PROMOTING EQUITY THROUGH ICT: A PROJECT FOR HUNGARIAN ROMANI (GYPSY) SCHOOLS

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Abstract

In the Hungarian project of the OECD initiated ICT research effort reported here, *"Promoting Equity Through ICT in Education"*, (2002-2005), our aim is to introduce ICT-based teaching and learning methods in 10 primary schools in secluded and poverty stricken villages of Northern Hungary, with 60% or more Gypsy student population, in the following areas: Mother Tongue, Science (Physics. and Chemistry), and Mathematics. We develop cognitive abilities, communication and learning to learn skills through virtual learning environments, online databases, individualised tutorial and examination systems and digital projects. Our final goal is to prepare students for secondary education and make students and teachers aware of the Gypsy cultural heritage through participation in national and international digital projects and creation of heritage sites and teaching aids.

Background

CERI, the educational research institute of the Organisation of Economic Co-operation and Development (OECD), commissioned an extensive study to investigate if and how information and communication technologies (ICT) resulted in changes in the quality of teaching and learning in public education. The research project entitled "*ICT and the Quality of Learning*" (1999-2001) involved researchers from 23 OECD member and allied countries. As part of the project, *school based case studies* were executed that evaluated the functioning of schools incorporating ICT in their education, internal and external communication and management. Altogether 91 cases were documented in 23 countries to verify five *pairs of hypotheses* through 3-6 school studies per country The anthropological / qualitative approach included structured interviews, observation of teaching and extracurricular activities, analysis of students' ICT-related work. Schools were revisited after 6, 12 and 18 months to see how educational change due to the introduction of ICT culture prevailed. (Cf. Venezky and Davis, 2001, Venezky and Kárpáti Eds., 2004)

Some results of this research showed different effects of ICT on education for Hungary – the only Eastern European country participating in the project – and the other OECD countries. The most conspicuous difference was the role of ICT in educational reform movements. The pair of hypotheses to reveal how computerisation of schools effected modernisation outlined the following scenarios: „Technology is a strong catalyst for educational innovation and improvement, especially when the World Wide Web is involved. The rival hypothesis is that where true school-wide improvement is found, technology served only as an additional resource and not as a catalyst, that the forces that drove the improvements also drove the application of technology to specific educational problems." (Venezky and Davis, 2001, 10)

In the OECD countries, the first hypothesis was proved to be valid. Those schools excelled in ICT-based innovations that had been outstanding in the use of up-to-date educational methods even before computers were ever installed. The summary of findings of

this part of the study clearly indicated that infrastructure and student competence did not contribute to the success of the reforms as much as teacher attitudes, motivation and skills. Almost all of the school-based case studies showed that reform-oriented educational institutions with dedicated and highly trained staff to be the first to engage in computer-related educational reforms. These schools were considered cutting-edge, innovative institutions before using ICT and continued to do good work through an effective and intensive use of computer technology in teaching and communication. Infrastructure was helpful and student support often needed but by far not instrumental. Most innovative efforts produced a diffusion pattern characterized by Rogers (1995) as "classic" for educational innovations.

In Hungary, however, results seemed to suggest a different pattern. Here, ICT infrastructure at schools played a decisive role in the initiation of educational reforms. Computer culture proved to be a successful catalyst of educational innovations and actually solicited change. The most popular educational paradigms in our country at the time of the first computerisation campaigns were *constructivism*, *situationism*, and *collaborative learning*. Students who had been considered passive receptors of teacher-generated information for centuries were encouraged to construct their own knowledge and engage in creative, discovery based inquiry in realistic situations in teams. (Halász, 1999, Schooling for Tomorrow, 2001) Hungarian education that had been geared towards instruction in high quality abstract knowledge needed a strong impetus – indeed *a new teaching-learning platform* – to alter classic pedagogical views and methods. We observed a *direct connection between the level of infrastructure and the innovative quality of teaching and learning* in the schools observed for the OECD study. (Kárpáti, 2003b) Though by far not practiced by all schools in Hungary, those institutions that were sufficiently equipped with ICT tools and digital teaching materials turned out to be much more motivated to upgrade their teaching culture than those who were left out of the computerization campaign. Similar results have been recently reported from France. (Pouts-Lajus et al., 2001)

