Abstract: Switzerland is small, but each of its 26 cantons has its own school law. Thus, for public general education, the national government had no authority to adopt measures in computer education that would reach all schools. Accordingly, the history of computer education in Switzerland is characterized by a constant struggle with the country’s decentralized political structure. However, different actors pushed for greater standardization and formed as interest groups that wanted to bring more computers into schools and advance computer education. Technology companies also tried to achieve a dominant position in the national market if possible. Only gradually did it become clear to the political stakeholders that the large corporations also posed new threats. With the dawn of more convenient office software and the World Wide Web, national political approaches emerged not to be dominated by technology companies, but to define for themselves the conditions under which computers should enter the classroom.

Keywords: Switzerland; interest groups; technology companies; computer education; political structures

Like other industrialized countries, Switzerland has gone through several phases of computer education. However, the historical developments in this small and rich country cannot be understood unless a specific political context is considered: Switzerland as a country has been – and still is – highly decentralized. This is particularly evident in education where each of the 26 cantons has its own school law. Tax laws, lay involvement in local government, and frequent referenda led to significant regional differences in schooling.¹ Thus, the role of the municipalities, can-

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tons, and language regions cannot be overstated in Switzerland’s history of public education.²

Due to the decentralized political structure of Switzerland, there are various historical pathways of computer education. The debates, actor constellations, and political initiatives differ considerably for the individual levels of the education system and geographical regions. At the same time, the implementation of computers in the classroom forced educational stakeholders to cooperate across traditional boundaries. The history of computer education in Switzerland is thus characterized by a constant struggle with the decentralized political structure of the country.³

A national policy on computer education did not seem possible in the complex political structure of Switzerland. Nevertheless, the reference to technological change and the actual or perceived need for coordination allowed for a gentle harmonisation. The widespread use of computers became possible only on the basis of standardised programming languages and routines. The proponents of enforced computer literacy assumed that it would be similar with education. The history of computer education in Switzerland is therefore a history of attempts at standardization and centralization in a highly decentralized country.

The historical development of computer education in Switzerland has hardly been researched. For Geneva, a well-informed study exists, but it only goes back to the mid-1980s.⁴ Only the significance of the new information technologies in Swiss vocational education and training policy and adult education governance has been


researched to a certain degree.⁵ This article focuses on public schools at a primary and secondary level. In particular, political initiatives and the role of various corporate and individual actors are considered. University education or practical vocational training are mentioned only when they are relevant to understanding other developments. The entire extracurricular field, i.e., computer camps, youth clubs, awareness campaigns, informal learning, etc., are not part of this historical study.

The historical analysis draws on four different sources. First, it evaluates the files of the Swiss Conference of Cantonal Ministers of Education (EDK) in the State Archives of Lucerne. Second, other archives are consulted for contexts of single developments or events in computer education. Finally, journals and publications of teachers’ associations and other educational stakeholders are analyzed. This is supplemented by less specific published documents like government reports and the daily press.

The Laboratory of Upper Secondary Education and the Government Machine

The first experiments with computer education in Switzerland beyond universities, state administration or vocational education and training took place at general upper secondary schools (Gymnasien, collèges, lycées). In Zurich, voluntary computer science courses at a Zurich upper secondary school started in 1964.⁶ In 1967, another introductory course in computer programming took place at a (private) school in Zurich.⁷ In Geneva, the first computer science course outside the university was held at Collège Calvin in 1967. The beginning of computer education in Geneva coincided with a massive expansion of higher education in which numerous new institutions were founded. By 1969, voluntary courses were offered in three Geneva upper secondary schools. The more advanced students learned the programming language FORTRAN and could add BASIC at a later stage. All in

⁶ StAZH/MM 3177 RRB 1985/3915, Kantonsschule Rämibühl Zürich, Mathematisch-naturwissenschaftliches Gymnasium (Computer).
all, the non-mandatory offer extended over two years and comprised two hours a week.⁸

These early computer science courses are situated in the context of mathematics and science education. Math or physics teachers wanted to experiment with the new digital technologies and invited their students to participate.⁹ Upper secondary school students were seen as future students at university. The schools were attended by only a small part of the population and served as preparation for university studies.¹⁰ The students already belonged to the elite group of Switzerland’s academic community.¹¹

