Informatics Classes in Austria’s Lower Secondary Schools – a Survey

Peter Smejkal¹, Monika Di Angelo¹

¹ Vienna University of Technology, Institute for Computer Aided Automation, Treitlstrasse 1/183, A-1040 Vienna, Austria

monika.diangelo@tuwien.ac.at

Abstract. At present, the curriculum for Austria’s lower secondary schools does not comprise informatics as a subject. This unfortunate situation led to a wide range of informatics classes both, optional and mandatory, at the lower secondary level, that were established solely through the initiative of the respective schools. These classes are offered in addition to the regular curriculum, which is enabled by the (small) autonomous space for curriculum design that the ministry grants its schools. In this work we present the current status of offers for informatics classes in Austria’s lower secondary schools. In particular, we are interested in what kind of topics are offered, how numerous those offers are, and what the legal frame for this outside of curriculum classes is. This study is based on data that was collected from the schools in June-September 2010.

Keywords: Informatics classes, lower secondary school, survey

1 Introduction

The computer is a standard instrument in today’s society which cannot be imagined without it. This fact is hardly reflected in the national school curricula, though: informatics lessons simply are not scheduled in the lower secondary school level in Austria. Computer classes only appear in the curricula for upper secondary schools. If a pupil decides to end the compulsory schooling with a polytechnic year, this is also a decision for no computer classes at all. Despite this unfortunate situation, there is a whole range of informatics classes at the lower secondary level, which are offered at school, outside the regular curriculum.

In this paper we seek for answers to the questions: “What is the current status of offers for informatics classes at the lower secondary level in Austria?” In particular, we are interested in a) what kind of topics are offered, b) how numerous those offers are, and c) the legal frame for outside of curriculum classes.
We first present a summary of recent studies with respect to informatics in Austria’s schools. Then we briefly summarize the legal framework for classes which are offered in addition to the regular curriculum. This is followed by a presentation of data we collected from the lower secondary schools in Austria during June to September 2010. The gathered information has been evaluated in regard to the legal framework, to the single states, to the two types of lower secondary schools that exist in Austria, and to the subjects of the classes.

2 Informatics in Austria’s Schools

Obligatory education standards for Austria in the area of informatics are not very numerous. There are simply none for the general-education secondary schools (AHS). Education standards were developed for the profession forming secondary schools (BHS) in cooperation with the ministry. [1] comments that here “uncharted waters are entered, because there are no approaches neither at the national nor at the international level that can be adapted to the Austrian situation”. After several years of fruitful discussion in the German-speaking countries the “Gesellschaft für Informatik” (GI) finally “enacted” education standards for informatics at school [9] in 2008 which unfortunately are not binding anywhere, yet. According to [4] there seems to be quite a resistance in Austria towards the further development of education standards since informatics is “already” a mandatory subject in year 9 in the AHS. In this respect, Austria is far from putting the GI education standards into action and no trend in this direction on the part of the responsible ministry has been located either.

An investigation in the state Kärnten [10] evaluated, whether the goals of the state standards for the lower secondary level (which were defined in the school year 2003/04) were accomplished and, after two years of informatics classes, how much knowledge was still available in the following year (year 7). The study confirmed the acceptance of the standards on the part of the teachers. However, the teachers were unsure, whether the standards could be achieved in a one hour per week class. In addition, it was confirmed that the informatics knowledge is lost, if the classes are not continued in the following years.

In the state Vorarlberg, the basic informatics knowledge of year 6 AHS pupils has been examined [5]. After completion of the one-year compulsory informatics class most pupils could handle the desktop, however approximately a quarter of all pupils had difficulties in copying files. Also, text editing was not accomplished without difficulties by approximately half of the pupils. Only a quarter of the pupils were able to handle standard presentation software without problems.

In a special issue of "CD Austria" [3] which is supported by the ministry (bm:ukk), it was remarked that although the range of informatics classes increased in the AHS within the last few years, the trend was more towards combined classes (like CAD) and the integration of industry certificates (like ECDL, Cisco, MS IT-Academy). Half of the investigated schools in the state Niederösterreich offered informatics classes.
Micheuz [7] evaluated the situation of the Austrian informatics education in year 9 via online questionnaires. The results show that due to the increasing school autonomy the range of informatics classes is in permanent development, leading to diverse school profiles. This results in a mismatch of knowledge among pupils of different schools. Even within the same school the pupils’ informatics knowledge is very uneven, more than a third of all pupils reach the end of the lower secondary level without basic informatics training.

