

# National Assessment in Primary Education in Slovenia: Is it Possible to Implement E-marking in One Year?

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## Abstract

Slovenia is a small country. In the school year 2012/2013, 164,300 pupils attended 842 primary schools and their branches. Since 2006, the national assessment at the end of 6<sup>th</sup> and 9<sup>th</sup> grade of elementary school has had a formative role. The national assessment at the end of 6<sup>th</sup> grade (11- or 12-year-old pupils) is optional. The national assessment at the end of 9<sup>th</sup> grade (14- or 15-year-old pupils) is compulsory for all pupils in public and private schools. The national assessment is centralized, and the tests are externally prepared and marked.

In the school year 2012/2013, 17,855 pupils in 9<sup>th</sup> grade took the national assessment in three subjects: mother tongue, mathematics, and one of the four subjects that are determined each year by the competent minister.

Up to 2012, pupil's tests in 9<sup>th</sup> grade were marked by teachers at 17 marking centers around Slovenia. Due to teachers' absence at the time of marking, school principals had a lot of organisational problems. There was also reluctance among teachers, mistakes in filling out the forms to be scanned, and a lot of problems with the quality of marking.

Therefore, we decided in 2011 that in the school year 2012/2013 we will move to e-marking of pupils' tests at the end of 9<sup>th</sup> grade, a year later, the same form of marking will be introduced in 6<sup>th</sup> grade. In August 2012, we selected the Scoris Assessor marking system (RM Education) and then began intensive preparations for which we had a very limited amount of time. In this article we will explain how we prepared for e-marking, how we organized the training network, what problems we encountered during the preparation and the implementation itself, what were the responses of school principals, teachers, principal examiners and their assistants. You will also see the first results of changes in the quality of marking. The presentation will be of interest primarily to those who plan a similar project in the future and will find the Slovenian experience useful in the implementation of e-marking.

Key words: e-marking, national assessment, primary education

## **Introduction**

Slovenia is a small country with 2,058,821 (1) inhabitants in 2013. 164,300 pupils were included in primary education in the school year 2012/2013 (2). There are 785 elementary schools together with smaller branch units. Primary (compulsory) education in Slovenia starts at the age of 6 and finishes at the age of 15, comprises 9 grades, is organised as a single structure and is divided into three cycles, lasting three years each. All schools are public with only two exceptions (one Waldorf elementary school and one catholic elementary school). In 2013, 17,699 pupils were included in 9th grade (3).

## **National Assessment in Slovenia**

In comparison with other countries of former Yugoslavia and some other former socialist countries, Slovenia has a relatively long tradition in external assessment. At the beginning of the 90's, we developed external assessment in primary education, and started working on the secondary school Matura exam. The country's smallness and finances were the main reasons why national assessment was organized as a centralized system from the start.

In the last 21 years three different forms of external assessment in primary education have been introduced: "Group Assessment" in the 8-year-primary education with a distinctive summative function (1992-2005), National Assessment in the 9-year-primary education with a formative/summative function (2001-2005) and National Assessment in the 9-year-primary education with a formative function (since 2006). The National Assessment at the end of the second cycle (year 6) has a formative role. The same could be said about the National Assessment at the end of the third cycle (year 9); however, these results can still be used, with parents' consent, as an additional criterion for admission to secondary schools with limited enrolment.

The main goal of the existing National Assessment is to gain additional information on pupils' knowledge and the functioning of the school system on the primary level. The National Assessment provides pupils and their parents with additional information on the level of knowledge attained, making it comparable with achievements of their peers and with the national average. The National Assessment enables teachers and schools to evaluate the quality of their work, while on the system level it can be used as a basis for making further decisions on the development of the education system, curriculum evaluation, development of teacher training and corrections in teaching materials.

The National Assessment at the end of the second cycle (year 6; 11 or 12-year-old children) and the third cycle (year 9; 14 or 15-year-old children) is compulsory for all pupils in public and private schools. The National Assessment at the end of the second cycle was optional up to the school year 2012/2013. The National Assessment for children who are undertaking a program with lower educational requirements is optional at the end of the second and the third cycle.

At the end of the second cycle schools conduct the National Assessment in Slovenian (or Hungarian/Italian in ethnically mixed areas), maths, and a foreign language (English/German).

At the end of the third cycle, schools conduct the National Assessment in Slovenian (or Hungarian/Italian in ethnically mixed areas), maths, and one of third subjects determined by the minister (geography, history, English/German, technic and technology in the school year 2012/2013).

The National Assessment tests knowledge standards set by curricula. The tests include different types of questions, ranging from multiple-choice, short- and long- answer to open-ended and essay-type questions. The latter are less objective in terms of marking but provide invaluable information on specific pupils' abilities that could not be extracted in other ways.

The National Assessment for all pupils takes place on the same day at the same time, as a rule, in May. All pupils in one subject answer the same questions.

The costs of the National Assessment are covered by the national budget.

The responsibilities relating to the National Assessment are shared by several institutions and committees. The National Testing Committee is responsible for reliability, efficiency and transparency of the National Assessment; it also prepares recommendations and initiatives related to the National Assessment outcomes for the minister. Subject Testing Committees develop materials for the National Assessment (tests, mark schemes), materials for the item bank, expert reports on pupils' attainments and a report on their own work. Expertise, development and other tasks related to the National Assessment are provided by the National Examination Centre (NEC) and the National Education Institute (NEI). Teachers participate in the assessment process in schools and marking.