While initial attempts to establish computer science courses at the upper secondary level were due to enthusiastic mathematics and physics teachers, another group provided the initial consolidation and expansion of computer science instruction: Felder has argued that the promoters of a pronounced computer education came primarily from management science.¹² Therefore, computer science courses are contextualized within government efforts to make data processing in state bureaucracy more efficient. The training of students was meant to benefit the computer as what Jon Agar has called the “government machine”.¹³ Public funding of the expensive IT infrastructure could only be justified if the machines would not only be used for research, but also for government administration. In Fribourg and Berne, the state administration and the universities always considered the joint use of the purchase or rental of the first mainframes.¹⁴

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⁸ Felder, *La scolarisation*, 20–21.
¹¹ In Zurich, there was also an introduction to the FORTRAN programming language and electronic data processing at the upper girls’ school. See StadtA ZH/V.B.b.43:2.95, Geschäftsbericht der Zentralschulpflege, 1971–1972; “Datenverarbeitung an der Töchterschule II,” *Neue Zürcher Zeitung*, June 24, 1971, Lunchtime edition: 21.
¹² Felder, *La scolarisation*, 41.
In Geneva, this meant that the beginnings were followed by a phase of centralization. There was no other way to justify the horrendous costs. The technocrats now replaced people with a liberal education in key public functions. The electronic computer suited the technocrats’ understanding of efficient management and control.¹⁵

In Zurich, the expansion of computer science education was driven by a representative of a specific orientation of management science, “operations research”. Hans P. Künzi, Professor of Operations Research and Electronic Data Processing, had lobbied in the early 1960’s for the IBM 1620 to be installed at the University of Zurich. This was to catch up with other Swiss universities that already had their own computer facilities.¹⁶ In 1969, the steadily increasing demand for computing power led to acquisition of a new computer for the university. In the early 1970s, the new IT equipment at the University of Zurich explicitly targeted students at upper secondary schools in addition to researchers, technical schools, and university training.¹⁷

The cantonal government in Zurich now provided schools with desktop computers. In addition, cooperation between upper secondary schools with the University of Zurich in terms of computer use was standardized. The state invested in the acquisition of and supported the implementation of appropriate infrastructure not only in universities, but also in schools. The goal was to give all upper secondary schools in Zurich access to computer technology.¹⁸

These early experiments with computer instruction in upper secondary schools remained limited in their impact. The courses were initiated by individual, sometimes highly influential local players. However, it quickly became clear to some of the stakeholders that at least a soft political coordination of the various efforts was needed if computer education was to be implemented on a broad scale. Now soft coordination began at a national level. In 1973, Pierre Banderet, a Swiss physicist who had learned about scientific computing in London in the 1950s, then worked for an important Swiss industrial company and set up the com-

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puting center at the University of Neuchatel,¹ conducted a survey devoted to computer science education in Switzerland’s upper secondary schools. The patronage for this survey had been taken over by the Swiss Center for Continuing Education in Lucerne (WBZ), which was particularly concerned with the continuing education of upper secondary school teachers.²⁰

Banderet’s nonrepresentative survey described the use of electronic computers and calculators and numerous activities in computer science classes in the nation’s upper secondary schools. A list of names compiled as part of the survey included a total of 106 teachers and administrators who had previously dealt with the issue of electronic computers. Although it was incomplete, the field of computer education seemed to be the concern of a small, dedicated interest group that was becoming increasingly networked.²¹

Banderet emphasized the role of the OECD’s efforts in computer education, which would also guide Swiss experts. At a national seminar in the field of computer education in 1975, participants envisioned different applications for the classroom and established a coordination group to address the implementation of computer education in upper secondary schools throughout Switzerland. The task was to identify the educational as well as the political and administrative challenges that would stand in the way of a comprehensive introduction of computer science courses in schools.²² The coordination group was chaired by Raymond Morel, who had already been engaged in the introduction of computer science courses in Geneva. Besides Morel and Banderet, teachers from various upper secondary schools in French- and German-speaking Switzerland were members of the group. The Swiss Center for Continuing Education in Lucerne (WBZ), the state authorities, and the Swiss Federal Institute of Technology in Zurich (ETH) were also represented.²³

The steering committee of the WBZ tasked the coordination group with writing a report for the state authorities, networking with other stakeholders in the field of computer education, coordinating and promoting ongoing initiatives, and organizing continuing education courses. It concluded that the core content of computer education could be taught in 24 hours. This introductory course was meant to be compulsory for all students in upper secondary schools and not related to specific

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²¹ Banderet, “L’enseignement.”
²² Banderet, “L’enseignement.”
hardware or programming languages. Computer education was meant to be taught from the tenth grade onwards.²⁴

