The Reform's Framework for Incorporating "Collaborative Learning" Activities

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Abstract

The majority of school reforms' efforts are often realized without any contribution from technology in the main content of school "production" process. Technological solution is not necessarily related to the reform's activities. Categories of educational technology implementation are designed to highlight differences in the learning activities and related (technological) applications.

The "educational technology" includes different tools for learning, student/teacher collaboration possibilities, as well as a range of curriculum development, and incorporation of "collaborative" activities in the school organization. Reform-oriented ways of implementing (collaborative, engaged) learning include importance of connections to curricular goals and policy frameworks. The purpose is very clear: incorporating new directions in the mostly traditional learning process.

Studies of classroom implementations of technology have demonstrated that we can use "technology effectiveness framework" to measure the extent to which individual technologies and technology-enhanced programs are effective. This paper briefs this issue with indicators for measuring the effectiveness of technologies used in education.

Keywords: educational technology, educational reform, organization, curriculum, educational indicators.

Introduction

There are several aspects of educational "production" process, which researchers have investigated. Issues of teaching /learning and technology are more critical today than ever before. Most evaluations are oriented to the costs, the complexity or the feasibility of educational technology. We can take the education process in school as one of information provision and exchange. If we consider it from a systems theory viewpoint, we specifically expose (1) holism of observation and action, (2) relations of elements of the education process, and (3) synergies emerging on their basis.

The relation of our specific interest in this contribution is the one between information technology and education process. We do not have room to be holistic, so we will concentrate on the viewpoint of reforms in education related to introduction of updated information technology. The outcoming emerging synergies will be covered by a quite holistic measurement of impacts of three approaches to education reforms in Croatia, for which we will use a system of indicators of high technology performance.

Educational technology – a reform framework

The use of teaching aids and application of various technological solutions aimed at enhancing the level of curriculum composition has been supposed to have a "revolutionary" impact upon the organization of educational process over the past decades. Hence, the television in 1960's, personal computers by the end of 1970's and in the beginning of 1980's, video-presentations and other contemporary aids at the end of 1980's, were expected to significantly facilitate and modernize the process of teaching in advanced educational systems. However, this did not happen. Communication with or without the use of (informational) technology in the formal curriculum continues to develop "the same way it has always been developing" (Oakes & Schneider, 1984), in form of direct contact between the teacher and student, which still proves that "computer is not more important than a chalk" (Lesourne, 1993).

At the same time, as a rule, educational reforms are implemented or have been implemented without especially emphasizing the role of technological innovations in achieving more significant changes in school organization.

The recent researches on application of technology in education deal with issues like organization of school activities and curriculum, including the ways of communication, involvement and influence of parents and students, helping children with learning problems and similar. The mentioned areas have represented the targeted areas in the 30 years long research of school activities by the Phi Delta Kappa/Gallup Poll (1998) on public attitudes about public education. A modern school is expected to open the opportunities for communication with the environment (74% of respondents expressed a positive attitude about effectiveness of recording the school committee meetings, and 63% of them expressed interest in the possibility of establishing the direct communication with professors and school management board via Internet), which indirectly affects the modernization of their internal organization.

Phases of the education process

Organization of the educational "production" process is subject to changes under the influence of politics (in the context of applying the tenets of educational policy), as well as of various forms of technological influences. The application of computer technologies is possible in all segments of education "production".

a) In **the Input**: its users are facilitated their access to the desired educational programs which enables a higher level of awareness about all their peculiarities with regard to course of education in a selected educational institution. At the same time it enables the providers of educational services (primarily to teachers but also to the administrative personnel which makes selection/ranking on the principles of positive selection) to obtain of precise information about the abilities and success of an individual candidate.

b) In **the Teaching process** it enables the selection of teaching and extracurricular programs according to personal inclinations and needs of students, i.e. it aids teachers in grouping students aimed at active, teamvise mastering of curriculum.

c) In **the Output** it contributes to faster and better management of teaching-pedagogical documentation about students, which significantly facilitates the directing of

further course of their education or entering the labor market.

Requests for application of qualitatively different, technologically more acceptable, teaching aids in various phases of learning (classroom instruction) can be classified as one of the three basic **types of educational reforms**.

Types of educational reforms

An increasing number of studies of choosing and using educational technology in schools have focused on implementation process. In addition, they provide a basis for policy recomandations regarding to use of technology to support education reform (ED, 1993). We can discuss three types of educational reforms.

