

# Notes on the Recent State of Digital Education in Austrian Lower Secondary Schools

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**Abstract.** This paper conveys a snapshot of exemplary areas regarding the digital development and its current state with the focus on Austrian lower secondary schools. After reasoning about some general notes on digital education in general, recent top-down measures of the ministry of education are represented and commented, based on a survey among experts in the field. These measures are part of a nationwide project covering eight digitally relevant educational areas. Although not explicitly listed in the related *8-points plan*, a general curricular reform for lower secondary schools is on the way, with a recently introduced broad school subject called *Basic Digital Education*. The paper concludes with remarks on this challenging and exciting national endeavour in progress.

**Keywords:** (Basic) Digital Education, Digital School, Curriculum, National Reform, Lower Secondary Schools.

## 1 Introduction

This article sheds some light on recent developments regarding the digital transformation of Austrian lower secondary schools (age-group 10-14 years/grades 5-8). It begins with notes on digital education in schools in general, followed by relating it to the current European Digital Education Plan 2021-2027. Some of these terms are theoretically placed in a frame of reference, and can be found in the empirically complemented part to present the results of an online survey of Austrian computer science teachers.

Not least, due to the Covid pandemic and a new government, an already fully elaborated national masterplan “Digitization in Education” in 2018 has been replaced by a so called *8-points plan* which encompasses the main areas central digital services, educational media and materials, and IT infrastructure including the broadband access for all schools, and not least with equipping all pupils aged 10-14 years with mobile devices.

The third chapter deals entirely with selected subgoals, underpinned by the cumulated opinions and attitudes of experts – teachers and educators - in the field.

Although not explicitly listed in the 8-points plan, a general curricular reform is on the way, concerning a recently introduced broad school subject called “Basic Digital Education” where it is up to the schools to offer it as a discipline in its own right with dedicated hours in the weekly schedule or integrate it as a cross-disciplinary approach in other subjects. The paper concludes with an appraisal of these measures accompanied by a cursory outlook.

## 2 Notes on the Term Digital Education

Describing the term *Digital Education* in all its complexity is not easy and will not perfectly succeed here either. There is no uniform definition of this often used, fuzzy and abstract term, but there are already many concretizations and contexts. One finds this plastic word in educational policy contexts, used in advertising language in the course of a "digital education offensive" [5], in web portal names such as "www.bildung.digital", in essays such as "Digital education: an interdisciplinary understanding between media education and computer science" [7], or simply and instrumentally as the "result of learning with digital media" [10]. Last but not least, the term has manifested itself concretely and fundamentally since 2018 in the Austrian curriculum for lower secondary education in the form of a special subject "Digital Basic Education".

Provided this, a comprehensive working definition of *Digital Education* could be: It comprises the application, design and reflection of computer-based media on the basis of information technology and computer literacy. It is inextricably linked to teaching and learning with and about digital technologies and their reflective, routine and creative use. This also includes a fundamental understanding of information-technological basics as well as informatic ways of thinking and working. Schools are parts of an increasingly digitally shaped world. *Digital Education* is therefore also an indispensable part of general education.

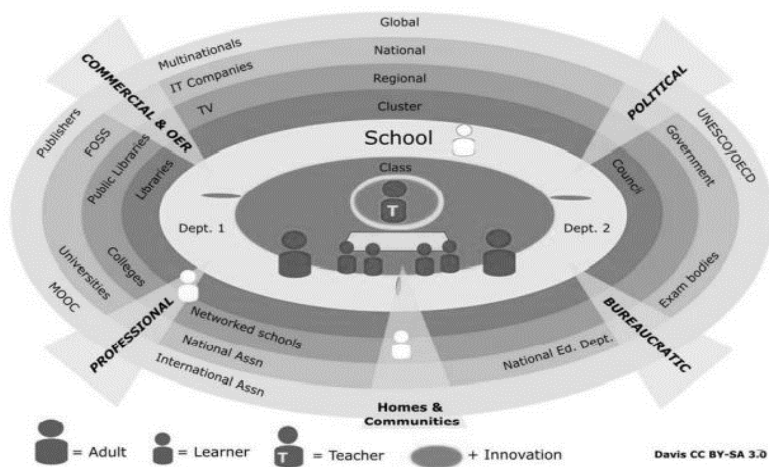


Fig. 1. Arena of Change [6].

