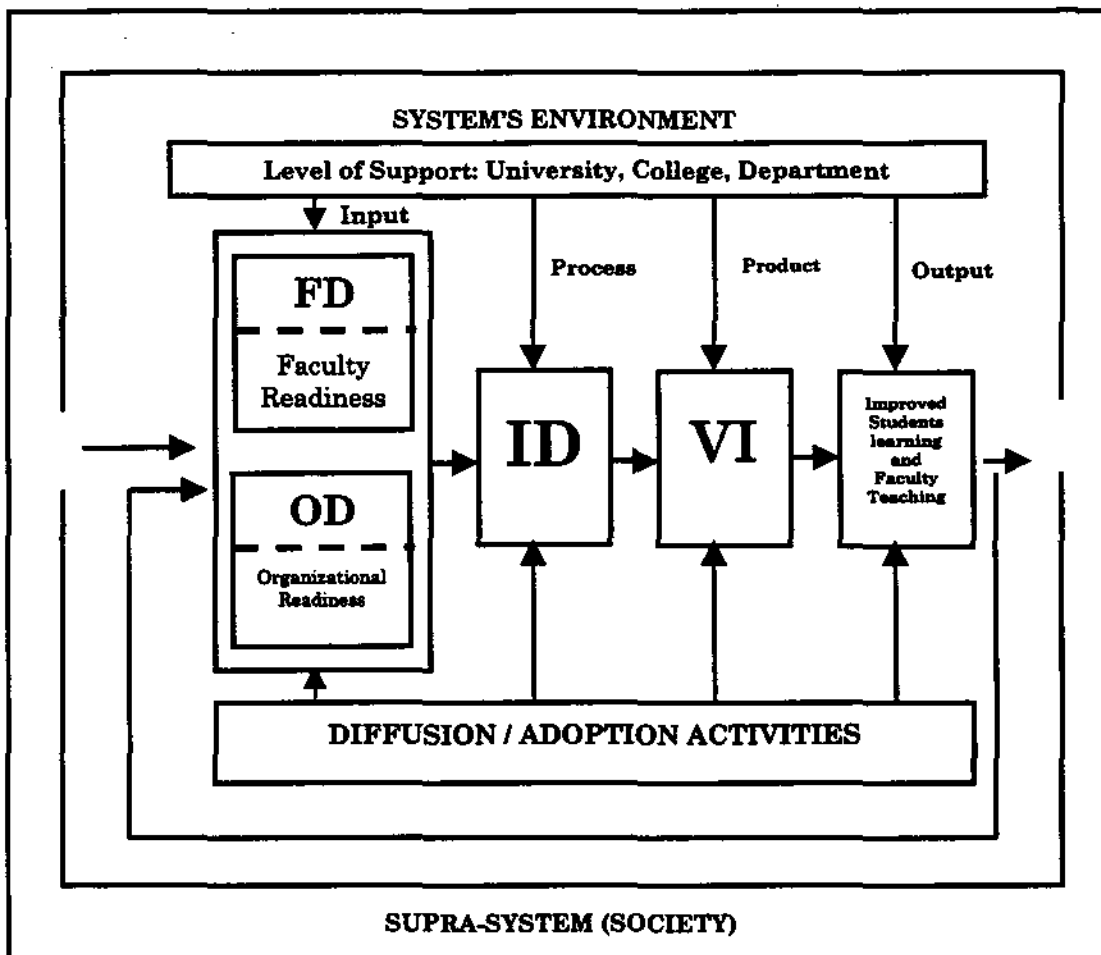


Figure 3. A System's Model For the incorporation of Virtual Instruction into Traditional Universities

The following section, presents FD, OD, and ID factors and sub-factors and or selected guidelines that are needed to facilitate the transformation of a university from traditional fact-to-face, text based, and teacher-centered instruction to one that is more conducive to learner-centered and collaborative on-line VI. These factors and sub-factors and or guidelines are not exclusive, rather, they reflect some basic concerns related to VI.

