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НОВЫЕ ВЫЗОВЫ ГЛОБАЛЬНОГО МАСШТАБА**

Часть III

**DISTANCE LEARNING:  
NEW CHALLENGES ON A GLOBAL SCALE**

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Выступления участников конференции посвящены актуальным проблемам и перспективам актуальных задач в области применения дистанционных технологий и распространение эффективного инновационного опыта на международном уровне.

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## **MODE OF DISSEMINATION OF INFORMATION (MDI) AND METHOD OF TEACHING (ME)**

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The past 50 years have seen different types of distance education programs attracting enthusiastic supporters. The main mass communication technologies such as cinema, radio, television and (currently) the Internet have been used to transmit information and to support distance education. For each of these "new" media, researchers have encountered the same difficulty in finding credible evidence that they lead to a high educational success rate (Clark, 1995). Since the time interval between the arrival of two technologies tends to be similar to that between two generations, advocates of technologies have been tempted to ignore the past and admit that their "new technology" is unique (Clark and Solomon, 1986). Failure to learn from past mistakes has one damaging consequence: their repetition. For example, a recent in-depth analysis of research and evaluation studies of hypermedia in distance education (Dillon and Gabbard, 1998) shows that it is

difficult to obtain valid evidence of its impact. The purpose of this article is to suggest evaluation strategies to avoid past mistakes and obtain defensible evidence about the effectiveness of distance education.

### **What is an assessment?**

Evaluation is a process by which we judge the usefulness of something in order to make decisions (Baker, 1991). Evaluating a technology involves many modes of analysis and measurement strategies that help us make judgments about the "usefulness" of distance education programs. The judgments made during the development of a program are called "formative". An evaluation that attempts to describe the impact of an educational program in progress is often called "summative". Until our values guide both our summative and formative assessment activities, we need to be clear about the types of questions that allow for the assessment of distance education based on the needs of education users. remotely - students and their community. The questions we are asking about distance education and its assessment instruments will necessarily emphasize certain parameters and leave others in the shade. The evaluation questions for distance education implicitly convey assumptions and beliefs about the weight of different parameters and their impact on the desired results. For example, by asking ourselves whether a new teaching medium leads to more success for students than a traditional medium, we admit that the medium is capable of influencing their learning. This assumption has been seriously discussed (Clark, 1992a; 1994a; 1994b; Clark and Estes, 1998; 1999; Clark and Salomon, 1986; Gardner and Salomon, 1986).

One of the most important recommendations linked to this discussion is that each evaluation should explicitly apprehend the relative contribution of two characteristics of distance learning technologies, different but compatible, embedded in any distance learning medium. One technological characteristic - material - influences the dissemination of information and another - intellectual - influences learning through teaching.

The mode of dissemination of information is characterized by the equipment, machinery and media that allow access to information. Books, computers or teachers are familiar examples of MDI. Teaching methods (ME) aim to influence student learning. Examples of ME would be ways to organize and structure lessons, use of examples, ways to encourage practice and testing. ME can be brought to the student through various MDIs. For example, information, examples, practice and tests can all be made available to the student through books, computers and / or teachers.

ME and MDI are generally confused when evaluating distance education. Increases or decreases in student success rates influenced by ME are more often attributed to MDI. Reductions in cost or time spent reaching particular student populations (for example, rural or disadvantaged) are incorrectly attributed to ME. This confusion about the benefits that technology can bring can lead to costly and inappropriate policy mistakes. The large number of definitions of the term "technology" is no doubt due to this confusion (Clark, 1992d).

### **What technology and for what purpose?**

In a general framework, the term "technology" suggests the application of problem-solving science and experience (Clark and Estes, 1998, 1999; Heinrich, 1984). The major obstacle which prevents us until now from understanding in detail how the new technologies contribute to distance education is the confusion made on the contributions of these two distinct technologies (ME and MDI). One of these technologies, MDI, comes from the application of various scientific and engineering principles to the development and use of equipment, educational materials and procedures that record and transmit information. These educational media technologies have been

developed through physical science that has enabled the creation of new electronics-based multimedia (for example, fiber optics, interactive video discs and computers). MDI increases the student's access to knowledge learning, which is the most important goal in distance learning.