A. *Reform initiated by the State, i.e. department of the Ministry in charge, activities of which include hierarchical structure of subordinated governing bodies (**top-down reform**)*

The influence of regulatory organizations on the processes of planning and activities in application of technology is very pronounced, if the technological innovations in curriculum are understood as an integral part of the educational reform. They require financial investments in order to increase the technology level of equipment with modern teaching aids (computers, video and equipment for showing, TV sets and other), as well as in the training of teachers that would ensure qualitative keeping abreast of changes in use of modern aids (*software* courses and exchange of experiences in teaching work).

With regard to variety of educational-political, i.e. financial abilities in redistribution of budget resources allocated for reform purposes there are **four basic categories of status in terms of application of educational technologies (ET):**

1. Application for **teaching** purposes: ET supplement the teaching process by provision of additional information (e.g. Internet), demonstration of teaching contents from the same sources and simulation of solutions to the teaching problems, which make up the basis of an individual program unit. The teaching process designed in such a way enables the performing of additional contents with practical application of computers, TV/VCR and multi-medial systems. The advantage of applying the contemporary technologies in teaching is in momentarily and, thus, it demands problem solving. "Introducing complex, multidisciplinary projects and a strong element of student control means opening the

door for students to explore content areas that are unknown to the teacher" (ED, 1993).

2. For **research** purposes one uses ET in the computer labs, computer simulations and multimedia, which are, with an equal success, applied in practical part of the teaching program, and recently also in the processes of distance learning.

3. For the purpose of managing **the pedagogical and administrative documentation** one introduced ET as software for design of databases, their use, as well as the systems of maintenance of WWW and editing (school) publications.

4. For the purpose of creating and promoting the **communication** between students and teachers one uses ET in internal network (local area network) along with simultaneous expansion of communication channels with the environment (parents, enterprises, local community and similar).

However, many researches have pointed out the occurrence of resistance to the acceptance of technological innovation initiated from above. So, for example, in educating the students with development disadvantages, the teachers refused to implement modern aids. Rather, they returned to classical methods of pedagogical work despite the fact that intention of use of resources, equipment and teaching materials was to alleviate their burden arising from the demand for an individual approach to each individual student.

B. *Reform activities stimulated by individual schools, i.e. their teachers and as a consequence of noted obstacles in the direct process of work in the classroom itself (**bottom-up reform**)*

Exactly the opposite from the previous type of reform, the initiative for redesign of educational "production" process, which is conducted in classrooms or even the radical change of total teaching and pedagogical process (*curriculum*) is initiated by a school independently. A requirement for up-grading the implementation of educational technology is most frequently related to the achieved level of school management, which is a feature of decentralized educational systems. The level of autonomy in managing the school organization *(school-based management, SBM)* increases the influence of teachers upon the structure of educational process, and by it – indirectly – upon the possibility of their continuous improvement. At the same time, their further professional development represents a component part of (autonomous) business decision-making about the needs for introducing different technological solutions.

To what extent is it possible to expect from schools and their school boards to make decisions about the need for technological improvement of the teaching work?

Considering the different levels of schools' autonomies in comparison to the level of decentralization of education system, we found the teachers' influence upon the organization of curriculum more or less limited. Although the concept of modern school for the 21 century assumes exactly their "creative impetus to use of technology" (which basically represents a feature of the modern *classroom management*), the level of autonomy in managing school organization is still significantly different. It is possible to track diversity with regard to the ownership sector (private in comparison to the public school system), as well as with regard to the level of decentralization of the school system (which opens the opportunities for greater or smaller share of local community in additional financing of "producing" education).

The use of books, additional teaching materials and aids in teaching is also prescribed in advanced educational systems, that is, with regard to *formal* curriculum. In performing the elective contents, as well as in additional teaching, the schools decide autonomously on use of alternative technological means in which teachers find the opportunity for a greater contribution to the capabilities and needs of their students.

