INTEGRATION OF INFORMATION AND COMMUNICATION TECHNOLOGIES IN THE TEACHING PROCESS

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Abstract

The digitalization of teaching procedure, as a real fact of the times we live in, brings another element to didactic interpretations of teaching factors. Beside already known facts, triangle the teacher, the content and the student, introduction of the fourth angle would be precisely the digitalization of the teaching process.

Currently, there is a real need (if we want to keep up with contemporary European and world trends) for the improvement of the teaching process digitalization, which is already more or less established in schools. The trends of price reductions and ever faster and better technical and technological achievements give us the right to estimate that it is only a matter of time for digitalization to become a routine in the teaching process. The increased flow of information, to which we are exposed on a daily basis, necessarily leads to the appearance of "excess information". So, in addition to useful information, we are swamped with useless information in equal amounts.

It is imposed that when we search for the information, as well as when we use that information, we should make a selection, and that is the first step in knowledge management with the help of computerization of the teaching process. However, there is no single element of educational technology that will be sufficient and modern enough to achieve all goals and to be equally interesting and effective for all students. There are many important issues when it comes to learning and teaching that are the choice of didactic models and strategies when we are talking about multimedia.

Keywords: digitalization of teaching process, knowledge management, introduction of changes, information and communication technologies.

INTRODUCTION

We should be aware of the fact that new generations of students have grown up in a digital multimedia environment. It is quite logical that a student who is overwhelmed with information every day, when entering the classroom, cannot be satisfied with the old fashion textbook as the only information source.

Therefore, the rich multimedia environment itself is the environment not only of the future but also of the present. This kind of environment engages more receptors when transferring information. Consequently, the effects of the teaching process are more interesting and better. Of course, teachers and professors with good management of the teaching process, didactic media, should have in mind that in the process of learning and teaching, the same information is not repeated too often unplanned.

Information broadcast by contemporary didactic media, multimedia, has the task of intensification, improvement and rationalization of the learning and teaching process. Like so, the teaching becomes obvious, dynamic, interesting, convincing, and multimedia should maximize its role in the teaching process. By integrating text, sound, animation, we achieve the desired effect.

This does not imply the abolition of classic teaching methods such as monologue, dialogue, text, but on the contrary, it additionally promotes, strengthens and makes the mentioned methods more convincing if auditory and visual elements are implemented in parallel. The student profile of a person who skillfully uses a computer and routinely uses the Internet can only further inspire teachers and professors to educate themselves on a daily basis, to modernize their teaching techniques, and simply follow the imposed pace.

The main goal of contemporary didactic media, multimedia in teaching, is to be applied in the direction of emancipatory development of students with a focus on the bare quality of teaching. New strategies, if applied in the right direction, are actually developmentally focused on the student and are an opportunity for an educated teacher and professor to introduce information through the game, to implement teaching content through the computer. The student at that stage would experience the learning process as a new game. Learning through the game, students at the beginning of "hanging out with the computer" will learn to use the computer and slowly will get to know the possibilities offered by so. The basic IT dictionary and software routine, in time, becomes an everyday tool. Students get used to hardware and software and react naturally to learning by using a computer and multimedia content through adapted software packages.

The use of didactic media in combination with digital technologies provides a good basis for effective and creative use of knowledge. Knowledge and intelligent use of information are key factors in the development of the economy. Therefore, instead of the term information society, we can often hear the term "knowledge society" in the media today.

ICT technologies have become an indispensable segment in the development of society, and they found new directions in which society will head in the future. Young generations, who need to move in these directions, should have more active interaction with information and communication technology in the education system, both in primary and secondary schools, as well as in colleges. Simply put, they must be prepared for it. Nowadays training and education, younglings must not be left out of ICT in the education process. The application of technologies has brought society to such a stage where ICT skills, along with the knowledge of reading, writing and arithmetic, are considered to be elemental.

Schools were exempt from this digital technology revolution. They remained unchanged, despite numerous reforms, computerization and networking. Looking at the situation as it was several decades ago, almost nothing has changed.

A.W.Bates (1995) claims: "If a student from the thirteenth century suddenly found himself in today's lecture hall, he would probably know immediately where he was." According to him, the same teaching methodology is used today in modern teaching disciplines, such as natural sciences or mechanical engineering. The problems are not in the high expectations of ICT in the education field, but in the fact that the complete and high-quality application of ICT in the teaching profession requires fundamental changes, starting with the environment in which teaching and learning of any subject takes place. In the teaching process, it is necessary to make radical changes in the methodology and organization.

