

## UPPER-SECONDARY TEACHERS' PERCEPTIONS OF THE MATURA EXAM IN MATHEMATICS

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*This paper reports a study on mathematics teachers' perceptions of the Matura mathematics exam in Croatia. The study focuses on the suitability of mathematics school textbooks for students' preparation for the exams, the complexity of the tasks in the exams, the grading and scoring of the exams, and teachers' level of satisfaction with student achievement. The study used a convenience sampling method. It was conducted through a questionnaire administered to 308 upper secondary mathematics teachers. The findings showed that teachers do not perceive school textbooks as suitable resources to prepare for the higher level exam. Furthermore, the teachers believe that the test length is not appropriate i.e., the time given to students for the higher level exam is insufficient. On average they are satisfied with their students' results, but are undecided about the criteria and scoring of the Matura. Vocational school teachers showed more dissatisfaction with the requirements and outcomes of the Matura exam compared to grammar school teachers. The results of this empirical study can be taken as a good starting point for re-assessing the requirements of the Matura exam in mathematics.*

**Keywords:** *Matura exam, mathematics teacher, teacher attitudes, textbooks, school-leaving examination in mathematics*

## 1. Introduction

A national secondary school-leaving examination, called the Matura, was introduced in the Croatian educational system in 2010 (NN, 1/2013). It is a form of graduation of upper-secondary school, functioning as an exit exam from the secondary education system (Holme *et al.*, 2010). School-leaving exams are also known as exit exams, state graduate exams or certificate exams. The Matura is an external exam conducted by the National Centre for External Evaluation of Education (NCVVO, 2020). In external exams, external actors have control over the testing process like test design, assessment/scoring, use of the results/outcome, and the individual teacher cannot object to how these processes are implemented (Jonsson and Leden, 2019). The Matura is also a high-stakes exam because it has important consequences for students on the basis of their performance, namely it has an entrance function to the desired higher education institution. Lastly, the Matura is conducted in a standardised manner (Primorac *et al.*, 2009). This means that all test takers have to sit for the same test and under the same conditions, sometimes also at the same time (Jonsson and Leden, 2019). Standardisation secures comparability among the test takers.

Mathematics is one of the compulsory subjects in the Matura. Considering that the Matura was implemented more than ten years ago and given the multiple roles it has, we argue that it is important to examine how mathematics teachers view the exam. Therefore, we conducted a study to investigate mathematics teachers' perceptions of the Matura exam in mathematics in terms of: general requirements; the mathematics textbook used; student achievement in the exam; and the compatibility of students' final school grades in mathematics with the grades achieved in the Matura mathematics exam.

## 2. Matura in Croatia

### 2.1. General outline of the Matura exam in mathematics

The Matura is set of exams which are compulsory for students finishing four years of grammar school (NN, 1/2013). Upper-secondary schools in Croatia include grammar schools (general or specialising in natural sciences, mathematics, foreign languages, or classical language-

es), vocational schools, and art schools. Vocational schools last from one to five years depending on the type of education programme required for a particular profession, i.e. the vocational curriculum for obtaining a qualification. The Matura exam is not mandatory for students in vocational schools, but can be taken by those students who attend four- and five-year vocational schools, who want to continue to higher education. Students who complete four-year art schools may also sit for the Matura exams. The Matura is organised and conducted by the National Centre for External Evaluation of Education, which is also responsible for marking the exams and awarding grades. Grades are awarded according to the average of the population's results, and there are no pre-set criteria for passing the exam (NCVVO, 2018).

Mathematics is one of the compulsory exams in the Matura. It can be taken at two levels: the higher level (A) and the basic level (B) (NCVVO, 2020). Students select which level of the exam to take based on the requirements of the higher education institution they wish to attend. The higher level (A) of the Matura exam in mathematics also affords access to those institutions that require the basic level (B). Students who take the basic level (B) of the mathematics exam are not eligible to apply for institutions which require the higher level. The higher level exam in mathematics corresponds to the maths curriculum of grammar schools (NCVVO, 2020). However, the number of hours taught differ according to the education programme of the school. For instance, grammar schools with a focus on foreign languages have mathematics three hours per week for all four years. Grammar schools specialized in mathematics have at least four hours of mathematics per week for all four years. However, the higher level exam in mathematics also corresponds to most four-year vocational school programmes where mathematics is taught at least three hours per week (NCVVO, 2020). The basic level exam in mathematics corresponds to the cross-section of other four-year upper secondary programmes where mathematics has the minimal number of hours per week. For comparison, some four-year vocational schools have mathematics two hours per week for all four years which places vocational students in a difficult position in terms of access to the higher level Matura exam in mathematics.

The higher level exam in mathematics lasts up to 180 minutes, and the basic level exam lasts up to 150 minutes (NCVVO, 2020). The basic

level exam has 28 tasks in total – 16 multiple choice and 12 short answers and participants can achieve a maximum of 40 points. The higher level exam has 30 tasks in three categories – 15 multiple choice, 13 short answers and 2 long answers and participants can achieve a maximum of 60 points.

## ***2.2. Studies related to the Matura in Croatia***

Even before the Matura was introduced into the Croatian educational system, Bezinović (2009) pointed out that it promotes inequality because students from grammar and vocational schools are exposed to completely different curricula during their secondary education but have to/will take the same exam. Namely, the upper secondary vocational school curricula in Croatia promote diversity, whilst the Matura concentrates on one set of learning outcomes. Recently, Baketa *et al.* (2020) conducted a study related to the perception of equality and fairness of the Matura from the point of view of upper-secondary school principals. The opinions of the principals of grammar, vocational and mixed secondary schools differ in terms of fairness of access to higher education. The principals of vocational and mixed schools believe that the Matura is more tailored to grammar school students. Moreover, they believe that this inequity is reflected in the enrolment requirements of higher education institutions which call for the higher level Matura exams. Consequently, vocational students are less likely to be accepted into the higher education institution of their choice. Evidence of this was also shown in the study of Žauhar *et al.* (2016) who analysed the structure of students enrolled at the Faculty of Medicine and the Faculty of Health Studies at the University of Rijeka, before and after the introduction of the Matura. Their study showed that the proportion of students who had attended grammar schools increased significantly after the introduction of the Matura compared to the proportion of students who had attended vocational schools.