Considering the fact that privatization processes, which also include the educational activity, directly impact the change of teacher's position, the results of research on differences between public (state owned) and private school systems (mainly in USA) show that teachers in private schools have greater opportunity to exert influence over changes of curriculum and, hence, the application of educational innovations. A research on attitudes about privatization of education and perception of teachers about the possibilities of their influence over the organization of teaching ("production") process in Croatia (1996/1997) confirmed that similar relationship between teachers could also be found in Croatian educational system. Teachers in public (state owned) and private schools showed significant differences in perception of their own influences. To the question "Evaluate the possibilities of your influence upon the organization of the teaching process at your school (class schedule, use of book and materials handed out in class, independence in teaching classes, use of the cabinet space and similar)", the following answers were provided:

there is a possibility of influence,

there is a small or very small possibility of influence,

pedagogical steps are prescribed, and

there are detailed instructions for classroom teaching.

Figure 1 represents the data obtained from the research conducted in the beginning of the school year 1996/97 on sample of teachers in Croatia (N=49).
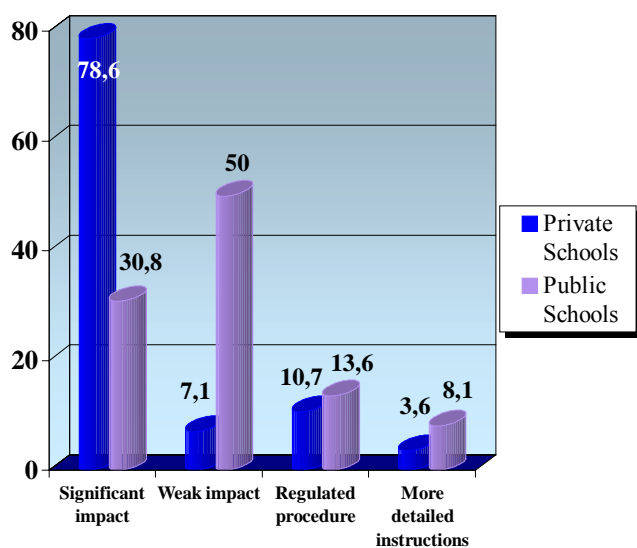

Figure 1: Perception of teacher's influence upon the organization of teaching activities

C. *Reform initiated with combined (mixed) incentives of orientation and stimulation on part of the State governing bodies and, on the other hand, the design and application of technological innovations which are left to control of schools and local governing bodies.*

The research results indicate the fact that, with Government support to implementation of technologically advanced programs within the framework of educational reform, additional impetus to the activities of schools themselves, but also of their environment, could be provided. Such, partial market orientation of public schools, which Ericsson (1986) calls "public schools' privatization", very often stimulates the formation of local working groups, partnerships with (production) enterprises, community and University aimed at shaping and working out the idea basis for promoting work in classrooms (ED, 1993). On this ba-

sis, technology directly impacts the expansion of market for educational services, on one hand, and increases the material base of educational activity, on the other hand.

Use of computer technologies in organization and performance of curriculum forces "sluggish bureaucracy" on local levels of decision-making to form a self-servicing educational *establishment* (Loveless, 1996). With selection of teachers through selection of courses in additional classes, extracurricular contents or programs outside the formal system of education (additional education, retraining and other), the *process of learning individualization* in a (teaching) group occurs at all levels of education. Individualization is possible primarily because of the possibility for "avoiding" the teacher's authority, which significantly changes the features of rigid teaching process based on the principle of teacher's superiority in conditions of strictly controlled communication *question - answer*.

The needs and possibilities for measuring the application of technology in education

There is a significant consensus between the researchers about the need for including the technological solutions and technologically more advanced programs in processes of education at all levels. Almost all thoughts follow on Lesourne's conclusion that "new technologies, and especially informational technologies, can at already present time, and probably even more in forms they would take in future, become one of the ways in which the individuals will develop in the future world of changes, gain more independency and perhaps more innovational ability and more creational power" (Lesourne, 1993).

In report by the International Committee for Development of Education in 21st Century the recommendation was made that the new technologies of the "information society" should be introduced in all countries. This would prevent the deepening of the gap between rich and poor countries. The level of development and the degree of applying computer technologies are becoming, along with business and marketing, indicators of success for the "*engaged*" teamwork and in the process of education. Thus, it comes at no surprise that the research results confirm the interrelatedness between the levels of economic development and of the equipment of (public) schools. Among the research results on the project of achieving student's independence with help of new technologies (1998), it has been established that "despite the acknowledgements about the significance, uses and importance of computer technologies for community and school (within the Croatian society in

transition, and due to stagnation in its economic development), Croatia has still not sufficiently equipped its schools with modern computer technologies to present" (Stankov et al., 2000).

