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Computers in the Classrooms of an Authoritarian Country: The Case of Soviet Latvia (1980s–1991)

Abstract: Our study focuses on the time when the subject 'Informatics and basics of computing techniques' was introduced in Soviet secondary schools' curriculum during Gorbachev's *perestroika* in 1985. The sources of our research were reflections on computing and informatics studies in the Soviet press, as well as interviews with early informatics teachers and students. The story of the entering of the computer into the classroom of one Soviet republic – Latvia – reveals the introduction of major innovation in everyday school life: how the need for innovation is explained and justified in the authoritarian country, and how it is accepted by educational consumers and innovation subjects – students, teachers and society in general; what changes in the socialization process of schooling accompany innovation: how innovation processes accumulate unintentionally transmitted values, belief systems and relational norms, and how innovation can generate social agreements "not to see" what is in hidden in plain sight – a hidden curriculum, the inevitable companion to schooling.

Keywords: informatics; hidden curriculum; Soviet school; Soviet Latvia

Introduction

When the subject 'Informatics and basics of computing techniques' was introduced in Soviet secondary schools' curriculum during Gorbachev's *perestroika* in 1985, the number of people who could successfully predict that the computer would gain ground in everyday education was modest. However, in the Soviet Union, an authoritarian state, orders from above were not discussed. According to "internal hypernormalization of authoritative discourse"[1] – if informatics was provided in the school curriculum, then it had to be taught in schools.

The record of the first years of informatics is a story about how major innovations are introduced in everyday school life, how the need for these innovations is explained and justified, and how it is accepted by educational consumers and

1 Aleksei Yurchak, *Everything Was Forever, Until It Was No More: The Last Soviet Generation* (Princeton, NJ: Princeton University Press, 2005), 163.

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innovation subjects – students, teachers, and society in general. The story of the entering of the computer into the classroom also leads to a broader look at the introduction of innovation, namely what changes in the socialization process of schooling accompany innovation: how innovation processes accumulate unintentionally transmitted values, belief systems, and relational norms, and how innovation can generate social agreements "not to see"[2] what is hidden in plain sight – a hidden curriculum, the inevitable companion to schooling. Our research questions are as follows: how did the new technologies enter the classrooms of Soviet Latvia? What hidden curriculum accompanied digital change in Soviet schools?

In recent years, interest in the history of computing has grown in proportion to the popularity of computers in education, further accelerated by the COVID-19 pandemic. One can agree with Tedre, Simon and Malmi that history of a discipline is a revealing sign of a mature field.[3] Our study mainly utilized works that analyze the history of computing in the Soviet Union and the United States, the most powerful computer producing countries.[4] However, the experience of the Soviet Union in these works is considered by associating this super-power with only one republic, namely, Soviet Russia. The fact that the Soviet state consisted of 15 different republics, including the present-day Baltic states, is neglected. The aim of our research on the computerization of Latvian schools will enhance the understanding of the transition of the center's (Moscow) orders to the periphery of the country. The doctoral dissertation on the introduction of informatics in Latvian schools, defended by Viesturs Vēzis,[5] helped us immensely in the case study of Latvia. The dissertation is written in Latvian and therefore, unfortunately, is not available to a broader international community.

Researchers have followed the world of computing as it has evolved. Two papers from the existing scholarship are relevant to our study. The first is an article by Aleksandr Uvarov, first published in 1989 at the Institute of Sociology of the

2 Eric Margolis et al., "Peekaboo. Hiding and Outing the Curriculum," in *The Hidden Curriculum in Higher Education*, ed. Eric Margolis (New York and London: Routledge, 2001), 1, 6; Fulya Damla Kenti, "Comparison of Hidden Curriculum Theories," *European Journal of Educational Studies* 1, no. 2 (2009): 83–88.

3 Matti Tedre, Simon and Lauri Malmi, "Changing Aims of Computing Education: A Historical Survey," *Computer Science Education* 28, no. 2 (2018): 159, https://doi.org/10.1080/08993408.2018.1486624.

4 Alexander Nitusov, "Computer Development in the Socialist Countries: Members of the Council for Mutual Economic Assistance (CMEA)," in *Perspectives of Russian and Soviet Computing*, ed. John Impaglizzo and Eduard Proydakov (Heidelberg, Dordrecht, London and New York: Springer, 2006): 209.

5 Viesturs Vēzis, "Informātika skolā [Informatics at school]" (PhD diss., University of Latvia, 2005).

USSR Academy of Sciences.[6] Uvarov provides a comprehensive analysis of the computer literacy campaign in the Soviet Union. The author explains in detail the social aspects of computing education in the context of *perestroika*, the implementation strategy, and does not shy away from revealing the problems that should be addressed at a national level. Uvarov's article, knowing the still authoritarian USSR of that time with the presence of censorship, is not the opinion of a single author, but rather represents the official computing literacy programme of the whole Soviet educational elite. We used the digitized version of this work.

Alongside Uvarov's article, in the same year of 1989, the study by the American David A. Wellman on the situation in the field of computer technology in the USSR was published.[7] Both Uvarov's and Wellman's studies, although on different sides of the Iron Curtain, are strikingly similar. Wellman, focusing on highlighting the USSR's technological backwardness, identifies similar problems as Uvarov. Thus, the synthesis of Uvarov's and Wellman's articles revealed the entry of computers into Soviet classrooms from the perspective of the country's highest levels of power.

To reveal how the guidelines of the "center" were adapted in the local context, we compiled and analyzed 179 articles in Latvian periodicals. As the press of the respective period has been digitized, the selection of articles was made by relevant keywords search.

The introduction of computers into school practice was explored by using five video interviews and one telephone interview with informatics teachers who started teaching informatics in secondary schools at the very beginning, in the mid-1980s. Teachers' views are complemented by six video interviews with the first informatics students. The respondents represent all regions of Latvia. Five of the teacher respondents are male and one is female, which corresponds to the gender ratio among the first IT teachers. Open-ended questions were used in the interviews. Each interview lasted approximately 40 to 60 minutes, was conducted by one of the authors of the study, and all interview recordings were listened to by both authors. Content of the interviews was processed to determine the frequency of words most often used to describe new technologies. References to the interviews were encrypted in order to respect the ethical standards of the study and to maintain the anonymity of the respondents.