The program “computer science in 24 hours” was now implemented in a pilot project. Furthermore, the coordination group, which had developed the curriculum and initial proposals for implementation, remained on the subject. The WBZ had course materials prepared. It was financially supported by the Association of Swiss General Upper Secondary School Teachers.²⁵

However, the developments in the cantons and regions were still poorly coordinated. During a seminar in Davos in 1980, the challenge of implementing computer education nationwide in a decentralized country like Switzerland was discussed. In a study of developments in 11 cantons of German and French-speaking Switzerland, it was found that almost all upper secondary schools now offered some form of introduction to computer science. These courses were often voluntary. In total, 230 courses per year could be identified, involving more than 3000 students and 200 teachers at upper secondary schools.²⁶

New Markets in a Decentralized Political System

As long as computers were expensive and large, no school could afford its own device. Public education only became an interesting market with the invention of smaller and cheaper digital devices. Announcements for the best hardware to use in schools were now increasingly appearing in the educational press. An early example is a 1976 advertisement by Digital Equipment Corporation (DEC) promoting its school computer called “CLASSIC”.²⁷ The acronym CLASSIC stood for “Classroom Interactive Computer”, and it comprised a PDP-8/A minicomputer as well as a floppy disk, a video terminal, a copier, and an operating system. The offer also included software and curricular materials.²⁸ DEC was an American company that had become very successful, especially in the minicomputer mar-

²⁶ WBZ, Die Einführung der Informatik.
In the USA, it provided the computer citizen movement with the necessary hardware infrastructure, programs, and a BASIC (Beginner's All-purpose Symbolic Instruction Code) primer.\footnote{For the history of Digital Equipment Corporation, see Glenn Rifkin and George Harrar, \textit{The Ultimate Entrepreneur: The Story of Ken Olsen and Digital Equipment Corporation} (Rocklin, CA: Prima Pub, 1990).}

DEC’s 1976 advertisement indicated the shift in the usage of smaller and cheaper devices for computer education. The advertisement had been published in the journal for elementary school teachers in German-speaking Switzerland, not in the journal for upper secondary schoolteachers. The accompanying text announced that with the CLASSIC even the “smallest school” would be able to afford a computer. Even though the price was still exorbitant compared to today’s computer systems, it was significantly lower than that for early electronic computers. According to the provider, the CLASSIC was easy to use, contained the necessary hardware and software, mastered FORTRAN and BASIC, and could be used in the classroom as well as in school administration.\footnote{Joy Lisi Rankin, \textit{A People’s History of Computing in the United States} (Cambridge, MA: Harvard University Press, 2018), 96, 100–101.} DEC’s offerings were attractive because they came to schools as ready-to-go packages. In the mid-1970s the company even presented itself at the European Didacta education trade fair with school computers that could be connected to numerous peripheral devices and accessed simultaneously with several terminals.\footnote{Schweizerische Lehrerzeitung on January 15, 1976, without pagination.}

However, DEC’s minicomputers were not the breakthrough for the computer as an educational device. The machines were still too bulky and expensive for a widespread sale. Computers didn’t really become affordable for schools or municipalities until they made their way into private households as well.\footnote{“Didacta Eurodidac Basel: 23.–27. März 1976,” \textit{Schweizer Schule} 63, no. 6 (1976): 173–199.}

Since the early 1980s, experimentation with computers in elementary and upper secondary schools steadily increased. In the canton of Zurich, the cantonal school authority was charged with conducting an annual survey of computer use in lower secondary schools. In 1983, there were just 10 municipalities in which computers were used. In 1986, there were already 66 of them. Half of the municipalities had procured so-called home computers, 10\% implemented personal computers, and the remaining schools used programmable calculators.\footnote{Gleb J. Albert, “Der vergessene ‘Brotkasten’. Neue Forschungen zur Sozial- und Kulturgeschichte des Heimcomputers,” \textit{Archiv für Sozialgeschichte} 59 (2019): 495–530.}

\footnote{StALU/A 1270/1738, Informatik in der Oberstufe der Zürcher Volksschule. Empfehlungen des Zürcher Erziehungsrates zuhanden der kommunalen Schulbehörden. Ausführliche Fassung gemäss Beschluss des Erziehungsrates vom 28. Oktober 1986, 3.}
Among the cantons, the implementation of microcomputers in the schoolhouses in the first half of the 1980s was almost uncoordinated. Even within the cantons, many municipalities themselves ensured that their schools were provided with the appropriate infrastructure. However, this also meant that the procured computer types varied widely, and numerous providers competed with each other in this limited market. In a survey, the “Schweizerische Arbeitsgemeinschaft für Bildungsmittel”\(^3\) asked its member schools in 1986 which hardware and software they had. Only vocational schools and upper secondary schools took part in the survey.\(^3\)