Another evaluation [8] deals with the autonomous informatics offers of the AHS. It is "based on elementary statistical data as well as the results of a national online survey" and comes to the conclusion: Although there are some offers for informatics classes at the lower and upper secondary level, these offers are highly unstructured, unclear and very heterogeneous. Due to the missing education standards and the unsatisfactory rooting in the curriculum, informatics education in Austria lacks clear structures.

3 Legal Framework

In Austria the ministry (bm:ukk) issues curricula and sets the legal frame for possible informatics classes. All following information is taken from the ministry’s web site [2].

There are basically two possibilities for a school to establish informatics classes: on the one hand, a few weekly hours (max. 5) can be dedicated to a freely eligible school focus according to the “autonomous curriculum design” which the ministry grants its schools since the school year 2003/2004. These school autonomous subjects are obligatory for all pupils of this school (or this school branch), in this paper referred to as “obligatory offers”. On the other hand, "electives" can be offered by the school in a limited range (they are financed by the ministry). These electives are in addition to the mandatory subjects and can be freely chosen (or not) by the pupils. Electives are not restricted to informatics topics of course, but rather cover a wide range of subjects (such as music, language, sports and many more).

The regulation of this design space for schools is found in the curricula [6] and reads: The curriculum can be adapted through school autonomous subjects “under consideration of the spatial, equipment and personnel conditions of the school” – in other words, at no extra costs. Furthermore it is explicitly noted that for the lower secondary level an informatics focus can be chosen “in the context of school autonomous curriculum regulations”.

In Austria there are two types of schools at the lower secondary level: the AHS (“Gymnasien”) runs from year 5 to 12, thus comprising both, the lower and upper secondary level. The HS (“Hauptschulen”) runs from year 5 to 8 and only comprises the lower secondary level. Both operate with the same curriculum.
4 Data Collection and Evaluation

For data collection, firstly e-mail messages were sent out to all schools with a lower secondary level, the HS and the AHS. Secondly, since the number of replies to the e-mail messages was – as expected – very low, the web sites of all schools were searched for information on informatics classes in form of obligatory offers and electives. This method delivered by far the most data; there were hardly any schools without an appropriate web site. Thirdly, some schools were contacted by phone to further complete the data. In total, 1338 schools (271 AHS and 1067 HS) were investigated [11].

4.1 Results for obligatory offers

The number of schools with obligatory offers of informatics classes (in the context of the school autonomy) is already considerable in some states, although it varies widely over the states. Fig. 1 shows the percentage of schools with obligatory classes. The data was split up according to the two type of school of the lower secondary level the “Gymnasien” (left bar) and the “Hauptschulen” (middle bar). The average for the whole lower secondary (“Sek 1”, both school types put together) is indicated by the right bar. It should be noted, that fig. 1 contains no information on the weekly hours of the classes, nor on the year(s) in which the classes are held.

![Fig. 1. Obligatory offers in percent of the schools. “Gymnasien” and “Hauptschulen” in comparison, split up according to states.](image)

With respect to the single states, a clear descent can be seen from leader Kärnten with a commendable average of about 71% of the schools with obligatory informatics class...
offers in the complete lower secondary down to the bottom of the table marked by Tirol with about 32% of the schools which offer obligatory informatics classes. Especially with respect to the “Gymnasien”, Kärnten is in the fore with approx. 87%, and again Tirol forms the end with only just more than 31%. As for the “Hauptschulen”, Oberösterreich is in the lead with 68%, while Vorarlberg marks the end with about 32%.

Also, there is a visible difference between numbers for the “Gymnasien” and the “Hauptschulen” in most states, with no clear tendency.

4.2 Results for electives

Besides the obligatory offers there is a multitude of informatics electives, which are not attended by all pupils but rather only chosen by some of them. It is not obvious from the collected data as to how many pupils opt for the classes. The offer nevertheless is considerable and indicates that also the pupils show a strong interest in informatics topics. Fig. 2 depicts the range of electives in a tag cloud: Electives that are offered more often are represented in larger letters, more rare classes in smaller letters.

Fig. 2. Tag cloud of electives

Fig.3 depicts the percentage of schools which offer electives in informatics. The data was split up again into the “Gymnasien” (blue) and the “Hauptschulen” (red). Both school types put together are indicated in green. It should be noted, that fig. 3 contains no information on the weekly hours of the classes, or on the year(s) in which the classes are held, or on how many pupils chose those classes.

The overall numbers for the electives (roughly ranging between 35% and 55%) are slightly lower than those for the obligatory offers (between 32% and 71%).