In most schools, the traditional way of teaching is still active, with some minor changes regarding ICT use. The result is slow progress, often linked to the economic development of individual countries. The implementation of ICT in the teaching process is not only a technical issue but we need to search answers to basic questions about teaching methods, funding priorities, mission and vision of the school. When defining educational goals, it is necessary to take into account the new technological, internet and multimedia possibilities. It is not only about infrastructural improvements, but fundamentally changes in its roots (Ibid). The integration of information and communication technologies into the teaching process entails the question of the professor's expertise. The information and communication skills of the lecturer, who chooses the teaching contents and determines the teaching process, are of essential importance that affect the quality of education.

Training and professional development of teachers, preparing them for the process of "Long Life Learning", following trends and frequent changes in information and communication technologies. That is an indispensable process that cannot be bypassed (Delic, 2008). In the educational system, it is necessary to establish as a part of basic education, skills of computer literacy, and application of information and communication technology in learning and teaching procedures.

Future teachers should be able to:

♣ implement educational projects in the field of ICT application in learning and teaching,

♣ diagnose and evaluate knowledge using ICT,

♣ create a learning environment suitable for students of different ages (by competent use of ICT in teaching),

♣ encourage independent learning,

♣ evaluate and select educational program support in various fields,

♣ conduct independent training.

Information and communication technology has become an integral part of the education system as support for teachers in the implementation of traditional teaching or as a replacement for such

teaching with one of the new methods and ways of conducting the teaching process as well as the learning and teaching process (Iso).

Related to this is multimedia, computer networking and software engineering, which led to the emergence of a new generation of learning and teaching computer systems. The new teaching paradigm is oriented towards the student (learner-centered paradigm). The student is placed in the center, with environmental resources for learning, both in terms of time and place are available around him. According to the student, everything is oriented and covered by one term - resources for learning (people, knowledge, technology, media, organization...) (Ibid).

RESULTS OF PREVIOUS RESEARCHERS

Looking through the prism of nurture and education, the differences between urban and rural environments, in the possibilities of learning and teaching, the use of didactic media, the general satisfaction with the teaching personnel, following demographic and sociographic parameters, are evident.

The expansion of digital media in the 21st century predicts a strong impact on education (Lesourne, 1993). The newly created media environment also develops new forms and culture of learning (Rodek, 2011; UNESCO, 2005). So, in what way and how to teach, how to create scenarios in a new environment, what competences primary and secondary schools' teachers have in interaction with the students in their digital multimedia environment (Matijević, 2008) gives a completely new dimension. Learning and teaching anywhere and anytime becomes a very realistic option. Differences between developed and underdeveloped countries, urban and rural, cultural differences, socioeconomic environment directly affect the possibility of individual education within the current modern environment.

The question that arises by itself is the perception of an individual (either student or teacher of any level of education), from different geographical areas (urban and rural), about the possibility of learning and teaching with modern media.

Research conducted about 30 years ago indicates the present differences between urban and rural school teachers. Trentham and Schaer (1985) detect differences between urban and rural teachers in satisfaction with financial income, curriculum, moral values, etc. Also, high school students in urban and rural areas have different aspirations, students in urban areas tend to have a higher level of education, and therefore jobs with higher incomes compared to students from rural areas (McCracken and Barainas, 1991).

While Can (2010) in his research on a sample of future teachers and the use of modern media found that there is no difference between students from urban and rural areas, i.e., the future teachers, regardless of the mentioned demographic characteristics, have a positive opinion about the use of modern media. The results coincide with the research of Yilmaz and Alici (2010), where it was determined that teachers have a positive opinion about teaching with the help of contemporary media.

Zakaira et al. (2009) researching a sample of 198 teachers in Malaysia from urban and rural areas,

found that there was no difference in opinion about the implementation of multimedia in teaching, although the respondents indicated the need to develop competencies in the use of modern media. Davis (2007) found that there is no difference in the self-assessment of the competence of future teachers in IT knowledge in relation to gender. Şimşek et al. (2010) found that the attitude towards distance education with the use of modern media is significantly related to gender and level of education.

Through research, Yousuf and Balogun (2011) determined that future teachers have a positive opinion about the use of IT in teaching and that there is no difference in the competencies in using IT relative to gender.