## ***2.3. Research foci***

Our literature search shows that the number of studies related to Matura exams is small. Studies that examine the mathematics teach-

ers' role, beliefs or practices in the context of the Matura, are practically non-existent. Mathematics teachers work with students teaching them and preparing them for the Matura exam through upper-secondary school, but also have the opportunity to participate in the development of tasks for the Matura exams, to review exam materials and mark the exam papers (the tasks that require short and long answers) every year. Accordingly, we designed a study that aimed to cover teachers' opinions and attitudes about several aspects of the Matura exam in mathematics. The research foci of this study are on teachers' opinions and attitudes concerning:

- the suitability of school textbooks for preparing students for the Matura exam
- the design of Matura mathematics exams over the years
- scoring in the Matura exam in mathematics
- satisfaction with the results obtained by their students.

Moreover, we are interested in looking at teachers' opinions and attitudes in relation to the type of school at which they teach.

### **3. Studies related to the research themes**

In this section we provide relevant results and studies to support our research themes.

#### ***3.1. Mathematics textbooks***

The first research theme in our study is related to mathematics textbooks. Mathematics textbooks greatly influence mathematics teaching practice, maybe more than in other school subjects (Fan *et al.*, 2013). Because of this, the textbook used by the students affects the opportunities to learn that they are provided with. Studies investigating student achievement in some form of external evaluation, like TIMSS or national exams, showed that there is a correlation between better student achievement and mathematics textbooks that have higher cognitive level tasks (Hadar, 2017; Törnroos, 2005). Textbook analysis has shown that Croatian lower and upper-secondary mathematics textbooks mostly contain tasks with a low cognitive level, namely procedural tasks

dominate over conceptual ones (Glasnović Gracin, 2018; Glavaš *et al.*, 2019).

### **3.2. Design of exam tasks in mathematics**

Our second research theme is concerned with teachers' perceptions of the Matura exam in mathematics over the years. This theme is approached from the perspective of task design in mathematics education and its complexity. The term 'complexity' refers to the extent to which the task differs from performing a simple calculation to a complex synthesis integrating problem solving, communicating, reasoning, and making connections (Suurtamm *et al.*, 2016). Mathematics teachers should be aware of Matura exam task features, not to *teach to the test*, but to enhance their teaching practice if necessary and to prepare students for the Matura exam adequately. Moreover, a component of teaching mathematics is related to the selection, modification, design, utilization and evaluation of tasks (Dieteker *et al.*, 2018) and such work is achieved using the textbooks or other curriculum materials, such as past papers of the exam.

The catalogue of the Matura exam in mathematics (NCVVO, 2020) prescribes which mathematical domains and associated learning outcomes may appear, but not what must appear in the exam. This also contributes to task design and its complexity.

### **3.3. Grades awarded by teachers and external evaluation**

The third research theme in our study is concerned with scoring in the Matura exams in mathematics and, consequently, with the grades students obtain in the exam and those awarded by the teacher. The reliability of a teacher's grade is important for schools, teachers, families, and students. Some studies have examined the relationship between the grades given by the teachers and some form of external examination. In one way, the teachers' grades are more reliable than outside measure because of their holistic nature, i.e. the teachers can make reliable judgements about student achievement because of their interactions with students over time (Marlow *et al.*, 2014). In contrast, formal assessment can be considered more accurate and objective than

the teacher's assessment (Black *et al.*, 2011). A review of studies which examined the accuracy of teacher judgement compared with external exams described mixed results – some studies reported strong accuracy and some studies reported weak accuracy (Brookhart, 2013).

### ***3.4. The impact of students' Matura exam results on teachers***

Our fourth research theme is concerned with teacher satisfaction with students' results at the Matura exam in mathematics. The results of such a high-stakes exam can have various consequences for teachers. Some countries implemented policies to evaluate teachers' effectiveness based on their students' exam results. This means that teachers are being held accountable for student success. Such policies contribute to an increase in job-related stress experienced by teachers (e.g. Ryan *et al.*, 2017) and have a negative effect on teacher self-efficacy (Abrams *et al.*, 2003). Moreover, teachers often feel uncomfortable or humiliated when their students' passing rates are presented at school meetings (Booher-Jennings, 2005). Sometimes low passing scores result in penalties for teachers (von der Embse *et al.*, 2016). On the other hand, teachers' dissatisfaction with students' results can lead to the narrowing of the curriculum and teaching only to the test (e.g. Abrams *et al.*, 2003). In Croatia, teachers are not penalised for students' low scores in the Matura, but it is possible that the results impact their self-efficacy and teaching practice.

## **4. Methodology**

### ***4.1. Participants and data collection***

The study presented in this paper was conducted in 2019, using a convenience sampling method (Cohen *et al.*, 2018). The teachers for the study were recruited through a research participation pool at a local university where many teachers participated in mathematics professional development workshops or conferences. We sent an email to the participants with a link to the digital form of the questionnaire. The participants' responses were collected anonymously, meaning that we did not collect any information that could reveal the teacher's identity

such as name, email address, or name of the school. Data collection began at the end of July 2019 and lasted for a month. Completion of the questionnaire took about 15 minutes.