### **Before the introduction of e-marking**

In a 20-year history of external assessment, Slovenia has witnessed different organisational forms of external marking. The tests were paper-based and so was the marking. Besides marking the coded tests on paper, teachers had to fill in the marking sheets, which were then scanned at the NEC. The marking of the Group Assessment tests in the 8-year-primary education was done by primary school teachers, while the NEC recruited external markers for the marking of the National Assessment tests in the 9-year-primary education. In both cases the markers received payment for their work.

In 2006, when the National Assessment with a formative function was first administered, no longer having a decisive influence on final grades nor playing an important role in secondary school enrolment, the marking was organized as a part of teachers' working duties. The ministry in charge considered the National Assessment with a formative function as a part of the learning process. From then on, school principals had to name the teachers responsible for the marking of the National Assessment tests and the marking was no longer paid. This caused a lot of reluctance among teachers.

The marking of the tests at the end of the second cycle took place in schools: coded tests were marked by teachers using moderated mark schemes developed by subject testing committees.

The marking of the tests taken by the pupils at the end of the third cycle took place at 17 marking centres around the country; coded tests were marked by teachers following moderated mark schemes developed by the Subject Testing Committees under the supervision of principal examiners' assistants; principal examiners' assistants were appointed by the NEC. Marking was managed by the NEI which also organized teacher training for the marking. The external marking of the tests in one subject was completed in one day.

The pupils and their parents were able to review the marked tests. At the end of the second cycle this was done at schools in the presence of teachers who also carried out the re-marking procedure when enquiries upon results were made.

The enquiries at the end of the third cycle were made by school principals at nine regional centres across the country, where they were resolved by principal examiners' assistants.

### **Why we introduced e-marking**

Ever since the introduction of formative national assessment, the marking was one of the burning issues between teachers and school principals. The problem was largely discussed at a national level, by the competent Ministry, the National Testing Committee and the NEC. Dissatisfaction with the existing marking system was widely expressed also by the NEI, which was responsible for the organisation of the marking and teacher training. There were a number of attempts to change the existing external marking system in order to abolish distinctions between the marking at the end of the third and at the end of the second cycle. The National Testing Committee advocated that the marking should stay external as the transfer of the marking to schools would make the data less reliable and objective. Also, many comparisons and trend following would be lost. Intensive discussions about changes in the marking system started in June 2011. The NEC presented the concept of e-marking to the competent Ministry and to the NEI, and in September of the same year all three institutions signed an agreement to determine that in the school year 2012/2013 the National Assessment tests for pupils at the end of the third cycle would be marked electronically for the first time. In the year 2013/2014, when the National Assessment becomes compulsory for all pupils at the end of the second cycle, e-marking will be introduced for those tests as well.

The main reasons why we decided to introduce e-marking were:

1. School principals complained that teaching process at schools was disrupted due to the marking of the National Assessment tests at the centres. Four days a year the timetables had to be reorganized as the teachers of maths, Slovenian and third subjects were absent and the replacements had to be found.
2. There was a lot of reluctance among teachers. They found the existing marking system stressful and degrading. It seemed absurd to them that they had to fill in the marking sheets to be scanned later on at the NEC. Besides, the fact that school principals did not send all teachers to the marking centres caused a lot of discontent among the teachers who came to the centres, as they had to mark more tests than planned.
3. We wanted to improve and monitor the quality of marking. In the past it was not possible to monitor the marking quality of individual markers. The NEC drew attention to numerous errors in marking, non-compliance with the marking scheme and difficulties in marking open-ended responses. There were also a lot of errors in filling in the marking sheets (Figure 1). Consequently, there was a high number of enquiries upon results (Figure 2, Figure 3).

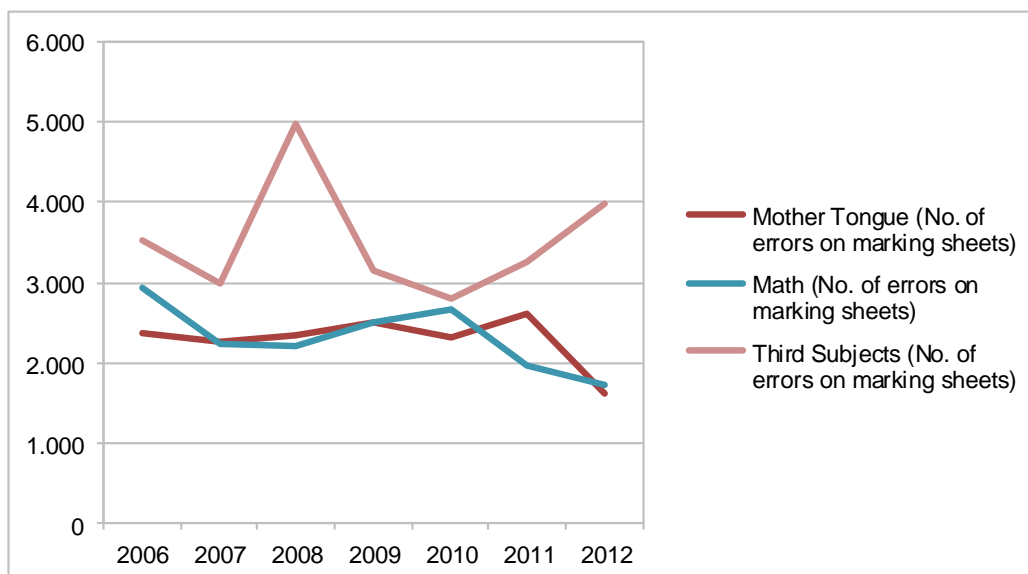


Figure 1: Number of errors on marking sheets for mother tongue, mathematics and third subjects, May session 2006–2012

Source: NEC, 2013

In 2006 teachers marked the highest number of tests, i.e. 62,412 tests. Since then the number has been falling, reaching 51,743 tests in 2012, which is due to a decreasing number of children in the population. Since 2006, between 7,337 and 9,522 marking sheets had to be corrected. The share of incorrectly filled in marking sheets moved between 13.0% in 2007 and 16.8% in 2008. In all other years it exceeded 14%. As shown in Figure 1, the most incorrectly filled in marking sheets belonged to third subjects, each third subject being on average tested every third year. The trends in mathematics and Slovene suggest that in eight years there was no significant progress in the accuracy of filling in the marking sheets.