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The “Schweizerische Arbeitsgemeinschaft für Bildungsmittel” SAB (= Swiss Association for Educational Media) was affiliated with the “Schweizerischer Kaufmännischer Verband” (=Swiss Commercial Association), the main umbrella organisation for white collar employees in Switzerland. See “Computer für Berufsausbildung,” Computerwoche, October 15, 1982.

The responses came from 72 schools belonging to a total of 13 cantons in German-speaking Switzerland. The French- and Italian-speaking cantons and the elementary schools were not represented in the survey. See StALU/A 1270/1710, SAB Umfrage vom 1. September 1986, Computer Hardware und Software in unseren Mitgliedschulen.

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**Fig. 1:** Computers in Schools 1986. Source: StALU/A 1270/ 1710, SAB Umfrage vom 1. September 1986, Computer Hardware und Software in unseren Mitgliedschulen.
According to this survey, the market in upper secondary education was dominated by three providers who had already been popular in the pre-digital age (see tab. 1). IBM had been successful with its tabulators and punched cards, and was then an important supplier for the mainframe computers that also found their way into state administration and universities in Switzerland. Triumph-Adler (Alphatronic) and Olivetti originated from typewriter manufacturers. Only in fourth place was an original computer company. In fifth place was NCR corporation, another provider that had been established in the pre-digital age. This was followed by the computer manufacturers Commodore and Apple, and numerous other technology providers, which hardly carried any weight in these statistics (see fig. 1).

However, the companies were not only aiming for short-term profit, but also tried to establish themselves as hardware providers in the long term. This is evidenced by the donations of computers to schools and universities by a private company like IBM.

The technology brands even found their way into public educational policies: in 1986, the Zurich Education Council, the main advisory body to the highest cantonal education authority, recommended that schools purchase “Apple Macintosh computers”. This recommendation caused protests in the cantonal parliament. Apple computers were considered an expensive gimmick. Thus far, computer training for teachers had been done on IBM machines. Many municipalities had already purchased school computers that were at the bare minimum, IBM-compatible. It also seemed questionable whether Apple Macintosh, with its exclusive and incompatible offerings, would have any chance of surviving in the global market in the long run.

In 1984, the intercantonal board of education ministers (EDK) began to address the issue of computer education. The differences in computer education between cantons and municipalities were considerable in the 1980s. Due to the lack of legal competencies at a federal level, it was up to cantonal governments or even local school boards to initiate computer courses or equip schools with computer infra-

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37 The same year the survey was conducted, Triumph-Adler was merged with Olivetti. Cf. Leonard Dingwerth, *Die Geschichte der deutschen Schreibmaschinen-Fabriken: 1. Große und mittlere Hersteller* (Delbrück: Verlag Kunstgrafik Dingwerth, 2008), 29.


structure. Where government initiatives were missing, hardware and software were implemented only where the municipalities or the schools and individual teachers were active participants. In this political context, only soft governance approaches seemed possible. EDK’s soft governance of computer education was institutionalized through various committees. The “joint committee on computer science” was intended to ensure that general and vocational education did not diverge too much. In addition, there was an “Elementary School Working Group” and a “Secondary School Working Group” for general education. Once a year, a colloquium was held in Interlaken and a study week in Davos, where the central challenges of computer education throughout Switzerland were discussed.\footnote{Schweizerische Konferenz der kantonalen Erziehungsdirektoren EDK. \textit{Jahresbericht 1984/85}. Berne: EDK, 1985, 18.}

However, hardware in the classrooms did not guarantee the use of these new technologies. In the spring of 1985, the EDK started a monitoring to determine the status of computer education in the cantons. Already in the fall of the same year, a second, similar survey was conducted, which was then supplemented again in 1986. The rapid succession of these surveys indicate how dynamic developments were in the mid-1980s.\footnote{StALU/A 1270/1732; Palmier, \textit{Informatik}.} Even between these close survey dates, the EDK noted an increase in activities in the elementary school sector. In some reports, amplified intercantonal cooperation was reported. In many places, action committees were formed and pilot projects were started. Again, the use of products from a whole range of computer manufacturers in elementary schools is striking, from Olivetti and IBM, to Apple and Commodore, and the Swiss school computer SMAKY, which was used primarily in French-speaking Switzerland.\footnote{StALU/A 1270/1732; Palmier, \textit{Informatik}, 5–7. The acronym “SMAKY” stood for “SMArt KeYboard”. See “La Suisse et l’aventure Informatique,” \textit{Tracés: Bulletin Technique de La Suisse Romande} 128, no. 18 (2002), 31.}

