

OECD/CERI ICT PROGRAMME

**Hungarian case study No. 2**

A Case Study of ICT and School Improvement at

**FRIGYES KARINTHY BILINGUAL SECONDARY GRAMMAR SCHOOL, BUDAPEST,  
HUNGARY**

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## **1. Overview of the present**

In the Frigyes Karinty Bilingual Secondary School, Budapest (abbreviation in this text: Karinty) the word KEKSZ (in English: CAKES) does not call a piece of dessert to the minds of students in the first place. When they hear the word, they are more likely to remember exciting free time activities, challenges well met and adventures that are not forgotten long after most facts and figures learnt for the final examination will have faded into oblivion..

The concepts abridged as KEKSZ can be translated like this: Creativity, Effort, Community Building and Service. All students of this school are obliged to get involved in at least one of the extracurricular activities offered and develop creativity, make effort, contribute to community building through rendering service to peers. In one of the best grammar schools of the country as measured by successful entrance examinations to the most prestigious universities, living in an extremely rich ICT environment, students are educated to be dedicated team members as well as successful individuals.

KEKSZ experiences create a bonding with the school that often lasts much longer than the compulsory years of education. Graduates will come back to teach novices the ethos of togetherness. In a more and more individualistic, yuppie-like youth culture, this feature is perhaps one of the most important merits of this school.

Picture 1: The building of the Karinty School has won a prestigious award for its architect and was declared one of the most beautiful and functionally superior school buildings in the country.



## 1.1 What has been accomplished?

"Built in 1986 to the highest specifications, the Gimnazium has been designed to create an academic and purposeful atmosphere for everybody who works there. Sloping roofs combined with huge plate glass windows to flood the interior of the building with natural light. There is a sense of space and freedom everywhere. Within its walls the school contains all you would expect from a modern educational establishment: the latest technical equipment, well-staffed libraries, fully featured classrooms, excellent recreational facilities. The school is surrounded by fields and fronted by a beautifully maintained park. There is a parallel between the academic character at Karinthy Frigyes Secondary Grammar School and its namesake, (the nationally famous writer), Frigyes. Karinthy had the rare quality of being simultaneously light-hearted and serious. We strive to maintain that same quality in our learning atmosphere." (Description of the school building from the home page, additions in brackets by authors of this study)

The Frigyes Karinthy Bilingual Secondary Grammar School, Budapest (abbreviation in this study: Karinthy) is the first Hungarian school to adapt a bilingual (English and Hungarian) curriculum and teach Hungarian native speaker students a range of disciplines in English. The current number of students is 625. (213 boys and 412 girls - a ratio not unusual for language--oriented educational institutions.) The number of full time teachers is 69. The total site budget (without grants and other, not foreseeable resources is 710.000 US\$. The school is regularly sponsored by the World Bank, the City Council of Budapest, the district educational authority and Microsoft Corporation.

It is the major objective of this school to educate European citizens who safeguard and cherish their national culture but are very well aware of global cultural values. Graduates speak English on a level much higher than "normal" language learners whose knowledge is based mostly on language books. While learning geography or Mathematics in English, students

acquire a professional vocabulary and a way of thinking about areas of science and arts at the same time. With the English language as a catalyst, Karinty teaches about the culture and mentality of the English speaking world and gets students acquainted with its educational methods and contents.

Teaching began in Karinty in 1987 when seventy-two students started on the first year of the school's bilingual academic programme. Knowledge of English, however, is by no means a prerequisite for successful entrance to the bilingual programme. During their first year -known as the zero year- all students are required to take part in a highly intensive language course consisting of twenty English lessons a week. In their remaining four years at the school students must study the core subjects on the Hungarian curriculum: mathematics, history, geography, physics and biology.

Picture 2: Students working on a bilingual project in the English Reference Library



*Bilingual education* means that several disciplines are taught and assessed in English or German. Subjects taught in English are History, Geography, Biology, Mathematics, Physics, Computing, P.E. (Apart from these, Chemistry, Economics, Psychology, Philosophy, Theory of Knowledge are taught in English for those sitting for the international baccalaureate.). Subjects taught in German include Mathematics, Geography, History. The contact person for the bilingual programme, Dr. Anikó Bognár (Programme Director and Vice Principal) is a long time devotee of ICT culture as it facilitates her work considerably. The school maintains a *3:1 student:teacher ratio*. At least ten percent of the staff in the bilingual section is made up of native English speakers from both Britain and North America. Five staff members are former Fulbright exchange teachers, and several others have also studied and worked abroad.

*Learning results* of the school are very impressive. On average about 80-90 %

of graduates are accepted by institutions of higher education; a figure which compares very favourably with the success-rate obtained even by the best schools in the country. Indeed, many of the most prestigious universities have given their recognition to the value of the bilingual project awarding extra examination points to students completing the programme. - In May 1992 fifty-five of our second year students entered for the International *G.C.S.E.* (General Certificate of Secondary Education - Great Britain) in first language English; an examination administered by the University of Cambridge and designed principally for native-language speakers. Seventy-two percent of these students obtained grades A, B or C. These results were a startling 20% higher than those obtained in Britain. Many of our students have also achieved very high standards in other internationally recognised foreign language examinations.

