

Computer Education and Social Changes in Slovenia

Franci Pivec
IZUM Maribor,
e-mail: franci.pivec@izum.si

Vladislav Rajkovič
FOV Kranj,
e-mail: vladislav.rajkovic@ijs.si

Andrej Jus
Infos Ljubljana,
e-mail: andrej.jus@infos.si

Keywords: WCC; computer education; computer programming competition

Received: May 25, 2004

The World Computer Congress (WCC) held in Ljubljana in 1971 played a very important role in the promotion of computer science. Slovenian school authorities enjoyed relative autonomy in the former Yugoslavia and this made it possible for them to promote computer education. Informal computer education and the introduction of computer science subjects into regular school curriculum started very early in the 1970s. Strong support from civil society was of significant importance in that process. This expressed orientation towards an information society was one of the major differences between Slovenia and the rest of the former Yugoslavia and one of the causes contributing to the attainment of Slovenia's independence.

Povzetek: članek obravnava uvajanje računalništva v slovenski izobraževalni sistem in njegov vpliv na družbene spremembe.

1 Introduction

The history of computer education is almost half a century long. Consequently, written records documenting its beginnings and subsequent development have been growing in number. At the 18th World Computer Congress, held in August 2004 in Toulouse, the first Conference on the History of Computing in Education was organised; it seemed worthwhile, as well as necessary, to present the Slovenian experience there. (Impagliazzo&Lee 2004) This contribution recapitulates, to the largest extent possible, that presentation so that it can be verified and upgraded.

The former Yugoslavia, a socialist country, was determined to demonstrate its progressiveness, among other things, in science. Consequently, large scientific and technology centres were built in the three main university cities as innovative cores capable of being competitive in the international level. The centre in Ljubljana, Slovenia, had decided to purchase a Zuse Z-23 computer as early as the end of the 1950s. This was actually the beginning of computing in Slovenia (The pioneer times of computing in Slovenia are dealt with in a special round table discussion within the Slovenian Informatics Society, web page: <http://hist-ri.slo.net>.) Computer science was considered to be a field of strategic national importance. The applied mathematics team in Ljubljana was well aware of the significance and attractiveness of the new technology; thanks to their efforts, Jožef Stefan Institute (Institut Jožef Stefan)

became one of the first computer education centres in the world with an incredibly progressive motto stating that all people, aged 3 to 73, with an interest in the new technology were welcome.

2 WCC 1971 in Ljubljana

Ljubljana was the only city "on the other side of the Iron Curtain" where the IFIP World Computer Congress was held and that as early as 1971, and those facts had far-reaching consequences. Slovenian computer experts established excellent connections with highly developed environments. As one of the consequences of the IFIP World Computer Congress, the use of computers became the imperative of progress in Slovenian public opinion. The largest computer corporations concluded, due in part to the influence of the WCC, that Ljubljana was a suitable location for establishing their representative offices for doing business with the "East"; we can mention Intertrade as an example in this respect. Soon, they began to license the manufacture of computer equipment (ISKRA, Elektrotehna, DELTA, GORENJE, etc.), on which special export restrictions had actually been imposed in the countries of origin.

The chronology of events leads to the conclusion that the WCC had a large impact on computer education in Slovenia. In the beginning of the 1970s, the first major decisions which made the introduction of the new technology into schools possible were reached.

Today it can be estimated that the attitude towards computer science as the technology of the future—leading to changes also in the social organisation and with a great impetus from the WCC—was one of the delicate differences between Ljubljana and Belgrade. As a result, categorical demands for a change in the direction of development increased. On the basis of information technology, Slovenia defended modern managerial approaches and a complete openness to the world. The opposition to governing practices and to the anti-technocratic policy of the federal authorities was becoming increasingly evident.

3 The beginnings of computer education

At the end of the 1960s, computer science was introduced into schools in a rather informal way. Young employees of the computer centre at the Jožef Stefan Institute (Bratko, Rajković, Lajovic, Hafner, Trampuž, Cokan) offered to conduct optional computer courses in various secondary schools. Such courses, most of them consisting of approximately 40 lessons, usually included elementary computer functions and basic programming in FORTRAN. Fairly quickly, these activities received a favourable reaction from the Slovenian Board of Education under the leadership of B. Lipužič and, consequently, the Commission for the Introduction of Computer Education into Secondary Schools was established. In education circles, France Strmčnik (1972) and Barica Marentič-Požarnik (1972) were of special importance; as early as the beginning of the 1970s, they had started to prepare teachers for computer-assisted teaching and to arouse their enthusiasm for it. In view of the declarations by the Slovenian computer "avant-garde", it is appropriate to mention here also that co-operation with the Multimedia Centre of the Referral Centre of the University of Zagreb was of considerable importance. There Mužič and Šoljan systematically researched the use of computers in education.