We took care that the sample of teachers for the study to some extent agrees with the official data on students who took the Matura exam in mathematics in 2018. Therefore participants were asked socio-demographic questions that provided information on their gender, years of service, career advancement, type of school they work at, and whether they corrected Matura exams (Table 1). Among 392 upper secondary school programmes in Croatia whose students took the state graduation exam in 2019, 189 (48 %) are grammar schools, and 203 (52 %) are vocational schools (MZO, 2018). The sample of teachers who participated in this study agrees with this to some extent: 51 % of the teachers work in vocational schools, and the rest work in grammar schools. More than 40 % of the teachers participated in marking Matura exams in mathematics. Given the information we have about the teachers who participated in the study, we believe their attitudes and opinions are a good representation of upper-secondary mathematics teachers in Croatia.

**Table 1.** Information about the participants

Participant information	N (%)
Gender	
Female	268 (87%)
Male	40 (13%)
Type of school	
Grammar (non-mathematics)	112 (36%)
Grammar (mathematics)	38 (12%)
Vocational	158 (51%)
Teaching experience	
< 5 years	37 (12%)
6-15 years	95 (30%)



16-25	84 (27%)
26-34	71 (23%)
35+	21 (7%)
Teacher promotion	
No promotion	168 (54.4%)
Teacher mentor	90 (29.2%)
Teacher adviser	50 (16.2%)
Experience in marking Matura exams	
Participant	130 (42%)
Non-participant	178 (58 %)

#### 4.2. Instrument

We designed a questionnaire that sought to capture all relevant aspects of the research themes. The questionnaire (Appendix, Table 2) contained 32 items to determine the opinions and attitudes of mathematics teachers on: the suitability of school textbooks for student preparation for the exam; the design and complexity of tasks in the Matura exam over time; the quality of passing criteria and scoring methods for the Matura exam in mathematics; and teacher satisfaction. Each item was to be evaluated on a five-point Likert-type scale where 1 = strongly disagree and 5 = strongly agree. The result is expressed as the mean value of the response.

The questionnaire was designed exclusively for the purposes of this study, thus it was necessary to perform an exploratory factor analysis (EFA) using the principal axis factoring (PAF) method before processing the data. Initially, all items were examined and this resulted in recoding items 11 and 22. The Kaiser-Meyer-Olkin and Bartlett's test (0.876,  $p = 0.000$ ) were used to examine the adequacy of the data. We retained five factors whose characteristic roots exceed 1. The factors obtained by the analysis of the main components explain a total of 63.21 % of the variance of the manifest variables.

The first factor refers to the teacher's opinion on the suitability of the textbooks used to prepare students for the basic level of the Matura

exam (items 1–4). The second factor relates to teachers' opinions on the suitability of the textbooks used to prepare students for the higher level Matura exam (items 5–8). The third factor, which refers to the design of the Matura exam over time, consists of 4 items (recoded 11, 15, 18, 19). The fourth factor consists of five items (23, 25, 26, 27, 29), and refers to the teachers' opinion about the scoring of the Matura exam. The fifth factor, referring to the criteria of the Matura exam, consists of three items (20, 21, 24). The rotated factor matrix can be seen in Table 3.

**Table 3.** Rotated factor matrix

	Factors				
	1	2	3	4	5
Item 6	<b>.853</b>	.283	-.057	.084	.096
Item 5	<b>.815</b>	.181	-.034	.135	.144
Item 7	<b>.784</b>	.288	-.073	.170	.071
Item 8	<b>.771</b>	.346	-.137	.034	.117
Item 2	.328	<b>.815</b>	-.120	.219	.122
Item 4	.343	<b>.712</b>	-.165	.215	.169
Item 1	.363	<b>.695</b>	-.108	.215	.156
Item 3	.411	<b>.672</b>	-.053	.300	.111
Item 29	-.009	-.086	<b>.771</b>	-.027	-.022
Item 26	-.159	-.060	<b>.716</b>	-.154	-.166
Item 23	.045	-.067	<b>.643</b>	-.033	.022
Item 27	-.034	-.041	<b>.633</b>	-.089	-.253
Item 25	-.169	-.065	<b>.609</b>	-.089	-.217
Item 15	.170	.193	-.005	<b>.808</b>	.148
Item 18	.116	.177	-.104	<b>.784</b>	.124
Item 11	-.043	.121	-.255	<b>.646</b>	-.065
Item 19	.211	.165	-.020	<b>.502</b>	.259
Item 20	.065	.081	-.113	.096	<b>.810</b>
Item 21	.108	.107	-.143	.108	<b>.729</b>
Item 24	.155	.164	-.261	.106	<b>.547</b>

However, the factor analysis excluded a large number of items (9, 10, 12, 13, 14, 16, 17, 22, 28, 30, 31, 32), which we find relevant to our study, therefore we included them in the results section as well. Data analysis included descriptive analysis, ANOVA variance analysis, Games-Howell and Bonferroni post hoc paired comparisons, *t*-test and correlations. The analysis was performed in the SPSS.