FD related factors:

One of the major factors for the improvement of teaching and learning in post secondary education resides within the individual faculty member; “faculty is the chief factor underlying effective instruction” (Mitchell, 1999, P. 269). Literature related to change and innovations makes a strong case that “unless an individual faculty member possesses some minimal level of readiness for the adoption of the innovation –it is unlikely that s/he would voluntarily become involved in instructional innovations “(Abedor and Sachs, 1984, P. 395). Mitchell (1999, 269) states” a primary barrier determining the future of distance education may be the faculty’s attitudes, perceptions, and willingness to use technology. Ely (1999, P.4) identified eight conditions that facilitate the adoption and implementation of instructional innovations among which are skills and knowledge of the faculty member to use the innovation and his willingness to invest time into innovative activities.

Caffarella and Zinn (1999) proposed a conceptual framework of FD; Schifter (2000) conducted a study about faculty motivators and inhibitors for participation in distance education; Eastmond et al., (2000) developed an incremental approach to the implementation of WBI; Danielson and Burton (1999) proposed a systems approach to adopting new technologies in education; and Wang and Cohen (1998) addressed factors affecting faculty use of the internet. Factors shown in Table 1, are based on reviewing these works and other that appear in the references of the study.

FD Factors related to VI	
1 Attitude:	- Positive attitude toward VI
2 Values:	- Faculty member places importance on teaching and learning via VI
3 Beliefs:	- Faculty member's beliefs that teaching and learning can be enhanced through VI.
4 Skills and knowledge:	- The faculty member possesses skills and knowledge in the design, development, and delivery of VI.
5 Dissatisfaction with the status quo:	- Faculty member feels that change in teaching and learning patterns is needed; that VI is a viable option toward this end.
6 Time:	- The faculty member is willing to invest a substantial amount of time in planning, preparation, and implementation of VI courses, and on an ongoing development process of such courses.
7 Personal motivation:	- The faculty member is driven by personal (intrinsic) motivation to use VI.

8	Working relationship :	- The faculty member has a positive working relationship with colleagues, department chair, college dean, and other university administrators.
9	Involvement:	- Willingness of faculty member to engage in committees, team work, and ideas exchanges about VI related issues.
10	Human Element:	<ul style="list-style-type: none"> - Faculty member uses various pedagogical tools appropriate to the course and students learning styles. - Faculty member provides opportunity for fact-to-face sessions to support the social element of teaching and learning. - Faculty member provides remedial work for students who lag behind. - Faculty member monitors students progress through planned process. - Faculty member encourages active learning through various levels of interactions. - Faculty member encourages students to pursue their own learning goals and to evaluate the virtual course and suggest modifications.

Table 1. FD factors that facilitate the adoption of VI

OD Factors related to VI

As pointed previously, mutual support and interdependency relationship exists between FD and OD. According to Abedor and Sachs (1984, P. 395):

“ No matter how ready an individual faculty member might be for ID, if any instructional innovation is to survive in the long term, then the organization within which the faculty member functions must, at the very least tolerates or accepts the innovation. In this regard, organizations possesses several characteristics which affect their readiness to change or accept the innovations proposed by their members. These characteristics include the structures, rewards norms, resources, and polices of the organizations. Unless there is some minimal level of organizational readiness, it is unlikely that any individual member’s instructional innovation will survive very long”.

Likewise Ely (1999) has identified OD condition that facilitate adoption of innovation (e.g. leadership, commitment, resources, time, and incentives), Ravitz (1998) studied the eight conditions identified by Ely in regard to teacher’s use of the internet; Hirumi et al., (1994) presented a framework for infusing technology in teacher education; and Frantz and king (2000) developed a distance learning system that emphasized inputs components

(human resources, materials, facilities), and operational, processes and outputs.

Table 2 presents OD factors that facilitate the incorporation of VI into traditional universities.

OD Factors related to VI	
1 Norms:	- Organizational norms support the use of VI and technology integration.
2 Structure:	- Organizational structure allows open and free communicators and encourages group collaboration to solve instructional problems.
3 Resources:	- Easy access to hardware and software resources needed by faculty and students to engage in VI is provided and maintained by the university. - The university supports VI at the engineering, application, information service, and user levels.
4 Technical and Instructional support:	- Technical and instructional support to VI are provided to faculty member(s) at the worksite and on demand. - Technical and instructional support are provided at the university, college and department level.
5 Commitment:	- Leadership at the university, college, and department levels is committed to the improvement of instruction through VI.
6 Professional development:	- The university (and college) provide opportunities for professionals development (e.g. release or paid time; formal and informal training, etc.) - Special attention is given to face-to-face and one-to-one individual consultation to meet the unique needs of the individual faculty member.
7 Incentives:	- Recognition, promotion, and rewards are provided for successful and effective integration of VI into one's instruction.

