

## **eLearning: The influence of ICT on the style of learning**

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*Abstract:* Learning and teaching are two mutually dependent elements of a teaching process. From traditional up to the present forms of teaching where ICT technology plays an important part, the focus of the process of teaching has changed. Since teaching has its definite goals it should also be specially tailored to meet the needs of a student. Different forms of teaching have taken into consideration the above mentioned facts in a different way. The tendency of individual approach to a student is constant, but the real level of individualization depends on actual situation and specific circumstances in which the teaching process is carried out. The application of ICT in teaching, more precisely in learning, has considerably changed the above mentioned circumstances. This paper considers to what extent the position of the student has changed and what advantages s/he can expect in the virtual environment.

*Key-Words:* eLearning, teaching, ICT, a student, individualization

### **1 Introduction**

Learning as a synergic part of the teaching process is mainly student-oriented. The student, the one that is being taught is placed and contrasted to other participants or elements of the teaching as an integral process. Together with the teacher, the student represents the basic axis of the teaching process. Their relationship as well as the involvement in mutual communication at a particular moment creates actual realization of teaching. The quality and quantity of this relationship will determine the final outcome of the teaching process. The level of knowledge and skills acquired necessarily reflects the quality of the realization of the above mentioned processes. All the activities of the teacher and the student are organized around the teaching material as the object of teaching. The ways these materials are prepared and organized usually does not depend neither on

the teacher nor the student, although they are meant for them. The final goal of the teaching is to prepare the student for the operational use of the acquired knowledge and improved skills. The realization of this goal depends on the above mentioned teaching materials and the way these are prepared and presented. The relationship student-teacher-teaching material-goals is situated in the context which defines the acceptable ways of behaviour. In literature these are defined as paradigms – generally accepted ways of interpreting basic notions, methods, techniques and technologies. Nevertheless, the dynamics of acquiring and the actual competencies of an individual depend on other factors as well. The paradigms of teaching provide a framework in and through which activities we call teaching are carried out. The way these activities are realized is shaped into an acceptable and recognizable sequence with a tendency to become

common. But even then, in the way of realization teaching is subject to specific adjustments which are necessary because teaching is always an individual form adapted to the student and his abilities. The individualization has always presented a serious problem. The traditional forms of teaching in the classroom and groups have been difficult to carry out. The development and implementation of ICT in all areas of activities, teaching included, have considerably influenced both learning and teaching. Within the frames of a particular activity ICT can be involved in several ways, and its influence can be studied from different aspects. Directly and indirectly, the consequence of technological development in general is its influence on the process of learning in terms of quality and quantity. The ICT and the web provide the possibility to access information and knowledge appropriate to a specific situation and in a required quantity. Although access and quantity do not imply quality as well, an individual is in a situation to access them in a particular moment for a particular period of time. This ensures individualization in several components which define the process of learning. In this paper we examine the influence of ICT on the individualization in the approach to learning and specific qualities which can modify previously arranged way of learning at any phase. Each modification can be considered unique which makes the usual way of learning specific and its style different. Variations are possible from one situation to another and in the case of an individual. With this paper we have tried to establish some facts which determine the style of learning in the teaching process supported by information communication technologies.

## **2 Learning – paradigm, mode and style**

The meaning of the term style mainly depends on the context in which it is used. Very often it is used to stress a certain specific quality. The style is linked to the realization of a particular activity and in a certain way it characterizes it. Indirectly style indicates also specific qualities of the person performing an activity. In these activities s/he can appear either as a creator or performer of an activity or a consumer of the result of these activities. As a consequence s/he is the one who to the largest scale determines the way of realizing specific activities managing the course of realization with adequate modifications which can be suggested or even necessary. However, the use of the term is very

often lump-sum even when it is linked to a specific intention.

