

# Public Examination System as a Support for Teaching and Learning Improvement in Slovenia – Assessment for Learning Analytic Tool

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Thirteen years ago Slovenia presented the so-called external Matura exam, which is a centrally administered school-leaving exam at the end of Upper Secondary Education (USE). It consists of five units: mother tongue, maths, foreign language and two optional subjects. The critics of this untraditional external Matura exam have stressed its negative influences on learning and the lack of qualitative information such assessment contributes to efficient teaching and learning in schools and classrooms within schools.

In 2005 the National Examinations Centre started to develop a software tool called Assessment for Learning Analytic Tool (ALAT), where, using extensive multi-annual databases of students' achievements in their final years of school and in the Matura exam, schools and teachers could be provided with data on students' achievements, allowing them to perform analyses, to interpret and compare the data with similar school groups. This tool enables analyses of differences between a particular school and a similar school group in the country, differences between classrooms within a school; it enables analyses of drop-out rates, determining the number or proportion of students who choose certain optional subjects, the comparison of results of different forms of assessment, and recognizing the trends.

This presentation shows the structure and functions of ALA Tool, and gives examples of some data analyses, which are useful for subject testing committees, schools and teachers as a basis for further improvement and a more efficient way of teaching and learning.

**Keywords:** *Data Analysis Tool; Formative and Summative Assessment; Secondary Level of Formative Assessment; School Effectiveness; School Improvement;*

## Introduction

It has been thirteen years since Slovenia presented the so-called external *Matura* examination, which is a centrally administered school-leaving examination at the end of Upper Secondary Education (USE). It consists of five units (Gabršček & Bethell, 1996): mother tongue, maths, foreign language and two optional subjects. This was a new approach in Slovenia and also the first attempt of such examination in any of the

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central or eastern European countries. The external Matura exam has reached its teenage years.

At the end of a four-year General Secondary Education (GSE) 40% of each generation finish secondary studies with the *Matura* certificate. Matura is a public examination at the end of GSE, which prepares students for university studies. In Slovenia the score on the Matura exam is stated on the certificate, which is handed to the candidate at the end of GSE. A successfully passed Matura exam is obligatory for enrolling in university studies, and its results are also used for admission procedures in tertiary education. The results are especially important, if there are more candidates for a certain field of study than there are vacant positions, in which case the enrolment is limited.

The public ranking of schools according to the Matura results is not allowed in Slovenia. Since the beginning of the external Matura, schools have always received data on their students' achievements, also in electronic version. Every school management and GSE teacher reviewed such results with interest and they praised themselves in case of good results to parents and students of junior classes. Since Slovenia did not have a tradition of external examination in schools, the public and some experts have been expressing much criticism of it, saying that such external final examination (summative assessment of learning) does not make any sense. They still stress the negative influences such external final examination has on learning for exams and the lack of qualitative information such assessment contributes to efficient teaching and learning in schools and classes within schools.

The summative function of assessment does not exclude the formative function; the assessment of learning does not prevent teachers and students to use the acquired information for teaching and learning, and this is certainly true for students in junior classes, who are still a few years away from the Matura exam. Mc Gaw (2006) states that external assessment can provide schools and teachers with information which is not obtainable by internal assessment. Such information shows the comparison between the achievements of certain classrooms and the achievements of the classrooms in similar schools.

The National Examinations Centre is aware of many different ways the results acquired with public examination (Zupanc, 2006) can be used. That is why we started to develop a software tool in 2005, which would, using extensive multi-annual

databases of students' achievements in their final years of school and in the five-unit Matura exam, help schools and teachers to achieve the following:

- acquire a transparent image of students' achievements in the last years
- analyse and interpret students' achievements
- compare the achievements with comparable school groups
- compare and analyse the differences in achievements between classrooms and teachers in their school
- analyse drop-out rates of students in GSE
- compare the results of different forms of assessment: teacher's grade, external grade, written and oral marks, coursework mark, etc.
- compare the number or proportion of students who choose certain optional subjects in a school or a classroom within that school
- recognise the trends, etc.

The information that is gathered during implementation of public examinations, such as Matura in Slovenia, can be useful for evaluation of work in schools and classes within schools. Furthermore, the systematically acquired information on students' achievements in individual classrooms is also very useful for that particular school and other schools in the country, as it presents an important role in the management of education policy and curricular changes (*Formative assessment*, 2005). The tool (Urank, Zupanc, 2007), which is being developed in Slovenia, shows the students' achievements in the Matura exam in three different levels: national level, school level, and the level of a particular classroom or teacher in a particular school. Such information, analyses and interpretations are intended for subject experts and the management of educational system in the country, as well as for school managements (headmasters) and individual classroom teachers.