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6 Aleksandr Uvarov, "Perestroika obrazovanija i informatizacija obscestva [Restructuring education and the informatisation of society]," in *Prognoznoje socialnoje projektirovanije: Metodologiceskije i metodiceskije problemi* [Predictive social design: Problems of methodology] (Moskva: Nauka, 1989).

7 David A. Wellman, *A Chip in the Curtain. Computer technology in the Soviet Union* (Washington: National Defense University Press, 1989).

Historical Context: Computer as an Indicator of State Power and Social Progress

The real goals of the introduction of the subject of informatics, the hidden curriculum designed by the state, can only be understood by knowing the future, that is, from today's perspective, where the policies and ideology of the Soviet Union are evaluated.

In the Soviet Union, all new technologies were developed primarily with the country's military potential in mind.[8] Soviet computing grew as part of military power, alongside nuclear bomb, radar, antiballistic defense systems, and space programs.[9] However, the topic of militarisation was top-secret and excluded from the public discourse. The development of military potential did not match the Soviet Union's image as a peaceful state. Therefore, other arguments had to be found to legitimize the teaching of computers and influence society's need for it.

In the context of Gorbachev's *perestroika*, a demand was made to present the Soviet Union as a modern and innovative country, which should not be information dependent on "developed countries" and lag behind in the latest technologies. Concerns about the backwardness of the Soviet Union in the 1980s were justified because of the slow commutation of the "civilian" sector.[10]

Central to the push for computing was, of course, education, whose task was to produce young, educated minds that would further develop the country's technological potential in the never-ending competition with the "Western capitalists".[11] Informatics in school was the agenda for the making of exemplary citizens for the socialist "information society" in the 1980s.[12] Hence, the entry of computers into Soviet classrooms was associated not only with educational, but also with ideological goals.

In the public domain, the computer was presented as a working tool for creating, processing and using information, on par with food products, industrial goods, and energy.[13] The Communist elite was well aware that centralized and well-supervised state computing was a struggle for media and information con-

8 Georg Trogeman, Alexander Nitussov and Wolfgang Ernt, *Computing in Russia. The History of Computer Devices and Information Technology revealed* (Wiesbaden: Vieweg+Teubner, 2001), 6.

9 Wellman, *A Chip in the Curtain*, 6; Ksenia Tatarchenko, "The Computer Does Not Believe in Tears," *Kritka: Explorations in Russian and Eurasian History* 18, no. 4 (2017): 736.

10 Uvarov, "Perestroika obrazovanija," 14; Wellman, *A Chip in the Curtain*, 6.

11 See Wellman, *A Chip in the Curtain.*

12 Tatarchenko, "The Computer."

13 Uvarov, "Perestroika obrazovanija," 3–4.

trol.[14] The outcome of this struggle in an authoritarian state from today's perspective can only be the subject of conjecture and speculation.

To mobilise the public, the state-controlled mass media produced the vision that new technologies would straight away enter every home and workplace, and it would be difficult to work in the future without computer skills.[15] Therefore, the new generation must start preparing for working with computers at school.[16] The newspapers predicted that "It will not be long before ECM[17] enters our apartments, becomes our mentor, helps us navigate through difficult situations in life, and does some of the homework for pupils. It will become the most rigorous and knowledgeable teacher".[18] Hence, the challenge was the one ever cherished by decision-makers in education, i. e. to prepare for the future. In hindsight, they did succeed this time – the computer really became "an ordinary element of the environment for most members of society",[19] only it was no longer a Soviet society.

In speeches by Communist Party leaders, in documents of the Party and Communist youth organisations, and thus also in the press publications serving Soviet ideology, the course towards the general elimination of so-called computer illiteracy was proclaimed.[20] The acquisition of computing was compared to the elimination of illiteracy after the Russian Revolution of 1917[21] and Lenin's Russia's electrification programme in 1922.[22] Consequently, the "nations computer literacy campaign"[23] began.

14 Wellman, *A Chip in the Curtain*, 13.

15 Arnis Blodons, "Arodu apgūst ar kompjūteru [The craft is learned with a computer]," *Padomju Jaunatne* [Soviet Youth], November 10, 1987.

16 Baldurs Apinis, "Bez noslēpumainības plīvura [Without the veil of mystery]," *Padomju Jaunatne* [Soviet Youth], September 27, 1985.

17 Electronic Counting Machine (ECM).

18 U. Koškins, "Iepazīsimies! Mani sauc ESM [Let's get acquainted! My name is ECM]," *Pionieris* [Red Pioneer], March 21, 1986.

19 Uvarov, "Perestroika obrazovanija," 6.

20 Apinis, "Bez noslēpumainības plīvura [Without the veil of mystery]."

21 Wellman, *A Chip in the Curtain*, 125; Tatarchenko, "The Computer," 736; Apinis, "Bez noslēpumainības plīvura [Without the veil of mystery]."

22 Uvarov, "Perestroika obrazovanija," 3.

23 Wellman, *A Chip in the Curtain*, 131.

Computers as a Material Challenge

In Soviet Latvia, the use of digital technologies entered teaching-learning process already in the 1960s, when the subject 'Computational Mathematics and Programming' appeared in specialized mathematics school's curriculum. The terms 'audiovisual' (*audiovizualnyi*) and 'screen-sound' (*ekranno-zvukovoi*) frequently appears in schooling and research of Soviet Union field.[24] However, computer technologies were not present at the school but more often students would go on excursions to the local computing centre to see how the ECM works.[25]

When informatics became a compulsory subject in the curriculum of comprehensive secondary schools, an avalanche of problems hit educators at all levels, affecting teachers especially. In 1985, the situation in the schools of the Soviet Union, and thus in Latvia, was as follows: informatics was introduced in the school curricula, but there were no computers in schools, teachers were poorly trained to teach informatics, and there was a lack of teaching aids.[26] Everything had to be started from scratch, "there was nothing", the only resource was the teacher's mind.[27]

The subject of informatics in schools started as theory classes, as work on paper and blackboard, as a "machineless" version.[28] This paradoxical situation, i. e., computer training without computers, was portrayed by the Soviet mass media as perfectly normal, they claimed that the informatics curriculum contained a great many basic ideas which everyone should know, and that everyone should learn to program.[29]

As there were no computers in the schools, the teachers taught the theory about the structure and functions of computers, algorithms, computing techniques, and drew schemes on blackboards. Teachers gave tasks to their students, the students solved it independently or in pairs and then compared the results with the whole class.[30] "It was interesting to do it, but we did not see the meaning in it".