The *Arena of Change* (Fig. 1) spans a multifaceted frame of reference that allows the manifestations and influencing factors of digital education to be classified. Systems and processes in particular can be examined on the basis of this classification model. By locating the individual stakeholders and institutions in terms of spheres of influence and modes of action, it is possible to show how the interaction structure of the "digital

school" is changing and developing as a crystallization point for formal digital education.

Finally, we can consider digital education as a *dispositive*. This term, coined by the French philosopher Foucault, can be understood as a complex space within which discourses, practices, systems of reference, and modes of subjectivation are formed according to specific rules. According to Agamben, a *dispositive* refers to a "totality of practices, knowledge, measures, and institutions whose aim is to manage, govern, control, and direct the behavior of and thoughts of people in an ostensibly useful direction" [2]. If we replace herein people with teachers in this, one also becomes aware of the political, philosophical and very concrete dimension of digital education.

As an orientation framework for national programs in the context of digital education, the plans of the European Commission are briefly cited below [9].

The Digital Education Plan 2018-2020 had three priority areas:

- *making better use of digital technology for teaching and learning,*
- *developing digital competencies and skills,*
- *improving education through better data analysis and foresight,*

The new „Digital Education Plan“ 2021-2027 has been modified and extended. Both fields of action „digital education ecosystem“ and „skills/competences“ are listed here in the original wording

1. *Fostering the development of a high-performing digital education ecosystem*
  - *infrastructure, connectivity and digital equipment*
  - *effective digital capacity planning and development, including up-to-date organisational capabilities*
  - *digitally competent and confident teachers and education and training staff*
  - *high-quality learning content, user-friendly tools and secure platforms which respect privacy and ethical standards*
2. *Enhancing digital skills and competences for the digital transformation*
  - *basic digital skills and competences from an early age*
    - *digital literacy, including fighting disinformation*
    - *computing education*
    - *good knowledge and understanding of data-intensive technologies, such as artificial intelligence*
  - *advanced digital skills which produce more digital specialists and also ensure that girls and young women are equally represented in digital studies and careers*

Almost all goals in this action plan are to be implemented also in Austria, as we will see below. There is a commitment to this by the Austrian Minister of Education [1]: "[...] Digital School is a project that will not only touch all facets of schools but will change them sustainably and fundamentally. I am pleased that the project "Digital

School for All” will go from a vision to reality during my term in office, step by step, and with the involvement of all stakeholders [...]"

However, in the next section Austrian teachers and teacher trainers, presumably the most important key players in providing digital education in all its facets, get their say. What they think about aspects of the digital school will be presented below in excerpts.

### 3 Exemplary Empirical Findings

In December 2020, an online survey was conducted among the registered users of an Austrian portal for teachers of Informatics. The online questionnaire consisted mainly of closed questions, extended by free-response options on three specific topics: *EdutheK* as a portal for open educational resources, open source aspects and the subject *Digital Basic Education*. This survey, which was not commissioned and financed by any official body, aimed to obtain feedback from experts in the domain of digital education. The raw data were made available for download as Open Data immediately after the data were collected. Accordingly, the data set is open for possible further discussions and quantitative and qualitative studies as well.

#### 3.1 Overview of the respondents

Of approximately one thousand invitations sent out by mail to all registered users of an Austrian portal in mid-December 2020, there were a total of 257 responses in the period Tue 15 - Wed 23 December 2020.