In 1971, the first seminar for computer science teachers was held. (Bratko et al 1972) At that time computer science was taught, in one way or another, in a quarter of all Slovenian secondary schools. In 1974, the first Slovenian computer science textbook was published. (Bratko&Rajković 1974) One year later, when computer science was being taught at a half of all Slovenian schools, the first evaluation was carried out, and the report produced was presented at the IFIP (International Federation of Information Processing) Computer in Education Conference. (Bratko, Rajković, Roblek 1975) In 1973, the International Conference on the Use of Computers in Chemical Education was held in Ljubljana. The conference was led by Aleksandra Kornhauser, and it represented the basis for the establishment of the UNESCO International Centre for Chemical Studies (ICCS). (Kornhauser 1975) In 1974, a symposium on computer in education was organised at Jožef Stefan Institute. It triggered an enthusiastic reaction, and a

number of interesting presentations were delivered, e.g., those by V. Bufon (1974), P. and S. Tancig (1974) and B. Marentič-Požarnik. (1974)

Not many schools had their own computers at that period of time. Commercial and public organisations with computer equipment in their possession made terminal or direct access available to schools. This kind of co-operation, in most cases free of charge and with a generous support provided by computer experts, though few in number at the time, was undoubtedly something uniquely Slovenian; it confirmed the then wide-spread conviction that computer technology was crucial to the future of Slovenia. Within the special interest community for computer education, schools and future employers, hand in hand, took care to improve computer equipment in schools. The ideological décor of the time put aside, the imaginative approach in Slovenia engendered positive surprise among experts.

The emergence of microcomputers was the beginning of radical changes. According to I. Gerlič (2000), this period of time can be divided into two phases:

- the multiform phase, when schools purchased all types of computers available (Comodore, Sinclair, Apple, BBC, ORIC, etc.) and
- the uniform phase, after the decision was made to purchase only IBM-PC compatible computers with the uniform MS-DOS operating system.

Comodore and Sinclair triggered such enthusiasm among the first computer generations ("X generations") that they would strongly deserve to have memorial tablets erected in Slovenian schools. In 1983, the first regulation governing hardware and software standardization in schools was issued. Also in the following years, the import of personal computers represented a special chapter in the development. Yugoslavia belonged to the group of states which hindered the proliferation of computer equipment outside controlled central systems.

This was also opposed by Slovenia at the official level; in October 1984, the then Slovenian Executive Council submitted the "Information on the Current Situation in the Field of Computer Literacy" (IS-SRS 1984) to the Parliament. That document had been drawn up also with the participation of the authors of this article. Among the delegates, Erik Vrenko and Ciril Baškovič from the then Republic Committee for Research and Technology were the ones who defended this document. The document conflicted with the strictly confidential (!) federal regulations banning the import of home computers; in this respect it referred to the public appeal which had been previously published by the Republic Conference of the Association of Socialist Youth of Slovenia.

Then computer education was introduced as an optional subject in primary schools and as a range of compulsory subjects in all secondary schools. A Computer Science

Secondary School established in 1981 in the framework of a school reform—which, however, eventually proved to be rather unsuccessful—was a Slovenian phenomenon. Almost 2% of the total school population enrolled, which clearly indicated that this school was among the more popular ones. This confirmed the euphoric openness to the new technology and the great expectations Slovenian society had for it.