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24 Stephen Kerr, "Innovation on Command: Instructional Development and Educational Technology in the Soviet Union," *Educational Communication and Technology* 30, no. 2 (1982): 97–116.

25 Vēzis, "Informātika skolā"'; Interview with teacher, February 9, 2021.

26 Wellman, *A Chip in the Curtain*, 131.

27 Interview with teacher, February 24, 2021; Interview with teacher, February 9, 2021.

28 Apinis, "Bez noslēpumainības plīvura [Without the veil of mystery]"; Interview with teacher, February 12, 2021.

29 Wellman, *A Chip in the Curtain*, 130; Apinis, "Bez noslēpumainības plīvura [Without the veil of mystery]."

30 Interview with teacher, February 24, 2021; Interview with teacher, February 8, 2021; Interview with student, February 9, 2021; Interview with student, February 24, 2021.

Informatics was not perceived seriously more like the subject of entertainment where everyone received excellent grades. Accordingly, the result was: "I did not learn anything".[31]

Practical reality began to settle in when the first calculators appeared in schools, which at the time were perceived as "key devices"[32] and "top-flight".[33] As Gorbachev's *perestroika* with partial freedom of expression had begun, teachers could lament the lack of programmers' calculators in public, namely in the press: "[...] incomprehensibly little attention is paid to the very real boxes, which, although much smaller and more modest than the non-existent personal computers, perform in principle analogous functions. I mean programmable pocket micro-calculators. [...] Why do we forget [most readers do not even get to know] that these really accessible devices allow a practical introduction to programming [...]".[34]

The calculators could be used for real operations in informatics lessons,[35] but these calculators had to be provided to students, and this was a problem for teachers. One of our respondents said that she had seen calculators at the University of Latvia: "I did my homework. I went to the Ministry of Education, and they gave us programmable calculators for the school", which could be used for programming games or teaching algorithms.[36] "We had six or eight Japanese-made calculators in the school, at least two of which were regularly broken".[37]

Industrial companies helped schools with calculators by "making arrangements". One of the IT teachers had seen a picture of a large, working calculator on the wall, on which operations could be demonstrated. He approached the school patrons, a rich industrial company, with a request to get a wall-mounted calculator for their informatics classroom, which the company made specifically for the school (see *Fig. 1*).[38]

The calculators were the first complex technological device that the students could use themselves. Teachers had to accept pupils' independence, learn to entrust them with complex technological tools.[39] Calculators have pushed the boun-

31 Interview with student, January 22, 2021; Interview with student, February 10, 2021; Interview with student, February 26, 2021.

32 Tatarchenko, "The Computer," 737.

33 Interview with student, January 26, 2021.

34 Baldurs Apinis, "Par dažādām idejām [About different ideas]," *Padomju Jaunatne* [Soviet Youth], December 18, 1985.

35 Interview with teacher, February 12, 2021; Interview with teacher, February 10, 2021.

36 Interview with teacher, February 9, 2021.

37 Interview with teacher, February 12, 2021.

38 Interview with teacher, February 9, 2021.

39 Uvarov, "Perestroika obrazovanija," 13; Interview with student, January 22, 2021; Interview with student, February 9, 2021.

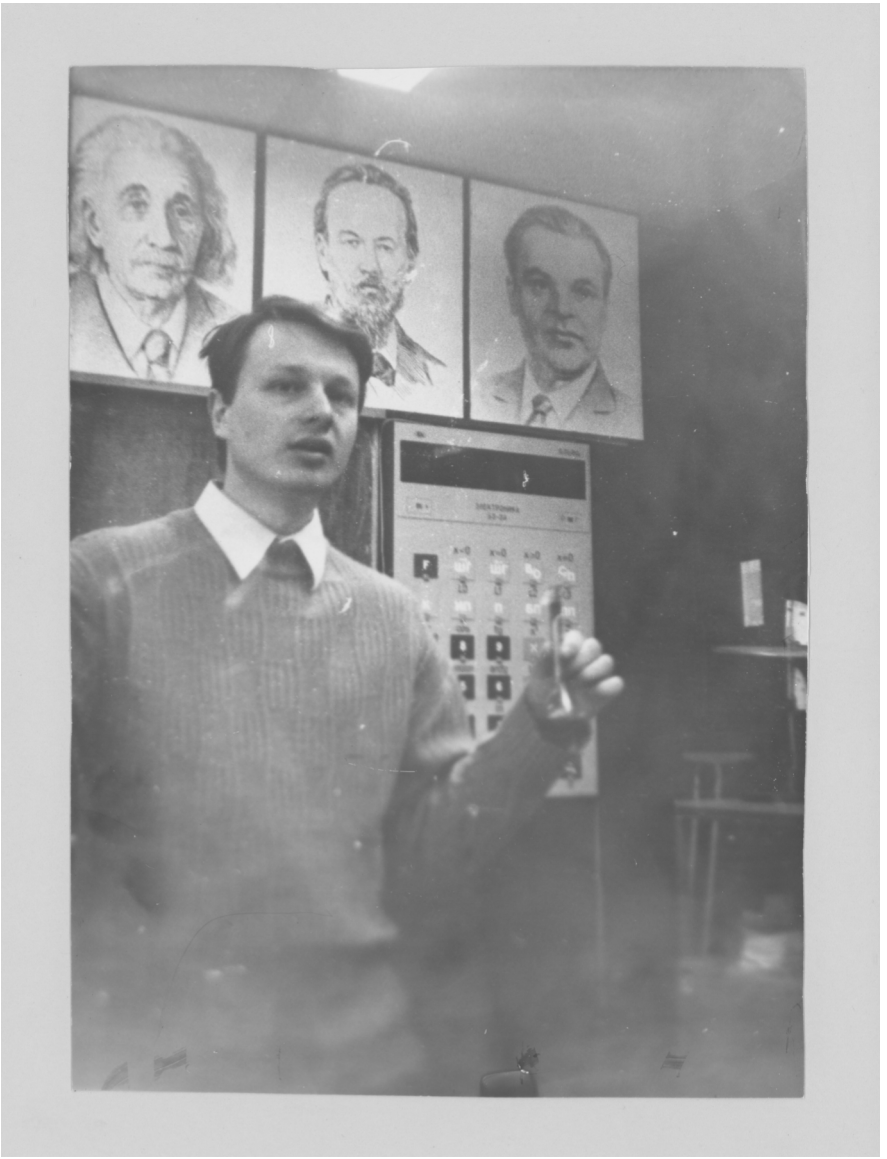

Fig. 1: Calculator on the wall. Teacher Valdis Lūsis at a secondary school in Riga, 1980s. Personal archives.

daries in the treatment of pupils and technology that had hitherto been rigidly marked out. For example, our respondent recalled her experience with "old" technologies: "God forbid you touch the player!"[40] Calculators as part of "hands-on curriculum"[41] initiated the use of individual technical tools in the daily classroom routine.