### **Data, Methods and Analyses**

The presentation will introduce an on-line data analysis tool and data selection system. The tool was created for national subject testing committees, schools, and classroom teachers. It provides feedback in the form of analyses of effectiveness with the purpose of improvement of teaching in the classroom and better learning (Zupanc, Urank, & Bren, 2006). Data on students' achievement at the end of GSE (i.e. teacher's grade) and all data on achievement in the five-unit *Matura* have been

gathered for the entire yearly cohort from 2002 to 2007, which comprises 11 exam sessions (54,400 candidates) with 272,000 *Matura* exams. We have gathered data for certificates at the end of GSE as well as for selection procedures for enrolment in tertiary education.

The basic data in the database are obtained from school (i.e. teachers') assessment and external examinations, which are held for all students who finished GSE. The database includes the existing data, already assembled in the school system, for all externally assessed subjects on completion of GSE, so that overall achievement can be calculated. Students' achievement is investigated in the wider range of the national curriculum (overall achievement, compulsory subjects and also optional subjects), not exclusively in English and mathematics (Creemers, & Kyriakides, 2006; Kyriakides, Campbell, & Gagatsis, 2000).

The ALA Tool (Urank, Zupanc, 2007) presents data in seven different types of analyses and in various combinations between them (Zupanc, Urank, & Bren, 2006).

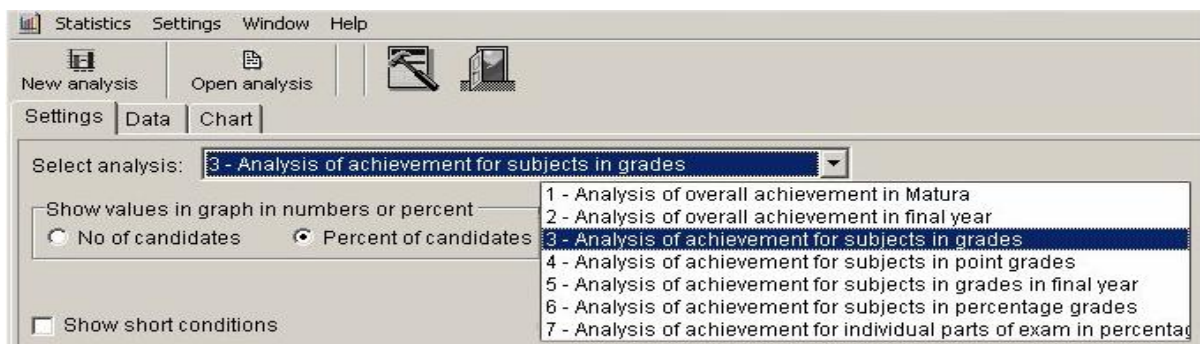


Figure 1. Types of analyses and their combinations in the ALA Tool (Urank, Zupanc, 2007)

*Analysis of overall achievement in Matura* presents sum of data on students' grades for each of the five subjects, graded from 1 to 5 at Foundation tier, and from 1 to 8 at Higher tier.

Before taking the *Matura* exam, candidates must successfully finish all five subjects in GSE. The *Analysis of overall achievement in final year* can be performed by choosing the second option.

If a user wishes to perform *Analysis of achievement for subjects in grades*, he/she should choose the third option. To perform a similar type of analysis, only for subjects in point grades, he/she can choose the fourth option.

Before taking the *Matura* exam, each candidate gets a teacher's grade for compulsory and optional *Matura* subjects in the final year of secondary education.

Such data are presented in *Analysis of achievement for subjects in grades in final year* option.

The next option is called *Analysis of achievement for subjects in per cent*. Achievement of the *Matura* exam is assessed in raw scores, while syllabuses regulate the proportions of written (i.e. external) and school-based parts of the exam (i.e. oral exams or course work, e.g. laboratory work, written assignments, etc.). Together, both parts of the exam are worth 100%. The distribution of percentage is usually 80% (or 75%) for the external part and 20% (or 25%) for the school-based part. The *Analysis of achievement for individual parts of exam in per cent* is obtainable under option 7.

Analyses within the ALA Tool can be combined in various ways.

In the beginning the user of the ALA Tool has to determine the (sub)group of candidates to analyse. There are nine selection categories.