### **The teaching method (ME)**

A second category of technology involves various principles from the social sciences, and is linked to the development of educational engineering methods (Reigeluth, 1983; 1987). ME is rooted in research on teaching, learning and methods to improve student success. The "products" of an ME are new theories in educational engineering (Reigeluth, 1983; 1987; Gagné, Briggs and Wager, 1992; Merrill, Jones and Li, 1992), new teaching methods and new strategies for improve student success (Clark, 1998; Clark and Salomon, 1986; Weiner, 1992). These products can be integrated into courseware (courseware) distributed within the framework of distance education.

The main objective of this discussion is to show that all evaluations of distance education programs must aim to highlight, in a reliable and valid way, the separate effects of ME and MDI.

### **Separate evaluation questions from MDI and ME**

Support for distinguishing between ME and MDI contributions during evaluations is clearly established in the literature, but is rarely taken into account when evaluating or organizing programs. Schramm (1997), the most renowned critic on the use of the media in education, concludes that "... learning seems to be affected more by the message to be delivered than by the way of delivering it" (p. 273). More recently, research on media and technologies comparing their effect on learning (Clark and Salomon, 1986; Clark and Sugrue, 1989; Gardner and Salomon, 1986; Schramm, 1977; Clark, 1983; 1985; Allen, 1971; Jamison, Suppes and Wells, 1974; Kearsley, Hunter and Sidel, 1983; Levie and Dickie, 1973; Lumsdaine, 1963; Mielke, 1968; Salomon, 1981; Winn, 1982) can be summarized by the following analogy: the media "... Does not influence learning any more than the truck delivering supplies influences the nutrition of a community" (Clark, 1983; p. 3). The medium used by distance education is the vehicle that transmits information to students. The choice of vector strongly influences students' access to information, as does the speed and price of the transfer. This choice, on the other hand, does not influence the impact of the information delivered to the "client" on his learning. Delivery vectors can deliver useful, dangerous or neutral education without distinction.

### **Choice of relevant indicators for the evaluation**

Future assessments of distance education technologies involve answering the following questions: What aspects of the assessment protocol improve the usefulness of information for decision-makers? How could we collect information about the program that could help us determine if MDI or ME is having an effect? (Clark, 1995; Baker, 1989; United States Congress, 1998). While many questions about evaluation may not apply to all programs, three generalizations appear to be helpful to all, (a) be concerned with evaluation as soon as possible, (b) use a multi-level evaluation protocol, (c) conduct systematic cost-effectiveness analyzes.

### **Be concerned with the evaluation as soon as possible**

Evaluation specialists and policy makers need to be actively involved as early as possible in the development of distance education programs. Previous experience suggests that waiting until the end of a system design before thinking about evaluating it is a common procedure, but very expensive and counterproductive (Baker, 1989). It is essential to have initial information about the program at an early stage, for example knowing precisely under what conditions a new distance education program is created. One way to do this is to spend a lot of time, when developing the program,

precisely describing the problems that this program aims to solve. We could describe how the current conditions will be measured (for example, a measure of the initial conditions of the existing situation, including the views and impressions of the people involved) and carefully discuss possible alternative solutions to the problem (s).

It is advantageous to develop an evaluation procedure in parallel with the design and implementation of the program. In the field of computer-assisted learning, Henri Levin (1983; 1988; Levin and Meister, 1985) describes eight exemplary cost-effectiveness evaluation protocols. Each of these examples allows us to measure the initial conditions of the problems we are trying to solve. It raises the question of evaluation from the start of the implementation of the program, which makes it possible to determine its positive or negative aspects. The negative aspects can thus be corrected and the positive points improved to achieve maximum benefit. For example, most high school distance education programs try to integrate a maximum of different curricula and quality education. The designers of such programs could start with an analysis of the possible options (the different media can broadcast a new course) and their target audience (for example, assessing the number of students who could enroll in these new courses). Early interest in evaluation leads to the collection of information both on the needs and on the potential audience of the program, and on the existing teaching resources. Another advantage of this early interest is to be able to implement an evaluation protocol throughout the implementation of the program. Too often, programs are developed and implemented and then, some time later, their designers remember that "we have to do some evaluations". In the end, we learn very little information about the program, information which could however be useful both for its development or for that of others. [...] Levin (1983) showed how difficult it was to find an adequate evaluation of a program in terms of cost-effectiveness. After studying six reports evaluating distance education programs according to their cost-effectiveness, he noted that only one of them was correctly carried out from this point of view. Since most reports are not published, it can be assumed that this type of evaluation from the start of the implementation of a program is not yet a widely shared concern. The second useful tip for any distance education program is to adopt a multi-level assessment.