Apparently, in Hungary, computers acted like *Troyan horses* – smuggling an army of new methods within the fortified walls of perhaps the most traditional public sector in Hungary: education. Technology acted as an initiator of the reforms – but was it really a catalyst? Did it significantly contribute to the maintenance of innovative ideas and teaching – learning methods? Providing means is one aspect - another issue is the role of ICT in keeping up high level, innovative education. Here, our results approached those of other OECD countries more closely. Hungarian schools that had been innovative before the introduction of computers – for example, the first bilingual secondary school (www.karinthy.hu) or the first privately owned educational institution (www.akg.hu) – made a better use of the potentials of educational computing. Another group of schools in our sample, however – the tiny village primary school named after the great Hungarian computer scientist, John von Neumann, (www.enjai.sulinet.hu) or another primary school in a small town at a developing industrial area (www.almasi.mako.hu) initiated educational reforms clearly after the introduction of computer technology, inspired by its potentials. Therefore, we could not exclude the role of technology acting as a catalyst for better education although we agreed that a kernel innovation effort had to be present at a school to be successful in making full use of the potentials of ICT. (Kárpáti, 2002b)

Rationale For Research on Promoting Equity Through ICT

The eve of the school computerisation campaign in Hungary, 1990-98, was characterized by massive investments in infrastructure. In the second phase, 1998-2001, the training of teachers was in the focus. Results of the first OECD study outlined above helped

policy makers plan the next step of the reform movement: development of educationally valuable content and teaching methods to make best use of infrastructure and teacher competence and providing equal access to ICT culture for those with social, physical or mental handicaps. (Cf. Kárpáti, 2003a for an overview.)

In the third phase of computerization of Hungarian schools, starting in 2002, content development and diffusion of ICT-based teaching methods has become central for national sponsoring efforts. Research on student and teacher competence shows that *ICT skills are not age-specific* – even middle-aged teachers of humanities can be successfully trained for computer use. (Passey and Samways, 1997) Training efforts are now geared towards medium and small size schools situated in small towns and villages where educational institutions may act as mediators of Knowledge Society culture also to adult citizens in their neighbourhood.

Extensive studies of small Hungarian village schools indicated, similarly to our OECD project findings, that ICT was perhaps the most effective device for schools situated in socially disadvantaged settlements that needed to make the "tiger's leap" and overcome decades of underdevelopment through one single investment. Fehér, 2000) No other educational toolkit can so flexibly be adopted to local needs, no other set of information is so easily extendable. During the student and parent surveys of the OECD project and other international evaluation efforts, we also noticed how popular ICT was even among the most disadvantaged youth groups whose parents made huge efforts to facilitate their children's involvement in a culture they hoped would help them fight poverty and achieve a social status much higher than themselves. (MONITOR, 2000) Therefore, in 2002, researchers suggested increased government support for small and medium size schools in villages and towns with modest cultural facilities to engage in computerization and staff training. It was generally assumed that ICT tools would help develop learning to learn skills and cognitive abilities of children with social handicaps more effectively because of its inherent motivational value.

Promoting Equity Through ICT in Education: Helping Travellers Reach Cyberspace

Framework of the research project, aims and objectives

In the present OECD initiated ICT research effort, (2002-2005), coordinated by the Education Division of the organization, *equity* was chosen as one of the key issues to be investigated. How can In Hungary, sponsored by the Ministry of Education, our research team at Eötvös University, UNESCO Centre for ICT in Education was commissioned to launch our national research project in co-operation with OECD: the *Romani (Gypsy) Education Through ICT Project (2003-2005.* In the framework of this effort we create ICT-enriched, constructivist learning environments in 10 primary schools of Borsod County in Northern Hungary and develop teaching programmes for Hungarian Romani (Gypsy) children to overcome their learning handicaps and develop their national culture to its full potential. Based on results of the first OECD study outlined in this paper before that was conducted with cutting-edge schools, we now want *to show how ICT works in the most difficult educational situations*. If computer technology proves to be useful here – it deserves to be called the biggest educational invention of all times. At present, 5-8 % of Gypsy students go on studying after graduation from the compulsory primary school that involves 8 grades. Those who do not continue their studies will be unskilled workers, unemployed most of the time. We hope to at least double this miserable percentage and thus increase social mobility.