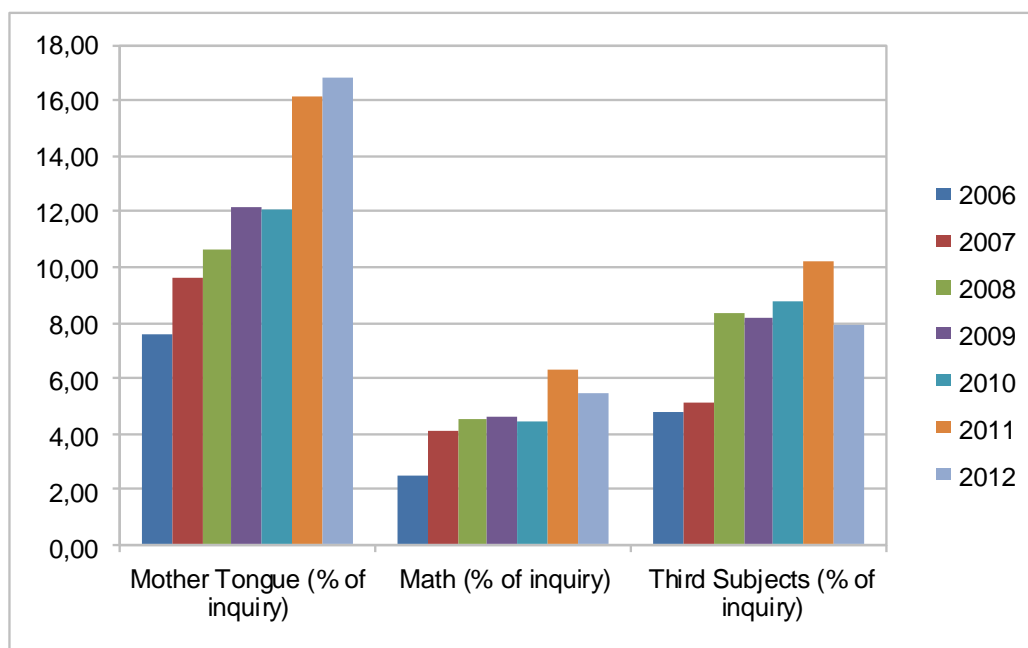


Figure 2: The share of enquiries upon results in mother tongue, mathematics and third subjects, May session 2006–2012.

Source: NEC, 2013

Figure 2 clearly shows that the share of enquiries upon results was the highest in mother tongue, leaving third subjects behind, while mathematics had the lowest share of enquiries. The data also shows that the share of enquiries increased every year. It is only in 2012 that we can note a slight decrease in mathematics and third subjects. While there were 3,099 inquiries altogether in 2006, the total number of enquiries peaked at 5,761 in 2011. The year 2012 saw a slight decrease; there were 5,210 enquires, which makes for 10.7% of all scripts.

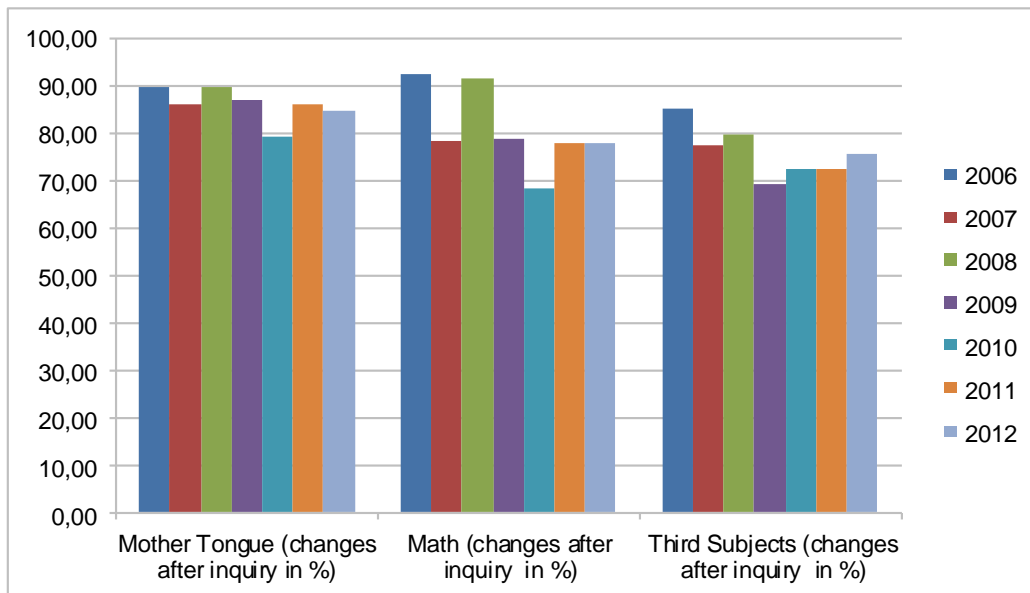


Figure 3: The share of changes after enquiries in mother tongue, mathematics and third subjects; May session 2006–2012.