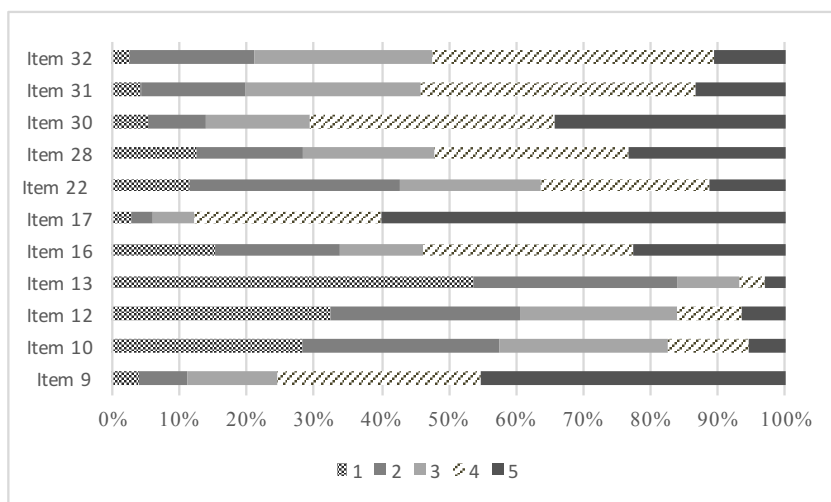
## 5. Results and discussion

In this part, we present the results on mathematics teachers' opinions and attitudes concerning four aspects of the Matura exam in mathematics: the suitability of currently valid textbooks (variables Textbook A & Textbook B); the design of the exam over time (variable Design, Items 9, 10, 12, 13, 16 & 17); scoring and criteria for passing (variable Scoring, variable Criteria, Items 22, 28, 30); and the teachers' satisfaction with the students' results (Items 31 & 32). Descriptive statistics for new variables and other items can be seen in Table 4. Proportional response distributions for the Items 9, 10, 12, 13, 16, 17, 22, 28, 30, 31 & 32 are presented in Figure 2. In the following subsections we present results in more detail.

**Table 4.** Descriptive statistics for the questionnaire items and created variables

	$\alpha$	N	M	SD
Textbook A	0.92	308	3.11	1.10
Textbook B	0.92	308	3.76	1.08
Design	0.81	308	3.24	.97
Criteria	0.78	308	3.34	.92
Scoring	0.82	308	2.69	.86
Item 9 (Appropriateness A level)		308	4.06	1.07
Item 10 (Appropriateness B level)		308	2.37	1.17
Item 12 (Demanding A level)		308	2.30	1.20
Item 13 (Demanding B level)		308	1.72	.99

Item 16 (Time length A level)		308	3.28	1.39
Item 17 (Time length B level)		308	4.39	.95
Item 22 (Scoring correct-incorrect)		308	2.94	1.21
Item 28 (Low passing score)		308	3.35	1.31
Item 30 (Scoring complications)		308	3.86	1.14
Item 31 (Satisfaction)		308	3.44	1.04
Item 32 (Grade)		308	3.35	.99



**Figure 1.** Proportional response distribution for the selected items

### 5.1. The suitability of currently valid textbooks

In this section, we describe results for the variables *Textbook A* (Cronbach's  $\alpha = 0.918$ ) and *Textbook B* ( $\alpha = 0.921$ ) on teachers' opinions on the suitability of school textbooks for preparing students (independently and with the teacher's help) for the higher level Matura exam (A) and for the basic level (B), respectively. Teacher's opinion is examined concerning the type, number and appropriateness of textbook tasks. Variable *Textbook A* was created from items 1–4, and *Textbook B* from items 5–8. On average, teachers believe that textbooks are

more suitable for preparing students for the basic level ( $M = 3.76$ ,  $SD = 1.08$ ) than for the higher level ( $M = 3.11$ ,  $SD = 1.10$ ). The analysis also showed a statistically significant difference in opinion on the suitability of textbooks for taking the higher and basic level of the Matura ( $t = -12.731$ ,  $df = 307$ ,  $p < 0.001$ ).

Also, there are statistically significant differences between the teachers from vocational and non-mathematics specialized grammar schools when it comes to the suitability of textbooks for the basic level (Table 5). The teachers from vocational schools assessed the suitability of textbooks for preparation for the Matura with a lower score (Table 6,  $p = 0.008$ ). There were no statistically significant differences with regard to the type of school they work at and the suitability of textbooks for the preparation for the higher level (Table 5).

**Table 5.** One way ANOVA

		SS	df	MS	F	<i>p</i>
Textbook A	Between Groups	6.120	2	3.060	2.535	.081
	Within Groups	368.147	305	1.207		
	Total	374.267	307			
Textbook B	Between Groups	10.148	2	5.074	4.437	.013*
	Within Groups	348.773	305	1.144		
	Total	358.921	307			
Design	Between Groups	.392	2	.196	.206	.814
	Within Groups	291.181	305	.955		
	Total	291.573	307			
Scoring	Between Groups	.679	2	.340	.448	.639
	Within Groups	231.102	305	.758		
	Total	231.781	307			
Criteria	Between Groups	1.168	2	.584	.694	.500
	Within Groups	256.490	305	.841		
	Total	257.658	307			
Appropriateness A level (Item 9)	Between Groups	1.616	2	.808	.658	.519
	Within Groups	374.446	305	1.228		
	Total	376.062	307			

Appropriateness B level (Item 10)	Between Groups	4.529	2	2.264	1.654	.193
	Within Groups	417.533	305	1.369		
	Total	422.062	307			
Length level A (Item 16)	Between Groups	26.953	2	13.477	7.204	.001*
	Within Groups	570.589	305	1.871		
	Total	597.542	307			
Demanding A level (Item 12)	Between Groups	.031	2	.015	.011	.989
	Within Groups	444.083	305	1.456		
	Total	444.114	307			
Demanding B level (Item 13)	Between Groups	6.497	2	3.248	3.381	.035*
	Within Groups	293.045	305	.961		
	Total	299.542	307			
Satisfaction (Item 31)	Between Groups	10.334	2	5.167	4.904	.008*
	Within Groups	321.367	305	1.054		
	Total	331.701	307			
Teacher's grade (Item 32)	Between Groups	8.347	2	4.173	4.339	.014*
	Within Groups	293.328	305	.962		
	Total	301.675	307			

Note. \* $p < 0.05$

Teacher opinion is consistent with research on the analysis of the content of mathematics textbooks in Croatia (Glasnović Gracin, 2018; Glavaš *et al.*, 2019), where it was found that procedural tasks dominate in Croatian mathematics textbooks and tasks that demand higher cognitive levels are vastly underrepresented. The basic level of the Matura exam in mathematics is in accordance with less demanding upper secondary school programmes; thus, this result is not unexpected. Moreover, the teachers from vocational schools were the least satisfied with the textbook they use. School textbooks in Croatia must be approved by the Ministry of Science and Education in Croatia and teachers can independently select a textbook from among them (NN, 116/2018). Future research could examine which textbook mathematics teachers from vocational schools use as their primary curriculum material.