What is actually style? Each term is defined and specified from the scientific point of view by the closest generic term together with specific differences which identify a certain phenomenon. Naturally the exceptions are terms that have axiomatic meaning. Style can be connected to a mode in terms of meaning and concept. The term mode most frequently implies the form of realising one or more sequential activities. The mode of realising a specific activity is generally predefined and to a certain measure determined. At the same time the possibility of variations of a predetermined sequence of activities is a way to measure the extent to which the mode is determined. Each variation has its stochastic characteristics through which differences in the mode of performance can be defined. The expressed differences and the established variations in qualitative and quantitative sense represent style. This is why our own working style makes us different from the usual way of performing working tasks in a specific environment and which make us different from other participants who carry out the same tasks or some similar ones. Similar definitions of the term style can be found on the web in the dictionaries of scientific institutions [1].

For example – style is a manner: how something is done or how it happens or linked to another notion as an expressive style: a way of expressing something in language, art, music and architecture that is characteristic of a particular person or group of people or period of time. A style (lat. stilus – a pencil) is a way of expressing characterized by all those features that make us different from the others. ([hr.wikipedia.org/wiki/Stil](http://hr.wikipedia.org/wiki/Stil), 30.07.2009) [2].

A style can be determined by an individual's character but also by the character of a group or an organisation if the activities are carried out in a group.

One of the goals of education is to enhance learning. The realization of that goal is conditioned by several factors. One of these factors is the quality of the design of the teaching material that will be used in teaching i.e. learning. Designing material is the task of the teacher who should keep in mind the principles and the modes of learning students use.

This is especially important for online learning where the teacher and the student are situated in the virtual classroom and are physically separated. The teacher should be familiar with the tested theories of learning that have been proved successful. When ICT is used as a medium of teaching, its influence on the quality of teaching is not central, but it can be

significant if it is accompanied by an adequate methodology and technique.

For this paper it has been important to consider the relationship between the notions of the paradigm of learning and the style of learning. In current literature very often one can come across the term paradigm of learning by which theoretical and practical approach to learning is defined and determined. A detailed definition of a paradigm says that “A paradigm is a constellation of concepts, values, perceptions and practices shared by a community which forms a particular vision of reality that is the basis of the way a community organises itself.” [3].

Thus behaviourism, cognitivism and constructivism are the most commonly accepted paradigms of learning (Fig.1).

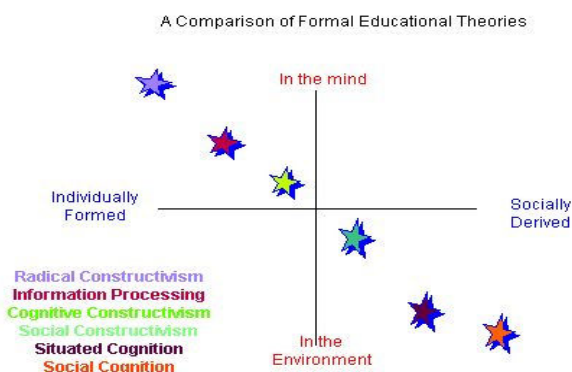


Fig.1: Formal Learning Theory Paradigm (source) [www.personal.psu.edu/wlm103/edpsy/paradigms.html](http://www.personal.psu.edu/wlm103/edpsy/paradigms.html), 15-10-2008).

Basically behaviourism implies that learning is a measurable change of behaviour provoked by external stimuli, without taking into consideration the opinion of the student. This drawback brought about the opposed approach, cognitivism. For cognitivists learning is an internal process which comprises memorization, motivation and thinking. The most common psychological current paradigms of learning with the scope of helping human cognition are based on the Atkinson and Shiffrin model of cognitive psychology which studies learning from the point of view of data analysis. The student uses various forms of memorization in the process of learning, including activities appropriate to different styles of learning. It is the very need to take into consideration the style that has caused this shift towards constructivism as a paradigm. The constructivists claim that the student interprets information and the world around him in compliance with his own personal reality, and that he learns through observation, analysis and interpretation transforming the information received

into knowledge. The link between these paradigms is the fact that behaviourism is used to teach facts, cognitivism to teach principles and processes, while constructivism to encourage advanced thinking and acquiring personal view of the things learned and their application.

A paradigm ensures conditions for the realization of the desired activities and processes. It prepares and defines the way or patterns these activities will follow or recognize in a certain context. Style will be determined as a modification or specific realization of the common way of carrying out activities which in our case is learning.