Sang et al. (2010) also found that there is no difference between male and female students in their opinion about the integration of contemporary media in teaching. Interestingly, Akbulut et al. (2011) came to the result that male students have a more positive opinion about the use of contemporary media in teaching. Similarly, Birgin et al. (2010) found that there are certain differences between future teachers in the use of new media in relation to gender.

MANAGEMENT AS A FACTOR OF CHANGES

In the broadest sense, change means a transition from one (existing) state to a new state (complies to individuals, organizations or society itself). Change is the most significant event in a system. The success of change is evaluated by the sense of a new state, and whether it would occur depending on several influential factors, like: environment, management, knowledge, will to change, entrepreneurial spirit, motivation, risk, etc.(Ristić,2005).Druker (1999) called the convergence point of innovation and change "organizational abandonment". The essence of every change is to abandon the unproductive, outdated and recognize the moment by accepting the new, better and more efficient state. There is also a certain difference between innovation and change. Innovation is the introduction of the new "tool" during the process, i.e. improving the old by introducing the new without interrupting the process (in our case, the teaching one). Due to its parameters, innovation is positioned as a small-scale change. There is no precise line from which we can say that innovation has passed into change. Like change, innovation is an addition to the existing system and it "changes something within something" but, as we said, on a smaller scale. Roughly, we can say that the introduction of several innovations in a certain system can already be considered a change.

This is a thought about change. There are many things about change in different aspects of our life. You see if the charge is inevitable, you should direct the change, don't you think, instead continue going through the change.(Komatic&Technicolour 2010,https://www.youtube.com/watch?v=lIMhj4Iq6Qw).

According to Ristic (2005), a wider point of view, we can freely say that changes do not happen spontaneously, by chance. Changes occur under the influence of management. Changes in the system occur when we want to improve the existing situation (or take advantage of a specific event

or situation), model it and raise it to a higher (or another) level. In order for changes to occur, it is necessary to go through a certain algorithm. One of the versions of changes through influencing factors is shown in the following graph:

Graph1: Model of changes (Ristić,2005.)
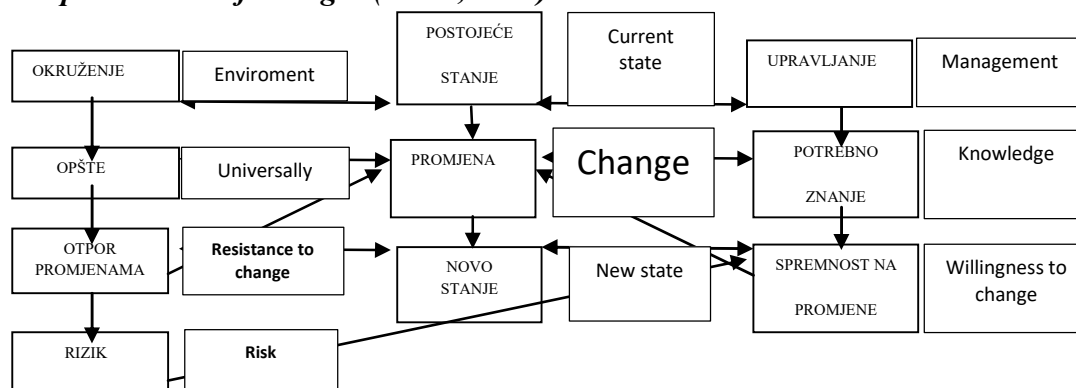
This model needs to be developed by a group of activities in function of their mutual influence on each other. The influencing factors are as follows (Ristić, 2005): The environment. The need for change comes by the nature of things, because every new state becomes the old state after a certain time. The need for a new state comes from the environment, information is drawn from it that results in ideas for the desired changes, and the environment itself is a place for inventing novelties. ♣Knowledge. Information from the environment represents a fund of knowledge. Knowledge is a common good that is public or hidden as a secret. It can be perceived or not, it may exist only for itself. You need to have a feeling for the innovation, to understand it, to recognize it. This further means that some kind of sensor should be built into the management system, which will be oriented towards changes or the to be able to generate own solutions for changes. ♣ Learning is the element that we described in the knowledge subsystem as a sensor that monitors changes. Learning is not just about gaining new knowledge, but learning how to reach a new state. In this sense, it is necessary to distinguish between the real need for learning and the superficial information that something is happening around us. Only this element of our model can be developed as a or into a separate model. This whole area is studied today as knowledge management.