**Table 6.** Post hoc paired comparisons, with Games-Howell/Bonferroni adjustment depending on the homogeneity of variances

Variables and items	School type M (SD)			Post hoc paired comparisons with Games-Howell/Bonferroni adjustment, Md (p)		
	VS	MGS	GS	VS & MGS	VS & GS	GS & MGS
Textbook B	3.6 (1.13)	3.75 (0.99)	3.99 (0.99)	-.154 <sup>a</sup> (.686)	-.392 <sup>a</sup> (.008*)	.239 <sup>a</sup> (.416)
Item 13	1.85 (1.02)	1.76 (1.09)	1.54 (0.86)	.092 (1.0)	-.313 (.030*)	-.221 (.706)
Item 16	3.35 (1.30)	3.92 (1.32)	2.96 (1.46)	-.573 <sup>a</sup> (.053)	.382 <sup>a</sup> (.072)	-.955 <sup>a</sup> (.001*)
Item 31	3.33 (1.07)	3.92 (1.09)	3.42 (.94)	-.586 (.006*)	-.086 (1.00)	0.499 (.032*)
Item 32	3.18 (.99)	3.54 (.96)	3.52 (.98)	-.362 <sup>a</sup> (.127)	.337 (.016*)	-.025 <sup>a</sup> (.989)

Note. \* $p < 0.05$ , <sup>a</sup> = Games-Howell post hoc test, otherwise Bonferroni, VC = vocational school, MGS = mathematics specializing grammar school, GS = non-mathematics specializing grammar school, Md = mean difference

## 5.2. Design of the Matura exam in mathematics over time

In this section we refer to the design of the Matura exam in mathematics over the last 10 years with regard to the complexity of the tasks, the length of exams and school programmes. For the descriptive statistics, we refer the reader to Table 4.

From items 11 (recoded), 15, 18 and 19, we created a new variable called Design ( $\alpha = 0.81$ ), which examines the opinion of participants on the design complexity of the Matura tasks over the years. On average, teachers are undecided ( $M = 3.24$ ,  $SD = 0.97$ ) and there is no statistically significant difference with regard to the type of school in which the teachers work (Table 5).

Teachers generally disagree that the basic level exam is more appropriate for grammar schools than vocational schools (Item 10,  $M = 2.37$ ,  $SD = 1.17$ ). Moreover, we did not detect a statistically significant

difference in the teachers' responses depending on the type of school at which they teach (Table 5). For this level exam, teachers believe that the time length is sufficient (Item 17,  $M = 4.39$ ,  $SD = 0.95$ ), and do not consider that tasks are too demanding (Item 13,  $M = 1.72$ ,  $SD = 0.99$ ). However, the teachers' responses to this question differ significantly depending on the type of school at which they work (Table 5). There is statistically significant difference between teachers of vocational and non-mathematics grammar schools (Table 6,  $p = 0.030$ ); namely teachers from the vocational schools disagree with the statement to a lesser extent, meaning that the basic level is challenging for their students. This is also supported, for instance, by psychometric analysis of the Matura exam for 2018 (Bugarin, *et al.*, 2020) which showed that the basic level was quite difficult for exam candidates. Vocational school students constituted around 70 % of those candidates.

Teachers believe that the higher level exam is more appropriate for grammar schools than vocational schools (Item 9,  $M = 4.06$ ,  $SD = 1.07$ ). On average, they are undecided about the length of the exam (Item 16,  $M = 3.28$ ,  $SD = 1.39$ ), but there exists statistically significant difference between the teachers from non-mathematics grammar schools and mathematics grammar schools (Table 6,  $p = 0.001$ ); namely, teachers who work in non-mathematics grammar schools believe that not enough time is given for the higher level exam. It seems that teachers would propose an increase in the duration of the higher level exam. But an increase in the amount of time allocated for the exam may affect students' performance. Some studies examined how extended conditions affect students. Laitusis *et al.* (2007) found that students taking a high-stakes exam under extended-time conditions (i.e., more time-on-task, but not more items) experienced no difference in exam performance. This would appear to confirm the teachers' view that students' performance would improve if they had more time to complete the exam. But Ackerman and Kanfer (2009) caution that there is much to learn about how students regulate their effort to achieve higher scores despite longer test sessions.

Teachers do not consider that the higher level tasks are too demanding (Item 12,  $M = 2.30$ ,  $SD = 1.20$ ). There is no statistically significant difference depending on the type of school they work at (Table 5). Additionally, the correlation coefficient showed that teachers who consider



the tasks at the higher level to be too demanding, also consider that the duration of the exam is insufficient (Spearman  $r = -0.344$ ,  $p < 0.001$ ). This corresponds to the psychometric analysis of difficulty of Matura exams conducted by National Centre (Kapović *et al.*, 2019; Bugarin, *et al.*, 2020), which showed that the higher level exams are mostly of average difficulty with an average task index at both levels between 0.4 and 0.5. The higher level exam in mathematics is the threshold for students who enrol in technical and natural science study programmes. Thus the tasks should more demanding than tasks in the basic level. The question is to what extent, if teachers believe that the textbooks they use are not suitable for preparing students adequately for the exam?

### 5.3. *Scoring and the criteria for passing the Matura exams*

In this section we describe results for the variable Scoring, variable Criteria, Items 22, 28, and 30. For the descriptive statistics, we refer the reader to Table 4.