Source: NEC, 2013

The share of changes after enquiries (Figure 3) shows that marked scripts really contained a lot of marking errors, which were not only of technical nature.

4. School principals complained about how enquiries upon results were carried out; they considered the procedure too expensive and time-consuming.
5. We wanted to increase security: due to numerous transfers of tests from schools to the NEC, from the NEC to the marking centres and then back to the NEC, and finally back to schools, it happened that every year a script was lost, mostly during the marking process.
6. With e-marking, savings will be made, especially in the salaries of teachers who participate in the marking process as they will no longer be absent from work.

### **First pilot e-marking project in secondary schools already in 2009**

Before introducing e-marking of the National Assessment tests in 2012, the NEC had some prior experience with e-marking. For several years the NEC put a lot of effort into promoting the necessity of introducing e-marking of the General Matura exams as it would enhance the quality of external marking. The General Matura in Slovenia is a high-stakes exam that concludes secondary general education and serves at the same time as an entry ticket to higher education. Therefore, the quality of external marking is extremely important. That is why the NEC decided to carry out a pilot e-marking project together with the British company RM Education from September 2009 to October 2010. The main aims and objectives of the project were as follows:

- To choose and evaluate a suitable software supplier.
- To evaluate the quality and suitability of the chosen e-marking software.
- To get familiar with technical prerequisites for the introduction of e-marking (preparation and digitalization of material, database preparation, script allocation, control over the marking process etc.).
- To analyse the impact of new technology on the quality of marking.
- To analyse the acceptance of new technology by external examiners and to gain their opinion on it.
- To analyse the quality of e-marking in comparison with the existing quality of marking.
- To carry out a study whether the software is suitable for the introduction of e-marking in all General Matura subjects.
- To estimate costs and savings that e-marking would bring.

During the pilot project one paper of each exam in compulsory General Matura subjects (Slovene, mathematics, English) was electronically marked. We tested the differences between paper-based and on-screen marking. The NEC and RM Education agreed that all project aims and objectives were achieved. However, the NEC did not obtain the agreement of the competent Ministry to gradually introduce e-marking of General Matura.

### **How we introduced e-marking in primary schools**

It was a big surprise when the competent Ministry gave their consent for the introduction of e-marking of the National Assessment tests. After signing an agreement on introducing e-marking in September 2011, the NEC considered two options: to develop its own software for e-marking, which would offer more independence in the long run, or to lease software, which was already tested and seemed as a more reliable option at the time. Due to time constraints the NEC decided for the latter option. In March 2012, a tender was published and the company RM Education with its Scoris Assessor application was chosen. All formal procedures were finished by August 2012 when intensive preparations for the introduction of e-marking began as seen from the table below.

<b>Activity</b>	<b>Date</b>
Preparation of Project Initiation Document	August 2012
Preparation of timeline	August 2012
Preparation of e-marking software	August–November 2012
Installation and configuration of software	August–September 2012
Translation of user interface	August–September 2012
Translation of user guides (marker guide, standardisation setup guide, supervision guide, online training)	September 2012–January 2013
Preparation of new software and adjustments to NEC information system (development of interface, indexing software, teacher registration software, enquiry upon results software)	October–December 2012
Test preparation (setting up new formats, page codes, defining test structures in Scoris Assessor)	September 2012–March 2013
Preparation of digitalisation procedures	October 2012–March 2013
Pilot project (test preparation, trialling and confirming the pilot version of the software, pilot standardisation and marking)	October 2012–December 2012
Informing schools, pupils, parents and general public about e-marking	September 2012– ...
Preparation of instructions for schools on how to carry out e-marking and enquiries upon results	September 2012–March 2013
Workshops and trainings for NEC employees, computer operators, e-marking assistants at schools, NEI advisers, headmasters and principal examiners' assistants	September 2012–April 2013
Defining procedures for teacher/marker data recording; database setup and database management	September 2012–January 2013
Defining conditions for appointing principal examiners' assistants, deciding on the number of assistants needed and selection procedure, arranging database	September 2012–March 2013
Preparation of timeline for e-marking and enquiries upon results	February–March 2013
Preparation of online questionnaires for teachers, headmasters, principal examiners, principal examiners' assistants	March–April 2013
E-marking (May session)	13 May–24 May
E-marking (June session)	3 June–6 June 2013
Enquiries upon results (May session)	29–31 May 2013
Enquiries upon results (June session)	11–12 June 2013
Analyses of questionnaires	June, July, August 2013
Preparation of reports and analyses	May–September 2013

Table 1: Sequence of activities related to the introduction of e-marking



From signing the license agreement it took only eight months to establish e-marking. The NEC was well aware of the fact that the project would only be successful if the training network was well organised, as all teachers of the subjects tested in the third cycle would participate in e-marking. The data from previous years showed that there were around 4,000 such teachers. Considering the fact that the marking of national exams is one of teachers' working duties, all teachers had to be involved, especially because of the washback effect that e-marking could have on in-class assessment.