Experimental sample

Situated in small villages or suburbs of towns, the group of 10 primary schools we work with struggle with a range of problems that we hope to solve or ease by the use of ICT: lack of suitable teaching aids and individualized learning kits, motivating communication

environments, an equal access to relevant information and a well-trained and experienced in ICT use staff. The *student population* selected for ICT-enriched education are all 7th Graders of the schools, 264 students aged 13-14 years who will receive two school years (2003/2004, 2004/2005) of ICT-enriched training in five disciplines (details below) and hopefully be able to continue their studies in secondary education to learn a vocation or prepare for higher education in a secondary grammar school. Girls and boys are almost equally represented in the sample. *Schools* all educate low SES students and the ratio of Romany (Gypsy) students is between 65-80 %. These institutions represent major primary school types of the county: the small village school with partly multi-grade classes, the school and house of culture compound, the minority education centre that provides in-service training for other primary schools in the area and the arts-oriented school with specialised classes and courses for talent development in music and the visual arts – two areas the Romani minority living in Hungary traditionally excels.

New learning environments for schools

Detailed case studies were made on the infrastructure, staff ICT competence and teaching practices, student achievement levels in major disciplines and ICT skills, school management methods and plans for development. Based on these studies, school principals and their staff elaborated an ICT development plan together with the technical specialists of our research team. Using funds from our research grant and applying for local and national support, we have started to create a minimal infrastructure for ICT-supported education. After 6 months of work, all schools now have a computer laboratory with Internet connection and all participating classrooms have a PC constantly available for demonstration and practice. An Intranet has been set up in those schools with no local area network and basic software packages purchased and installed for daily use. School libraries and staff rooms received book and software packages collected for the five disciplines involved in our experimental treatment. Five schools applied for a PHARE grant to build a new computer annex to serve community as well as school purposes.

Methods of treatment

After an intensive summer course for teachers of the participating primary schools, new local curricula were developed enriched with ICT-based teaching and learning methods in the following disciplines, involving at least 30 % of classes: *Mother Tongue, Science (Physics. and Chemistry), and Mathematics*. Methods were selected to develop cognitive abilities and communication and learning to learn skills through virtual learning environments, online and CD-ROM databases and individualised tutorial and examination systems. Students of the partner schools are encouraged to work collaboratively on digital projects. We prepare students for secondary education and individual studies with the help of *Information Technology (IT)*, a compulsory school discipline in Hungary. In our experiment, IT education focuses on fostering information retrieval, processing and presentation skills.

Extracurricular activities are also offered to help increase ICT competence of 93 % of our experimental population: students who do not possess a computer at home. Through the creative use of digital communication media, we invite students and teachers to share Gypsy cultural heritage through home pages and school magazines.

In 4 of the 10 settlements, it is the local primary school, our partner in the project, that is furnished with computers – even the Village Hall has none. Therefore, we hope to develop our experimental schools ICT knowledge centres for their settlement by the end of the second school year. We train and encourage them to offer basic ICT courses for adults (mainly parents, grandparents and alumni) and help the work of the local administration with computer based clerical and Internet services.

Teacher Training: the Mentoring and Role Modelling Method

Local teachers who have volunteered to participate in the experiment teach the five school disciplines that form the basis of the treatment. They have formed *discipline based ICT study circles* co-ordinated by *mentors*, members of our research team who are experienced teachers and ICT specialists at the same time. Three of the five mentors are currently working on their PhD dissertation connected to the project, thus they act as participating observers and facilitators at the same time. Study circles meet once a moth for a weekend to discuss problems of ICT use in their discipline, share teaching results, learn and practice new methods or experiment with a new device or teaching aid.

Mentors always present samples of their own work with ICT (video documentaries, PowerPoint presentations and small programmes (for example, Java applets) they developed for educational use and share student work with their colleagues. They describe in detail, how they prepare for ICT-supported classes, what information resources they use, which tools they find most helpful for the development or adaptation of teaching aids, how much time does it take to prepare for a lesson, and how can student development be best assessed. Thus, local teachers, novices in educational computing, will not only learn methods but also a new working culture presented by an authentic role model: their peer.