Teachers reiterated the experience they had gained during their university studies. At least once during the school year students were taken on a field trip to institutions where, to quote a phrase, "on the basis of friendship",[42] they could learn the workings of the ECM. "On the basis of friendship" means that such excursions were not part of the curriculum but were arranged through teacher acquaintances who worked at the Computing Centers. The organization of such excursions also had to take into account factors of security because, as is mentioned earlier, all technology in the Soviet Union was related to national defense and security, and thus the Computing Centers were also heavily guarded and could only be entered after passing through a security check. In the Computing Centers, the students were introduced to ECMs and punch cards. From these excursions, the respondents have remembered especially the huge computing cabinets and the loud noise.[43]

The "era" of informatics in schools as a purely theoretical subject and based on calculators did not last long. On 1 January 1986, the first computer class was established in Lielvārde, a village about 50 kilometers from the capital city Riga.[44] This was an incentive for other enthusiastic teachers to try, because it was "psychologically difficult – I know it is there, but I don't go near [the computer]".[45]

Since the allocation of resources in the Soviet Union was carried out under a centralized control/planning system, funding was provided through special state programmes.[46] Computer classrooms in Latvian schools could only be set up through centralized distribution under the supervision of the Ministry of Education of the Republic. Thus, the distribution of material resources among schools was bureaucratic and the centralized system unwieldy. The backwardness in the

40 Interview with student, February 10, 2021.

41 See Heshium Lawrence and Mark Miller, "A Historical Perspective of the Evolution of Technology Education," *International Journal on Integrating Technology in Education* 3, no. 2 (2014): 1–7, https://doi.org/10.5121/ijite.2014.3201.

42 Interview with teacher, February 9, 2021.

43 Interview with student, January 22, 2021; Interview with student, February 9, 2021; Interview with student, February 10, 2021.

44 Interview with teacher, February 8, 2021.

45 Interview with teacher, February 12, 2021.

46 Uvarov, "Perestroika obrazovanija," 8, 11.

material provision of informatics was acknowledged even by official Soviet sources and it did not remain hidden abroad either.[47] It was impossible to buy computers as an individual for personal use, as the price was too high in the modest conditions of Soviet life.[48] It should also be noted that computer production in the USSR was associated with "exaggerated secrecy" as part of the military industry.[49] By 1989, 200 computer classes had been established in 58 % of secondary schools in Latvia.[50] By comparison, as early as 1984 in the USA 85.1 % of all elementary and secondary public schools had microcomputers for student instruction.[51] Therefore, the computerization of Soviet schools lagged far behind the largest competitor of the Soviet Union, the United States.

The first computer classrooms were given to schools specialising in science subjects and staffed by "enthusiastic teachers".[52] Although the material equipment of schools was under the supervision and control of the state, the human factor, which was very important in Soviet society, played a role here, namely the ability to "find," "arrange" and "knock out" what was needed for the school. "In order to implement your ideas, you had to understand where to get [the funds]."[53] Initiative on the part of the school and the teachers was important.[54] One of our respondents recalled that several computers had been received by a school in a nearby city and that he "hankered after one for a long time until I was given one "beka" [BK computer[55]]". It was the only computer in the whole school, but at least it could serve to demonstrate the topics teachers discussed in informatics lessons in practice.[56] Another respondent praised the school principal who did not take the outdated computers ("bekas") offered to the school, but waited two whole years for a newer model to arrive, thus making his school's computer room the best in Latvia.[57] Of course, this also brought fame to the school management and this was not secondary in the "battle" for innovation. Whichever pathways led to computers; the winners were not judged.

47 Uvarov, "Perestroika obrazovanija," 9; Wellman, *A Chip in the Curtain*, 15; Uvarov, "Perestroika obrazovanija."
48 Wellman, *A Chip in the Curtain*, 10.
49 Nitusov, "Computer Development," 209.
50 Vēzis, "Informātika skolā."
51 Wellman, *A Chip in the Curtain*, 122.
52 Interview with teacher, February 8, 2021.
53 Interview with teacher, February 8, 2021.
54 Interview with teacher, February 12, 2021.
55 Elektronika BK-0010 – the first Soviet personal computer, mass-produced since 1984.
56 Interview with teacher, February 12, 2021.
57 Interview with teacher, February 24, 2021.

When the first lucky ones were given computers through the Ministry of Education, they had to be delivered to school. A typical case was told to us by one of the respondents: an informatics teacher came to the First Deputy Minister of Latvia's Ministry of Education to explain the need for computers in school and to receive her signature for a business trip to a computer factory. The teacher personally drove several hundred kilometres to a factory near Moscow to pick up the computers for his school in Latvia.[58]

When computers arrived in schools, it was also up to the teachers to install them because in the Soviet Union it was customary that the practical work was done by whoever was interested – so if a teacher needed a computer room, he would run the wires and clad the walls, sometimes with the help of pupils.[59] In the first computer rooms, the wires were hung on clotheslines and stretched overhead in the classroom. Only later were the wires built into the floor.[60] Under the poor Soviet conditions, it was taken for granted that all males knew how to "build and assemble and make something",[61] as this skill was a basic need in every household. During this time, the Soviet Union lacked the most basic materials needed to set up a computer room. Materials could not be bought in a shop but had to be procured privately through an influential contact.

Teachers' work in setting up computer rooms, for which they received no extra remuneration, was taken for granted.[62] It is true that teachers were rewarded in Soviet style: they received moral support, were recognised as successful in their profession and were praised in the press. In 1987, a typical teacher's story was published: "We worked all summer (it's good that a teacher has such a long vacation). First, we had to prepare the classroom – interior design, rewiring, furniture, then we had to arrange all 12 workstations rationally and finally we had to connect the computers to one control system. Each workstation needs six cables, a local cable for the tape recorder, a cable for the central computer [allowing for the possibility that the whole machine will run on DC power], some of these cables had to be hidden under the plaster, etc. The only support and advisor was V. Remicāns, a foreman from the production association *Impulss*, who had come to install the equipment. I can quietly say that I got the materials – cables, etc. – with the

58 Interview with teacher, February 8, 2021.
59 Interview with teacher, February 24, 2021; Interview with teacher, February 9, 2021.
60 Interview with teacher, February 12, 2021.
61 Interview with teacher, February 9, 2021.
62 Wellman, *A Chip in the Curtain*, 132.

help of my old schoolmates, otherwise I would not have made it".[63] Our respondents had similar stories.