RM Education delivered initial trainings on the use of the e-marking application (Scoris Assessor) and on the standardisation process for the NEC employees, principal examiners and 21 computer operators responsible for teacher trainings on the use of ICT. RM Education also carried out workshops on system administration, the use of administrative interface, technical support and online services. The NEC provided additional trainings for computer operators on the use of Slovene version of Scoris Assessor and prepared them for further trainings that they had to carry out for 463 e-marking assistants appointed by school principals at schools across Slovenia. The role of e-marking assistants was to ensure a smooth e-marking process at schools and to familiarise teachers with the technical side of the e-marking application. In November and December 2012 the NEC and the Subject Testing Committees tried out the pilot Slovene version of the application. However, due to time constraints it was impossible to test all additional tools (script review, enquiry upon results, reports, marking of atypical scripts etc.) The NEC also provided training for 34 subject advisers at the NEI, who later on trained more than 4,000 teachers at 258 workshops for the practical use of the application. The workshops were organised for small groups so that each participant could use their own computer. In March and April the NEC organised trainings for 225 principal examiners' assistants, who participated in the standardisation setup process together with subject testing committees.

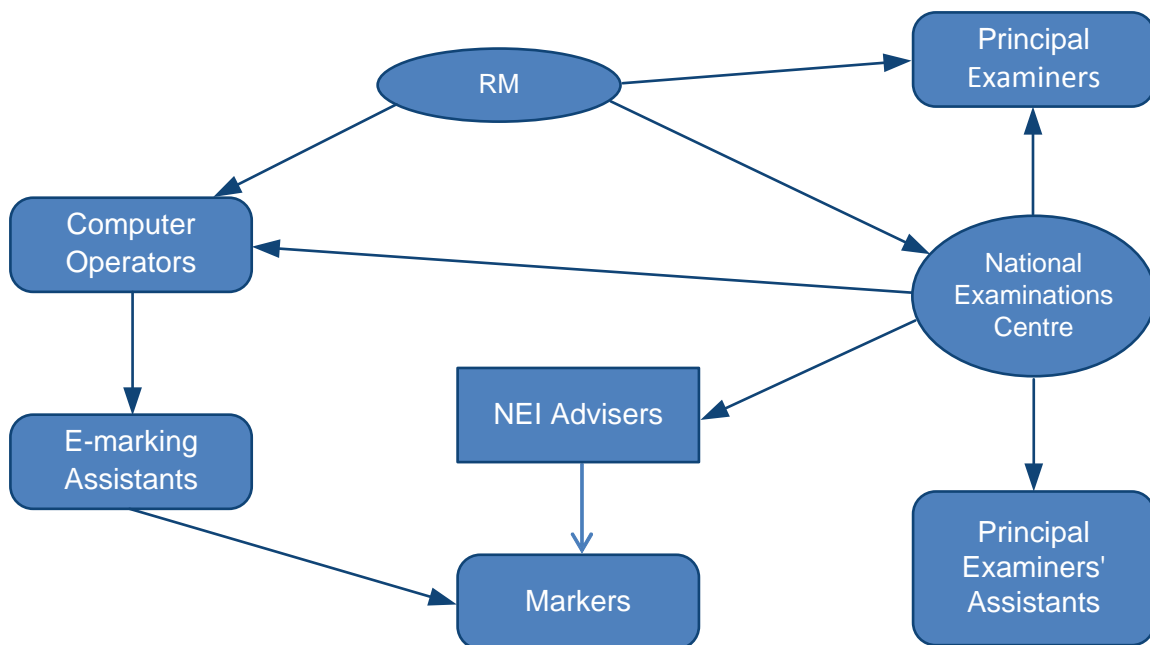


Figure 4: Organisational outline of training for the e-marking process

### **How e-marking was carried out**

After pupils had taken the exams, the scripts were sent to the NEC where they were digitised. Moderation of mark schemes was done by Subject Testing Committees and principal examiners' assistants. In addition, they had to prepare so-called Standardisation Setup in Scoris Assessor, which meant choosing one practice, two standardisation and three seeding scripts and marking them, i.e. applying so-called definitive marks. The NEC was given 4 to 6 days for the above activities but they often overlapped. In accordance with the National Assessment Schedule, teachers of maths and Slovene were given five working days for e-marking, while three working days were assigned for e-marking of other subjects.

Principal examiners in each subject and their assistants were responsible for providing expertise, monitoring markers' work and ensuring accuracy. There were 50 principal examiner's assistants for maths and Slovene respectively, 45 for English and 25 for each of the following: geography, history, design and technology. Subjects with a very small number of candidates (Italian, Hungarian, and Lower Education Standard) did not have principal examiner's assistants. In all, 3,936 teachers marked 62,540 scripts. On average, each maths and Slovene marker marked 20 scripts, while the markers of other subjects marked around 15 scripts. The first day of marking was devoted to practice and standardisation: teachers were supposed to mark practice and standardisation scripts at school, in the presence of the e-marking assistant. Practice was intended to familiarise markers with the mark scheme instructions. After a marker submitted standardisation scripts, they were reviewed by a principal examiner's assistant who pointed out any possible mistakes or deviations from definitive marks. Markers themselves were able to compare their marks with definitive marks as well. After submitting standardisation, all markers were approved for marking. Standardisation scripts did not serve to suspend markers but were used as a quality control factor. Unfortunately, we were not able to use this mechanism as it is used elsewhere because we feared that teachers, who were not additionally paid for marking, would boycott the marking or deliberately poorly mark the standardisation scripts in order to get suspended.

After e-marking was finished, pupils were able to electronically review their scripts. For the first time, pupils and their parents had online access to scripts by using their personal identification number and their exam code. For scripts where marking errors were discovered, headmasters used a special online application and filled in a form in order to appeal against results. The principal examiners and their assistants reviewed and re-marked the scripts, which were then sent back to schools and pupils.