Table 2. OD factors that facilitate the adoption of VI

ID Factors related to VI:

Currently, there exist many ID models that provide guidelines for effective design and development of instruction. Those models can be adapted to inform the design of VI. More ID models that are proposed specifically to inform the design of online VI appear in the literature. These later models are based on the assumption that new WBI models are needed because of the characteristics of VI which are quite different from traditional instruction. In VI almost all teaching and learning take place online with minimal or no face-to-face contact between students and instructors, in addition to "the functions available in online" (Edwards, 1999, P. 399). Further, recent development in ID brought by constructivism and related theories call for a sheft in ID paradigm using alternative approaches. The instructional designer is, thus, surrounded by a vast array of design models that belong to different schools of thought. The author beliefs that all ID approaches provide helpful guidelines to effective instruction. A compilation and synthesis of those effort may facilitate the tasks of ID.

Models for WBI have much in common: they stress the need for clear goals, collaborative learning, motivational concerns, generative knowledge, reiterating the goals at various points in the course etc. (Edwards, 1999, P. 319). Several WBI models have been proposed by Reeves and Reeves (1999), Ritchie and Hoffman (1997), Duchastel (1997) and Edwards (1999), (cited in Edwards 1999, P. 319).

Madhumita and Kumar (1995) proposed 21 guidelines for effective ID; Kemp and Smellre (1989) have evolved eleven generalization related to such factors as motivation, and individual differences, learning objectives, feedback, organization of content, practice and application; likewise Knirk and Gustafson provided guidelines related to perception, motivation, practice, and learning transfer (Madhumita and Kumar 1995, P. 58,59). Further, more guidelines and models have been suggested to address specific concerns in VI. Examples include Keller's motivational design model (cited in Shellnut et al., 1998, P. 390) which suggested guidelines related to motivational components of attention, relevance, confidence, and satisfaction; Lamb and Smith (2000, P. 12-15) have developed ten guidelines to the design and delivery of distance education; Moallesm's developed a frame work of WBI for integrating objectivist and constructivist ID (2000); Beriswill (1998) has developed screen design guidelines; Seels et al., (1996) have proposed a framework for message design; Roblyen et al., (1998 P. 37-75) summarized strategies based on objectivist and constructivist design; Wilson et al., (1996) proposed guidelines for incorporating the internet into instruction based on a case

study findings; Wilson and Ryder (1996) described factors that need to be considered in using behavioral and constructivist ID; and many more. Table 3, summarizes selected ID factors related to VI.

ID Factors related to VI

1 Motivational

Factors:

a. Attention:

- Provide relevant graphic and animation throughout the lesson.
- Include ample learner interactions.
- Use consistent placement of screen title, keywords, objectives, summary, and appropriate media.
- Use shorter texts elements (ten or less lines) with focus on main points.
- Use surprise novelty to reduce predictability that appears to promote learning boredom.
- Use colorful instruction that incorporates a variety of attention gaining and maintaining strategies for generating interest and preventing boredom.

b. Relevance:

- Design instruction that presents concepts and applications in meaningful context.
- Design Web pages with features that would help students to achieve their learning goals.

c. Confidence:

- Use a consistent and logical interface with user control, embed on line support of the lesson, and provide appropriate interaction.
- Increase learner's access to embedded online content, alternate navigation choices and guidance about the program interface.
- Include topics objectives and summary information.
- Include note taking access to allow students to take notes and feed it on a floppy disk.

d. Satisfaction:

- Give learner more control of navigation.
- Provide helpful feedback and guidance (guided exercise) and self-check's with access to hints and solutions.
- Provide assessment that matches objectives and self-checks to increase student's satisfaction of completion and intrinsic rewards.
- Orient students to value of skills they expect to acquire in the virtual course.