In the first final year, 76% of the students chose to enter for the *Cambridge Certificate of Proficiency in English* or the *American Test of English as a Foreign Language*. In the first year eighty-nine percent of the total number of the students passed either the C.C.P.E. with grades A, B or C or scored above 600 points in TOEFL; a figure specified as the requirement for entrance to major American universities such as Harvard and Yale.

In the yearly Hungarian educational achievement survey called *MONITOR* the school traditionally ranks in one of the first ten places and was the first from Hungarian Language and Mathematics in 1999.

Picture 3: The main lobby of the school



The school was also the first to be selected as an International Baccalaureate (IB) site and ranks among the highest achievers in Europe in this very demanding, English language secondary school leaving examination. The average grades of Hungarian IB students at Karinty were already in the first year of implementation, 1997, the highest in the world.

*Foreign relations* are naturally a preferred area of activity in a bilingual school. The major destinations for exchange trips are Germany, Denmark, Finland, France, The Netherlands, Norway the UK, and the United States. Besides these there were trips taken to Italy, and ski camps in Austria and Slovakia.

The school is *one of the flagship institutions of school ICT culture in Hungary*. An early starter in the field and a very successful grant applicant from the start of computerisation of Hungarian schools in the early eighties, it has benefited from grants offered by the George Soros Foundation, the PHARE and World Bank funds. It has also won several grants issued by the Hungarian Ministry of Education. The school leadership team includes a Vice Principal, László Hutay who is responsible for ICT development and maintenance management as well as preparation of grants and organising the PR activities of the school – all these centring round the development of the usage of computers in education.

*Many teachers participate regularly at ICT competitions* and win prestigious awards for using ICT in teaching different disciplines. Non-ICT specialists also excel in inventing novel applications, involving students in their use and thus creating a teacher-student team to spread ICT culture. (One example, the school librarian, will be described under 3.3 below.)

As regards ICT culture, one of the most important features of this school is the so-called *scattered computer placement system*. Traditionally, computers are placed in computer laboratories in Hungary and this arrangement strongly affects use. It is the area of influence (and certainly also the responsibility) of the ICT teacher to ensure the proper maintenance of the lab and regulate its use. Thus, non-specialist teachers have to sign up for lab time, which requires planning ahead and practically impedes the realisation of ad hoc ICT supported lessons. Non-specialist teachers will often be rejected because of lack of time and hardware problems. At Karinty, computers are scattered around the whole school. Some of them are placed in discipline rooms (spaces dedicated to the teaching of one discipline), others are in the library or in student or teacher study areas. This arrangement, initiated by one of the Vice Principal of the school, László Hutay, has become a model and has been implemented in several Hungarian secondary schools with success.

Maintenance and upgrading are tasks routinely performed to keep the PC system in good shape. Information on all existing PCs and other ICT equipment is carefully updated and provides a basis for decisions about development. The file backup system used is mirroring all hard discs on to the school web server and regularly updating these files.

The school is a *Microsoft Affiliated School* and enjoys the benefits of constant support from the company. Free software as well as occasional hardware gifts are on the agenda. One of the Vice Principals, László Hutay is regularly invited to organise and act as one of the major jurors for the national school *home page competition* sponsored by Microsoft. (Its title is *Verseny* in Hungarian, in English: Competition) This competition invites Hungarian primary and secondary schools to create home pages that do not only inform about their institution but can also be used as an educational resource and/or management and communication tool. Karinty, as the organising institution, feels obliged to show a good example in this respect. (C.f. the English language version of the school home page at <http://www.karinty.hu/>)

## 1.2 Who profits from the introduction of ICT?

Picture 4: Teachers' Room for Geography teachers



1. *Scattered placement of computers* ensures that many people have access and may profit from ICT culture. For students, there are four *computer access areas*. Six PCs are situated in the main School Library that is used both for normal library functions and as a site for ICT-supported Hungarian Language and Literature classes. Three PCs are situated in the English reference Library where small groups may engage in computer-assisted language practice or Internet search. In the ICT Laboratory, 19 PCs are arranged in three rows with a server placed in front on top of the teachers' desk. There is a smaller lab space called "Hangout" where students can freely use nine PCs for e-mail, Internet search or other computer-based tasks. Teachers, the management and administration possess many more PCs for personal use - preparation for classes, administrative tasks and communication. Altogether, there are 60 Internet--connected PCs and 3 that have no access. The type of Internet connection is ISDN (64 kBit/sec) provided by the Hungarian School Net free of charge, 24 hours a day.

*Students and staff involved in international activities* (exchange projects, the IB examination, multinational educational research projects) seem to profit most because they regularly use ICT for better teaching and learning in a supportive and motivating international environment. The school is based on the idea of spreading knowledge on the English speaking world. *Teachers involved in the bilingual part of the educational programme* have quickly realised the potentials of this culture in obtaining, updating and sharing knowledge on countries and people of the UK, US, Canada and Australia.

*Students interested in ICT culture* have quickly realised the chance to be pioneers in the computerisation process of their school and have joined their teachers already at the

start to act as assistant technicians, web designers and programmers and facilitators of classroom use of ICT tools.