1. Select level of data:  
 national level  school level School code:   Mask school code

2. Exam session:   ←

3. Types of programme:  ←

4. Educational programmes:  ←

5. Types of exam:  ←

6. Select candidates:  
 Matura course:  ↓  
 21-year-olds:  ↓  
 Student status:  ↓

7. Gender:  ↓

8. Class(es):  ←

9. Subject:    ←  Combine subject levels

Series	No cand.	No schools	Average	STD	Comments	Conditions description
1	2492	79	3,29	1,04		R=051; P=HIS; Š=ALL; N=1; MT=NO; 21L=NO; S=Students;
2	2822	80	3,05	1,00		R=061; P=HIS; Š=VSE; N=1; MT=NE; 21L=NE; S=Dijak;

Figure 2. Determining the (sub)group of candidates (Urank, Zupanc, 2007)

First, the level is selected. The user can choose the national level for analyses of the entire yearly cohort of students, or school level for data analyses of students of an individual school or a group of students within a school. Users in individual schools can access all data on the national level and only data for their own school at the school and classroom level. Each school has its own code, which is hidden by asterisks in the tool – for analyses presentation.

The next step is selecting the exam session of *Matura*, which is held in spring and autumn each year. Then, type of programme is selected, which enables schools to compare achievement of their students with their peers. In Slovenia there are different streams of GSE and *Matura*: General, Technical, Classical, Arts, and the specific *Matura Course*.

In step 4 the educational programme is selected. The user can compare achievement in *Matura* in an individual school or in different classes within a school with achievement of their peers in the same type of educational programme in Slovenia.

Next, the type of exam is selected. The majority of candidates sit the entire (i.e. all five subjects) *Matura* for the first time. Candidates sometime take *Matura* for the second/third time because they failed the first time (have to re-sit one or several of the *Matura* exams) or because they want to improve a grade.

In the next step the user selects the candidates to analyse. Some candidates attend part-time programmes before taking *Matura* and the achievement of such subgroup significantly differs from the group of full-time students, who take *Matura* after completing GSE. These are candidates who attend a one-year *Matura Course*, and candidates who are allowed to take *Matura* at the age of 21 or more without having successfully completed secondary education.

Then, gender (both genders together or boys and girls separately) and class (4A, 4B, /.../ 4H) are selected. A single class or several classes within a school can be analysed – classes taught by the same teacher can be grouped together. In the final step the subject is selected. There are 34 *Matura* subjects and some exams are prepared at Foundation and Higher tiers.

By determining a (sub)group the ALA Tool users make an on-line enquiry on the central server of the National Examinations Centre in Slovenia, where the number of candidates of the chosen (sub)group is calculated on the achievement of the selected group of candidates (i.e. the number, point average, standard deviation and

other information necessary for the presentation of the distribution of grades, points, etc).

Different options in the ALA Tool enable presentation of distribution and comparison of several distributions with different graph types: line or column graphs, pie charts, etc. Data from the ALA Tool can be exported to Microsoft Excel to perform further analyses (Zupanc, Urank, & Bren, 2006).

Figure 3 shows the distribution of grades in Geography in *Matura* (on the scale from 1 to 5) for two classes of the same school for the Spring session of 2006.