The variable *Criteria* ( $\alpha = 0.78$ ) examines the teachers' opinions on the existing criteria for scoring the Matura exams, namely whether the current scoring provides a real picture of students' knowledge and whether it correlates with their grading criteria. The variable was created from items 20, 21, 24. It seems that teachers are undecided whether the existing scoring criteria are appropriate ( $M = 3.34$ ,  $SD = 0.92$ ). Given that it is difficult to study criteria without taking the scoring method into account, we created the variable *Scoring* ( $\alpha = 0.82$ ). This variable was created from Items 23, 25, 26, 27, 29. Here we also found that teachers are undecided about scoring methods ( $M = 2.69$ ,  $SD = 0.86$ ). Statistically significant difference between the teachers depending on the school where they work was not detected in either variable (Table 5). On average, teachers are undecided about whether tasks should be scored as either correct or incorrect (Item 22,  $M = 2.94$ ,  $SD = 1.21$ ) but believe that scoring the entire solution procedure would make marking complicated (Item 30,  $M = 3.86$ ,  $SD = 1.14$ ).

The scoring of the Matura exams is prescribed by the examination catalogue (NCVVO, 2020). At the basic level there are multiple choice tasks and short answer tasks, where a correct answer receives one point. At the higher level, in addition to these two types of tasks, there are also

long answer tasks where the solution procedure is also scored, not just the solution. Most teachers were undecided about the appropriateness of the scoring of the Matura exams, but believe that scoring the solution procedure would make marking the exams more difficult. In contrast, various researchers have pointed out that scoring the solution procedure is beneficial from a psychometric perspective because a higher distribution of points per task increases test reliability (e.g. Ebel, 1979). Within mathematics education, some researchers (Swan and Burkhardt, 2012; Suurtamm *et al.*, 2016) argue that the exam items should provide students an opportunity to demonstrate their way of thinking i.e., to explain and argument their solutions, even if the end result is incorrect. Moreover, they argue that increasing the number of points in the tasks allows different levels of achievement which would be very useful in accomplishing the exit function of the Matura. The fact that the teachers are undecided as to whether current scoring gives a real picture of student knowledge and about the appropriateness of the scoring, shows the need for revising the current scoring methods in the Matura exam in mathematics.

Further, teachers are undecided whether the low criteria for passing the exam has an effect on student motivation in preparing for the exam (Item 28,  $M = 3.35$ ,  $SD = 1.31$ ). The passing grade over the years has varied between 24–25 % correct answers for the basic level, and 25–28 % for the higher level. Perhaps a higher passing threshold would motivate students to better prepare for graduation because some studies show that high-stakes tests can motivate students to put more effort into learning, especially in the case of mathematics (e.g., Ryan *et al.*, 2007; Simzar *et al.*, 2015).

#### **5.4. Satisfaction with the students' results on the Matura exam**

In this section, we describe the results for Items 31 and 32 which are related to teacher satisfaction with the Matura exam. For the descriptive statistics, we refer the reader to Table 4.

Most teachers are satisfied with their students' results on the Matura exam in mathematics (Figure 1, Item 31). The teachers' attitudes differ depending on the type of school at which they work (Table 5). As can be seen in Table 6, there is a statistically significant difference between

the teachers from mathematics grammar schools and non-mathematics grammar schools ( $p = 0.006$ ) and between teachers from mathematics grammar schools and vocational schools ( $p = 0.032$ ). Furthermore, there is a statistically significant correlation between teachers' opinions regarding the suitability of textbooks for the higher level and satisfaction with their students' results (Spearman  $r = 0.238$   $p < .001$ ), and regarding the suitability of textbooks for the basic level and satisfaction with their students' results (Spearman  $r = 0.244$ ,  $p < 0.001$ ).

Most teachers believe that the grade achieved at the Matura exam corresponds to their final grades (Figure 1, Item 32). However, teacher opinion differs significantly depending on the type of school at which they work (Table 5), namely between those from vocational schools and non-mathematics grammar schools ( $p = 0.016$ ), with the latter believing that their final grades are closer to the grades achieved at the Matura (Table 6). The report on the Matura in Croatia in 2018 and 2019 shows moderate correlation between school grades and the grades obtained in the Matura exam in mathematics, which means that students who have higher school grades mostly have higher grades on the Matura exam in mathematics (Kapović *et al.*, 2019; Bugarin *et al.*, 2020). However, the report also shows that the grades achieved on the Matura exam were slightly lower than the grades achieved at school. For instance, in the 2018 exam the basic level Matura grades were lower than the school grades while the higher level Matura grades were closer to the grades given by the teachers.

The findings of the study point to the unfairness and inequality of Matura exams. The teachers from vocational schools are the least satisfied with student achievement on the Matura exam (Table 6). Some vocational school students only have mathematics as a subject for two years in their upper-secondary education, while some have it for four years but perhaps only one hour per week. If vocational school students, who have been taught a less demanding maths curriculum, choose to sit for the higher level exam, they have to fill any gaps in their knowledge on their own. It is possible that they do not have adequate curricular resources to convert their educational experience to the values measured on the Matura tests (Ćosić, 2017). On the other hand, some students have maths curricula similar to grammar schools. These and the above-mentioned considerations led us to the conclusion that many vocational

school students are at a disadvantage, i.e. access to higher education is not available to them to the same extent as it is to grammar school students. Therefore, the low level of teacher satisfaction with vocational students' results is a good indicator of the inequality their students experience.

Moreover, vocational school mathematics teachers' opinions of the textbooks, the higher and basic level exam, and student achievement could also be indicative of stress-related issues. Even though the Matura is elective in vocational school, those teachers feel pressure to ensure the success of their students. The study by Čosić (2017) showed the Matura expanded subject teachers' classroom practices in vocational schools. Teachers felt that vocational curricula, which has fewer hours and a lighter subject load, disadvantaged their students in demonstrating the kind of knowledge and skill required at the Matura examinations. Additionally, they felt responsible for converting their students' learning into good Matura results.