There are so-called "internationally valid" *disciplines that are well furnished with CAL materials*, e.g. foreign language education, mathematics, science, biology, (world) history and art. Teachers of these areas of study find it easy to obtain teaching aids suitable to their curricula. They can make use of products of big international software developers, enjoy shareware provided on the Internet and exchange their own programmes with colleagues. (Other, less ICT-oriented disciplines and study areas like literature, music, biology, geography, national history, PE etc. Will have a much narrower selection of materials, fewer teacher training programmes and consequently much less models for ICT use that interested but untrained in ICT teachers may use as examples. Thus, there will be disciplines with very little computer use.)

### 1.3 How do the staff, students, and parents view these accomplishments?

Picture 5: Teachers' Room for Biology teachers



We have not met anyone who was against introducing ICT culture to even more areas as have already been tackled. We have met several enthusiasts and experts and some more hesitant supporters from among the *teachers* but only happy and contented *parents* and *students*. It seems that families who select a bilingual secondary school with a high level of education will be those who fully understand the importance of ICT knowledge and educate their children to benefit from it.

*Alumni* of Karinty whom we also managed to interview see it as a big advantage to have had the chance to be among the first secondary school students in Hungary to receive a profound training in computer use. Many of them have decided to volunteer for work in the

ICT department of their home school - even if their jobs or studies are totally unrelated to information technology. They underlined the importance of helping "the Karinthy kids of today" to get access to the Internet and be regular users of resources on CD-ROM in order to succeed in life and be active members of the knowledge society.

Picture 6: Students at recess in the "hangout": the student ICT space freely available from morning



## 2. Overview of the past

### 2.1 What led to these accomplishments?

Information Technology as a discipline was introduced right from the foundation years of the school, from 1988/89. Teachers of Technology incorporated basic computer skills in their curriculum and kept in pace with national reforms. When ICT as a separate discipline was introduced, they were among the first to teach it. Around 1990, the discipline-based teams of teachers received their computers to investigate possible uses. At one of the first national ICT competitions for secondary school students the first prize went to a student of Karinthy.

In 1992-93, the George Soros Foundation issued its first computer lab grant application and Karinthy was one of the winners. In 1987, at the launch of the Hungarian School Net - the educational network connecting by now all Hungarian secondary schools and 60 % of primary

schools - Karinty was invited to give a demonstration on how computers may be used in the teaching of different disciplines. This series of demonstrations was an important national event, much publicised in the media and gave a big boost to *discipline-based innovation on ICT use in education*.

This aspect makes Karinty a unique place to study the effects of computer culture on education. In the majority of schools not just in Hungary but also in many other countries where ICT is included in the national curriculum as a separate discipline for study, computer culture at school is anchored to the teacher of ICT. Not true for Karinty: here several teachers have been active computer users, software analysts and programme customizers right from the start. This feature is invaluable for cultivating a tradition for integrating new developments in ICT with traditional, valued and valuable methods of education, making this emerging culture *an "improver not an intruder"*.

## 2.2 Who initiated the ideas, who shepherded them to completion?

As one of the leading figures of the school, as one of the Vice Principals has formulated it, innovative ideas arise from motivating, brainstorming sessions among staff members but many ideas generate from *alumni*. An example: the previously described "scattered placement of computers" scheme (cf. 1.1) was an idea of a graduate who, in the early 1990s, - the advent of computer use in our country - started working as systems manager at a law firm. There he gained experiences about the optima use of computer networks and later, when Karinty applied to the George Soros Foundation for a network of one server and 12 work stations, he could give advice on optimal placement of the machines.

Picture 7: The ICT laboratory - place for discipline-based InformationTechnology studies



It is generally believed that younger teachers are more likely to adopt new teaching methods and tools than their older colleagues. At Karinthy, it is by far not the case. Major PC users are in their mid forties and the art teacher mentioned before, who became a national authority on software useful for secondary level art education was well into her fifties when she first sat in front of a computer. ICT specialists were instrumental but there were *teachers of different age groups and disciplines right at the start* of the computerisation process. *Women* teachers at Karinthy seem to be as active computer users as men and *no sex differences in school use* of ICT has been observed among students either. (Preferences for war games versus fashion web sites are evident but, in our opinion, do not reflect different patterns of PC use.)

## 2.3 What barriers were overcome in doing this?

There have been and perhaps still are opponents of computer use - teachers who are afraid of losing the "human touch" of education if mediating knowledge through computers. The strategy used to convince ICT-haters was mild but effective and taken from the world of hunting. Hunters provide food for their future game long before they actually go out to hunt for them in order to make them used to special places of the forest. School leaders provided computers for hesitant teachers, placing PCs into staff rooms, but did not make ICT use obligatory. The "food" was there, luring, in front of their eyes, and they could see how more experienced colleagues make use of it. Sooner or later those rejecting computers started to watch, ask questions, test easy but lucrative applications (playing cards or doing a simple word processing task) and finally became ready "game" for managers who could now offer in-service courses to motivated novices.

*Lack of adequate funds* is an obstacle all schools have to face. Innovative teaching requires extra efforts. Fortunately, the management of Karinthy is aware of the importance of financial motivation and tries to do its best to allocate resources in an optimal way.