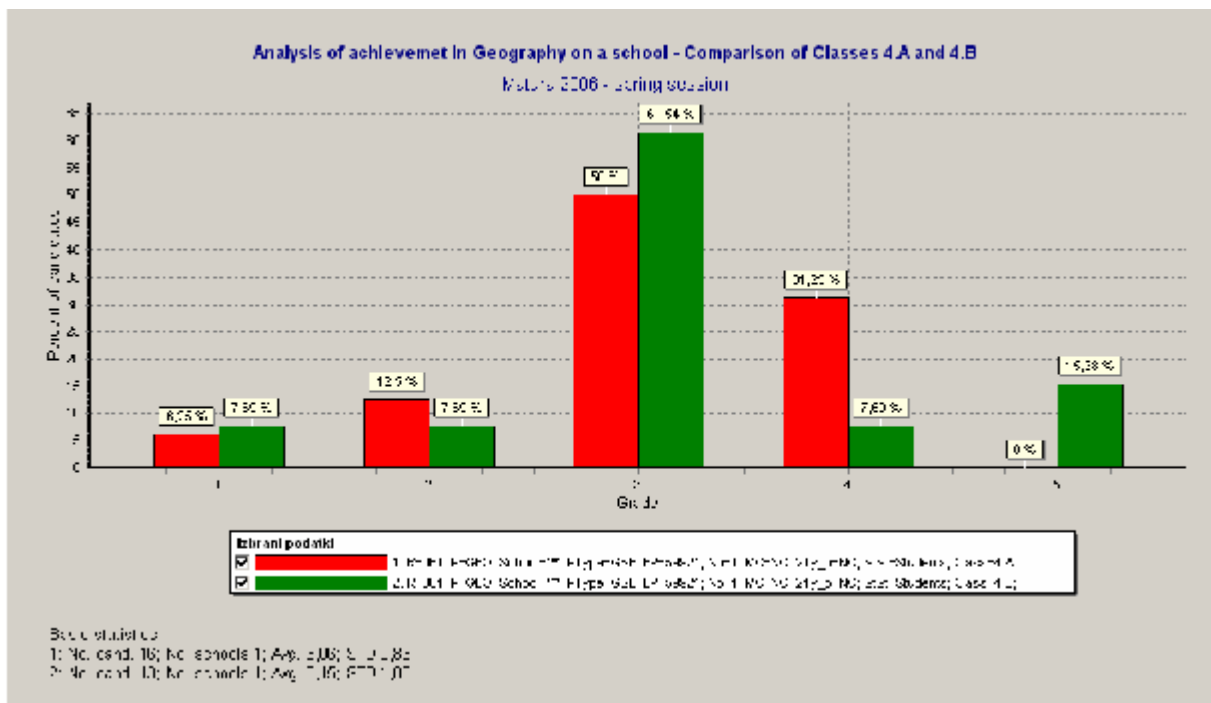


Figure 3. Analysis of achievement in Geography in a Slovene school: Comparison of Classes 4.A and 4.B (*Matura* 2006, Spring session) (Uranc, Zupanc, 2007)

We can interpret the classroom, school and national levels simultaneously; the data are the same and analyses are comparable. Such information can be used to identify strengths and weaknesses and to develop strategies for improvement.

A few analyses at the national, school and classroom levels will be presented.

This presentation will include the analysis of the proportion of successful students in GSE. In some schools (ca 20%) all students are successful, however, in the large majority of schools (ca 60%) there are between 95% and 100% of successful candidates. Candidates must successfully finish the final year of GSE, if they want to take the *Matura* exam. Variability between schools is greater if we take a look at the

proportion of students in the final year of individual USSs, who were unsuccessful in school.

In order to establish school efficiency, we should consider its achievement in a longer period, i.e. over several years. One should not generalize the results of a single Matura session. The ALA Tool database includes data on all schools for the last six years. Interesting trend analyses cover overall achievement in school, average subject grades in school, average candidate grades taught by the same teacher, etc. By choosing the school level, schools can compare their achievement, i.e. average grades in *Matura* with average grades of a comparable group at the national level. School can be above the national average in some subjects, while in others it can be far below it.

Analyses of classes and groups within schools can be performed according to teachers' grades in GSE or according to points or grades achieved in *Matura*. The ALA Tool makes it possible to make comparisons between school grades and grades of external exams, such as *Matura*. This way, the external assessment is more transparent. Identification of variability, which cannot be a matter of coincidence, is a very good starting point for self-evaluation of teachers' work in classes.

## **Conclusion**

With the development of this software ALA Tool, its implementation in schools and usage by teachers of different subjects we wish to contribute our share to the systematic gathering of numerous data of public examination, such as Matura in Slovenia, and to presentation and usage of these data for the purpose of improved teaching and learning.

The approaches of summative and formative assessment should be aligned, the focus on teaching and learning should be preserved and further innovation should be encouraged (*Formative assessment*, 2005). This is much more important for countries and educational systems where there is no tradition of such public external examinations. It has been very useful to distinguish between two complementary levels of formative assessment: Level 1 concerns the formative assessment which directly benefits the students who are assessed, and Level 2 concerns the situations where formative assessment data are used to inform the teacher making plans of future instructional activities for new student groups. Teachers are encouraged to



carry out Level 2 regulations as well, which can lead to systematic improvement of instruction in the long run. According to the OECD study, the use of data to inform the teacher making plans of future instructional activities for new (junior) student groups (or at the policy level, for policy adjustment) can lead to systematic improvement in the long run. This could be considered as a secondary level of formative assessment (Allal, Mottier, & Lopez, 2005).

In the future our plan is to work with headmasters and teachers to show them how to use, analyse and interpret results from the ALA Tool. Students' achievements will be presented in quantiles (quartiles) – with box plots, and we will look for appropriate methodology which enables comparison of achievement distribution.

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