♣ Management. Under management here we mean running an organization. Management through learning about the change should articulate the need for management and the will to change that affects the current state. All of the above will succeed if resistance to change is overcome.

In order to implement a management decision, certain conditions must be achieved. Some elements of this model (Ibid) must be implemented:

♣ Willingness to change, which is a key element in this model. In terms of management, it may be about changing the culture of the organization. However, the problem does not end there,

but practically begins the process of changing that organization. Changing the existing state to a new state is a process that takes a certain amount of time. The existence of the will depends on the size of the risk, the risk is overcome by motivation. Motivation is a source of energy in the fight against forces "for" and forces "against" change. At the same time, risk encourages resistance to change.

♣ Resistance to change is a social phenomenon. This phenomenon always exists, and it is a negative force that prevents changes. The basis of resistance to change is the interest of individuals or groups, because the greatest resistance to change is provided by those who do not like the changes because they have an interest in the situation remaining unchanged. Unfortunately, most often in desirable changes part of the collective has to be sacrificed. Because of that, a suitable social program must exist.

PHASES OF CHANGE

According to Miles (1986) and Fullan (1991), the change process consists of three phases:

♣ stages of initiation,

♣ implementation stages,

♣ stages of institutionalization.

Initiation phase

Initiation is the stage of deciding to embark on innovations and changes. The key activities of this phase are the decision to start and the review of the current state and conditions for the introduction of innovation and changes into schools. Matthew Miles (1986) analyzed the various phases of school improvement:

♣ innovation should be related to the local agenda and improving the needs of the local community through practicality, clarity and quality,

♣ a clear, well-structured approach to change,

♣ willingness of individuals to engage,

♣ access to innovation,

♣ colleagues support,

☐ quality of innovation.

Implementation phase

Implementation is the phase of the process that receives the most attention. This is the stage of using innovation. It consists of implementation experiences. Key activities during this phase are publishing action plans, checking progress and problem solving . The key factors that make success in this phase according to Miles (1986) are:

♣ clear definition of responsibilities (manager, coordinator, external consultant),

♣ joint control (evaluation) over implementation,

♣ empowering individuals and schools,

♣ combination of pressure and support,

♣ constant and appropriate development and improvement of the individual,

♣ rewards for teachers (empowerment, collegiality, meetings, classroom assistance, costs, resources).

Institutionalization phase
Institutionalization is the phase when it is checked whether innovation and changes have been implemented with quality and whether they have become a common way of practice.
The key activities in this phase according to Miles (1986) are:
☐ emphasis on incorporating changes within school facilities,
☐ its organization and resources,
☐ wide application in school and in the area of the local community,
☐ built-in evaluation, help, networking and teacher training.
Many changes, regardless of the effort put in, fail to show results at the beginning of implementation. That's why you should be patient when it comes to results and continue to work on the professional development of the teaching staff.

Picture2: Stages of the process change (Miles et al., 1987)

Inicijacija

Implementacija

Implementacija

Vrijeme ⟶
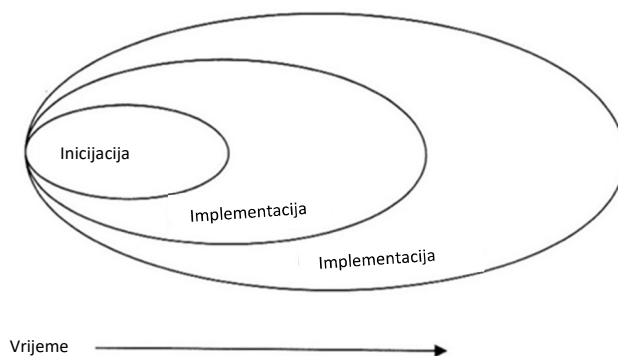
CHANGE MANAGEMENT

Changes are the basis and driver of development. In today's world, the world of changes, the introduction of innovations gives greater chances for progress and success to those who think, create and apply innovatively. The schools of the 21st century face new tasks and it is good to consider possible changes that would keep pace in these times, that would improve and raise the quality of education. Constant professional development must become essential for everyone, and with that a learning school can be a "treasure hunter's school" (Meyer, 2002). The development of the school by introducing innovations and training of the teachers is not a goal by itself, but the

establishment of a continuous process that will be simple, fast and efficient for those who teach and those who learn.