### **Problems we encountered during the preparation and the implementation**

While preparing for e-marking and at the time of e-marking we did not encounter any major problems. Considering a very short deadline we had to meet to implement e-marking, we can say that the process was carried out extremely well. Nevertheless, we can point out certain difficulties that we faced:

- During the pilot it was not possible to test certain procedures, which means that they were not tested until going live. Therefore, there was an ongoing feeling of uncertainty, but fortunately, in May 2013, e-marking and all related activities ran smoothly.
- Test papers were prepared before the decision about moving to e-marking was taken and so they were only partly adapted to new needs. If Subject Testing Committees had been able to use the e-marking application beforehand, they would have developed tests accordingly.

- The biggest problem we encountered right before going live was open letters addressed to the competent Ministry, general public and to everyone involved in the e-marking implementation. In the letters, teachers expressed their disagreement with the formative role of the National Assessment, but above all, they complained about spending money on e-marking at the time of financial crisis. They were also opposed to the fact that e-marking would be done after classes. This was happening right before e-marking was about to begin, when there was plenty of other work, which was very stressful.
- Certain markers were not well prepared for e-marking which was due to poor quality of certain trainings, absence from the trainings or to the fact that some teachers still do not use ICT.
- There were plenty of remarks concerning test structures. Teachers complained especially about the Slovene test, which contained a lot of open and half-open questions. E-marking of responses to such questions takes more time, it is more demanding and the marking scheme is more complex.
- Some markers did not respond to messages received from principal examiner's assistants.
- Marking of unscannable scripts (A3 enlargements, braille, latex, etc.) represented a special challenge. Such scripts were marked in written form by principal examiners' assistants; later on, the scores were entered into Scoris Assessor.
- Reviewing the marking of standardisation scripts that differed from definitive marking was extremely time-consuming for principal examiners' assistants. Consequently, it took some time before they began reviewing seeding scripts and notifying the markers about differences between their and definitive marking. There were cases when markers marked standardisation scripts within tolerance but were largely outside tolerance when marking seeding scripts. In such cases, they were only notified about their mistakes towards the end of e-marking, when they had to go through the scripts all over again and correct the mistakes.
- Despite the fact that the role of seeding scripts was explained in the translated and abridged version of the user guide for markers and that the markers were told about it at trainings, many of them angrily claimed that they were not informed about it.
- As it often happened that teachers at the same school were doing the marking together, they discovered that they were given the same practice, standardisation and seeding scripts. In future, it would therefore be a good idea to prepare more scripts, at least for seeding.
- In the two weeks that e-marking was in progress we only experienced four hours of technical problems when there were difficulties with logging in.

### **Responses of school principals, teachers, principal examiners and their assistants**

Immediately after e-marking, school principals, teachers, principal examiners and their assistants were asked to answer a questionnaire prepared by the NEC. The questionnaire contained questions on computer literacy, programme installation, e-marking trainings, e-marking itself, communication with principal examiner's assistant or with principal examiner, quality control during e-marking, advantages and disadvantages of e-marking.

A crucial question regarding success of the project and the future of e-marking in Slovenia was: "What was your opinion on the implementation of e-marking before the actual e-marking and what is your opinion after having participated in e-marking?"

The analysis, based on 412 responses by school principals (98.8%), showed that more than half of school principals were in favour of e-marking before it was introduced, the support rising to 82% after the implementation, mostly due to the principals who had no opinion before the introduction of e-marking. (4)

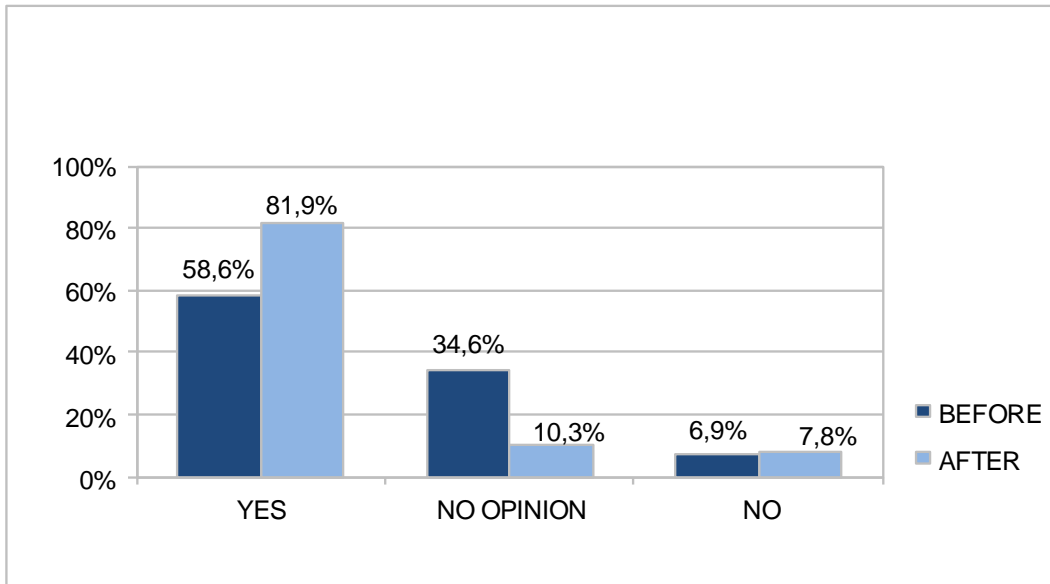


Figure 5: School principals' support to e-marking before and after implementation  
Source: NEC, 2013

Teacher survey was completed by 1,567 markers, which represents 40% of all markers. Despite the fact that teachers expressed less support compared to school principals, big differences in opinion before and after the introduction of e-marking can be seen. Teacher support before the implementation of e-marking was low, amounting to 21%. After the implementation, it rose to 56%. The share of teachers with no opinion dropped considerably, and there was an 11% decrease in the share of those against e-marking.