Although the Matura is designed as a school-leaving exam for grammar school students, who do not have any vocational qualification on finishing school and are expected to continue their education, mathematics grammar school students may choose to take the basic level of the exam. This shows the discrepancy between the design intentions of the Matura and the Croatian educational system. Many vocational school students take the Matura every year (Kapović *et al.*, 2019; Bugarin *et al.*, 2020), but some studies already show that their number is decreasing in certain higher education institutions (Baketa *et al.*, 2020; Žauhar *et al.*, 2016).

## 6. Conclusion

The study reported in this paper represents teachers' voices on a high-stakes test in Croatia. Teachers are a significant factor in the education system and their opinions and attitudes about high-stakes tests are reflected in their teaching practice: in the strategies they use to work with students in the classroom or in the choice of curriculum materials (e.g. Au, 2011; Leighton *et al.*, 2010). Therefore, it is important to hear their voices on the problems they encounter such as the suitability of mathematics textbooks for students' exam preparation, students' lack

of motivation connected with the (low) passing criteria, and their beliefs on the mismatched scoring of complex tasks in Matura exams in mathematics. The latter stems not only from the perspective of teachers, but also from the perspective of exam markers (Table 1). Thus, the results of this empirical study can be taken as a good starting point for re-assessing the requirements of the Matura exam in mathematics more than ten years after its introduction.

### 6.1. Limitations

One limitation of our study is connected with the methodological aspect of the study. We did not differentiate between vocational school programmes and their maths curricula, so our results can be conceived as overly simplistic. Future research should address this issue. Moreover, there were no art school teachers included in the study; it would be fruitful to engage with those teachers and include their voices.

## Bibliography

- Abrams, Lisa M.; Pedulla, Joseph J.; Madaus, George F. (2003), “Views from the classroom: Teachers’ opinions of statewide testing programmes”, *Theory Into Practice*, 42(1), pp. 18–29. doi: [https://doi.org/10.1207/s15430421tip4201\\_4](https://doi.org/10.1207/s15430421tip4201_4)
- Ackerman, Philip L.; Kanfer, Ruth (2009), “Test length and cognitive fatigue: An empirical examination of effects on performance and test-taker reactions”, *Journal of Experimental Psychology. Applied*, 15(2), pp. 63–181. doi: <https://doi.org/10.1037/a0015719>
- Au, Wayne (2011), “Teaching under the new Taylorism: High-stakes testing and the standardization of the 21st century curriculum”, *Journal of Curriculum Studies*, 43(1), pp. 25–45. doi: <http://dx.doi.org/10.1080/00220272.2010.521261>
- Baketa, Nikola; Ristić Dedić, Zrinka; Jokić, Boris (2020), “Jednaki i jednakiji: perspektive ravnatelja o državnoj maturi i mogućnostima ostvarivanja visokoškolskih aspiracija učenika strukovnih i gimnazijskih programa u Hrvatskoj”, *Revija za Sociologiju*, 50(2), pp. 223–251. doi: <https://doi.org/10.5613/rzs.50.2.4>
- Beziniović, Petar (2009), “Državna matura kao zapreka pristupu visokom obrazovanju”, *Revija za socijalnu politiku*, 16(2), pp. 175–176.
- Black, Paul; Harrison, Christine; Hodgen, Jeremy; Marshall, Bethan; Serret, Nastasha (2011), “Can teachers’ summative assessments produce dependable results and also enhance classroom learning?”, *Assessment in Educati-*

- on: Principles, Policy & Practice*, 18(4), pp. 451–469. doi: <https://doi.org/10.1080/0969594X.2011.557020>
- Booher-Jennings, Jennifer, (2005), “Below the bubble: ‘Educational triage’ and the Texas accountability system”, *American Educational Research Journal*, 42, pp. 231–268. doi: <https://doi.org/10.3102/00028312042002231>
- Brookhart, Susan M. (2013), “The use of teacher judgement for summative assessment in the USA”, *Assessment in Education: Principles, Policy & Practice*, 20(1), pp. 69–90. doi: <https://doi.org/10.1080/0969594X.2012.703170>
- Bugarin, Jelena; Ćurković, Natalija; Krašić, Sandro; Lukačin, Lorelaj (2020), *Statistička i psihometrijska analiza ispita državne mature u školskoj godini 2018./2019.*, Zagreb: Nacionalni centar za vanjsko vrednovanje obrazovanja.
- Cohen, Luis; Manion, Lawrence; Morrison, Keith (2018), *Research Methods in Education* (8th edition), New York: Routledge.
- Ćosić, Ivana (2017), “Theorizing standardized assessment in Croatia”, in: Silova, Iveta; Sobe, Noa W.; Korzh, Alla; Kovalchuk, Serhiy (eds.), *Reimagining Utopias: Theory and Method for Educational Research in Post-Socialist Contexts*, Rotterdam: Sense Publisher, pp. 227–244.
- Dietiker, Leslie; Males, Lorraine M; Amador, Julie; Earnest, Darrell (2018), “Curricular noticing: A framework to describe teachers’ interactions with curriculum materials”, *Journal for Research in Mathematics Education*, 49(5), pp. 521–532. doi: <https://doi.org/10.5951/jresmetheduc.49.5.0521>
- Ebel, Robert L. (1979), *Essentials of Educational Measurement*, Englewood Cliffs, NJ: Prentice – Hall.
- Fan, Lianghuo; Zhu, Yan; Miao, Zhu (2013), “Textbook research in mathematics education: Development status and directions”, *ZDM – International Journal on Mathematics Education*, 45(5), pp. 633–646. doi: <https://doi.org/10.1007/s11858-013-0539-x>
- Glasnović Gracin, Dubravka (2018), “Requirements in mathematics textbooks: A five – dimensional analysis of textbook exercise and examples”, *International Journal of Mathematical Education in Science and Technology*, 49(7), pp. 1003–1024. doi: <https://doi.org/10.1080/0020739X.2018.1431849>
- Glavaš, Amanda; Stašćik, Azra; Jukić Matić, Ljerka (2019), “What types of knowledge do mathematics textbooks promote?”, in: Kolar-Begović, Zdenka; Kolar-Šuper, Ružica; Jukić Matić, Ljerka (eds.), *Towards New Perspectives on Mathematics Education*, Osijek: Fakultet za odgojne i obrazovne znanosti i Odjel za matematiku, Sveučilište u Osijeku, pp. 229–241.
- Hadar, Linor L. (2017), “Opportunities to learn: Mathematics textbooks and students’ achievements”, *Studies in Educational Evaluation*, 55, pp. 153–166. doi: <https://doi.org/10.1016/j.stueduc.2017.10.002>
- Holme, Jennifer J.; Richards, Meredith P.; Jimerson, Jo Beth; Cohen, Rebecca W. (2010), “Assessing the effects of high school exit examinations”, *Review of Educational Research*, 80(4), pp. 476–526. doi: <https://doi.org/10.3102%2F0034654310383147>