*Fluctuation of teaching staff* is a big problem. Teachers love their high-level school housed in a beautiful, award-winning building but salaries are very low and pedagogical rewards (discussed in a later passage) do not always compensate for that. 10 % of teachers decides to leave each year and many replace their full-time teaching contract with a part-time one. As regards ICT, it means that well-trained teachers may decide to leave the school to be replaced perhaps by untrained in ICT methods colleagues.

# 3. The present

## 3.1 Characteristics of the school

Teachers at this school are fortunate to teach selected students with high abilities and strong self-motivation. Entrance examinations are necessary because there are at least 4-6 applicants for every single place at Karinthy - although there are several other bilingual secondary schools in the country. At its opening in the early nineties, when this was the only state-owned Hungarian school offering tuition in a foreign language, there were 20 applicants for one place. It is the talent and enthusiasm of students that makes teachers prefer their job at Karinthy to other, much better paid occupations outside of the education sector. Language teachers told us that they got job offers with lucrative salaries from multinational companies but declined them because they much rather teach bright kids who opt for bilingual education for less. Fluctuation, a problem mentioned before is there but if the quality of the population was lower, retaining highly qualified

staff had been much more difficult.

Picture 8: The spacious entrance area (aula) decorated for a school feast



One of the unique features of this school used to be its *fine arts specialisation class*. Graduates were accepted at major Hungarian art colleges and many of them became distinguished artists, designers, architects and art teachers. The corridors and halls of Karinty were famous for the extremely high quality student artwork exhibited and the senior art teacher, Mrs. Gitta Rózsavölgyi, was regularly invited to participate in international research projects on art and design education. Students had at least one art class every day and had a choice of several extra-curricular art and design activities. *ICT was embraced in this programme* as soon as it set foot in Hungary. Mrs. Rózsavölgyi learnt to handle graphics and CAD programmes in her fifties and started teaching them at once. Her art curriculum was an excellent example for the synergy of traditional and ICT-based creative methods. This programme unfortunately had to be closed down because students who were found most talented in art could not meet the other entry requirements of the school: high level performance in mathematics and Hungarian language studies. For many years, future artists had a different entrance procedure but student and parent revolt made the management to introduce unified entrance criteria.

### 3.2 Use of ICT by specialist teachers

ICT teachers regularly use their computer lab and engage in all other ICT-related activities of the school: building and maintenance of professional home pages,

international projects, preparation for competitions and writing grant proposals. They are qualified to perform maintenance activities and are responsible for monitoring fair computer use of students. As resource people, they are often asked by fellow teachers to give advice on software or fix hardware problems. These are typical unpaid tasks for Hungarian ICT teachers, but at Karinthy, numerous grants offer a chance for management to at least partially reward the services of these key staff members.

Picture 9: Room of the system operator



ICT teachers in Hungary enjoy a vivid professional life. They have several professional associations - the most important ones being the *ICT Teachers' Association* and the *Association of School ICT System Operators*. The members of this latter professional community that acts as a trade union and fights for the official acknowledgement and reward for this profession are also mostly ICT teachers, as they are obliged (morally or through management decision) to fulfil the task of system operator. Leadership in both associations is very interested in educational research and engage in several projects themselves. Two of the leading members are PhD. students working for a degree in Education, three others prepare for the entrance examination to a PhD. programme in 2002. Thus, ICT teachers at Karinthy, regular participants and presenters at *national conferences and professional meetings*, have first-hand knowledge on proceedings in ICT-related educational research.

### 3.3 Use of ICT by non-specialist teachers

One of the most important plans for the future is to increase the number of computers placed in discipline-based rooms. A special multimedia PC laboratory for non-ICT education is also planned. Management envisages the introduction of the *National Frame Curriculum in September 2001* as an imperative to increase ICT use. According to the Principal, Sándor Hartay, the new curriculum will restrict the number of lessons for several disciplines and it means *reduction of practice time for new knowledge*. One of the best ways to overcome problems created by less practice is to offer personalised practice opportunities with tests and tasks that students can do on the computer in their spare time. When structured well and tailored according to personal needs and deficiencies / talents, ICT can help overcome teaching and learning problems caused by reduced teaching time for important disciplines like physics, biology or chemistry. Teachers of these disciplines will be invited to find or develop digital teaching materials that optimises the transfer of learning materials in the restricted times available.

Ilona BenkQ, the librarian of the school has fully computerised the catalogue and information system of the school library. A very popular place to learn, browse and chat, this space is open practically all through the day. To ensure efficient service, she organised a *Student Librarian course* for senior students, taught them about ICT use in libraries and issued successful graduates a certificate testifying for their knowledge of basic library duties. Students trained by this dedicated librarian-teachers take turns in helping her out and provide excellent professional assistance for peers who come in to do research for homework, project assignments or matters of personal interest. These student librarians are fully authorised assistants to Mrs. BenkQ and may open up the library for peers in off-duty hours as well. This system of training and employing ICT-savvy student librarians became a model and has been adopted by several Hungarian secondary schools.