In the 1980s, the efforts for computer education intensified. A new textbook with the title "Computer Science with a Collection of Exercises" (Benkovič et al 1980) was published. At that time, in publications, a connection between computer education and an information society was mentioned; this was, at that time, in 1983, also rare worldwide. (Rajković&Kušče-Zupan 1983) There were contributions on educational software (Batagelj 1986) and on the necessity to plan how to supply schools with hardware. (Sovič 1987) Vladislav Rajković and Tomaž Skulj produced a study with the title: "How to Proceed with the Proliferation of Computer Literacy in our Schools" (Rajković&Skulj 1987) which helped present Slovenia as a country highly developed in this field at the Yugoslav Conference on Computers in Education held in 1987 in Nova Gorica. (ZŠ 1987)

The first university computer course was introduced in 1973; electrical engineering and mathematics students could enrol in it after their second year of study. Soon, computer science spread to other fields of study and also achieved the status of an independent university programme. However, the development of this deserves more attention and is not dealt with in this contribution. It is of special significance that Education Faculties introduced computer education for teachers as early as 1984. It is of the utmost importance that the state supported this development trend with a strong information infrastructure (www.arnes.si), which was accessible to everyone participating in the education process, free of charge, and with a very popular co-operative online public library service (www.cobiss.si) in which Slovenian libraries have been participating since the end of the 1980s. Regarding the usage frequency of the abovementioned infrastructure, Slovenia is at the top of EU countries. (SIBIS 2003)

4 The civil movement for the use of computers

The Association of Organisations for Technical Culture with its widespread network and the goal of popularizing technical innovations, and non-governmental organisations played a large, sometimes even essential, role in the introduction of computer education in Slovenia. In the 1970s, the use of computers became their major focus. Throughout Slovenia, they organised computer workshops and exhibitions (such as "Računalnica" and "Računalniški dnevi"), which represented a meeting-point for hardware and software providers and users, the latter ones consisting of teachers and pupils united in their common effort to master the

new technology. As a consequence, computer clubs emerged and these were to great assistance to computer education. The following activities also deserve to be mentioned: the organisation of visits to computer equipment producers, summer schools of computer science, modelled on youth research camps, and publishing. Popular presentations on computer science appeared in all types of media, from the Ciciban newspaper to the Radio Študent radio programme. Freely accessible software was provided. At that time, the idea of specialized computer newspapers, BIT and Moj mikro, was conceived. Nowadays an exhibition referred to as Information Technology in Slovenia (Informatika na Slovenskem), or INFOS for short, reminds one of past events in this field. (Skulj 2003)

Programming competitions were particularly popular; the first ideas concerning these competitions can be traced back to 1974, earlier than anywhere else in the world, and the first competition was organised in 1977 (Hafner 1977). Initially, these competitions were targeted towards secondary schools but later also to primary schools including first grade pupils. Without a doubt, P. Azalov is wrong when he claims that Bulgarian computer competitions were the first ones of this kind in the world; they were held no earlier than 1982, and, by that time, Slovenia already had a long tradition in the field. (Azalov 1989) The highlight of these competitions was the first International Computer Olympics, held in 1988 in Nova Gorica, Slovenia. Azalov has also ignored this fact and claims that the first Computer Olympics were held in 1989 in the city of Pravec in Bulgaria. (Azalov 1994) Fortunately, the Olympics held in Nova Gorica, have been assuredly documented with the publication of its "Problems in Programming" by the Wiley Publishing House. (Vitek et al 1991)

5 Conclusion

In the former Yugoslavia, the introduction of ICT (information and communications technology) became a field of confrontation between the different concepts of social development. The field of computer science symbolised an openness to the world, good management practices and ideological neutrality. From this aspect, its significance was similar to "perestrojka", "solidarnošč" or "svoboda vyrazu", which occurred much later in other socialist countries. ICT also had an impact on the radical changes taking place in the former Yugoslavia. The meteoric rise of computer education in Slovenia in the 1970s and 1980s undoubtedly contributed to the historic changes in Slovenia. Based on this was the idea that the existence of a small nation like Slovenia no longer depended on the "shelter" of some powerful state but on the creative participation in the global network of the information society. After the attainment of its independence, Slovenia became a member of the EU and NATO; however, it is of an even greater importance that it adopted its own strategy of transition into an information society. In 2003, ITU (International Telecommunication Union), on the basis of DAI (Digital

Access Index) ranked Slovenia among 25 highly developed countries and proclaimed it as "an early adopter of IT" (ITU 2003). This gave the greatest satisfaction possible to the large number of people who had devoted their efforts to computer education in the last four decades. The objective of Slovenia's attainment of independence was not to become isolated but to make stronger and more advanced links with the rest of the world. That is what can be pointed to as the very essence of the computer education paradigm from its very beginning and onwards.