INTRODUCING CHANGES IN SCHOOLS

The goal of changing the management is to get teachers' positive reactions to changes, primarily the implementation of changes that are in line with the set goals. The school is ready for changes when teachers have the desire for changes and the ability to implement those same changes directly in the classroom (Clemmer, 2005). The desire is actually the teacher's motivation to put his knowledge and skills at the service of implementing changes, and the abilities are education at the level that will ensure the successful implementation of changes. "Responding to change is as important for organizations as it is for people. There are two types of organizations in today's world: those that change and those that fail... Similarly, there are two types of people: those who change and those who prepare themselves to be victims of change." (Also).

In the context of schools, the introduction of changes in the teaching process down to the classroom level is possible only with teachers' cooperation. Teachers should have continuous education, and direct interaction at the school, municipality, city and canton level. Quality communication and teamwork will definitely increase the quality of the teaching process and enable teachers to introduce changes and manage changes more quickly.

"Effective communication implies a real connection between people that provides the exchange of ideas, thoughts, feelings and needs that lead to complete understanding and satisfaction. Communication that would increase the willingness of employees to change implies the development of communication skills, knowledge of communication, significant indicators of culture and attitudes, as well as the goals of the organization. We are also convinced that better communication would reduce the occurrence of conflicts in the organization that may arise as a result of changes implemented." (Grubić-Nešić, 2005).

Meaningful introduction and change management should include the complete school structure. The support of the school administration gives additional weight. Such schools are in connection with similar schools within the municipality, canton and further to higher state levels. When introducing changes, one should have a clear vision and have determination to implement the changes. Among other factors, purpose is indispensable. The purpose must be clear through all segments, beginning with recognizing the necessity for changes, accepting provided solutions and understanding the benefits and possibilities of implementation (Ibid).

The goal should be realistic, understandable and practical. Motivation and a detailed change schedule must eliminate doubts about deviating from the planned process. We should also be aware that there will never be complete support for change. Teachers may be tempted to resist changes by the doubt of risk or security, centralization or decentralization, short-term or long-term

perspective, cooperation or subterfuge. We mentioned that one of the factors is communication. Successful introduction, implementation and management of changes implies that the communication channels are passable and that they take place within the school at the teacher-teacher level, administration-teacher level, school teacher-teacher level, administration-administration level, etc.

Responsibility is proportional. However, it is the teacher who is on the front line of implementing the vision and managing the processes. Teachers should be encouraged to put all their knowledge and abilities in the service of change management. Suggestion is one element of encouragement. When introducing changes, teachers suggest to the management the modeling of the vision in purpose of even better change application (Clemmer, 2005). Here you need to be flexible and leave the possibility of small daily changes because teachers prepare for classes every day. The teamwork of teachers at the level of schools and municipalities will further speed up the processes. Teams are indispensable when it comes to change. Teams initiate, implement and evolve changes. Teams can be filled with the same subject teachers at the level of several schools within the municipality, and at the cantonal level. The powers of the teams should be clear so that during the implementation of the change process we can prevent possible misunderstandings and reduce errors to a minimum. Organizational culture can be one of the weakest links if this part has not been done through continuous teacher education. Without an organizational culture, the introduction of changes in teaching processes can result in difficult implementation of the process and even lead to a worse situation compared to the initial positions.

CONCLUSION

Teachers and professors are knowledge managing key factors within the learning and teaching process. They are that human resource on which the quality, dynamics, and knowledge transferring method to the end user - the buyer of knowledge, the student - depends. In order for the human resource to be able to respond to the task, it is necessary to constantly "update" the latest information, which will be applied at the general level of previous knowledge and experience with the classroom work. It is this constant updating of knowledge that will decrease to a minimum the danger of rapid obsolescence in work. The development of information technologies helps the teacher and professor to manage knowledge as quickly and easily as possible. Rationalizing the teaching process and increasing productivity in the same information technology frame helps the student in research and brings him very fast to the level of generalization. Schools of the 21st century need to keep up with the times, they must change, modernize the teaching processes in order to survive. For now, the possibility of choosing the methodology of changes is open. Changes today require speed and efficiency. Change management iskey to successful change. It must be well designed and planned (strategy). It must be simple and concrete. Without knowledge, teamwork, organizational culture and trust, changes are doomed to a failure. The damage of a failed implementation is multi-layered. Poorly implemented processes lead to a time and trust lost.

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