Picture 10: Traditional and ICT-based information materials side by side at the School Library



Gabriella Frank, German teacher and Imréné Pintácsi, Mathematics teacher currently participate in an experimental study to develop and test ICT-based teaching methods and materials. They have successfully tested several software packages and educational resources on the Internet and will disclose their experiences in the textbook series of this research project to be published by the National Educational Books Publishing House.

### ***3.4 Use of ICT for internal communication***

Every staff member at Karinty is entitled to have an *e-mail account* on the school server. 20 % of the teachers have more than one e-mail addresses and about 80 % have used their e-mail. Messages from the management are always sent by e-mail through paper copies are also distributed for non-users. Some teachers send students assignments or advise on e-mail and are ready to answer any queries concerning school life when submitted electronically by a student. (This extra working load is growing, however, and may cause problems in the future.)

Those teachers, who are actively engaged in ICT-based learning, have their own professional home pages that can be reached from the school web site. About 50 % of the teachers possesses a computer at home.

Picture 11 :Entry surveillance system in action - László Hutay, Vice Principal and biology teacher, initiator of the school's ICT programme tries to enter the building



The school ICT system has a new function that staff and students alike have to use: the *computer-based entry and surveillance system*. Everybody has an Entry Card that grants entry rights to predefined areas of the building. Using this card means being aware of how such systems work and what are their benefits and handicaps. Other functions for *smart cards* are being developed, e.g. access to the prepaid lunch counter.

### 3.5 Incentives used for spreading ICT culture

Each student is entitled to have an *e-mail account* with a limited storage space and access to Intranet. Using the Internet, however, is not unconditionally granted. As there are much fewer PCs than potential users, those who volunteer to help teachers or do homework with web search have priority. Storage space on the school server is granted for those with good learning results only. Actually, having a home page is very fashionable and not too many students have access to outside accounts and server space. Thus, it is a very powerful motivation for learning that *good marks ensure a possibility to have a home page and volunteer work for the school will be rewarded with more storage space* to host a fancier home page.

Teachers do not get a special reward for using ICT, nor are ICT skills required from applicants for new jobs. Those staff members, however, who intend to do work in this field, are supported by management in writing grant applications. When successful, grant receivers enjoy complete freedom to spend funds raised. Management encourages and supports attendance at professional conferences and looks for staff exchange possibilities abroad.

### 3.6 Level of computer use by students

ICT is taught at this secondary school according to the Hungarian national curriculum, as a separate discipline for all grades. Students perform below average at national and local ICT surveys. As Internet search, preparation of presentations and home pages belong to standard project tasks with several disciplines, they mostly excel in standard software applications and web browsing tasks. Those with a more akin interest in computers may join programming and web design circles.

Fair use is regulated in a brochure describing rules and regulations of PC and Internet use at school. This information material also describes the process of getting an e-mail account, using the school home page that has restricted access compartments. Students sign an agreement with the school in which they declare themselves ready to submit to the rules of fair and proper use. Internet use is constantly being monitored through a special surveillance software nicknamed Big Brother written by one of the system operators. With the help of this programme, authorised teachers may view any time which home pages are being visited by the individual students. Those who visit offensive sites or those with pornographic content will be deprived of their right to use the Internet.

In none of the surveys did we find any indication that boys are more skilled in ICT use than girls. Also, no gaps between medium and low poverty students were observed. (No high poverty student at this school.) Teachers asked could not come up with evidence about girls doing worse in ICT tasks than boys. However, evident differences of interest lead to different PC use patterns and consequently, higher level skills in certain tasks. (E.g.: hand-eye co-ordination in handling game keyboards is much better with boys and girls are more concentrated and swift information seekers on the Internet.)

### 3.7 Computer use by students and their parents at home

Many teachers are active users of ICT and work on creating novel applications with the use of computer-supported learning tools. The teacher of Biology, for example, created a web-based virtual lab where students could dissect a frog using ICT tools and pre-loaded images. Thus, (quasi) hands-on experiences of dissection and knowledge about the muscular and bone structure of the frog has been successfully disseminated to almost one hundred students and only one frog had to be sacrificed for the sake of science.

Foreign language teachers take part in several experiments using CD-ROMs and Internet sites in language learning. Here, authentic foreign language use is guaranteed through life-like speaking and writing tasks, orientation exercises as well as information retrieval and processing projects. Students and teachers are testing traditional textbook and CD-ROM packages with a regularly updated by the publisher educational homepage as a background. They intend to choose the most suitable ones for Hungarian learners. Teachers develop their own applications of existing programmes and even prepare self-designed tests and tasks. The methodical innovations and critical descriptions of existing material greatly contribute to the use of ICT in Hungary.

## 4. Projection to the future

### 4.1 How likely is it that these accomplishments will remain?

*The leadership of this school wholeheartedly supports change. They see the using ICT in education a never-ending process of educational improvements. They clearly see connections between the spread of new teaching methods and increased computer use. Any staff member who has an innovative teaching idea is encouraged to elaborate on it, come up with a project plan. When plausible and pedagogically in line with the school's basic objectives, this will enjoy the moral support of the Principal and its deputies. Financial resources are scarce, but management support also includes help with writing grant proposals. Thus, ICT-based innovations are very likely to become standard features of teaching and learning in this school.*

Picture 12: Office of the school administrator



Important aspects of ICT use at Karinthy are *internal and external communication and data storage*. Many of the teachers we interviewed declared that the functioning of the school is largely dependent on the proper functioning of the PC network. Most teachers have become so much used to computers for communication and information retrieval that they would consider the breakdown of the system a major obstacle.