While the proliferation of elementary schools could only be gently harmonized for constitutional reasons, other solutions were available for vocational schools and general upper secondary education. In vocational schools, apprentices in all trades throughout Switzerland since 1985 had to receive at least 20 lessons of introduction to computer science. As a rule, this already took place in the first year. In addition, there were opportunities to voluntarily go deeper and learn a programming language such as BASIC. However, in the vocational schools’, computer science was not taught as a separate school subject, but could be integrated anywhere.\footnote{“Informatik im Berufsschulunterricht,” SMUV-Zeitung, August 27, 1986; “BIGA-Projekt ‘Informatik für alle’,” \textit{Schweizerische Blätter für beruflichen Unterricht} 109, no. 12 (1984): 339–342.} The “Computer Science for All” program for vocational schools was
first rolled out in the German-speaking part of Switzerland, afterwards the other language regions followed suit. In March 1986, the Swiss government was informed that at least one teacher per school had now been sufficiently qualified at all vocational schools in Switzerland. This candidate was then to instruct their other colleagues in a so-called “snowball system”.45

Computer education was now declared compulsory in general upper secondary education. Almost every school in upper secondary education already offered some form of a mandatory 30-lessons introduction into computer science.46 Policy stakeholders and educational experts set out to revise the pilot program of the 1978 “Computer Science in 24 hours”. The opportunity arose due to the reformation of the upper secondary school curriculum. Since 1986, all upper secondary schools were required to offer an introduction to programming and computer science.47 However, the government declined to create a separate computer science subject for upper secondary schools. It was to be left to the schools or the cantons to decide at which level they would offer an introduction to computer science. The introduction could be integrated with the mathematics lessons, but this was not compulsory.48

These tentative attempts of a central implementation of computer education show that the new challenges were recognized, but that policy stakeholders did not yet know how to respond. However, the statistics show that at least the technical infrastructure in the school buildings was slowly improving. A comprehensive national survey in the late 1980s illustrates that computer hardware was increasingly finding its way into schools. The percentage of computers per school was highest in vocational education, followed by general secondary education. Lower secondary schools had the fewest devices per school (see table 1).

45 BAR/E7001C#19972#1229*, Notiz für Herrn Bundesrat Kurt Furgler; Referentenkurse Informatik für alle (Medienverbundpaket Blackbox), March 5, 1986.
46 StALU/A 1270/1732; Palmier, Informatik, 8–9.
Educational Software and the Promise of the Internet

However, the survey was not solely about the hardware present in schools. It also questioned the use of software, which was now more central to the general discussion on computers in education. The most popular software were word processing programs, database software, programs for spreadsheets or for learning programming languages. The authors of the report noted that the availability of specialized software for individual school subjects was not the central concern. Rather, advanced computer education often seemed to fail because of the missing implementation of the software in classroom teaching.⁵⁰

It seemed clear to the educational stakeholders that they had to become engaged in software issues. Evaluation by the public authorities or even standardization of educational software, however, had no strong lobby in Switzerland. When the director of the “Swiss Agency for Information Technologies in Education” (SFIB),

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founded in 1988, was asked in an interview about his political agenda, he first made a commitment to Swiss federalism and then emphasized that even the agency’s own comprehensive database for educational software, called “Logithèque”, was a mere inventory, which was not accompanied by any evaluation. The database intended to help teachers find the right computer programs for their purposes; it did not have to be built from scratch. The new database exploited other databases from cantonal authorities or documentation centers that already existed. SFIB now wanted to make the information available to those cantons and regions that lacked the money or the will to list the existing and suitable educational software themselves. The Logithèque database initially could only be used on Mac computers as it had been developed for Filemaker. However, SFIB also announced a DOS version and even offered to provide an extract on paper.

SFIB’s engagement in software issues reflected a more general trend: the focus in computer education in the 1990s moved away from teaching programming skills to the use of application software. This change is also reflected in the curriculum reforms. The compulsory introductory courses in computer science at general upper secondary schools were abolished in 1994 in favour of a more transdisciplinary approach. The protest of computer science and computer science teachers had not been able to prevent this.

