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# Evaluation of Technology Including Effects of Using Technology When Teaching

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**Abstract**

The ability to evaluate technology, resources, using technology and effects of using it is considered to be a justified educational requirement. It is in compliance with aspects of pedagogical objectivism (for fulfilling external, justified needs) and with aspects of pedagogical subjectivism (for cultivating of consciousness, emotions and being). Also the revised concept aimed at the cognitive domain (being a complex one) puts cognitive process and evaluation explicitly among higher dimension levels. The cognitive dimension of Bloom taxonomy includes four categories: factual, conceptual, procedural and meta-cognitive. It is obvious that the evaluation of technology and effects of its use as educational content of technical classes requires tasks of high appraisement.

This contribution focuses on the topic of evaluation of technological resources and effects of using technology; first, from a teachers perspective who must handle this topic successfully to educate a student plus from the point of view of educational goals and tasks and second, from the perspective of a student. This contribution analyses teacher's approaches towards the matter and ways of evaluating specific technological resources for educational purposes and for future practical use as well.

*Keywords:* Evaluation, technology, teaching, subject matter didactics

## 1. Introduction

It is generally accepted that technology is widespread and that it has both positive and negative effects. A school is supposed to prepare a pupil for thinking about technology and for effects of using technology during individual activities and activities within vast communities. This educational requirement is acceptable for

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pedagogical objectivism due to the aforementioned "external need" and this kind of education seems acceptable also from the pedagogical subjectivism point of view Blížkovský, B. (1996) which seeks cultivation of human consciousness, experiencing and being. Therefore, it can be stated that education aimed at evaluating technology and at effects of using technology can mean preparing pupils for the external world and their inner cultivation.

Today's conception of education is based particularly on emphasizing individual needs of a pupil regarding his/her future career. Each individual can fully develop his/her abilities only in a society which is able to learn and to react flexibly on occurring changes. Education as a manifestation of socio-cultural and economic dimension is nowadays related to using modern technologies in all aspects and areas and this will not change in the future – on the contrary. As an example, we can mention an already common phenomenon of a "virtual class" or schools educating "avatars" Marešová, H. (2009). Technology has been playing an increasingly important role in education when also carrying out non-traditional forms of education, such as education with no time and space constraints. Technology is employed in setting-up means for organizing education, but it also exceeds the content of education.

## 2. Evaluation of Technology and Evaluation of Effects of Using Technology

Technology, technical solutions and ways of creating/using technology and disposal of technology must be evaluated first from the point of view of appropriateness and then from the point of view of potential of a technical solution to meet expected objectives and furthermore, generally, from the point of view of effectiveness and maximizing benefits. Related form of evaluation from the point of view of minimizing negative effects is also important – see Löhr, J.-P. (2012). If a purpose for using technology is justified, there are usually more technical solutions for fulfilling a purpose; plurality of technical solutions is one of the basic features of technology Wolffgramm, H. (1994). It means that it is necessary to pursue solutions that are optimal regarding criteria corresponding to acknowledged values. If technology is not mere consumption, but if it represents important factor in a life of a person and society, it should be treated accordingly. Using technology is not only about technology itself and a method of use, but also about a user who can be for instance still a pupil.

It cannot be denied that a method of creating and using technology is mainly influenced by users themselves. Their activities determine the state of technology, possibilities of using technology and last but not least effects of using technology by people without specialized training. Decisions of professionals are driven by many regulations, norms and existence of control bodies and mechanisms available within the decisive sphere. However, technology is mainly evaluated by its users who are non-professionals. Let's introduce evaluation of technology and effects of its use in general terms first.

In this paper, the method of "professional" evaluation is of interest, which eventually leads to prevention of pollution, limitation of emissions and its effects on environment, and which is based on a demand of Best Available Techniques (**BAT**) use. The list of these techniques is available in the referential documents BREF (Reference Document on Best Available Techniques) which have been elaborated for individual categories of industrial fields, see (Referenční dokumenty BREF). Each BREF document includes for example production characteristics, description of techniques and used methods, level of emissions, and raw material and energy consumption. Permitted technology must comply with these norms. The directive states the following: „**best available techniques** shall mean the most effective and advanced stage in the development of activities and their methods of operation which indicate the practical suitability of particular techniques for providing in principle the basis for emission limit values designed to prevent and, where that is not practicable, generally to reduce emissions and the impact on the environment as a whole [...]"

The aforementioned is **an evidence of the fact, that evaluating technology and evaluating effects of its use is narrowly related and that technical as well as non-technical criteria are used for evaluating appropriateness of technical solutions. This corresponds to the most important feature of technology/technologies which is <u>the relationship of scientific and social aspects</u>** (Wolffgramm, 1994). Each technical object, system or procedure is based on practical use of scientific processes, phenomena, rules and possibilities of nature. Social aspects also play a role, although they can seem indirect and non-mandatory. Scientific laws delimitate space for technical solutions, but the choice and pace of creating and using technology