Another important agent of change is the *bilingual type of education*. English language teaching aids (produced both in the UK and US) are in regular use and many of them are

digital or supplemented by CDs and web sites. Teachers find it helpful to use them. With constantly upgraded equipment and double speed bandwidth for Internet (provided by the Hungarian School Net free of charge as an upgrade of existing services from January 2001 for 300 selected Hungarian secondary schools) they will certainly use them more and more often.

*The International Baccalaureate (IB)*, the final examination that students may sit for (as an addition to their obligatory Hungarian final examination or baccalaureate) makes frequent use of ICT. Students may view sample tasks from previous years, teachers may contact colleagues from other parts of Hungary or abroad to discuss preparation and results. Many support materials are offered on the IB web site ([www.ib.org](http://www.ib.org)) and Chief Examiners for the disciplines keep in touch with colleagues all over the world through e-mail. All these require constant computer use for teachers involved - and about 30 % of teachers are constantly involved with the IB procedure: preparation for it, the actual examination and assessment of IB work. This exam is another feature of Karinty that ensures the sustenance of ICT-based educational improvements. The World Bank of the UN gives financial assistance for the IB project. (About the results c.f. section 1.1.)

When asked about his *needs for further development of school ICT culture*, one of the leading figures in this field answered firmly: "Apart from money, we do not need a thing. Let them just leave us work in peace." This statement means that given the past experiences, staff and students of the "pioneering" ICT-oriented schools know exactly how to proceed along the path of ICT-enriched education. They seem to need no centrally issued policies and guidelines. All they desire is appropriate financing.

The most ambitious plan for the future is to set up an *ICT room available for all the disciplines* to use on a subscription basis. Apart from 2-3 PCs situated in the classrooms allocated to the different disciplines, there seems to be need for a computer laboratory to be used for fully computer-supported lessons. The existing lab is in full use for the discipline called Information Technology. As more and more teachers realise the importance of holding classes in Foreign Language or Geography, Maths or Arts with all students in front of a computer, the need for a second lab becomes evident. The school is currently looking for funding options to realise this new development.

## 4.2 How easily could they be extended to other schools?

New models of teaching through ICT that have been elaborated at this school are inspiring for colleagues and found to be adaptable even at schools with much lower infrastructure level and average student population. *In-service training courses* as well as *on-site teaching presentations* are standard features here. After every dissemination meeting, dozens of letters arrive (both electronically and on paper) from schools all over Hungary requiring further assistance and publications for the adoption of methods observed. Staff members regularly publish in educational journals, newsletters and conference proceedings and one of the leaders is a PhD. student working on the description of the ICT culture at Karinty as a model for secondary education.

Extension of educational knowledge is part of the mission of Karinty. The school is involved in teacher training as a *laboratory school* for Eötvös Loránd University. (During the years when the enhanced art programme was a standard feature, the University of crafts and Design also contracted the school as a training site.)

## 4.3 What resources are required for maintenance?

The job of the system operator for schools is not described in the Hungarian list of occupations. Therefore, school principals have to find their way around employing a specialist who will cater for the machines. Without a permanently employed specialist, no PC system is likely to function for long. This problem occurs at Karinty as well where students and alumni who have received degrees in ICT or engineering often help out with maintenance chores free of charge. The core team consists of three one-time students who regularly come to the school PC workshop on Friday afternoons and often stay there all night. They set up documentation about the whole system and keep track of use to suggest improvements. Recently a technician was employed who currently studies for a degree in ICT and will be employed as system operator in the near future.

Since the first major PC purchases in 1993, *upgrading* old computers is another burning problem that requires constant investment. Just like in other state-owned schools, the head quote allocated by the Ministry of Education for the upkeep of the school does not cover such expenses. Grant applications are constantly on the agenda and success is inevitable for further improvement.

At the time of the installation of the first systems, the early 1990s, there were several initiatives to organise teacher training courses for staff members. The introductory presentations were followed with interest but soon the knowledge level and interests of teachers became so diverse that no unified course seemed to be appropriate..

*Training of new staff* is another issue that has yet to be solved. At present, those who are hired do not receive any ICT training, only an e-mail address for the school server, codes for the dedicated areas of the home page and a briefing on its content. There is no written description of the facilities for computer-supported education and no *training needs analysis* for newcomers who may require basic or further training. For the foreign teachers, however, *information material* has been prepared that may serve as a draft for what is required for the Hungarian teachers joining the Karinty team. As one of the teachers remarked, "You either adapt quickly or fail adapting altogether."

## 5. Main hypotheses

*4.1 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.*

The second hypothesis has been proved with the example of Karinty. Here, the needs of bilingual education naturally led to ICT culture as a resource for study and tool for communication. ICT served as a catalyst that channelled innovative efforts of staff, giving a common platform for development.