Schools needed programs that were also used in offices and homes to prepare students for future tasks. The software producers and IT vendors, on the other side, had an interest in ensuring that their products would also be paid for. In this context, teachers suddenly found themselves accused of illegal piracy. Many schools, however, could not or did not want to afford the software licenses, especially for commercial office software. In the 1990s, the SFIB therefore inspected the problem of copyright in the software sector.

A Switzerland-wide solution could now be found regarding the piracy problem in education. However, it had to be clarified first who had the competence to ne-

55 StALU/A14272054, Minutes of the SFIB Board Meeting of 15 September 1993, 3–4; StALU/A1453/556, SFIB Annual Report 1994, 2, 5; SFIB Annual Report 1995, 5; StALU/A1453/557, EDK & BIGA, Software: Rahmenvereinbarungen für die Schulen.
gotiate a framework agreement with the software companies for all types of schools in this highly decentralized country. The schools themselves were to invest cautiously in software while the negotiations were still underway. There was a risk that individual schools or cantons would thwart the attempt to find a central solution.

Since 1994, the SFIB negotiated with numerous software providers to conclude framework agreements with them. The aim was not simply to use the companies’ existing educational licenses, but to negotiate better conditions for all schools at all levels of study. SFIB wanted to reduce the effort and cost of software use in schools. While the smaller providers were quickly willing to reach agreements, the negotiations with the market leader Microsoft turned out to be more complicated. The first framework agreements were concluded with the companies WordPerfect and Lotus. These applied to all “public and state-subsidized schools”.

It took until 1996 for SFIB to finally announce that they had also reached a framework agreement with Microsoft. The head of SFIB took the opportunity to point out to the educational authorities that it was their responsibility to push computer education in the classrooms. Teachers would now be allowed to install the software on their private devices. Schools were allowed to equip ten personal computers with each license purchased. Compared to the usual market prices for individual licenses in private households, this meant only a tenth of the costs. These conditions applied until the end of 1999 and then had to be renegotiated.

Since the late 1980s, another topic had already become the focus of some educational experts in the public authorities and professional associations. The growing number of databases that could be accessed via telephone lines increasingly served not only as information storage, but also for communication and self-promotion. Some electronic databases, such as the educational documentation center “Resedoc”, the “Réseau suisse de documentation éducationnelle”, had a history that even reached into the pre-microcomputer period.

63 The history of Resedoc is currently being researched by Fabian Grütter and will also be presented in a forthcoming article. For the idea behind the documentation center, see “[Editorial and Overview],” Schweizerischer Dokumentationsverbund im Bildungswesen: Bulletin 0, no. 1 (1988); Urs
In 1987, the Swiss government announced “Videotex”, after “Bildschirmtext” had already been launched in Germany and “Minitel” in France.⁶⁴ For the various educational institutions and stakeholders, however, the information and communication offer of the private Zurich based company “ComNet” became the playground of progressive and technology-savvy actors. “ComNet” and the “Data Star” package offered by the Bernese company “Radio Schweiz” dominated the Swiss market for database access at the end of the 1980s. ComNet had the advantage over Videotex and other providers that it did not require a personal computer with Vtx functionality and offered both telecommunications and database access.⁶⁵

While these services were already being used in a few business sectors, their use by ordinary consumers remained too expensive, too cumbersome and also too uninteresting.⁶⁶ Since 1986, the Swiss intercantonal board of education ministers (EDK) organized an electronic mailbox system via Comnet, which by 1989 was already serving as an online contact point for about 100 institutions.⁶⁷ In Zurich, individual vocational school teachers were seconded to learn about telematics and were accompanied by other experts since 1986. The focus here was on electronic communication and database use, but also on setting up so-called “wide area networks”. The members of this study group were to try out the applications themselves and then pass on their knowledge to other vocational schoolteachers as multipliers in the form of courses and publications. By using ComNet, they wanted to involve others who lived further away.⁶⁸

At the end of 1989, ComNet agreed with the intercantonal board of education ministers EDK and the SFIB to launch a pilot project for trial in the field of telematics, called “ComNet-B”. On the one hand, the project was to serve the development of its own information channels. On the other hand, it was also planned to establish a “nationwide ‘closed user group’ of all persons and institutions from the education sector”. However, the project should not only focus on building this electronic network for others. Rather, the electronic means of information and commu-
communication should be tested right away by the project team and, if possible, the project itself should be handled as far as possible via ComNet.\(^69\)