### **The mode of dissemination of information (MDI)**

The MDI can transmit various forms of education to students. The dramatic increase in access to computers and the Internet in schools and at home has led to more attention being paid to the benefits of MDI (Dillon and Gabbard, 1998). The evaluation questions associated with MDI attempt to measure the influence of the media on (a) the possibility for a student to access a greater variety of curricula, (b) the use of resources by the program or the school and (c) the reliability of the chosen modes. The questions typically found in media reviews are as follows.

325 °) Does the medium used for distance education maximize the student's access to new and / or high quality education, compared to other modes of dissemination?

Access to new courses and to high quality teachers or teaching techniques is one of the main objectives of most distance education programs. Collecting information on this access often leads to comparisons between the different means of broadcasting courses or between the number of students at the start / during the course of the program. For example, the Share-Ed program in Beaver County, Oklahoma (United States Congress, 1989) used a new fiber optic network to provide rural schools with access to new courses. The opinions of high school students were gathered on the increase in the diversity of the choices of the courses offered, which allow them moreover to validate in advance units of value then recognized at the university. These opinions, combined with a measure

of the initial level of the program and the number of students actually enrolled, show to what extent innovation promotes access. Evaluators should carefully consider the increased ease and quality of connection for minorities, older or widely dispersed student groups.

While "access" usually suggests the availability of new curriculum options, it may also suggest students' access to a more personal level. Teachers in the InterAct Instructional Television program in Houston, Texas (United States Congress, 1989) reported difficulty accessing their students personally and quickly to test their reactions or moods to adapt their teaching. On the other hand, teachers using computerized media often report an increase in the "individualization" of their teaching and the opportunity to "observe the students learning".

356 °) Does the media influence the use of school and educational community resources (for example, the space allocated, the equipment available, qualified teachers, new course materials developed on one site but not available on the others)?

This is often the case, since distance education programs are recorded and distributed across many sites, making the best teachers available to many more students. Evaluators could compile statistics on the knowledge and / or experience of teachers involved in distance learning, and compare them with those of traditional teaching. Here is an example of a different type of use: in Beaver County, Oklahoma as part of the Share-Ed program (United States Congress, 1989), the local telephone company installed fiber optics to improve the local service. The system was able to support communication volumes far beyond what the municipalities expected. The school network used the free bandwidth of optical lines for television and voice transmission for distance education. In addition, since few students use distance education, it is often provided to a smaller number of students per school than for a traditional course, and it mobilizes underused rooms and equipment (for example, storage spaces).

7 °) Are distance education media more reliable than other alternatives?

One of the main criticisms of remote media concerns their technical reliability. For example, the opinion questionnaires used to assess the educational television system in Beaver County, Oklahoma, only referred to technical issues to point out the weaknesses of the system. None of the administrators noted a technical problem, 11% of the teachers mentioned reliability problems, but 36% of the students mentioned in more detail problems with feedback from microphones, disturbing equipment, blurred images, noisy hardware and color display issues. This difference in the description of technical problems is probably related to the different experiences that each group of users may have had with television broadcasting. However, the evaluations could regularly check if such technical problems arise and thus rebalance the possible severity of the users, and if necessary correct these problems. When such dissemination problems remain unresolved, they can reduce the success and participation rates of the different players.

In effective distance education programs, the MDI (media) and the ME must interact. The characteristics of the media linked to dissemination must be able to ultimately save valuable teaching resources. Educational engineering, on the other hand, must be able to promote effective learning and the transfer of concepts. Teaching must be able to be developed taking into account the specific characteristics of each medium. However, funding institutions and agencies are increasingly concerned not only with the effectiveness of distance education programs, but also with their cost. Cost is a "goal" or "consequence" of both MDI and ME.