Computer classrooms were usually set up in the summer, during the pupils' and teachers' holidays, and Soviet propaganda material was also displayed on the walls, such as Gorbachev's quote about the importance of learning new technologies.[64] On the teacher's desk was the "main computer", a huge box. The number of computers provided for the pupils was not large – about 12 to 16. The pupils then worked on them either in two groups or in pairs on one computer.[65] All were satisfied – 12 to 16 computers in the school were considered a sufficient number, other schools were not as fortunate.[66] Wellman describes visiting a Moscow school, "a showpiece for visiting reporters", where there were 16 computers for 900 pupils in grades 1 to 10 "to support the computer literacy instruction".[67]

Understandably, computers were an expensive asset, hence security was necessary. The school had bars on the windows of the computer room, the classroom had iron doors and "it felt like a bunker".[68] The computer was a treasure, with material as well as symbolic value,[69] so it had taken the place of a powerful actor in the field of education.

Computer as an Intellectual and Psychological Challenge

"From the earliest days, computing was linked in the public mind to the brain and intelligence".[70] To introduce informatics, it was necessary to find "intelligent" teachers who could quickly acquire the necessary technical and specific pedagog-

63 L. Liepa, "Jau dara. Domā. Sapņo [Already doing. Thinking. Dreaming]," *Padomju Jaunatne* [Soviet Youth], January 16, 1987.

64 Interview with teacher, February 10, 2021.

65 Interview with student, January 26, 2021; Interview with teacher, February 10, 2021; Interview with teacher, February 12, 2021; Interview with student, February 10, 2021.

66 Interview with teacher, February 12, 2021.

67 Wellman, *A Chip in the Curtain*, 128.

68 Interview with student, January 26, 2021.

69 Matti Tedre and Peter J. Denning, "Shifting Identities in Computing: From a Useful Tool to a New Method and Theory of Science," in *Informatics in the Future*, ed. Hannes Werthner and Frank van Harmelen (Cham: Springer, 2017), 14, https://doi.org/10.1007/978-3-319-55735-9_1.

70 Tedre and Denning, "Shifting Identities," 14.

ical skills at the same time. "All technical teaching tools will be only as effective as the teachers who are trained to use them," wrote Uvarov.[71]

The choice for teaching informatics fell on mathematics teachers, whose professional thinking was considered suitable for understanding programming and algorithms.[72] In addition, physics and mathematics students at Latvian universities had to pass an exam in pedagogy to qualify as teachers. However, for math teachers, the workload in schools was already maxed out. Therefore, human resources were found among pedagogues around the age of retirement, which in the Soviet Union was 55 for women and 60 for men. As the pension was calculated according to the salary of last years of work, seniors were happy to earn, thus increasing their pension. The reliance on the intellectual potential of pensioners to master computing seems paradoxical, given the official set-up of the computer as an accelerator of generational change in the labour market.[73]

The recruited informatics teachers quickly split into two categories: the first was technology experts who had taken up the role of teacher by accident, as teachers were also recruited from universities and Computing Centers. They were not pedagogues and thus did not fully understand how to organize teaching and learning.[74] However, the other category comprised of teachers-enthusiasts who started the job because "they were interested in this subject",[75] they "just liked racking their brains".[76]

For many of the teachers, informatics became a lifelong passion, and they are still working in this field. One of our respondents described the first informatics teachers as follows: "The most enthusiastic were those who no longer had a problem with their subject, with their pupils, and so the school had become boring. And now they had discovered something new".[77] Something extraordinary had entered the Soviet school routine, something that made teachers approach teaching with renewed interest, accepting new challenges. Burbules notes that "New is exciting. New is cool. New is unprecedented".[78] Informatics teachers became charismatic role models, as Wellman claims, they could be described as inspirational, above

71 Uvarov, "Perestroika obrazovanija," 12.
72 See Tedre, Simon and Malmi, "Changing Aims"; Tedre and Denning, "Shifting Identities."
73 See Uvarov, "Perestroika obrazovanija," 4.
74 Interview with student, February 10, 2021.
75 Interview with teacher, February 9, 2021.
76 Interview with teacher, February 24, 2021.
77 Interview with teacher, February 10, 2021.
78 Nicholas C. Burbules, "Technology, Education, and the Fetishization of the 'New'," in *Educational Research: Discourses of Change and Changes of Discourse*, ed. Paul Smeyers and Marc Depaepe (Cham: Springer International Publishing, 2016): 9.

average intelligence, adaptive to rapid change, and unique.[79] The most enthusiastic of informatics teachers were ready to accept all challenges and to learn together with their students,[80] which was also acknowledged by our respondents: "change forces learning".[81] Moreover, in the field of new technologies, every experience quickly becomes obsolete,[82] which is why advancing education became a daily routine for informatics teachers.

While studying mathematics at university, the future informatics teachers had at least heard of new technologies, even learned programming without computers and worked with programmable calculators.[83] During their studies, they were familiar with programming machines at the Institute of Physics or computing machines at the Computing Centre of the Riga Polytechnic Institute.[84] Some had even seen real computers and touched them![85] This experience gained during the years of study was then reproduced at school when they began teaching informatics.

Before the introduction of special training for informatics teachers at universities (which was slow, as the curricula had to be changed), the responsibility for training in the new subject was given to the Teacher Training Institute, whose work was supervised by the Ministry of Education. Short-term courses were organised, but their effectiveness was low.[86] The same teachers who had taught informatics for only a few years became course instructors. For example, one of our respondents started working as a teacher of informatics in 1985, but by the autumn of 1989 he was teaching informatics to his colleagues at the Teacher Training Institute.[87] Three years of work in a new field was already considered a respectable experience to share with others.