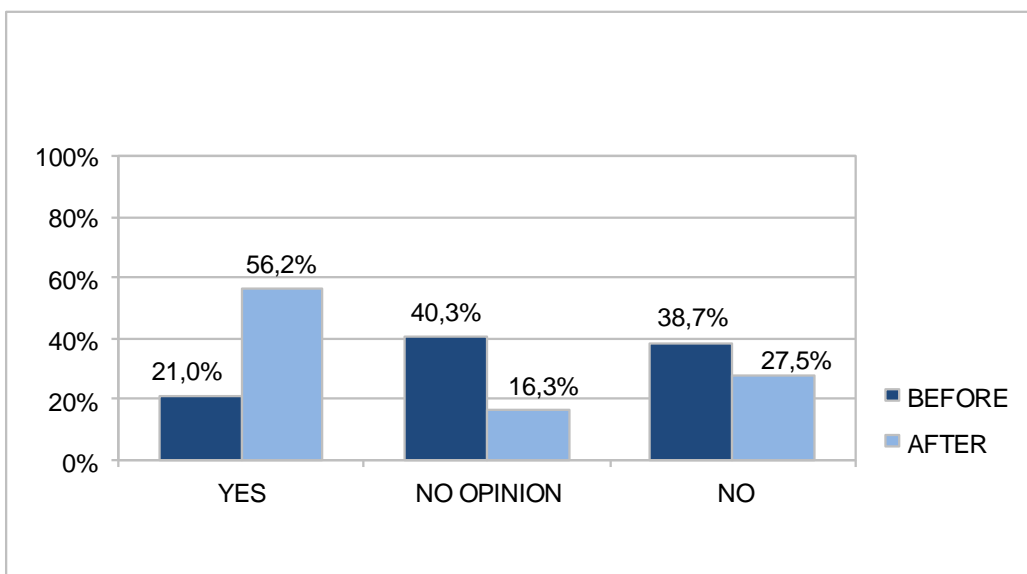


Figure 6: Teachers' support to e-marking before and after implementation  
Source: NEC, 2013

Compared to traditional marking, i.e. paper-based marking in the past, teachers believe that the possibility of technical errors is much lower, while the possibility of content-related errors is, in their opinion, higher. According to teachers, the overview of completed work is better but they feel that e-marking is more time-consuming and more tiring. Teachers awarded different aspects of the Scoris Assessor application with high average marks, all exceeding 3.6 on the scale from 1 to 5 (transparency of the programme, quality of scanned scripts, use of annotations, use of comments, sending messages, raising exceptions, clarity of the text in the programme, processing speed). A high percentage of teachers (88.1%) believe that being supervised by a principal examiner’s assistant is useful, and 78.5% of teachers replied that it did not bother them that principal examiner, principal examiner’s assistant and authorised NEC employees had insight into their work during e-marking. Most teachers find quality assurance procedures (practice, standardisation, seeding) necessary or useful. We can conclude that markers consider it necessary to be supervised during marking; on the other hand, there are a lot of markers who do not support e-marking, which is contradictory since the old way of marking did not enable such supervision. For markers, the biggest advantage of e-marking is electronic access to scripts and better control over the marking. When asked about the biggest disadvantages, they state that e-marking is physically more tiring, offers less personal contact with other markers and is dependent on suitable computer equipment. (5)

The questionnaire for principal examiners and their assistants was completed by 221 out of 224 teachers (98.7%). More than a half of them (56.1%) supported e-marking before the implementation, the number rising to 94.1% after the implementation. The share of those who were not in favour of e-marking decreased by 8% and it is now negligible (1.4%). (6) It is not surprising that principal examiners and their assistants express a strong support to e-marking as they applied for the job themselves.

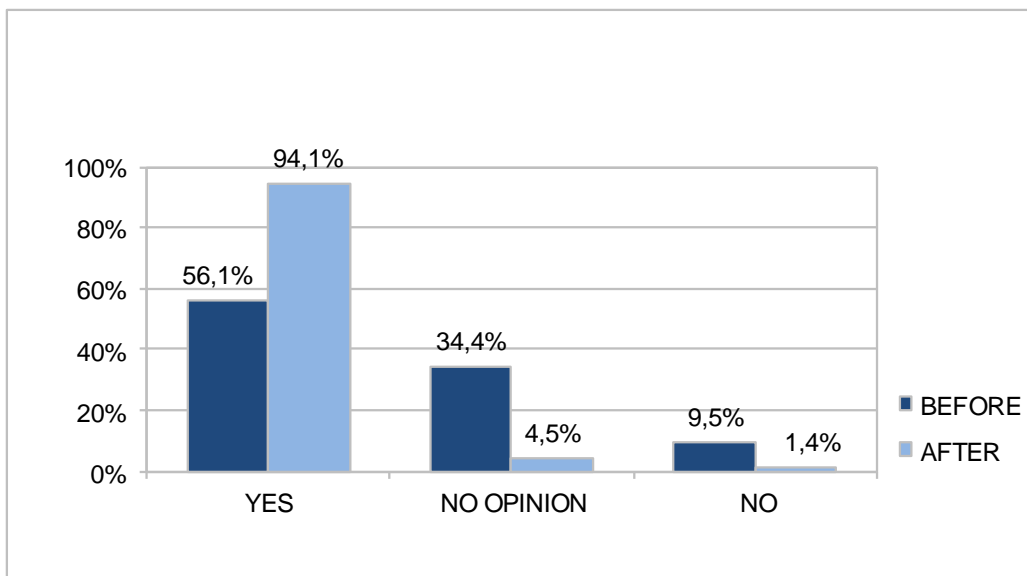


Figure 7: Principal examiners’ and their assistants’ support to e-marking before and after implementation