6 Reference

- [1] Azalov, P. (1989) Bulgarian competitions in informatics. *Matematics Competition*, 2 (1); 60–66.
- [2] Azalov, P. (1994) IOI'93 – To Mendoza and back. *M&IQ*, 3(4); 122–131.
- [3] Batagelj, V. (1986) Izobraževalna programska oprema. *Vzgoja in izobraževanje*, 1(5).
- [4] Benkovič, J. in dr. (1980) *Računalništvo: Zbirka nalog*. Ljubljana: DZS
- [5] Bratko, I., J. Grad, M. Kac, J. Lesjak, J. Virant, E. Zakrajšek (1972) *Računalništvo (Gradivo za srednješolske profesorje)*. Ljubljana: Zavod SRS za šolstvo.
- [6] Bratko, I., V. Rajković (1974) *Uvod v računalništvo*. Ljubljana: DZS.
- [7] Bratko, I., V. Rajković, B. Roblek (1975) What should secondary school students know about computers: analysis of an experiment. V: O. Lecarne, R. Lewis (ed.) *Computer in education*. IFIP, North Holland Publishing, 841–846.
- [8] Bufon, V. in dr. (1974) Computer managed achievement tests using the programme package KOLOK. *Zbornik Informatica '74*. Ljubljana: IJS.
- [9] Gerlič, I. (2000) *Sodobna informacijska tehnologija v izobraževanju*. Ljubljana: DZS.
- [10] Hafner, I. (1977) Prvo republiško tekmovanje iz računalništva. *Delo*, 21.april; 7.
- [11] Impagliazzo, J., Lee, J.A.N. (ed.) (2004) *History of computing in education*. IFIP 18th WCC, TC3/TC9 1st Conference on the history of computing in Education, 22–27 August 2004, Toulouse. Boston: Kluwer Academic Publishers.
- [12] ITU (2003) *ICT access categories: how are economies around the world doing?* ITU News, 10 (Dec.); 14–17.
- [13] Izvršni svet SRS (1984) *Informacija o stanju na področju računalniške pismenosti v SR Sloveniji (ESA – 558)*. Priloga Poročevalca, 9/10 1984, 8–14.
- [14] Kornhauser, A. (1975) *Uporaba računalnika v kemijskem izobraževanju*. *Vzgoja in izobraževanje*, 5; 3–24.
- [15] Marentič-Požarnik, B. (1972) *Vloga računalniške tehnike v poučevanju*. *Naši razgledi*, XXI, 10.
- [16] Marentič-Požarnik, B. (1974) *Can computer help us to improve instruction?* *Zbornik Informatica '74*. Ljubljana: IJS.
- [17] Rajkovič, V., Kušče-Zupan, S. (1983) *Izobraževanje za prehod v informacijsko družbo*. *Anthropos*, 5–6, 274–286.
- [18] Rajkovič, V., Skulj, T. (1987) *Kako naprej od računalniškega opismenjevanja v naših šolah? Prispevek za posvet "Idejno sporočilo na pragu inovacijske družbe"* (Arhiv avtorjev).
- [19] SIBIS (2003) *Measuring the Information Society in the EU*. Bonn: Empirica.
- [20] Skulj, T. (2003) *Ostrenje osti in pršenje na vse strani*. *Povezave*, November; 6–7.
- [21] Sovič, B. (1987) *Priporočila v zvezi z opremljanjem šol z računalniki: strojna oprema (hardware)*. *Vzgoja in izobraževanje*, 2(1).
- [22] Strmčnik, F. (1972) *Kibernetična smer programiranega pouka*. *Sodobna pedagogika*, 7–8.
- [23] Tancig, P., Tancig, S. (1974) *Uporaba računalnika pri konstrukciji testov znanja in pri obdelavi rezultatov*. *Zbornik Informatica '74*. Ljubljana: IJS.
- [24] Vitek, A., I. Tvrdy, K. Reinhart, B. Mohar, M. Martinec, T. Dolenc, V. Batagelj (1991) *Problems in programming. Experience through practice*. Chicester: John Wiley&Sons.
- [25] *Zavor SRS za šolstvo (1987) Bilten II*. jugoslovanske konference o politiki modernizacije izobraževalne tehnologije: *Računalnik v izobraževanju*. Nova Gorica.