An important part of teachers' training was the exchange of experience, networking, or "human contacts".[88] When some schools had computer labs, teachers from other schools went there to learn best practices. Teachers could even be so enthusiastic that they took public transport to another school after working

79 Wellman, *A Chip in the Curtain*, 120.
80 Wellman, *A Chip in the Curtain*, 131.
81 Interview with teacher, February 9, 2021.
82 Tedre, Simon and Malmi, "Changing Aims," 161.
83 Interview with teacher, February 8, 2021; Interview with teacher, February 9, 2021; Interview with teacher, February 10, 2021.
84 Interview with teacher, February 8, 2021; Interview with teacher, February 9, 2021.
85 Interview with teacher, February 10, 2021; Interview with teacher, February 12, 2021.
86 Interview with teacher, February 24, 2021.
87 Interview with teacher, February 10, 2021.
88 Uvarov, "Perestroika obrazovanija," 7.

hours so that they could work on the computer and then, to quote, "I was running breathlessly so as not to miss the last bus home".[89]

Teacher training offered necessary networking opportunities in a situation where one of the personal problems faced by IT teachers was professional loneliness. Colleagues in the school did not understand what new technology enthusiasts really did. Although the official position was that the computer should become part of the whole pedagogical process,[90] in practice nobody thought that computers could be useful in subjects other than informatics. And even if the idea arose that perhaps computers could be used, for example, in Biology lessons, colleagues had no interest in them at that time.[91]

Therefore, it was very important for the "newborn" informatics teachers to meet other enthusiasts and like-minded people and to understand that, to quote, "you are not the only idiot in the world".[92] Groups of thought-mates were formed, informally exchanging professional news with each other,[93] because during the Soviet period bottom-up professional organizations were not allowed under the strict supervision of the state security police.

While the national propaganda campaign was in full sail, standing face to face with their pupils in the classroom, informatics teachers were put in an awkward position. Our respondents, remembering the feelings of that time, admit that "no one knew why the subject informatics was introduced".[94] They admit that computers and algorithmic thinking "just came in, it could not be avoided".[95] Yet, the practical relevance of informatics was not understood by the teachers themselves: "At that moment I thought for a very long time myself, even for several years, why it was necessary." One of the hopes was that there would be no more paper, everything would be done electronically.[96]

However, doubting the need of teaching informatics in schools did not matter: the Soviet Union was an authoritarian country. Informatics had to be learned and that was the end of discussion.[97] Today, the teachers' view of this inevitability and coercion at the time is quite positive: it was good and necessary because it made

89 Interview with teacher, February 12, 2021.
90 Uvarov, "Perestroika obrazovanija."
91 Interview with teacher, February 12, 2021.
92 Interview with teacher, February 12, 2021.
93 Interview with teacher, February 8, 2021; Interview with teacher, February 10, 2021.
94 Interview with teacher, February 24, 2021.
95 Interview with teacher, February 10, 2021; Interview with teacher, February 12, 2021.
96 Interview with teacher, February 24, 2021.
97 Interview with teacher, February 10, 2021.

the field of computing develop rapidly. "Maybe the commanding form was not good, but nothing would have come without it".[98]

However, pupils in the classroom needed motivation to learn the subject, the applicability of which in practice was quite unclear to the teachers themselves. At the beginning of the new subject, the teachers had to explain, at least for appearances' sake, why one should study informatics. One of most common reasons brought forward was "brain training" through algorithmic thinking, which was recognised as a central skill in computing.[99] "If you liked mathematics, you could bend your brain"[100] and moreover, "algorithms help to organize thinking and learn a new way of thinking".[101] The emphasis was on theoretical programming skills. Among educators, civil servants and many specialists, there was a belief that computing would develop as programming, which every Soviet citizen would learn in school.[102] This was a prediction that did not come true.

In the "machine-free" period, all the arguments did not sound convincing to pupils, as evidenced by the answers in the interviews: "Everything was abstract [...] it could not be applied in life".[103] "It all seemed like some kind of cosmos – what, why...".[104] The situation changed, and the impetus to learn came when real technology – calculators and computers – entered the classroom and became a new, interesting toy, and technical marvel: "What mattered was that one could play".[105] For example, you could make pictures out of letters, which was very popular: "We made the Mona Lisa".[106] You could also play "war".[107] The pupils invented competitions for themselves, for example, a keyboard race to see who could type the fastest.[108] Games became a motivation to learn, and the opportunity to play became a reward because no one was interested in calculations.[109] The computer classes were also a chance to try out technical innovations. For example, attaching a tape recorder to the teacher's computer and sending messages. To ensure

98 Interview with teacher, February 9, 2021; Interview with teacher, February 12, 2021.
99 Tedre, Simon and Malmi, "Changing Aims," 165.
100 Interview with teacher, February 24, 2021.
101 Interview with teacher, February 10, 2021.
102 Tatarchenko, "The Computer."
103 Interview with student, January 22, 2021.
104 Interview with student, February 10, 2021.
105 Interview with teacher, February 24, 2021.
106 Interview with teacher, February 9, 2021.
107 Interview with student, February 9, 2021.
108 Interview with teacher, February 24, 2021.
109 Interview with teacher, February 9, 2021; Interview with teacher, February 12, 2021.

that the messages went both ways, the teacher, together with a male student and her father, a computer specialist, fitted special switches to the tape recorder.[110]

In the interviews, teachers mostly mentioned students who were particularly interested in informatics. It was exactly with this advanced group that the teachers enjoyed working. They searched for literature and worked with computers after the lessons, as well as assisted the teacher during classes.[111] Teachers still recall their first pupils, enthusiastic learners of informatics, vividly, emphasising their fascination: "Those who were interested in it were terribly interested in it. They were ready to queue up outside the classroom and wait for the lessons to finish to get to the computers".[112] The opportunity to work on the computer became a reward for pupils.

However, students who were fascinated by the new technologies were as lonely as their enthusiastic teachers. Neither their peers nor their parents really understood what they were doing. They raised quite a few eyebrows: "We were like dinosaurs".[113] However, there were those who appreciated them. The introduction of informatics into the school marked a frontier: Some of the pupils proved to be able and willing to learn a whole new area of knowledge and skills, thus becoming intellectual leaders in the eyes of the teachers. As one teacher admitted: "Algorithms are a way of thinking. There are those who can master it and those who cannot. It's like music. If you don't get it, you don't get it. It cannot be drilled".[114] Needless to say, in the eyes of teachers, of course, a pupil with algorithmic thinking skills is more capable than one who does not have it. It is true that learning new technologies required not only talent but also patience and perseverance, it was "difficult" and, to quote an interviewee, one always tends to find an excuse why one does not need it.[115]

Those who were successful with computers became the elite of the school – they were recognised as intelligent, hard-working, and persistent, the true "dream pupils".

