Successful Ingredients for Distance Education

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The technology of a delivery system is only one of the factors of importance when examining what does and does not work in distance education. The characteristics of the teacher and learner, and the content to be delivered, must also be examined before the delivery system is chosen, since these factors determine final learning outcomes. Research has shown that instructional methods which actively engage the student in the learning process are most successful. The incorrect assumption is that higher bandwidth (greater capacity) in a delivery system, which enables greater fidelity and interactivity, directly translates into better learning. In this article, we will provide a framework for categorizing distance learning systems and discuss specific examples of how teaching, learning, and distance education technology interact to produce successful teaching-learning experiences.

Potential delivery systems can be into broken three basic types: correspondence, broadcast, and interactive. A correspondence system is any system where there is a significant time delay between instructor dissemination and student receipt. Methods in this category include Mail Correspondence (paper, video, CD-ROM), and Electronic Mail. Broadcast systems take advantage of some mass media communications in order to reach a larger population. This method typically allows many students access, but has limited or no feedback to the instructor. Examples of these systems include broadcast radio (FM, AM), broadcast satellite (video and audio), terrestrial broadcast TV, and cable/closed circuit television (public and private). The interactive method introduces some level of intimacy and information is delivered and returned in a more timely fashion (almost real-time). Such systems include normal telephone, telephone (audio) conferencing, 2-way radio, slow scan TV, Video Conferencing, and Computer conferencing.

Based on these delivery systems, a common categorization method can be established which takes into account Technology factors, Economic factors, and Information Delivery factors. Figure 1 contains these categories, along with additional teacher and learner factors which will be discussed later. Technology factors are availability, maintainability, and compatibility. Economic factors are various costs, critical mass, and support issues. Information Delivery takes into account the means of information delivery. It must be noted that these outlined systems are representations and that most existing delivery system use some hybrid type to deliver instruction.

Wide bandwidth is a useful ingredient for the delivery of distance education but is not the most critical component of the knowledge dissemination paradigm. The teacher and learner must be examined in order to understand the complete model. The delivery systems above can be thought of as the information conduit between the instructor and learner. While much time and worry can be spent on the establishing and maintaining of the delivery system, failure to place significant emphasis on the teacher and learner components can lead to a poor learning environment.

We can roughly organize instructional considerations into three factors: proximity (intimacy), timeliness of instruction, and teaching style (lecture, seminar, etc). Proximity relates to how the instructor and student interpret the intimacy of the process. Timeliness takes into account the information flow to and from the student. Some systems have more flow one direction than the other. Both proximity and timeliness are determined by the type of delivery system, although some slippage can occur based on the course style. The teaching style is mostly dependent on the teacher and the structure of the course and cannot be defined significantly in this article. Finally, we can divide learning considerations into learning styles and cognitive factors. Learning styles include: visual, auditory, and kinesthetic. Cognitive factors encompass such things as attention, enthusiasm, and motivation. Cognitive factors are dependent on each student and cannot be determined solely based on the delivery system.

With these basic categories in place, how does a provider of distance education ensure that successful teaching-learning experiences take place? One strategy is to use the chart provided to make the best possible match up of delivery system, learner, and instructor. The second approach is to concentrate on the learner's needs. Lets take an example of a course delivered by direct broadcast satellite. As shown in the chart, availability is medium, maintainability is high, and compatibility is high. This means that the purchase and installation of the satellite equipment is not too difficult. The equipment is probably not easily maintained by the instructor or learner, thus requiring outside support, but the system is fairly compatible with other existing equipment. With respect to economic issues, startup cost for the delivery of instruction is high, ongoing cost of the delivery is average, the system requires a large critical mass in order to be productive, the sender is required to provide most of the support, while the receiver is required to provide little support. Regarding the information flow issues, the system provides high visual and auditory information, but very little kinesthetic interaction. This would mean that the system might not be the best method for teaching how to do a

gymnastic routine on the parallel bars or how to high jump, but might work well for a foreign language or science course. The system also might not be good for visually-impaired students, if visuals are used extensively without adequate audio supplements.