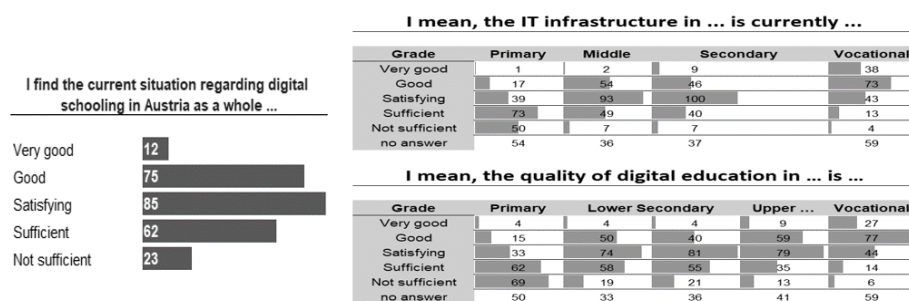
			PRIMARY	LOWER SECONDARY		UPPER SECONDARY		
				MITTEL-SCHULE	AHS UNTERSTUFE	AHS OBERSTUFE	BMHS	
CURRICULA DIGITAL EDUCATION	MEDIA EDUCATION	INFORMATICS COMPUTING	29	95		92		40
		ICT APPLICATIONS		DB: 62 INF: 59 SB: 47 LB: 15 ME: 55	DB: 58 INF: 74 SB: 40 LB: 29 ME: 61	DB: 0 INF: 29 SB: 10 LB: 6 ME: 17		
		DIGITAL SKILLS						
<b>TECHNOLOGY ENHANCED TEACHING AND LEARNING</b> (Didactics, Pedagogy, Educational Software, ...)								
<b>IT - INFRASTRUCTURE</b> (Networks, Hardware, System Software, Platforms, ...)								

**Fig. 2.** Structural model of the Digital School Austria and related numbers of respondents

The ratio of male to female respondents is 3:2, and the predominant age groups 30-50 and over 50 respectively balance each other out. The numbers in Fig. 2. indicate a representative sample of feedback and sound coverage of school types. In general, empirical social research aims for good representativeness and an acceptable response rate

for data quality [12]. Questions were also asked about school types and the roles and functions the respondents are representing at their schools. In Fig. 2 the abbreviations DB and INF stand for “Digital Education” (teaching digital basic education) and “Informatik” (computer science), SB for IT system support, LB for activities in teacher education, and ME for influencers (at schools in digital affairs). Most respondents hold multiple roles which indicates at a balanced sample. The abbreviation AHS stands for secondary academic schools (Gymnasium), and BMHS for vocational middle and high school.

### 3.2 Quantitative opinion survey



**Fig. 3.** School type-specific opinions about the quality of IT-Infrastructure and digital education

The first part of the questionnaire aimed to collect general opinions about the grade of satisfaction with the main aspects of digital school. Fig. 3 shows that the current overall situation - despite a perceived - typically Austrian latent dissatisfaction - is considered satisfactory by most of the respondents. The cumulated evaluations regarding the IT infrastructure in schools on the one hand, and on digital education on the other - both are mapped by the European digital action plan - show a diverse but expected picture. Primary (elementary) schools are rated below, while vocational schools are rated above average.

### 3.3 From the Master plan to the 8-Points Plan

"Implementation necessary, but don't expect miracles". This is the laconic wording of the draft of the *Master Plan for Digitization in Education*, which the ministries have been working on since summer 2018 [3]. The implementation of this ambitious national program with its three subprograms of **teaching and learning content, training and continuing education for educators, and infrastructure and modern school administration** was to be completed by 2023. However, this master plan was not implemented in its original form. Triggered by the unforeseeable Covid pandemic, the so-called *8-points plan* was concretized, published and set in motion, building on the concepts contained in [4]. The goal of this plan is the *comprehensive implementation of digitally*

supported teaching and learning and a broad implementation of innovative teaching and learning formats. The eight detailed goals are clustered and listed below.

- **Central Services:** Digital school portal / Unified communication processes
- **Educational media/materials:** Distance learning MOOC / Alignment of the so called “Eduthek” (collection of open educational resources) with curricula / Certifying learning apps
- **IT infrastructure:** expansion of basic school IT infrastructure / digital devices for students / digital devices for teachers

This change of course from the master plan to the 8-points plan may have been inspired by the dictum of George Patton, an American general (1885-1945): "A good plan today is better than a perfect plan tomorrow."

The questionnaire asked about personal priorities, with the result that the expansion of the IT infrastructure was ranked first.