Source: NEC, 2013

In comparison with traditional marking (i.e. paper-based marking in previous years), principal examiners and their assistants believe that e-marking offers a higher possibility to discover and eliminate technical errors (miscalculations etc.) and marking errors (marking not in accordance with the mark scheme). They feel that they have a better overview of completed work, while time consumption is almost the same. They find supervising the markers more tiring but at the same time feel that control over the marking quality is better and so is communication with the markers. Most principal examiners and their assistants (98.6%) found Scoris Assessor familiarisation mode useful, and they rated different aspects of Scoris Assessor with high average marks, all exceeding 4.1 on the scale from 1 (unsatisfactory) to 5 (excellent): transparency of the programme, quality of scanned scripts, use of annotations, use of comments, sending messages, raising exceptions, clarity of the text in the programme, processing speed. Communication between principal examiners and their assistants ran smoothly, 68.4% of principal examiners' assistants claim that communication was even better compared to previous years when marking was done at regional centres. The assistants often monitored markers' work (around 25% at least once and around 75% several times). Almost all of them believe that monitoring markers' work is useful (99.1%) but only 25% see it as undemanding. Better control over marking, electronic access to scripts, improved marking accuracy and better marking quality are, in their opinion, the biggest advantages of e-marking, whereas less personal contacts with markers and physically more tiring work are seen as the biggest disadvantages. (6)

### **Changes in the quality of marking**

For the NEC, changes in marking quality were one of the principal aims of the introduction of e-marking. By no means did we expect to see changes in the first year when our primary task was to ensure that the system worked smoothly. However, a certain progress was already noted.

1. An increased teacher participation in marking: in total, 3,936 teachers participated in marking (3,238 in 2012, 3,590 in 2011), which is almost 700 teachers more than a year before. This is very good news as continuous monitoring enabled us to make sure that teachers from all schools were included in the marking process. For the first time we can now refute some teachers' accusations that some school principals did not register any teachers for the marking.
2. Errors on marking sheets: the new marking system does not involve marking sheets anymore so technical errors are gone. Being warned by the system, the markers are now able to eliminate all possible errors during e-marking.
3. Number of enquiries upon results: the number of enquiries is significantly influenced by the type of exam questions. When a test contains a large number of open or half-open questions, there are more deviations in marking, hence an increased number of enquiries upon results. Mother tongue, foreign languages, geography, history, civic education and ethics are subjects with a higher share of such questions. Although it is difficult to compare the total number of enquiries between years as the third subjects differ from year to year, we can say that the number of enquiries upon results decreased. There were 4,037 enquiries in 2013, of which 1,737 were made for mother tongue, 980 for mathematics and 2,293 for third subjects. The share of enquiries for mother tongue was 10.2% this year, which is by far the lowest value since 2007. Compared to last year, it decreased by 6.7%. The share of enquiries for mathematics is comparable to the last year's share. The share of positively resolved enquiries upon results was 79.6% for

mother tongue and 76.3% for mathematics, which is less than in 2012 for both subjects. The e-marking application enables practice before marking starts, standardisation of applying marks to individual responses on concrete examples equal for all markers, and live monitoring of marking objectivity and reliability during the process. Such marking system has substantially contributed to a better marking quality.

4. Improved feedback: during the e-marking process, markers were able to highlight the problems that may have appeared and ask questions. At the same time, they quickly received answers and feedback from principal examiners or their assistants. It was possible to discover marking inconsistencies which were at least partly corrected during live marking. This was not the case with traditional marking.
5. Marking quality analysis: in the past, it was not possible to make individual analyses on marking quality, whereas with Scoris Assessor it is possible to collect various data on marking, on the basis of which marking quality analyses for each subject, each item and each marker can be made. The NEC is obliged to make marking quality analyses and send them to markers and school principals, who then have to prepare a report on marking and suggest measures to improve marking quality.

#### **Tips for those who are going to implement e-marking**

- It is important to provide the general public and everyone involved in the process of e-marking with up-to-date information in time.
- Training plan for markers and other participants needs to be carefully prepared. Marker trainings should be done right before e-marking begins.
- Special attention must be paid to establishing marking network and choosing competent principal examiners and their assistants.
- Test developers must familiarise themselves with e-marking beforehand as they will find it easier to decide on appropriate test structure and eliminate test methods which pose difficulties for the markers. More than ever before, the tests are now exposed to the public, making it even more important that they are well prepared.
- There must be enough time to carry out moderation and standardisation setup procedures. Practice, standardisation and seeding scripts must be chosen by previously set criteria, which will meet the needs of principal examiners and their assistants. It is important to choose scripts with legible handwriting and without blank responses.
- In order to assure a better comprehension of mark schemes, it would be a good idea to offer explanations of mark schemes via video conference as the markers seemed to miss that.
- It is vital to devote enough time for review and appeal procedures, bearing in mind that not all schools are equipped with computers equally.

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