As compared to the obligatory classes, a slightly different picture for the electives is revealed: Burgenland seems to prefer electives because it is located at the lead here. Three of the four leaders from the obligatory offers (Kärnten, Oberösterreich, Niederösterreich) are found on the front places again, while Tirol makes to the
midfield. The capital Wien ranks at the back for both, the obligatory offers and the electives.

In some states (Oberösterreich, Vorarlberg) there is a huge difference (over 30%, over 20%) between the “Gymnasien” with a rather low average and the “Hauptschulen” with a quite high average, while in other states (Niederösterreich, Kärnten, Salzburg) numbers are almost equal. Again, no clear tendency can be seen with respect to school types.

Fig. 3. Offers for “electives” in percent of the schools

4.3 Results for e-Learning

Another interesting aspect is the offer of e-learning, on the one hand to learn about its spread and gaining acceptance, on the other hand to find out any peculiar differences.

Fig. 4 depicts the percentage of schools that offer e-learning possibilities. Again, the data was split up into the “Gymnasien” (blue) and the “Hauptschulen” (red). Both school types put together are indicated in green.

The results are astonishing mainly by the fact that a serious difference was found regarding the school type which extends over (almost) all states: e-learning possibilities in “Gymnasien” can be found in 30% to 70%, while ”Hauptschulen” offer e-learning in less than 20%. They only sad exception is Wien where the “Gymnasien” approach the low average of the “Hauptschulen”.

![Figure 3: Offers for "electives" in percent of the schools](image-url)

![Figure 4: Offers for e-Learning](image-url)
A possible explanation for this data situation could be the circumstance that “Gymnasien” also offer the upper secondary level, while “Hauptschulen” are covering only the lower secondary level. One could therefore suspect that the effort to provide e-learning is mostly justified for the upper secondary level. In this respect it should be noted that the collected data does not indicate whether pupils from the lower secondary level actually use e-learning.

4.4 Frequent electives

The most frequent electives are in a clear agreement in (almost) all states: "informatics" (by far the most common elective and therefore basically equal with data from fig.3), "typewriting" (fig.5), and "word processing" (fig.6).

Fig. 5 depicts the percentage of schools that offer typewriting as an elective. Fig. 6 depicts the percentage of schools that offer word processing as an elective. Again, the data was split up into the “Gymnasien” (left bar) and the “Hauptschulen” (middle bar). Both school types put together are indicated by the right bar.

There is a clear trend, supported by all states, that typewriting is offered more often in the “Hauptschulen” than in the “Gymnasien”, roughly twice as often on the average.

Word processing seems to show no clear tendency whatsoever, neither with respect to the school types, nor with respect to the states. Overall numbers are less than half of those from typewriting.
Fig. 5. Elective “typewriting” in all of Austria (in percent)

Fig. 6. Elective “word processing” in all of Austria (in percent)
Fig. 7. List of most common electives in all of Austria (in order of frequency)

Fig. 7 lists the most common electives with their absolute numbers of occurrence in all of Austria. As can be seen, many classes are held in only a few schools. Some of them cover similar topics, some present content that overlaps with other classes.

"Informatik" (informatics) is by far the most common class, but that does not imply, that the same contents are presented in different schools. Every school is free to teach whatever they deem suitable. So, "Informatik" might actually cover contents
of all other electives. This diversity with respect to the topics and contents of electives might seem like a wide choice, but actually rather reflects the lack of structure in informatics education.

5 Conclusion

Results show that in fact a large number of schools at the lower secondary level use their autonomous curriculum design space for informatics classes, be it as obligatory offers or electives. There were only a few schools which did not offer any informatics classes at all (8.9% Gymnasien, 25.2% Hauptschulen). Averaging over all of Austria, obligatory informatics classes can be found at 53.4% of the lower secondary schools, while informatics electives are offered at 47.3% of them.

These school initiatives are very laudable and welcome as they try to fill the gap between society’s needs and the ministry’s (non-)regulation. Still, this cannot guarantee a sound informatics education. On the lower secondary level, rooting of computer skills in the curriculum is still missing, binding informatics education standards are lacking. Despite all efforts, the current situation leads to a disastrous heterogeneity in the pupils’ informatics knowledge at the end of the lower secondary level, which the upper secondary schools have to fight, inevitably.

References

2. bm:ukk Bildung und Schulen (abgefragt am 21.1.2011)
   URL: http://www.bmukk.gv.at/schulen/index.xml
6. bm:ukk Lehrpläne (abgefragt am 21.01.2011)
   URL: http://www.bmukk.gv.at/schulen/unterricht/lp/lp_abs.xml