110 Interview with teacher, February 9, 2021.
111 Interview with student, January 26, 2021.
112 Interview with teacher, February 9, 2021.
113 Interview with student, February 9, 2021; Interview with student, February 10, 2021.
114 Interview with teacher, February 12, 2021.
115 Interview with teacher, February 9, 2021.

Computer and Social Order

The Computer Literacy campaign brought with it changes in the hitherto fundamental and entrenched Soviet order of life, as well as highlight social challenges.

The first novelty was the breath of freedom and the hope for a better everyday reality. In the official ideological setting, the computer was presented as part of the revolutionary processes of the *perestroika* era, as an instrument for democracy and the reorganisation of the pedagogical process.[116] Modernising education was seen as an opportunity to solve social problems, as social problems have always been educationalized.[117] Soviet press stated: "Educational backwardness is ultimately reflected in low productivity, slow pace of scientific and technical progress and also in social problems such as alcoholism, lack of humanity in society and crime".[118]

In Soviet Latvian school practice, the officially proclaimed revolutionary processes of *perestroika* were understood more radically than the Communist elite thought – the longing for independence of their country had not been eradicated in Latvian collective memory during the 50 years of Soviet occupation. Computers became a tangible sign of change, harbingers of freedom: "Independence was already in the air".[119]

New technologies were also the cause of the opening of the Iron Curtain, "the sacred Soviet border" suddenly became crossable.[120] There were calls from the Communist elite, aware of the Soviet Union's backwardness in the field of new technologies, to provide informatics teachers with Western journals in the field and even to involve foreign pedagogues in training.[121] One of our respondents, an informatics teacher in a Latvian village school, participated in a unique event, namely a visit to London initiated by the Soviet leader Mikhail Gorbachev and UK Prime Minister Margaret Thatcher in the autumn of 1987. "We received a lot of material, and I gave it to the Ministry of Education. These were then used as

116 Uvarov, "Perestroika obrazovanija," 5.

117 See David F. Labaree, "School Syndrome: Understanding the USA's Magical Belief That Schooling Can Somehow Improve Society, Promote Access, and Preserve Advantage," *Journal of Curriculum Studies* 44, no. 2 (2012): 143–163.

118 "Kopīgi domāt, kopīgi rīkoties [Thinking together, acting together]," *Padomju Jaunatne* [Soviet Youth], June 10, 1988.

119 Interview with teacher, February 8, 2021.

120 Yurchak, *Everything Was Forever*, 205.

121 Uvarov, "Perestroika obrazovanija," 10, 13.

the basis for teaching standards. In the UK, it [computing technology] was already a reality".[122]

Informatics teachers also perceived freedom in their workplaces. Of course, freedom within the limits of the Soviet education system. In the uncertain and chaotic beginnings of informatics teaching, teachers today also see the positive: they were the first and therefore enjoyed their uniqueness. "The teacher could teach more of what they wanted, what they believed and what they needed [...]".[123] Teachers' freedom of action was officially accepted: educational institutions themselves were allowed to choose the forms and pace of teaching computer literacy, but at the same time, the educational institutions themselves "assume full responsibility for the validity of the decisions taken".[124] This message of Uvarov reveals the convenient position of the state to shirk the responsibility for the tactics of computer literacy implementation, while reserving the right to punish innovators for their mistakes.

Alongside the celebration of new technologies, their side effects were also revealed, namely that the computer contributed to the traditional companions of education to which Margolis refers – differentiation, selection, and stratification.[125]

Officially, all comprehensive secondary schools in the Soviet Union were supposed to be equal. In practice, however, the distribution of material resources and thus the introduction of new technologies was uneven, depending on "local context".[126] The beginning of computing, like any Soviet innovation, is to be found in the metropolis republic of the Soviet Union, in Russia. However, the Baltic States were also in a leading position and Latvia, in turn, was the leader among them. This is evidenced by the first computer classrooms set up as early as 1986 and the invitation of Latvian teachers to share their experience at All-Union conferences.[127] Within Latvia, the situation regarding school initiatives varied between regions. This was highlighted by the first computer competitions.

Once informatics became a bit more established in schools, subject Olympiads were organized. In 1989, it was held for the second time: "On the first day, participants wrote algorithms and did calculations; on the second day, they worked with calculators. For two days, pupils put into practice their knowledge of a subject that has only recently appeared in the timetable in some schools. Perhaps that is why the high level of training of the Riga schools was felt. [...] Not all the participants

122 Interview with teacher, February 8, 2021.
123 Interview with teacher, February 24, 2021.
124 Uvarov, "Perestroika obrazovanija," 9.
125 Margolis et al., "Peekaboo," 18.
126 Uvarov, "Perestroika obrazovanija," 11.
127 Interview with teacher, February 8, 2021.

were provided with Yamaha computers, so their users were in a more privileged position than the others. Thus, not all participants were treated equally".[128] The Olympiads highlighted the unequal provision of technology in schools. Computers manufactured in Japan, with which the Soviet Union had regular trade agreements, were a luxury item[129] available only to a small number of schools. Yet, in the second half of the 1980s, the competition for material resources was confined to schools only. The much more painful individual inequalities created by the introduction of personal computers into households in the 1990s were still in the future.

While computers were located only in schools, the IT teacher was lord and king of the computing field. The teacher had the material and intellectual resources, they managed them and only they decided how to use them: it was a "one-way movement".[130] The now grown-up boys remember standing in front of the computer room and praying in their minds that the teacher's children would not get sick, that she would be at school and that they would have access to the computers.[131] "Waiting for the teacher" is a disguised power mechanism, as Margolis et al. acknowledge,[132] but it teaches pupils who the authority is.