The EDK published information on ongoing cantonal IT school projects, announced events and teaching materials via ComNet. The content also came from other computer-centred projects. For example, the catalogue of the “Schulfilmzentrale Bern” with about 3,000 entries could be accessed via ComNet. Teachers could not only browse through the belongings of this public film provider via ComNet, but also order the required school film straight away.\(^70\)

The mailbox system was also increasingly used for electronic communication between the participants. By 1990, there were already 130 participants who helped each other with technical questions and maintained their network via ComNet.\(^71\)

Access to a personal computer, a telephone connection, and a modem were required. The EDK advised against using a cheaper acoustic coupler instead of a modem. Some of the necessary software could even be obtained free of charge or would be part already of other software packages. For the use of ComNet, a connection fee and a monthly fee had to be paid, whereby more affordable rates were offered for educational institutions.\(^72\)

Other databases or communication systems were much more focused on education than ComNet and they pursued a more focused educational agenda. In the canton of Bern, the so-called “Middle School Information System” (MIS) was created, which was to be particularly oriented towards the needs of teachers and was also driven by teachers. After a development period in the years 1986–1988, the MIS was managed from Berne for several years. The system should be used for communicating and publishing. It would provide information and make databases accessible for students from upper secondary schools as well as teachers.\(^73\) The use of the MIS itself was free. However, telephone costs were incurred all the way to Berne and the hardware had to be procured.\(^74\)

In the late 1980s, ambitious database projects were also launched in career counselling. In the canton of Zurich, the government approved a loan of two million francs in 1988 for the development of an information system, which was given

\(^{69}\) StALU/A1427/93, Agreement on the project ComNet-B, December 7, 1989.

\(^{70}\) StALU/A1427/1180, Leaflet ComNet-B [1990].


\(^{72}\) StALU/A1427/89, Correspondence EDK Commissioner for IT to Head of Commercial Vocational School Meiringen, October 9, 1989.


the acronym ZEUS.\textsuperscript{75} In parallel, the national government was already making extensive efforts to establish a national career guidance information system to be run under the acronym CH-OR, “CH-Ori
tentation”.\textsuperscript{76} In addition, a continuing education exchange (WAB) was to be established. Many of these database projects turned out to be much more complicated, costly, and personnel-intensive than initially planned.\textsuperscript{77} But online databases and telematics remained on the agenda of the educational experts.\textsuperscript{78}

All the elaborate projects to create local or national networks through which to communicate and provide information suddenly looked old when the World Wide Web (WWW) began to take hold in Switzerland and E-mail services became more affordable. At the same time, general internet use in Switzerland rose only very gradually at first. In 1997, just 17 percent of respondents said they had used Internet services at some time in the past few months. In some service sectors, on the other hand, there was already a veritable Internet boom in the mid-1990s.\textsuperscript{79}

However, the educational experts were unable to resist the general internet euphoria. The wider use of the World Wide Web (WWW) seemed to make many of the problems of previous software in education seem solvable at once. From now on, digital learning services that functioned independently of the operating system seemed possible. Software piracy became less likely when courses and learning tools were offered online. The integration of different media and the hypertext structure also seemed to fit perfectly with the contemporary requirements for educational software. Learning analytics now also seemed much more feasible on digital learning platforms as much larger amounts of data could be collected and analyzed centrally. The dawn of the Internet brought on a new era of envisioned “computer-based training”.\textsuperscript{80}

This platform-independent centralization was not only found as an educational vision in software development, but also as a political program. The Internet seemed to enable new modes of educational governance that were previously hardly imaginable in the highly decentralized country. These were much more ori-

