Defining Innovative Pedagogical Practice by LOGO-educators

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Abstract

Author interprets the opinions of Hungarian educators who are keen to dissipate LOGO-philosophy in primary, secondary schools, colleges and universities. They expressed their experiences about the impact of ICT in educational process. Teachers were asked how would they define the innovative pedagogical practice using technology, with special regards to the development of pupils’ skills and to the changes in methods of learning. The presented and grouped resulting models provide varied perspectives. These reflect a great deal of innovative drive while shedding light on the characteristic features of teaching practice in the 21st Century.

Keywords: innovation, ICT, LOGO-pedagogy, changes in methods of learning, development of skills

1. Introduction

Well on the way to becoming a society based on information, we are hearing more and more about the renewal of education and the challenges we face in transforming the goals and content of the teaching/learning process. The term 'innovative' is often used when we speak about new pedagogical methods and creative educators who represent a deviation from traditional didactics. Attempts to initiate reform in the classroom must now also incorporate the use of technological resources that have stimulated the birth of the information society. Keeping pace with the developments of the age, AV equipment, computers and other tools of communication have steadily found their place within the walls of educational institutions and the process of reforming pedagogical practice.

The appearance of technological wonders and their use in the field of education, however, can not automatically be regarded as pedagogical innovation. Is it at all possible to define the term, and if so, how? Education researchers at IEA1 were curious about the answer to this question when they assessed the role of information technology in the innovative pedagogical practice of different countries.2 (Anderson and Pelgrum, 1999)

Under the co-ordination of IEA, the Second Information Technology in Education Study (SITES) took place in 26 countries. Hungary participated in 1999 under the direction of the Centre for Evaluation of the National Institute for Public Education. Surveys were taken in a representative sample of schools in order to determine their degree of access to IT resources and how these were used as well as what may have prevented their use. The primary goal of the survey was to shed light on the current status of ICT in the school system so that practising educators and political decision-makers could familiarise themselves with areas in need of further development. Questionnaires were filled out by school directors and IT co-ordinators (usually computer science instructors).

1 International Association for the Evaluation of Educational Achievement, The Netherlands
2 Innovative Pedagogical Practice Using Technology (IPPUT)
2. Innovative examples world-wide

One interesting point on the questionnaire asked school directors to describe their most successful experiences in the application of ICT: "Can you provide an example of one of the most satisfying experiences of a learning activity in your school in which students are using computer-related technology?" The next task was to collect the case studies that had been sent in. A national co-ordinator for the research team in each country was responsible for selecting the ten best examples and sending them in English translation to the international research group. Since the compiled data contained an infinite number of different activities and was compiled from case studies received from 260 schools world-wide, IEA researchers assessed them by placing them in several categories:

- Student activities (e.g. processing information, creative work, communication...)
- Computer-related technology (e.g. preparing documents, programming, databases design...)
- Curricular domains (e.g. math, mother-tongue, foreign languages, sciences, social studies, cross-curricular...)
- Gains for students (e.g. motivation, activity, creativity, self-confidence building, possible negative influences...)
- Changes for teachers (e.g. an increase in knowledge, co-operative skills, ICT skills...)
- Other comments (e.g. connection to larger projects or teacher training, negative aspects...)

The aforementioned final study (Anderson and Pelgrum, 1999) provides a comprehensive selection of innovative adaptations in various countries, compiled according to age group and the viewpoints above.

The best practical solutions were in the area of humanities, native languages and natural science, although cross-curricular activities could be observed in many cases. Concerning the utilisation of software, the selected programmes were largely not subject-specific and tended to be general-purpose, user-friendly communications solutions. This is understandable considering the fact that much of the business software manufactured by different firms tends to be of unpredictable quality, sometimes over-specialised, limited in the scope of application, and rarely suitable for the daily requirements of schools. Our experience in Hungary also shows that user-friendly and open-ended software (like LOGO) can be applied with greater flexibility in the interest of building on the creativity of students. When such solutions are used intelligently, computers become genuine tools in the hands of teachers and students. Many school directors described the influence of ICT on local curricula, the changing role of teachers and the productive activity of students.