### 3 How to determine the learning style?

Style is mostly determined by the characteristics of an individual and his inclinations. In a specialized literature there are several methods and techniques for determining and recognizing the style of learning. All methods try to determine inclinations and specific qualities of an individual and to create a type of behaviour in a certain context and situation. We can single out three of these to present the way to determine the term style:

The MBTI method – a detailed way of determining style using Myers-Briggs Type Indicator [4]. 126 indicators in the form G is the most reliable method for accessing student learning style. The MBTI instrument is based on the theory of personality types described by Carl Jung and Isabel Briggs Myers and Katharine Briggs. This theory states that many of the valuable differences between people are the result of natural preferences. The MBTI provides data on four sets of preferences. These preferences result in 16 learning styles or types. A type is the combination of the four preferences. The most common MBTI type is the ESTJ, the Extraverted-Sensing-Thinking-Judger.

The memletics learning styles inventory - techniques takes as a starting point the fact an individual prefers a certain style of learning and application of certain techniques. The second assumption is that an individual usually mixes styles and does not exclude the possibility of using other styles. The technique defines seven recognizable styles mainly based on behaviour and demonstrating certain cognitive abilities:

- Visual (spatial) style
- Aural (auditory-musical-rhythmic) style.
- Verbal (linguistic) style
- The physical (bodily-kinaesthetic) style
- The logical (mathematical) style

- The social (interpersonal) style.
- The solitary (intrapersonal) style.

Learning Style Pyramid Model [6] - determining the style is done through the evaluation of indicators organized in the form of a seven-layer pyramid where the following six key areas are observed:

- Brain Processing
- Sensory Modalities
- Physical Needs
- Environmental Preferences
- Social Aspects
- Professional Attitudes

Each higher level is in a way sublimation and supplement to the lower level. Each layer takes into consideration individual characteristics of a person and his inclinations towards certain paradigms. The base of the pyramid, the lowest level, determines attitudes through an evaluation of the following indicators: Motivation, Persistence, Conformity, Responsibility, Structure and Variety. The next layer evaluates social characteristics by determining inclination towards individual work, work in pairs, groups or teams or inclination to be guided by some authority. The third layer defines inclinations towards certain type of working environment: noise conditions, lighting, temperature, type of furniture. The fourth layer defines the preferred physical activities such as mobility while working, Intake and particular part of the day. In the fifth layer sensory capacities of an individual are evaluated such as: listening, visualization, tactile and kinaesthetic capacities. The sixth layer examines the inclination of an individual towards a certain way of understanding and observing business problems and activities. The highest level tries to determine the prevalence between reflective and impulsive way of working and decision-making. The given set of indicators provides individual approach considering at the same time all specific qualities of an individual: biological, acquired or conditioned.

According to taxonomy, the majority of techniques are similar and define style based on the inclinations expressed and abilities shown. Since the involvement of ICT in the process of teaching is multiple, its influence on the learning as well as teaching style is considerable. The ICT can be used as a teaching tool, as an object of a study and as an environment where the whole teaching process is carried out. If we take into consideration the parameters used to determine style in some of the methodologies mentioned we must establish whether

certain parameters are conditioned by the use of ICT and in what way it becomes evident.

#### 4 ICT and the learning style

Two characteristics of eLearning are indisputable: a higher level of individualization in the approach to the student during teaching and providing conditions for the student to express his/her constructive abilities individually, in a pair or in a group. The result of this increased individualization is clearer expression of the student's specific qualities which in their turn determine and stress the style the student uses when learning.