It seems that with most modern delivery systems, emphasis is placed first on the delivery system and then on the teacher, with little thought given to the unique characteristics of the individual learners. This could be attributable to the fact that system developers have first hand dealings with both the delivery system design and instructor selection. The learner is assumed to be receiving some type of traditional course work, so that a pre-assessment of learner needs is performed and is assumed to be satisfactory. This might be the case if distance education was exactly the same as the traditional classroom. The problem is that distance education is not a 100% replacement for the traditional classroom. The advantages and disadvantages of distance education delivery systems, compared to traditional classrooms, must be taken into account in order to provide the necessary teaching adjustment in order to provide a positive learning experience for each student.

Programs that continually involve the student in the course content have been shown to be successful. This raises the level of attention and motivation which keeps the learner from being just a passive participant. Also, multi-modal systems, which incorporate more than one delivery medium, have shown good potential in meeting varied learner needs. By providing more than just video and audio the learner is transported to a new cognitive environment and thus again becomes active and engaged. Multi-modal information dissemination also allows for more learning methods and styles to be supported, thus providing better learning opportunities to learners. Another important feature of distance education is that it is well suited for low and high achieving students. Advanced students may be enthusiastic about the prospect of a new, previously unavailable intellectual challenge, while those struggling in a traditional classroom may welcome a new educational approach.

This article has outlined one possible method for classifying distance education systems, in order to compare and contrast them to determine optimum configurations. Each system has advantages and disadvantages compared to a traditional classroom environment. Understanding these advantages can help provide the highest potential for learning with ‘at a distance’ students. If the role of distance education is to provide alternate learning opportunities for ‘at a distance’ students, then the tail must not wag the dog — learners must be the main target for development (as opposed to the curriculum, instructor, or delivery system).

Unfortunately, because learners change each course cycle, tradeoffs must be made in an industrial model of education in order to provide teaching and learning that is both interchangeable and replicable. The ultimate question is 'Does the the manufacturing of education need to continue for students that are taught in a production line model?' Distance education has the potential to change the current instructional paradigm and give way to a new era in education, much like the communications satellite changed the way we communicate.

	Delivery System											Instructor			Learner					
	Technology Issues			Economic Issues					Information Flow Issues						Learner's Style			Cognitive Factors		
Potential Delivery System	Availability	Maintainability	Compatibility	Startup Cost	Ongoing Cost	Critical mass	Sender Support	Receiver Support	Visual	Auditory	Kinesthetic	Proximity	Timeliness	Teaching Style	Visual	Auditory	Kinesthetic	Attention	Enthusiasm	Motivation
Traditional Classroom Instruction	3	1	1	1	1	1	1	1	1	1	1	1	2							
Mail Correspondence	1	1	1	1	2	1	2	1	2-1	2-1	3	3	2							
Broadcast Radio (AM, FM)	1	1	1	1	1	2	2	1	3	1	3	2	2							
2-way Radio	1	2	1	1	1	1	1	1	3	1	3	2	1							
Telephone	1	1	1	1	3	1	1	1	3	1	3	1	1							
Telephone Conferencing	1	2	2	1	2	2	2	1	3	1	3	1	1							
Slow-Scan TV	3	2	2	2	2	2	2	2	1	3	3	1	2							
Computer Elec Mail	2	2	3	2	2	2	2	1	2-1	2-1	3	2	2							
Computer Conferencing	2	2	3	2	2	2	2	1	2-1	2-1	3	1	1							
Broadtcast TV	1	1	1	3	1	3	3	1	1	1	3	1	2							
Broadtcast Satellite	2	1	1	3	2	3	3	1	1	1	3	3	1?							
Video Text	3	2	3	3	2	2	3	1	2-1	2-1	3	3	1?							
Video Conferencing	3	1	1	3	3	3	3	3	1	1	3	1	1							
	1 = High 2 = Med 3= Low			3 = Large 2 = Avg 1 = Small					1 = Good 2 = Poor 3 = None			1 = Good 2 = Poor 3 = None			1 = High 2 = Med 3 = None			1 = High 2 = Med 3 = Low		