According to this survey we finished an assessment of web-sites in Hungarian secondary schools – based on representative models. Among other things, the survey was designed to evaluate the extent to which schools are open to receiving and publishing information. Furthermore we performed case studies in order to obtain the adaptable experiences of the innovative pedagogical practice. The achievements of this survey have been published in Hungarian pedagogical reviews (e.g. Körös-Mikis, 2001) and reported at conferences. Over the mentioned international and national level surveys we could obtain important information contacting directly the pedagogues involved in using ICT. In the following I would like to present their opinions relevant to the topic of the conference.

3. The Opinions of Educators on Innovative Pedagogical Practice

Based on ideas presented by IEA, the focus of my pedagogical research work has been on finding out what Hungarian educators regarded as innovative practice - assuming that new technical resources have been adapted. Those interviewed included 40 colleagues at every level of education, all of whom I knew to be enthusiastic about using ICT in schools and are specially interested in LOGO-philosophy, actively engaged in promoting reform - and not only in the context of computer science lessons. Pedagogues who volunteered to formulate concepts for innovative practice are represented in the following groups:
• primary and secondary school teachers,
• school directors,
• county level advisers,
• college and university professors,
• university tutors (not specialising in ICT),
• teacher's union leaders,
• education researchers,
• SZÁMALK (a professional firm providing ICT training) tutors.

None of the opinions provided can be considered "real" definitions, in part because - in the words of one interviewee - the definition itself is far less important than determining goals and function. On the other hand, the answers given were often based on first-hand personal experience, hence were considerably more lengthy then a mere definition. Consequently, everyone attempted to define innovative pedagogical practice according to their own style (in logical sequence, according to separate categories, or by listing bullet points). I have grouped the resulting models around a few significant "intersections", although the line between these is often blurred.

4. The connection between information/communication technology and innovation

Information and communication technology (referred to hereafter as ICT) can not be limited merely to Information Technology, that is computers and use of the Internet. It includes everything that teachers and students make use of during the teaching/learning process. Pedagogical practice is only innovative when a teacher uses resources, materials, methods, principles and explanations (the list could go on) that have not been employed before. One colleague puts it this way: "If someone teaches Madách's 'Tragedy of Man' \(^5\) by drawing a parallel with an idiom from the Lappish saga, that's definitely innovative. If we view this example purely in terms of the resources used, innovation only occurs when some kind of new teaching aid or medium of information is connected to it."

Therefore, the employment of technical resources is not necessarily a satisfactory condition for innovative practice - it can serve only to support, assist or elicit innovation. This view was expressed more sharply by another colleague: "Innovative pedagogical practice that makes use of ICT is not the same thing as using ICT in education". In light of this, the technical resource itself may not even be present in the given educational institution. "For instance, the school may not have a computer network, but teachers might have access to such networks outside of the school, enabling them to engage in sharing experience and, locate more up-to-date teaching materials, thus raising the quality of education - so in the course of pedagogical practice education is embellished by the following:

- the opportunity to handle and publish data and information
- easier accessibility and storage of large volumes of data
- the rapid and inexpensive transfer of information".

The secret of innovation lies in the fact that it provides something new in comparison to the existing practice. According to a researcher and teacher of biology and technology, both biological and technical viewpoints influence this process. In assessing the biological conditions for innovation - after all the final goal is to transfer information to the human brain - the evident conclusion to be reached is that a pedagogue must influence as many of the five senses as possible. Not only are printed, textual, visual and additive sources of information important, but also that which can be learned on a kinaesthetic level (like turtle games) - in addition to information conveyed by taste and smell. The technical side of recognition and the acquisition of knowledge includes complex multimedia packages, networks and the Internet, all of which are equally as significant in terms of innovation as its biological and psychological conditions.