The research conducted tries to establish the link between the use of ICT in the learning process and the changes in the learning style of a student. We have directed the research on a group of students i.e. higher-education population assuming that they can express their abilities and inclinations in a reliable and sincere way. The questions have been grouped according to the six key areas used in the method for determining learning style trying to detect the use of ICT and the inclination of the respondents to use ICT in a specific key area. The goal of the research has been to confirm the starting assumption and to determine factors within particular key area that will indicate a higher level of influence of ICT. A questionnaire with 25 questions made with the tool <http://inovacije.eu/ankete> was used. The questionnaire can be accessed at the address: [www.inovacije.eu/ankete/index.php?sid=48825&lang=hr](http://www.inovacije.eu/ankete/index.php?sid=48825&lang=hr) During the period of one week the questionnaire together with the notice inviting students to participate in the survey was on the website of the Polytechnic. In this way the respondents remained anonymous at the same time ensuring easy access to the questionnaire. The research during which 344 questionnaires were collected was conducted on a sample of students studying at professional study programmes. It is important to say that one part of the respondents are IT students. They are linked to ICT in two ways: they use ICT as other students, but ICT is for them at the same time the object of their studies and their future profession. For the purpose of this research it was not important to make distinction between these two groups because the focus was on general impression of the respondents. A descriptive statistic analysis was used and the results are (also you can see more detailed results with statistical data at address: [www.veleri.hr/~pogarcic/LSQRGe09.doc](http://www.veleri.hr/~pogarcic/LSQRGe09.doc)) The majority of the respondents have got a computer with a broadband connection. They consider themselves computer literate and believe that ICT is

important and useful in their professional life. Vast majority often uses the computer for learning and believes that the computer additionally motivates them for learning. However when considering the influence on perseverance in learning, help provided for creating notions and maps, the percentage of positive answers drops and is probably limited to IT students. It is interesting to note that only one third believes that the computer can enhance the learning discipline and responsibility towards learning. Social aspects vary but the majority believes that the computer influences their independence. The respondents are relatively aware of the conditions, time and space independence which the use of the computer offers. When expressing opinion on special physical activities their answers reflect that they do not consider the fact that working on the computer requires more pronounced typing/dactyl abilities or long and very often uncontrolled sitting in front of the computer. More than half of the respondents prefer logical analysis of activities and creating concepts adapted to the situation in mastering learning material, while a slightly smaller number believes that the computer helps them in doing that.

## 4 Conclusion

The curriculum, goals and context mainly determine the way of learning i.e. the way and sequence particular activities are carried out. This way is defined as a paradigm/model which can be changed before or during learning. An individual with his personality and his characteristics determines these modifications adding certain qualities thus giving to the way a specific form – style- which makes it recognizable. Style therefore can be observed as an individually characteristic way of learning, although the notion individual should be taken with caution. Electronic forms of learning allow cooperation and collaboration as means of communication. In that way a group can have characteristics of an individual. It is in this area that the influence on the learning style can be seen. Through the group an individual can express his/her specific qualities and bring about the realization of goals in the best possible way. The constructivist approach that eTeaching stresses makes an individual think about the way the activity is carried out and consequently possible changes of the style.

Style depends on the complexity of content and the level of the goals set. The possibility to express personalities increases with the complexities of the content and the level of the goals set. More simple activities which are often repeated do not give an

opportunity for style expression. In the same way all automated activities are deprived of style since they represent routine. In such cases eTeaching is particularly appropriate to ensure automation which excludes stylization. The development of ICT makes possible simplification of such activities and their complete automation. Modern technique and technology at the same time open up new possibilities and ask for defining new professions or considerable modification of the existing ones.

This is an indirect influence on the learning style because the time period of changes and the appearance of new demands is getting shorter and consequently also the time necessary for learning.

The application of ICT in the basic use of computers at the faculty and at home, the access to the Internet, electronic mail provides an opportunity to learn anywhere anytime. Portable computers and mobile phones remove spatial and time restrictions and ensure better conditions. This research has been oriented on the individual determining his/her style neglecting the influence of the group and other influences such as communication with other students or how learning certain materials is conditioned with the focus on sequence and implementation. The techniques and taxonomies used start from the individual observing him through some common paradigms of learning. The ICT can considerably enhance the quality of individual approach leaving to pedagogical theory and practice space for more profound considerations about everything that makes learning, style included. The correlation of the influence of the elements that make teaching on the learning style definitely exists and should be examined. Future research in defining learning style and the influence of ICT on the learning style could be conducted in that direction.

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