*4.2 The diffusion of the innovation/improvement (and therefore of ICT) followed the traditional diffusion pattern for innovations, as outlined by Rogers (1995). The rival hypothesis is that technology functions differently from traditional innovations and that therefore different diffusion patterns occur.*

ICT seems to function differently from other innovations. Spread of this culture

is related both to equipment and skills of users. Both of these can be increased but their *growth rate is highly unpredictable*. (For example, winning a big grant may double the number of computers available and result in different use patterns in a short time. New legal regulations of the teaching profession including ICT competence requirements may dramatically increase teacher willingness to participate in courses - but a popular software application broadly covered by the media will have similar effects.)

*Innovations in the field of ICT* are rapid and may dramatically influence the quality and quantity of use. Also, these innovations *cannot be foreseen* and taken into consideration when planning an ICT in education policy for a period of five, let alone two years. Therefore, pattern of growth in this area will be studied by historians of education who look back to the first decades of school computerisation to reveal patterns of change that characterised the past but may hold no consequences for the future.

*4.3 Successful implementation of ICT depends mostly upon staff competence in the integration of ICT into instruction and learning. This hypothesis assumes that teachers mediate ICT applications when they are successful, and that ICT's academic value relates positively to teacher competence. The rival hypothesis is that the school technological infrastructure and student ICT competence rather than staff competence determine ICT implementation outcomes.*

Student competence in ICT does not guarantee high level educational use, it only helps - and certainly manifests a challenge for - teachers to increase their own competence and become successful moderators of ICT culture related to their own field of study. At Karinty, clearly the first hypothesis is

Positive management views on ICT seem to be the most important prerequisite for safeguarding accomplishments. If school leadership is neutral or negative towards ICT culture, use of computers in education and communication will be sporadic, minimal and stagnant.

*4.4 Gaps in academic performance between high and low poverty students will not increase when all students have equal access to ICT. The rival hypothesis is that equal access to ICT will lead to more advantaged students increasing the performance gap with disadvantaged (high poverty) students.*

At Karinty, it is the first hypothesis that holds. There are no high poverty students at this school but those who are less advantaged benefit a lot from the use of ICT. Gaps in academic performance actually decreases between the two groups as students with no library or computer access at home find information and supplementary material for learning through the ICT facilities they can access at school.

*4.5 Successful implementation of ICT will lead to the same or higher academic standards in spite of the low quality of many ICT materials. Academic standards are a function of teacher and school expectations and not of the standards of textbooks, ICT materials, and the like. The alternative hypothesis is that ICT use will lead to a lowering of academic standards as students spend more time on marginally beneficial searches and in browsing poor quality Web and courseware content.*

None of the hypotheses are verifiable at this point. Even at Karinty, one of the frontrunners of ICT culture, it is very difficult to test the results of ICT on learning to learn skills or performance in any given discipline. Isolation of the effects of computer culture from other factors that have been proven to substantially influence change is very difficult.

One can, however, express beliefs that are justified by the interviews and classroom observations at this school. ICT does not hinder scholastic performance as students cannot

spend excessive amount of time in front of the computer engaged in irrelevant for their studies activities. Simply, there are not enough machines for that. On the other hand, quick access to information seems to be an advantage that actually increases time to be spent on learning. Presentation and word processing devices, graphic and data processing software all relieve students from tedious hands-on chores that have little or no connections with skill development or cognitive growth. Thus, in the near future when the majority of students will have a PC (in the majority of cases with Internet access) from their homes, ICT will definitely improve learning results, as homework will become an intellectual task rather than an exercise in handwriting.

## **Appendix A : Methodology; description of the amounts and types of data collected**

**Size and composition of the research team:** a team of four researchers – all holding a teachers’ degree also and acquainted with the work of the school since its foundation - was organised. Observers were trained, along with others working in the other Case Study schools, in two, full day sessions and given the Workbook Version 9b in Hungarian along with structured interview questions. The team was encouraged to supplement questions to the interview scheme to suit local needs. Previous experiences with the school and work connections with several staff members in the frameworks of other ICT projects proved to be very helpful.