\(^5\) "The Tragedy of Man" by Imre Madách is an influential work of Hungarian literature, respected much as the work of writers such as Marlowe are in Anglo-saxon countries.
Over the last few decades educators have witnessed the appearance and rapid spread of numerous technical resources, mistakenly believing that all of them would bring about educational reform (consider how overhead projectors, language labs, programmed teaching, video and computers have come to be "fetishized"). Placing new resources in the framework of an old model does not constitute innovation any more than the introduction of one or two new methods or concepts. An education researcher writes: "If we start using coloured chalk on the blackboard tomorrow only because it's more attractive, this doesn't mean we are deviating from or practising against any well-tested principle, method or approach. Innovation is to be found only in practical experimentation (Not theory!), which means rearranging goals, methods and personal conditions in a tangible way so that a new system is established in place of the existing one (e.g. the official one functioning in a given institution)." She suggests that it may be worth examining innovation separately on an institutional level (embedded in the history of a school) as well as in view of the larger system (public education, vocational training and nursery school pedagogy in Hungary, measured within the context of its own history).

5. Assisting the development of skills and personality

Pedagogical journals of the 1990s often contained articles and studies dealing with the use of computers in developing skills and how this works in educational practice (Kőrösi-Mikis, 1996). Many publications drew the attention on the possibilities of LOGO concerning the development of pupils'skill, and few were presented in international conferences. (Farkas, 1999), (Kőrösi-Mikis, 1997) (Turcsányi-Szabó, 1997, 2000) Innovative pedagogical practice only produces results if the development of knowledge, skills and personal values takes place more rapidly, and has a deeper and more lasting influence. Consequently, significant changes and modifications in the organisation and operation of the learning environment are innovative when they improve the degree of influence achieved in the process of personality development. In the opinion of one high school teacher, it is uncertain whether small changes go hand in hand with creative innovation, but they should not be underestimated. "According to Marcus Aurelius: Be satisfied even with the slightest progress. Don't think of it as only a minor feat. In view of this, the use of ICT is innovative if it shows growth in the degree of its influence. This happens in different phases, some of which may not be regarded as genuine innovation.

- We simply add computers to the current learning environment, essentially leaving the basic system untouched.
- Computers are adapted to the learning environment, complementing, modifying and expanding the possibilities of the system.
- The learning environment is transformed by computers, significantly changing the system."

In the interest of developing skills, ICT can be applied innovatively in all aspects of the learning environment - in preparing for lessons, in libraries, during lessons, in computer rooms...

"Innovation can be established in any phase of the teaching/learning process. For example, various modules of information can be connected in the context of a multimedia programme, projectors can be used to present complete programmes for frontal observation, or creative exercises can be assigned as group-work."

A high standard of creative and innovative adaptation is achieved when computers are used to take maximum advantage of the opportunities they provide:

- combining many different kinds of data in a unique format (multimedia)
- connecting new tools of communication with the learning process (networks)
- assisting, expanding, complementing and
- accelerating human thought (interactive applications, LOGO microworlds)
Beyond improving the ability to utilise tools of communication, ICT (including LOGO-pedagogy) can also support the development of different skills, psychological functions and modes of thought:

- observation,
- discovery,
- decision-making,
- communication,
- memory,
- attention,
- concentration,
- imagination,
- creativity,
- problem-solving and
- critical thinking.

6. Changes in methods of learning

Innovation can be established in any phase of the teaching/learning process. Those defining it unanimously agreed that combining innovative practice and teacher-centred approaches to teaching can only be done with great difficulty, or not at all. Innovative teaching/learning processes are most often characterised by group exercises, teamwork or individual study. The emphasis is on learning rather than teaching. Exercises in this context mostly take the form of experimental research projects designed to maintain students' curiosity, and also providing long-term motivation to search for solutions independently.