\textsuperscript{75} “Projekt CH-OR,” Berufsbildung und Berufsbildung, no. 1 (1989): 44–47.
\textsuperscript{76} BAR/E3340B#2011/57#509*, Projekt CH-OR: EDV in der Berufsbildung. Schlussbericht: Voranalyse, Bd. 1–3.
\textsuperscript{77} StAZH/MM 3.203 RRB 1994/0338, II. Mitteilung an die Mitglieder des Kantonsrates und des Regierungsrates sowie an die Direktion des Erziehungswesens; StAZH/MM 3.203 RRB 1994/0339, Interpellation (EDV-Projekt “Zeus” der Allgemeinen Berufsbildung).
\textsuperscript{78} StALU/A1453#955, SFIB Annual Report 1996, 5.
ented to the idea of the “network” than to traditional concepts of a decentralized federalism or liberal corporatism. In 1995, the Educational Technology Unit (TECFA) and the University of Geneva joined forces with the Swiss Centre for Information Technology in Education (SFIB), the Swiss Coordination Centre for Educational Research (SKBF), the Geneva “Service de la recherche en education” (SRED), and the Central Office for the Continuing Education of Secondary School Teachers (WBZ) to install a server in Geneva. The aim of this pilot project was to create a national “virtual research community”. The project was financed by the Swiss National Science Foundation. For the Swiss Centre for Information Technology in Education (SFIB), AGORA provided the opportunity to learn from previous experiences with database projects and to feed its products and platforms into a new system. The central issue was to keep the information as up-to-date as possible. AGORA was seen as a way for schools to embrace the internet across Switzerland. The latest versions of the framework agreements with the software providers were also made available on the AGORA website.

In June 1997, SFIB launched a so-called “offensive” to bring “schools to the Internet”. On the one hand, the aim was to improve the supply of schools with Internet access. But then, above all, the educational use of the Internet was to be promoted. To this end, the SFIB took its cue from initiatives already underway in other countries. It organised so-called “Netd@ys”, as they had already gained the support of President Bill Clinton and his Vice President Al Gore in the USA in 1996 and were also imitated by the European Communities. This action program was all about public-private partnerships. The aim was to find companies that wanted to participate in the initiative. In Switzerland, the first “Netd@ys” were sponsored by Microsoft, Cisco Systems or Apple, but also by the national telecommunications company Swisscom and several Swiss traditional publishers of teaching materials.

The Internet, like the electronic computer before it, was seen by educational experts as a future technology with which pupils should be familiarized as early

82 StALU/A1453/955, Minutes of the SFIB Board Meeting of 20 September 1996.
as possible. At the same time, the different stakeholders worked towards exploiting the educational potential of the internet. The internet seemed to be a global encyclopaedia with an almost inexhaustible and constantly growing pool of knowledge that schools could finally make use of. In a report for Switzerland’s public TV channel from 1997, for example, all representatives of the political authorities and private associations confirmed the great importance of the internet. At the same time, SFIB was concerned that a problem that had already occurred with “ComNet” could repeat itself: if the information on the Internet was sparse or outdated, users would quickly turn away and the educational potential would not be unleashed.

The Urge to Centralize in an Emerging Digital Society

The results of all the various initiatives from the 1980s and 1990s were mixed. At the millennium, a representative survey for Switzerland concluded that at the lower secondary level, 93 percent of schools had Internet access. At the primary level, this was still 53 percent. At the same time, computers were available to students in nearly all lower secondary schools. At the primary level, this was still the case in 73 percent of schools. However, computer equipment in these schools was still modest. There was just one computer for every 12.8 students in compulsory education.

The digital journey was far from over. In 1998, the Swiss government launched a “Federal Council Strategy for an Information Society in Switzerland” in which it considered the information and communications technologies as a political priority. Among other things, the strategy paper resulted in different endeavours in the field of education, which, in addition to technical infrastructure of the schools and educational materials, were to include the further qualification of teachers.

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88 StALU/A1453/955, Minutes of the SFIB Board Meeting of September 20, 1996.
However, the situation had already changed. The age of digital platform economies was dawning, which would once again present digital societies with entirely new challenges. With the digital platform economy, the question of centralization and decentralized political structure in Switzerland presented itself in a completely new and different way. This had already been announced in connection with the national framework agreements with Microsoft and other companies in the mid-1990’s. The threat now seemed to originate in the enormous market power of individual global software providers, who could thus put their stamp on education and dictate their terms to educational administrations and public schools.

The challenges for a decentralized education system like Switzerland’s now came from the outside and no longer from overambitious national education reformers. In the reform initiatives since the late 1970s, the political stakeholders in Switzerland had always made it a point not to use the computer to un hinge the decentralized system. At the same time, widespread implementation of the computer in the classroom necessitated a degree of standardization. Computer education had to be based on shared school subject standards. Educational software asked for shared hardware standards, while digital networks required shared technical protocols. This urge to centralize was established from the early history of “digital federalism”. However, Switzerland’s educational stakeholders did everything in their power not to submit to technological determinism. They made use of their political leeway.

References

Archives

BAR = Federal Archives Berne
StALU = State Archives Lucerne
StAZH = State Archives Zurich
StadtAZH = Zurich City Archives

Literature