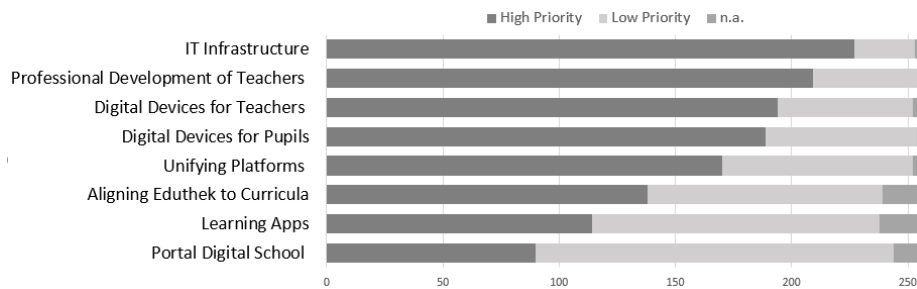


Fig. 4. Goals of the 8-points plan, ranked by the respondents and by priority

Ideally, project goals are S.M.A.R.T [8], which is an acronym for the attributes (S)pecific, (M)easurable, (A)ccepted, (R)ealistic and (T)ime. The implementation of these projects is already on the way, accompanied by a roadmap. Some legal adjustments have been made already, especially for the rolling out of about 350.000 digital devices for the pupils at lower secondary schools. All eight projects are and will be monitored by the ministry of education, funded with about 250 millions € and expected to be completed by the year 2014.

### 3.4 IT infrastructure and Central Platform

In early 2018, a full study was conducted on behalf of the Austrian Ministry of Education, which provided the following findings, among others [11]:

- 6% of middle schools, 6% of AHS, and 15% of BMHS run classes with student-owned devices (notebooks and/or tablets) "notebook classes."
- About two-thirds of middle schools, AHS and BMHS use student-owned devices (smartphones, tablets or notebooks) as needed in class.

These low percentages at lower secondary level are soon to become a thing of the past. As of the 2021/22 school year, (almost) all students will be equipped with digital devices as a result of a major nationwide investment. Although the 8-points plan explicitly provides for standardization, this is only being pursued on a school site-specific basis in the area of terminal devices. The schools have room to maneuver in terms of procurement.

According to the tender documents, a purchase volume of 240,000 MS Windows-based notebooks/tablets, 80,000 iPads, 7500 Android-based tablets and 14,000 Google Chromebooks has been expected for the entire lower secondary level for approx. 1700 schools. This ratio corresponds well with the experts' preferences from the present survey, especially for Windows- and iOS-based devices. The final figures are not yet available, but they already indicate the dominance of Microsoft with a Windows share of around 70%.

This is reinforced even further when one looks at the figures determined for the service platforms, which are available here separately for learning platforms and communication and collaboration tools (Fig. 5). Due to a flaw in the construction of the questionnaire, the apple ecosystem was (unfortunately) not explicitly queried, but it is likely to play a significant role due to the approximately 20% iPad share. Most likely the Apple ecosystem is represented in Fig. 5 under *Other platforms/tools*.

It can be assumed that no company voluntarily gives up a share of the lucrative education market to a competitor.

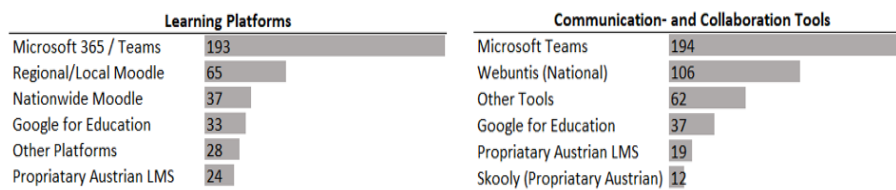


Fig. 5. Learning platforms and communication – and collaboration tools in use

### 3.5 Attitudes towards Open Source and Open Educational Resources

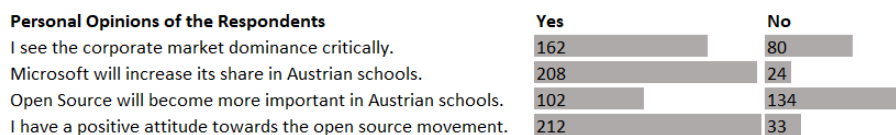


Fig. 6. Cumulated opinions about open source

In addition to the cumulative responses in Fig. 6, the open question about the reasons for the low penetration of open source products was answered by about 60% of the respondents. A qualitative analysis revealed not unexpected responses which range from bribery, lobbying, advertising and market power of the big players, the power of habit, Microsoft as an industry standard, requirements of the economy, lower user-friendliness to the lack of support from the Austrian ministry of education.