A university teacher of IT methodology writes: "Exercises are designed to inspire group-work, developing co-operative skills and making it possible - with an international perspective - to create on open community." These thoughts are echoed by an urban primary school teacher, who applies LOGO in her everyday pedagogical activity: "Instead of traditional class work, which often results in passivity among students, the innovative use of ICT is based upon group work, which has a positive influence on personal development. Students learn how to pay attention to each other, how to adapt, to help each other, share knowledge with each other, divide tasks amongst themselves etc."

![Figure 1: Hungarian folk-motif. Drawing of a 12 years old pupil by the turtle (Comenius Logo).](image)

Traditional teacher-centred classroom methods (in which the entire class is "taught" at once) are alien to the new schools of the information society, where the students' level of activity is maintained in the form of group work and individual study based on finding and providing answers to motivating questions. Students
engaged in experimentation and independent research have a wide variety of educational aids to choose from (including ICT resources), which are not automatically tied to the classroom or the school itself and traditional classroom structure (school, lessons, textbooks...) has become looser. In addition to using the information resources available, students can and should prepare their own study aids, the use of which is permitted in the course of recitation as well. "Using crib-notes during recitation is compulsory. All previously prepared study aids can be used, including those obtained by employing computer programmes." An environment utilising ICT resources is also beneficial to independent study by college students. "Computer rooms are available to students in the evenings as well. Instructors provide only minimal guidance in an environment where students teach each other. We've also installed computers in corridors, in entrance halls and in dormitories."

Along with case studies from 21 educational institutions, a recent survey conducted by a research colleague in 300 schools indicates that the most significant developments in terms of innovative learning methods are electronic communication (e-mail) among students outside of the classroom and use of the internet in providing solutions for independent assignments. (Tót, 2000) These methods have certainly broadened the features of pedagogical practice, despite the fact that the majority of schools in Hungary have yet to accept such an approach.

The starting-point for innovation must always be the goals and requirements of pedagogy. ICT use in and of itself is not a substitute for these, and devoting an appropriate amount of time is one of the necessary conditions for innovative teaching activities.

7. Transforming the structure of teaching materials

Already mentioned as one characteristic trait of innovative pedagogical practice is the widespread opportunity to access information. The idea of "one subject-one textbook" has ended in the schools of the information age. As huge advancements are made in all branches of science, the format and context of teaching materials is also undergoing transformation. Regarding content, models taken from everyday life become obsolete at an incredible rate in almost all areas of study. According to the author and promoter of the former IT module curriculum: "If we learn models, it is guaranteed that sooner or later we will be acquiring obsolete knowledge, but if we use models to observe sound basic principles, we can obtain the information we need to recognise the "models" of the future." This opinion holds that the stable elements of knowledge will remain in textbooks, while that which is undergoing change must be transmitted by IT resources and then "read" by computer.

Using new information resources in education is not without its dangers, however. Digital materials that have not been prepared appropriately can also be damaging. (A study conducted by Andrea Kárpáti is recommended for further reading on the quality of digital information sources. (Kárpáti, 2000)) The results of pedagogical assessments on Hungarian multimedia materials for educational purposes are reflected in the opinion of one leader in a professional association of IT instructors: "Very few of the educational programmes and CDs currently in use are suitable for the type of project work that can support innovative pedagogical practice. Moreover, teachers don't know what to do or how to do it. There is a great demand for the promotion of positive models and the goals they represent as well as those that have been achieved. The concept of "sparkling" new technologies has yet to garner much enthusiasm and in fact leaves a lot of room for dangerous "counterattacks" by those who oppose the use of computer technology (see 'the decrease of classroom time')."

Absolutely clear in the opinions above is the fact that we are witnessing a strong increase in both traditional and virtual sources of information, primarily due to the possibilities provided by the media, multimedia, the Internet and various databases, the access of which not strictly limited to schools and classrooms. The role of library research has also been upgraded in the interest of personally obtaining solutions and information - for students, teachers, and even parents who wish to broaden their knowledge!
8. Who is an innovative pedagogue?