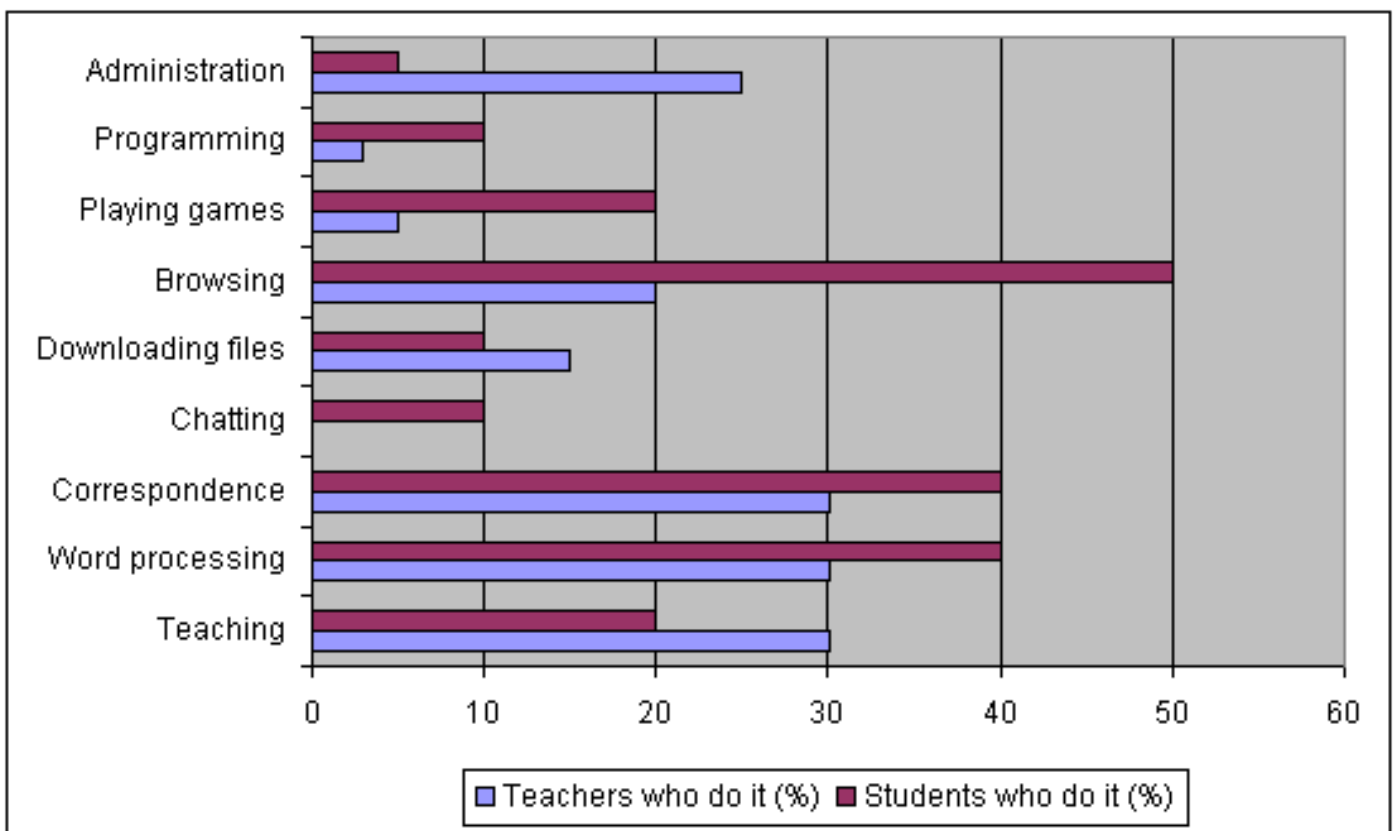
**Amount of time spent at the school:** 4 full days and 11 visits lasting 2-3 hours to attend special, ICT-related lessons and study circle sessions as well as interesting school events like art shows.

**Amounts and types of data collected:** as mentioned before, members of the OECD/CERI Hungarian research team have been acquainted with the work of Karinty all through the first decade of its existence. (The school is constantly being visited by teacher students of Eötvös University, home to the OECD research team, and hosts a range of professional workshops and conferences.) Thus, anecdotal evidence about the foundation of the school, level of teaching and learning, types of activities and general atmosphere were readily available. For the purposes of the study, the following data collection methods were employed:

- Ø Interviews with teachers and school administration (10 interviews executed)
- Ø Interviews with parents and students (15 interviews executed)
- Ø On-site observations of classes (15 lessons observed)
- Ø Observation of written and visual communication of the school (analysis of school home page, 20 home pages of students, 5 home pages of teachers related to special disciplines), school magazine
- Ø Analysis of digital teaching aids developed by staff
- Ø Testing of ICT skills and attitudes with Version 1 tests of the Quasi-Experimental Study of this research project (data were presented at the meeting in Poitiers in January 2000 and used for their further development. (90 students tested, age groups 13, 15, 17)
- Ø Critical reading of project applications and reports by Karinty staff members for grants donated by the school and by foundations.
- Ø Observation of student work done with the help of computers (papers, presentations, tests, creative work, computer programmes etc.)

### Appendix B: Tabular data and possibly graphs from the Teacher ICT Practices Survey. Use of computers by teachers and students-based on the Teacher ICT Use Questionnaires

Activity	Teachers who do it (%)	Students who do it (%)
Teaching	30	20
Word processing	30	40
Correspondence	30	40
Chatting	0	10
Downloading files	15	10
Browsing	20	50
Playing games	5	20
Programming	3	10
Administration	25	5



### Appendix C: Other supporting evidence (if any); e.g., examples of student work, school newsletters, inspector reports, newspaper articles about the school:

**Examples of student and teachers work** have been collected and are partly on show on the home page of the school: <http://www.akg.hu/> .

Here, the **digital version of the school newsletter** with archive of old issues, produced by students can also be seen, along with an archive displaying illustrations to articles and (very well-done) title pages of the newsletter also.

**Media coverage of the school** are being collected and kept in an archive by the school librarian – some recent reports, along with television interviews can be seen and downloaded from the school home page.