Competition, another indispensable companion to education, logically led to assessment. Pupils who had mastered computer skills were sent to the school Olympiads, and their hard work and talent were rewarded. As Margolis et al. write, rewards are part of the selecting procedure, which in turn makes the non-rewarded feel like "the losers in competition".[133] New technologies created a new elite, as the computer contributed to the classification of children. The same was true for teachers. The first generation of informatics teachers or "the first tribe", to use Tatarchenko's expression,[134] whether they realised it or not, was special: informatics pioneers received full, comprehensive state support,[135] were heard by large audiences, were reported on by the mass media, and doors opened for them to new intellectual and social worlds.[136]

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128 K. Puriņa, "Beigusies otrā republikas informātikas olimpiāde [The second Republican Informatics Olympiad is over]," *Padomju Jaunatne* [Soviet Youth], August 4, 1989.
129 Wellman, *A Chip in the Curtain.*
130 Interview with student, February 9, 2021.
131 Interview with student, February 9, 2021.
132 Margolis et al., "Peekaboo," 5.
133 Margolis et al., "Peekaboo," 6.
134 Tatarchenko, "The Computer," 721.
135 Interview with teacher, January 21, 2021.
136 Tatarchenko, "The Computer," 717.

Next to the intellectual differentiation highlighted by computer literacy, issues of gender also emerged. First, the involvement of mathematicians in pedagogy meant that Computer Science became a predominantly male field of work since science and engineering in the Soviet Union, and thus in Latvia, were predominantly male. Consequently, the selection of informatics teachers masculinised the field, a similar trend in the West.[137]

Second, "algorithmic thinking", highly valued by both teachers and authorities, was associated with a disciplined mind, which, in turn, was traditionally considered a male trait.[138] As our respondents explained, "women found that thing scary [...], it was a difficult thing".[139]

Third, boys were more interested in computers than girls.[140] Although teachers did not acknowledge deliberate gender segregation, boys' greater interest in computers was acknowledged as a fact and inevitable reality: "Boys have always been more interested in computers than girls".[141] Girls were blamed for this viewpoint as apparently they considered technology a "men's affair," although programming "requires accuracy"[142] – a quality that is associated with women. As one respondent claimed, girls are more impatient with technology – if something doesn't work right the first time, they say "oh, well, let it be," while boys will try again and again.[143]

New technologies taught new social relations centered around the material object, the computer, as a "reservoir of cultural and social resources".[144]

Conclusion

Computing technologies entered the classrooms of Soviet Latvian schools "from above" through the compulsory subject of informatics. From the state perspective, the elimination of computer illiteracy rooted in hidden military (development of country military potential) and ideological (symbolic demonstration of dominance

137 Tedre, Simon and Malmi, "Changing Aims," 173; Tatarchenko, "The Computer."
138 Tatarchenko, "The Computer," 723, 736; David Knights, "Binaries Need to Shatter for Bodies to Matter: Do Disembodied Masculinities Undermine Organizational Ethics?" *Organization* 22, no. 2 (2014): 12, https://oi.org/10.1177/1350508414558724.
139 Interview with teacher, February 9, 2021.
140 Interview with teacher, February 12, 2021.
141 Interview with teacher, February 9, 2021.
142 Interview with teacher, February 8, 2021.
143 Interview with teacher, February 12, 2021.
144 Margolis et al., "Peekaboo," 8.

over the West) goals, as well as an openly propagated social agenda (computer literacy as an inevitable necessity, for a future in the labour market). However, the exciting practice shifted the hidden and open goals of Communist elite to the background. The introduction of informatics was a successful attempt to "predict the future", which poses an endless challenge in the field of education. New technologies started as a marginalised sector but became hegemonic. The pioneers of computing technologies in recent years are winners both intellectually and financially.

The celebration of new technologies in Latvian classrooms also highlighted the side effects that accompany innovation: "In the secret garden of the curriculum, power and knowledge lie coiled like serpents".[145]

The first and least hidden side effect of computing was differential access to material goods, which became an instrument of power: who will get the resources needed for innovation? These inevitable, innovation-compliant challenges formed the differences between the republics of the Soviet Union, and the differences between the capital and the periphery within the republics. The distribution of material benefits in the needy Soviet education system was in the hands of a circle of people who had the power to choose who would receive them. Official power structures such as the Ministry of Education were joined by "hidden hands",[146] i. e. those with whom one had to "negotiate". "The place from which power is exercised is often a hidden place".[147] In Soviet society, there was an informal structure on which those who needed goods for their daily duties, namely teachers, depended.

Teachers' unpaid work in providing all the necessities and setting up computer rooms was taken for granted, it belonged to the social agreement "not to see" – "we use hides to cover our nakedness".[148] In our case, it means pretending that everything is right with the management of Soviet teacher's working in classrooms. Equally tacitly accepted was the fact that the teacher became the owner of access to the treasure – the computer. Pupils had to learn to wait.

The second sign of a hidden curriculum revealed by the computer was the segregation of winners and losers or "digital divide".[149] The new makes you feel special, which forms a sense of community. Others were judged from the perspective of this community: who is the first? Who owns the pioneer mandate? Who is the most capable to learn the new? The acquisition of innovations divided teachers

145 Margolis et al., "Peekaboo," 3.
146 Margolis et al., "Peekaboo," 4.
147 Margolis et al., "Peekaboo," 3.
148 Margolis et al., "Peekaboo," 2.
149 Ulli Samuelsson and Tobias Olsson, "Digital Inequality in Primary and Secondary Education: Findings from a Systematic Literature Review," in *Media and Education in the Digital Age Concepts, Assessments, Subversions*, ed. Matteo Stocchetti (Berlin: Peter Lang, 2014), 41.

and students as the rapid acquisition of new knowledge and skills became an important indicator of intellectual capacity; it created an elite. This elite was "fed" with open, hidden, and even unnamed rewards. Rewards included access to a computer outside school hours, a special relationship with a teacher, the opportunity to compare skills in computer science Olympiads, publicity, state-funded trips, and school honours.

Working with new technologies also brought about stereotypical beliefs regarding the most appropriate gender of savvy computer users, namely boys. They were assigned the traditional place of men – to be a brave pioneer, while girls were placed on the periphery of the path of innovation as "funky".

One can only agree with Tatarchenko that the arrival of the computer in Soviet classrooms was framed by issues of access and control, power, and inequality.[150]

The third, not publicly discussed, side effect of computing that we want to highlight is freedom. Because the new is unique, it allows for a greater degree of freedom. In the early phase of innovation, there is no group of established "preachers" who inevitably standardise their own experience and, with the best of intentions, offer it to others, arriving at rules or even laws that everyone must eventually follow. In the early days of informatics, the teachers were free to make their own choices (within the framework of the Soviet educational system). This bite into the pie of individual freedom made the computer a sign of the "advent" of the collapse of authoritarian rule.

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