The question is intriguing, but the answer is not at all complicated, opinions on this issue coincide. Based on their personal experience (obtained from the LOGO-environment too), all of them regarded the personality of the teacher to be a key factor in the process of pedagogical innovation. Equally similar descriptions were given concerning the changing role of teachers.

- Elementary school teacher: "The function of the teacher as a leader (often 'omnipotent') is being replaced by a new role as companion and partner in the acquisition of knowledge.
- Special tutor: "Teachers should be able to motivate, even from a distance. They act as observers and don't expect set answers from their students. One of the main tasks is to create a positive atmosphere for learning in which students are provided with guidance in developing their own individual methods of study. Teachers in this context are about placing the emotional, physical, psychological and intellectual traits of their students in harmony with each other. They are managers and organisers, or tutors and mentors, but not 'walking encyclopaedias' who know only one correct solution to the given task."
- University professor: "The task of teachers is to motivate, teaching their students how to learn and providing a model for life as well as incorporating their own subject of specialisation in the area of general knowledge."

A teacher of methodology provided a detailed opinion, the main points of which are the following: "Pedagogues project the idea of constant development and in doing so are also able to invoke this in themselves. They are able to properly incorporate teaching materials in the process and handle the challenges that arise as a consequence. This means that they must also co-operate with colleagues teaching other subjects. They leave sufficient room for constructive experimentation in the form of work in groups and independently, assigning tasks based on the driving force behind the individual interests of students. This is not a traditional role based on the principle of respect for the teacher, but a partnership based on providing help and guidance, which includes acknowledging the role of students who have a higher degree of knowledge in certain areas and turning this to the benefit of the community."

The attitudes of educators engaged in the alternative pedagogy of recent decades are in harmony with the personality and role of innovative teachers as partners in learning - curious, willing to experiment, tolerant of differences and supportive of progress in the acquisition of knowledge and in personality development. The work of Péter Fehér (Fehér, 1999) has been recommended to Hungarian readers interested in further information on the changing role of teachers using ICT in the Internet Age.

9. The opportunity to adapt

A significant trait of innovation is whether it can be "copied" i.e. passed on within the given institution and system or transferred elsewhere. Real innovation is not tied to one particular teacher, group of students, or school - it does not exist only as long as "Mr. Smith is giving lessons". Without adaptability, we can speak only in terms of unique pedagogical practice, which is merely "a flash in the pan" of traditional methods and which - because of the contingent circumstances - does not prompt others to borrow or adapt it.

The work of one IT counsellor in the area of providing educational assistance to students of the Romany minority in Hungary is not only important in light of adaptability, but provides such a fine example that we felt compelled to summarise the results below. "Innovative pedagogical practice utilising ICT resources is an activity that encompasses the entire institution, providing a model that extends its influence on a daily basis."
She applied ICT in education of Hungarian language and worked with LOGO too. The employment of computers in a special classroom resulted in successfully maintaining contact with students in the following ways:

- Romany students are motivated to attend school,
- take part in extra-curricular activities,
- work with educational programmes in their free time,
- receive a model for spending their free time constructively.

Contact with parents was also successful in that:

- Romany parents visit the school (e.g. demonstration classes),
- also feel that their children are learning useful activities,
- accept the school as a source of knowledge,
- regard the activities of their children in the school as a sign of equal treatment.

The transfer of such experiences (and the adaptation of the methods and applications that produced them) would be an important step toward integration in the information society. Adapted pedagogical practice significantly transforms traditional pedagogy (principles, goals, content, methods) and can lead to the creation the type of schools in the information society.

10. In summary

What all of the above demonstrates is that it is not possible to describe innovative pedagogical practice based on one standard set of definitions since this would leave no room to express its infinite variety. I feel that it was worthwhile asking colleagues-teachers to share their opinions, which – completing the international and national level survey – provided varied perspectives and reflected a great deal of innovative drive while shedding light on the characteristic features of teaching practice in the 21st Century. Whether innovation will take hold and spread in Hungarian education remains to be observed in how pedagogical practice develops in the near future.

11. References