One nationwide large-scale open educational resource called *EdutheK*, which is in development since few years, has been included explicitly in the 8-points plan. In the future it shall serve as a platform and central point of contact for materials. It has not been very successful so far as the responses (Fig. 7) speak for themselves. The additional free responses on this topic reinforce this negative impression and reserved attitudes for its future success.

	(rather) yes	(rather) no	n.a.
I know the EdutheK well.	115	138	3
I have used it already.	63	188	4
I find it useful.	55	130	69
It is a serious competition to textbooks.	57	156	43

**Fig. 7.** Evaluation of the EdutheK

#### 4 The Curriculum Basic Digital Education, a Work in Progress

Since 2018 the subject *Digital Basic Education* is mandatory for all Austrian lower secondary schools and all pupils. It is designed as a special subject (called *mandatory exercise*) which is not necessarily conveyed by a discipline in its own right with dedicated weekly lessons. It is up to the schools to integrate the subject areas - as listed below - in other subjects or/and to implement an independent discipline within the grades 5 to 8 with one or two regularly hours per week.

##### **Social aspects of media change and digitization**

Digitization in everyday life, opportunities and limits, health and well-being

##### **Information, data and media literacy**

Search and find, compare and evaluate, organize, share

##### **Operating systems and standard applications:**

Operating system basics, word processing, presentation - and spreadsheet software

##### **Media design**

Receiving digital media, producing digital media, developing content

##### **Digital communication and social media**

Interact/Communicate, participate in society, shaping digital identities, collaborate

##### **Security**

Protect devices and content, protecting personal data and privacy

##### **Technical problem solving**

Identify technical needs, using digital devices, solving technical problems

##### **Computational Thinking**

Working with algorithms, creative use of programming languages



	(rather) yes	(rather) no	n.a.
Curriculum is appropriate	132	80	42
It is unrealizable without dedicated hours.	210	22	23
The part Computational Thinking is reasonable.	106	60	88
Programming should be mandatory.	166	63	26
In my school the curriculum is implemented well.	122	70	59

**Fig. 8.** Cumulated answers regarding the curriculum

As pointed out in Fig. 8, the acceptance of the curriculum is mixed which might be due to the concerns that it is not achievable without dedicated hours. However, the experts' wish for a nationwide introduction of a compulsory subject is evident. A vast majority of the respondents suggested 1-2 weekly lessons in all four grades 5-8. This is also confirmed to a high degree in the free responses, and a full discipline Informatics – now incorporated in the broader subject Basic Digital Education - is a well known and discussed issue within the relevant community since many years.

Currently a major "Curriculum Reform 2020" for primary and lower secondary level is on the way. Still kept secret by the curriculum committees, it will go into the review process in the schoolyear 2021/22. It is planned to be enacted in two years.

Despite the reservations expressed by experts, it is to be feared that the subject *Basic Digital Education* still has to wait for implementation in the canon of compulsory academic disciplines for the next years.

## 5 Concluding remarks

With these selective spotlights into recent developments of top down initiatives driving the digital transformation of Austrian schools, only a cursory overview could be given. Like all education systems worldwide, national keyplayers, institutions and stakeholders, with the ministries of education in the forefront, are currently facing the enormous challenge of making the best possible use of the digitalization push caused by the Corona crisis and managing it well centrally.

"Digital school is the harmonious combination of modern, digital infrastructure and inspiring, forward-thinking pedagogy." May this quote and the lofty goal of the Austrian Minister of Education become reality, and all plans implemented in school practice.

It should be also pointed out that many discussions with regard to the recent projects are apparently too technical, and currently dominated by legislative aspects. It must be hoped, that pedagogical and didactical needs will gain momentum in the near future.

Finally, little has been said about the nature of Austrian educators, which on the one hand look for "regulations from above", and, on the other, are not averse for free decisions within school autonomy. This dichotomy has led us in Austria to a very colorful and diverse educational landscape, especially in the context of digital school development. Be it a thread or chance, it is most likely that all the measures described in this paper will not change this picture in the foreseeable future.

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