- 2 **Scaffolding:**
 - Provide advance organizers to support scaffolding.
 - Provide scaffolding for students using the web in situations where they use novices in regard to the system and content being studied.
- 3 **Interactivity:**
 - Determine the amount of interpersonal exchange necessary to meet the course objectives (synchronous & asynchronous communication).
 - Provide non-linear than linear navigation.
 - Provide hints and guidance to novice students who may need this help to participate in interactive activities.
- 4 **Learner control:**
 - Encourage students to take more responsibility for constructing their own views and perspectives.
 - Present to students project and problem based situations to complete.
- 5 **Guidance and Feedback:**
 - Provide detailed syllabus and clear time line for course assignments and activities.
 - Provide students with timely and prompt feedback,(e.g. e-mail reply, posting weekly reminder to course web sites, message center, etc).
- 6 **Collaborative learning**
 - Incorporate cooperative learning in virtual instruction. (e.g. VI group projects via e-mail, or asynchronous conferencing).
 - Assign students roles such as leaders or facilitators of discussion topics.
 - Use structured academic controversy to deplete.
- 7 **Psychological factors**
 - Provide learners with opportunity to practice and acquire new skills under low psychological risk conditions.
 - Emphasis web site friendness to increase perceived orientation.
 - Use non-linear navigation format.
- 8 **Systematic ID**
 - Use systematic ID principles for stable, well-defined content.
 - Use ID models and principles with heavy representation demand.
 - Use ID principles when mastery of discrete skills and rules is valud.
 - Design the virtual course in hight of learner profile.
 - Use ID to remedy identified weaknesses

- (prerequisite skills).
 - Use ID to promote automaticity of prerequisite skills (drill and practice)
 - Etc.
- 9 Constructivists ID**
- Use constructivists principles to generate motivation to learn (with low-motivated students).
 - Use constructivists principles to foster creativity.
 - Use constructivist principles to facilitate self-analysis and metacognition.
 - Use constructivist principles to support transfer of knowledge to real world problems.
 - Use constructivist principles to foster cooperative learning.
 - Use constructivist principles with changing, ill-defined, and complex content.
- 10 WBI models:**
- Organize ahead of time the virtual course into weekly modules with components and structure of the modules clearly specified.
 - Inform students clearly what is expected from them in virtual course.
 - Determine in advance methods of announcement, e-mail, and class discussions to enable students to follow the participation aspects of the course.
 - Use various pedagogical tools (e.g. chats, group discussion, etc) appropriate to students learning styles.
 - Provide independent and collaboration activities.
 - Reiterate independent and collaborative activities.
 - Update links to appropriate web sites regularly.
 - Etc.

Table 3. ID Factors that facilitate the Adoption of VI

Piecmeal Vs Comprehensive change:

A decision about the scope of required change to incorporate VI into a university has to be made. Piecmeal and comprehensive change are two alternative approaches. The first approach maintains the status quo while incrementally improving current practices, the other, seeks total reform and restructuring. While literature on diffusion and adoption does not generally support the piecemeal approach which brings minor change

overtime, scarce resources and firm beliefs and attitudes toward traditional teaching especially in a highly centralized curriculum system, may force a university to consider an incremental approach. Eastmond et al., (2000, P 42-45), proposed a model of incremental change to the integration of WBI. The model is composed of four stages: awareness (activities directed at engaging faculty as individuals or in groups through news letters, guest speakers, demonstrations, etc); faculty support (faculty tryout WBI where maintenance and technical support are provided); faculty skills (full development effort for revising university courses to allow teaching in any asynchronous mode; and developmental effort (full courses at the department level are designed in sequence with others where an entire curriculum is mapped out). Harmon and Jones(1999) developed useful guidelines that may inform the decision regarding the appropriate level of WBI. They described a number of factors upon which such decision can be made; these factors are physical distance, stability versus variability of curriculum, the need for multimedia, the need for students tracking, size of enrollment, amount of interpersonal required, social pressure, need for online resources, infrastructure, comfort levels of technology use, and access. Five WBI levels proposed by Harmon and Jones: Informational, supplemental, essential, communal, and immersive.

Summary and Conclusion:

This paper discussed the incorporation of VI into traditional universities from a systems point of view, suggesting that FD, OD, and ID are three interrelated and interdependent systems that need to be addressed together toward the creation of effective and efficient virtual instructional system. A number of factors and sub-factors in each system were listed.

It is concluded that factors related to faculty and organizational readiness to VI as well as factors related to ID through which VI is produced play a significant role in the success or failure of incorporating VI into traditional universities; that successful VI requires an ongoing technical and instructional supports at the university, college, and department levels; and that a system's view of the factors related to VI can be a powerful tool in dealing with the intricacy of these factors.

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