### **Cost-benefit assessment**

40It is necessary to assess the cost of MDI and ME of distance education programs separately. This makes it possible to combine the question of "effectiveness" (of media and education) with that of "cost" in order to provide decision-makers with information in terms of cost-effectiveness. This type of evaluation requires that at least two different technological options be compared according to the same criteria (Levin, 1983). In many ways, cost-effectiveness is the most valuable information we can provide to school officials, taxpayers and their elected representatives. As resources for education are limited, it is important to focus on the financial and time cost of new programs.

#### **Cost of information dissemination mode (MDI)**

The assessments preceding the introduction of a new medium should explore the costs of its alternatives. In many cases, older technologies (for example, tutors, books, video tapes, postal system) are more economical. Cost assessments should always consider less expensive and more traditional MDIs. Evaluations indicate, for example, that trained minimum wage tutors are less expensive than computers for many teaching tasks (Levin, 1983). An excellent discussion of cost-benefit analysis was provided by Fletcher (1990) in a review of the question on the use of interactive military training DVDs. He noted that some programs categorize their costs such as: (a) initial investment, (b) technical assistance (maintenance and replacement), and (c) cost of use; while others amalgamate them. Fletcher maintains that the separation of costs gives a better picture of their source and helps to control them. He noted that the cost-effectiveness ratio varied widely between programs. Some studies find huge benefits compared to the cost of the technologies used. Others refer to big financial problems. Clearly, this question involves many factors, many of which have not yet been identified. Fletcher suggests that cost-effectiveness analyzes can be (and are) manipulated when he suggests that "in fact, these ratios can be as low as we want, and depend on the equipment to be used" (Fletcher, 1990, p. 19). Distance education program evaluators are advised to adopt a costing approach in terms of "ingredients", described below.

#### **The cost of the teaching method (ME)**

In schools and educational communities, there is a wide variety of goals that influence the evaluation criteria of the category "costs related to effective teaching". The expenses necessary to increase the motivation of students, their learning and transfer are more and more frequently studied (Jamison, Suppes and Wells, 1974; Congress of the United States, 1998). If individual school authorities want to develop their distance education policy, they would be well advised to collect information on such costs. Developing an ME leads to making choices about teaching, motivation and transfer with very different financial costs (United States Congress, 1988; Levin and Meister, 1985).

Beyond these costs, schools are more and more interested in the time cost associated with mastering learning and performance objectives. Certain types of tasks consume more "teaching time" and / or "learning time" (Clark and Sugrue, 1989). For example, it takes longer to teach a student a learning method than it takes to memorize. It also takes longer for a student to really assimilate procedural knowledge, until it becomes automatic, about 100 hours of practice for the simplest procedures, which is a common estimate (Clark, 1989; Gagné, Briggs and Wager, 1992). Fletcher (1990), by counting numerous military computer training programs, showed that the time saved was around 30% at the various sites. It is almost certain that the choice among different methodological options will increasingly relate to their time cost.



## **Conclusion**

In the past, evaluations of distance education programs have generally led to "after-the-fact reflections" and have been based on opinion questionnaires that are often unreliable and not very representative of the participants involved. Even when the assessments focused on student success, the questions mixed MDI and ME contributions.

Stronger plans for evaluating distance education programs must be adopted in the future if we want to identify their strengths and eliminate their weaknesses. These plans should mainly be based on the experience of those who have evaluated technology in the past (Levin, 1988). Three main lines should be followed: first, the evaluation should start from the start of planning the distance learning program. Starting an evaluation from the start of the project can provide much more useful information on its strengths and weaknesses. So any changes can be made in time. The second recommendation is that all programs should adopt a multi-level evaluation system. The different roles of qualitative (for example, questionnaires, daily reports and participant feedback) and quantitative (for example, student grades, monetary costs) data should be defined. The MDI and ME evaluations should be separated and the different objectives evaluated. Finally, new methods, such as Levin's "ingredients" method, make it possible to assess the cost-effectiveness of distance education programs.

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