At the same time, the needs for further advancement of technological and, thereby, educational-technological innovations, which additionally increase the possibility for choosing among ways and methods of teacher's work, are not disputed.

Effectiveness in use of the contemporary teaching aids and means with which the level of applying qualitatively different solutions in organization of educational process is influenced, are assessed with regard to the following six categories (Fly Jones et al., 1995):

- *approach* taken by the school towards various technologies and technological resources in its' classrooms as well as in extracurricular activities;

- technological *feasibility*;

- *organization* of technology in terms of its inclusion and distribution;

- *"engagability"* or technological possibilities for involvement of students in processes of additional education *(challenging learning)*;

- *simplicity of use*, and

- *functionality,* i.e. technological possibilities for preparing the students for use of various educational and technological means.

For each of the six mentioned categories of applying technological solutions to development (within) the school organization, a high degree of implementation for indicators, which could affect the changes in educational process, have been found possible. Attachment 1 contains the overall display of the mentioned variables with their respective indicators.

Instead of Conclusion

The level of educational technology application in different types of schools or parts of educational system (by levels of education, types of educational programs and orientations etc.) depends on the strategy of educational development as a whole. In addition, the same applies to school institutions classified by ownership (public and private, as well as mixed ones in some advanced countries). Regardless of whether a broader educational reform is at work or it concerns the reconstruction of a part of educational process, those technological solutions are applied in schools, which are found able to influence qualitative shifts in organization of "producing" education.

This also means that the introduction of technologically advanced teaching means and aids certainly contributes to a different, *reform-oriented* type of learning. However, their significant impact upon the necessary accompanying activities in schools (libraries, computer laboratories and similar), without which it is not possible to form the skills and abilities the development of society is oriented at during the transition to the 21 century, should not be excluded.

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Biography

Denisa Krbec is a faculty member of University of Rijeka, Croatia where at the Faculty of Economics and Tourism in Pula currently teaches two courses in the field of economic sociology. She's a Head of Department for Economic Theories. Prof. Krbec has authored over 20 papers on the various subjects of sociology of education.

Attachment 1

Indicators of High Technology Performance

Variable	Indicator of High Technology Performance	Indicator Definition
Access	*Connective*	Schools are connected to Internet and other resources
	Ubiquitous	Technology resources and equipment are pervasive and conveniently located for individual (as opposed to centralized) use
	Interconnective	Students and teachers interact by communicating and collaborating in diverse ways
	Designed for equitable use	All students have access to rich, challenging learning opportunities and interactive, generative instruction
Operability	*Interoperable*	Capable of exchanging data easily among diverse formats and technologies
	Open architecture	Allows users to access third-party hardware/software
	Transparent	Users are not – and do not need to be – aware of how the hardware/software operates
	Distributed	Technology/system resources are not centralized, but exist across any number of people, environments, and situations
	Designed for user contribution	Users can provide input/resources to the technology/system on demand
	Designed for collaborative projects	Technology is designed to facilitate communication among users with diverse systems/equipment
Engagability	*Access to challenging tasks*	Technology offers or allows access to tasks, data, and learning opportunities that simulate through and inquiry
	Enables learning by doing	Technology offers access to simulations, goals-based learning, and real-world problems
	Provides guided participation	Technology responds intelligently to user and is able to diagnose and prescribe new learning
Ease of Use	*Effective helps*	Technology provides help indices that are more than glossaries; may provide procedures for tasks and routines
	User friendliness /user control	Technology facilitates user and is free from overly complex procedures; user can easily access data and tools on demand
	Fast	Technology has a fast processing speed and is not "down" for long periods of time
	Available training and support	Training is readily and conveniently available, as is ongoing support

Reform's Framework

	Provides just enough information just in time	Technology allows for random access, multiple points of entry, and different levels and types of information
Functionality	*Diverse tools*	Technology enables access to full diversity of generic and context-specifies tools basic to learning and working in the 21st century
	Media use	Technology provides opportunities to use media technologies
	Promotes programming and authoring	Technology provides tools (e.g. "wizards") that are used to make other tools
	Supports project design skills	Technology facilitates the development of skills related to project design and implementation

Source: Fly Johnes et al., 1995.