Assessment of student achievement

Students were pre-tested at the end of 6th Grade, in May 2003, before experimental teaching had begun in September 2003. They will be post-tested at the end of both school years (end of 7th Grade, May 2004 and end of 8th Grade, 2005). Five areas of skills and abilities are assessed with tests developed and standardised for Hungary by the Educational Research Group at the University of Szeged, Department of Education:

1. General thinking abilities (Test for Inductive Thinking)
2. Operational abilities (Test for Combinative Abilities)
3. Reading achievement (Text Comprehension Test)
4. Self-regulation learning strategies and learning motivation (Learning Abilities Test)
5. Affective dimensions of personality (Personality Characteristics Test)

Testing involved 120 minutes in total and was evenly distributed between two school days. Results were computed for all students, classes and the whole experimental group. Comparative data were presented from previous samples representative for Hungary and the given age group and sub-samples including students from Hungarian schools with similarly low SES only. Teachers were furnished with a detailed documentation of results of their students and classes – statistics were visualised and explained in detail with consequences for development. ICT-enriched curricula were elaborated after the analysis of pre-test data (June-July 2003). Curricula for the second school year (2004-2005) will be based on findings of the first post-test (May 2003) and classroom experiences of the first school year.

First results of the project

An encouraging result of the pre-test: all low SES classes include some students that are close to or even slightly above the national average. There is one class where all students are around the average level of achievement in all the areas tested. Apparently, social handicaps and resulting learning deficiencies are in some cases successfully overcome by efficient teaching methods.

In total, however, results are in all areas below the national average. Students in our experimental schools are poorest in inductive thinking (average test result: 22,89 %) – a fact that hints on poor learning abilities. They performed best in the Combinative Thinking Test (55,23 %) – a collection of tasks requiring manipulation with non-verbal information only. Their dominant learning method is memorisation (58,50 %), self-regulatory ways of knowledge acquisition are less developed. Their level of motivation is average (55 %) Their personality test revealed a lack of emotional stability (31,54 %) but a comparatively high level of task orientation (51,22%).

The level of abilities does not, however, explain extremely poor learning results. These students are certainly capable of learning much better and achieve higher marks leading to better average results – necessary for secondary school entrance – if their learning methods were improved and their knowledge processing strategies became more diversified. Also, language skills are in need of further development. All Romani children speak Hungarian fluently when entering primary school and use their mother tongue (a dialect of the Romani language) only at home, in conversation with elderly relatives. Still, both oral and written comprehension is poor and insufficient for efficient learning. Therefore, we focus our development efforts on teaching how to learn (methods geared towards a better understanding of Mathematics and Science are especially needed) and developing communication skills through digital platforms.

Teachers have entered the project with absolutely no ICT knowledge (78 %), a medium level competency (12 %) and a diploma or certificate in ICT (10 %). After the summer course, the majority of novices asked for a supported European Computer Driver's Licence (ECDL) training course and are now preparing for their examination. Parallel with basic technology training, all teachers of the five selected disciplines attend monthly mentoring weekends and make more and more use of ICT-supported pedagogical knowledge, as they feel more competent in basic skills.

School principals unanimously agree that ICT-enriched education may be the chance of a lifetime for their students and support their staff members in their re-training efforts. Still, it is extremely difficult for participating teachers to learn about new educational technology and a new philosophy and practice of teaching at the same time. Several teachers complain about intellectual or emotional overburden but none has left the project so far. In fact, village intellectuals seem to welcome the chance of adherence to a larger professional community and enjoy the team spirit.

The research team encounters problems not usually present at educational development projects: the need to act as a social worker trying to raise funds, member of an ICT technical helpdesk always ready to mend faulty machines, a moral supporter (a shoulder to cry on) available constantly by e-mail and phone and a guide plus role model in modern education. The thrill of breaking new ground through helping the most needy and the challenge of contributing to the solution of one of the biggest problems of Hungarian education: social immobility and unequal access to knowledge makes this project a unique experience.

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