- Jonsson, Anders; Leden, Lotta (2019), “The ambiguous influence of high-stakes testing on science teaching in Sweden”, *International Journal of Science Education*, 41(14), pp. 1926–1943. doi: <https://doi.org/10.1080/09500693.2019.1647474>
- Kapović, Iva; Džida, Marija; Novak, Josip; Ćurković, Natalija (2019), *Statistička i psihometrijska analiza ispita državne mature u školskoj godini 2017./2018.*, Zagreb: Nacionalni centar za vanjsko vrednovanje obrazovanja.
- Laitusis, Cara C.; Morgan, Deanna L.; Bridgeman, Brent; Zanna, Jennifer; Stone, Elizabeth (2007), “Examination of fatigue effects from extended-time accommodations on the SAT reasoning test™”, *College Board Research Report No. 2007-1*. New York: The College Board.
- Leighton, Jaqueline P.; Gokiert, Rebecca J.; Cor, M. Ken; Heffernan, Caroline (2010), “Teacher beliefs about the cognitive diagnostic information of classroom versus large-scale tests: Implications for assessment literacy”, *Assessment in Education: Principles, Policy & Practice*, 17(1), pp. 7–21. doi: <https://doi.org/10.1080/09695940903565362>
- Marlow, Ruth; Norwich, Brahm; Ukoumunne, Obioha C.; Hansford, Lorraine; Sharkey, Siobhan; Ford, Tamsin (2014), “A comparison of teacher assessment (APP) with standardised tests in primary literacy and numeracy (WIAT-II)”, *Assessment in Education: Principles, Policy & Practice*, 21(4), pp. 412–426. doi: <https://doi.org/10.1080/0969594X.2014.936358>
- [MZO] Ministry of Science, Education (2018), *ŠeR - Školski e-rudnik* (Vol. 3). Available at: <https://app.powerbi.com/view?r=eyJrIjoiOTUxNTE3YmQtM2E3MC00MDc0LTg3OTQtYTEwZWZhYzU3Y2FlIiwidCI6IjJjMTFjYmNjLW13NjEtNDVhYzY1h0WY1LTRhYzc3ZTk0ZTFkNC1slmMiOjIj9> [14 August 2019]
- [NCVVO] *National Centre for External Evaluation of Education* (2018), *Godišnji izvještaj o radu i poslovanju nacionalnoga centra za vanjsko vrednovanje obrazovanja za 2017. godinu*, Zagreb: Nacionalni centar za vanjsko vrednovanje obrazovanja.
- [NCVVO] *National Centre for External Evaluation of Education* (2020), *Ispitni katalog za državnu maturu u školskoj godini 2020./2021. Matematika*, Zagreb: Nacionalni centar za vanjsko vrednovanje obrazovanja.
- [NN] Official Gazette of the Republic of Croatia (2013), *Pravilnik o polaganju državne mature*, 1/2013. Available at: [https://narodne-novine.nn.hr/clanci/sluzbeni/2013\\_01\\_1\\_35.html](https://narodne-novine.nn.hr/clanci/sluzbeni/2013_01_1_35.html) [2 February 2013]
- [NN] Official Gazette of the Republic of Croatia (2018), *Zakon o udžbenicima i drugim obrazovnim materijalima za osnovnu i srednju školu*, 116/2018 [19 December 2018]
- Ryan, Katherine E.; Ryan, Allison M.; Arbutnot, Keena; Samuels, Maurice (2007), “Students’ motivation for standardized math exams”, *Educational Researcher*, 36(1), pp. 5–13. doi: <https://doi.org/10.3102/0013189X06298001>
- Ryan, Shannon V.; von der Embse, Nathaniel P.; Pendergast, Laura L.; Saeki, Elna; Segool, Natasha; Schwing, Shelby (2017), “Leaving the teaching profe-

- ssion: The role of teacher stress and educational accountability policies on turnover intent”, *Teaching and Teacher Education*, 66, pp. 1–11. doi: <https://doi.org/10.1016/j.tate.2017.03.016>
- Simzar, Rahaila M.; Martinez, Marcela; Rutherford, Teomara; Domina, Thurston; Conley, AnneMarie (2015), “Raising the stakes: How students’ motivation for mathematics associates with high- and low-stakes test achievement”, *Learning and Individual Differences*, 39, pp. 49–63. doi: <https://doi.org/10.1016/j.lindif.2015.03.002>
- Suurtamm, Christine; Thompson, Dennise R.; Kim, Rae Young; Moreno, Leonnora D.; Sayac, Nathalie; Schukajlow, Stanislaw; Silver, Edward; Ufer, Stefan; Vos, Pauline (2016), *Assessment in Mathematics Education: Large-Scale Assessment and Classroom Assessment*, Cham: Springer.
- Swan, Malcolm; Burkhardt, Hugh (2012), “A designer speaks: Designing assessment of performance in mathematics”, *Educational Designer: Journal of the International Society for Design and Development in Education*, 2(5), pp. 1–41. Available at: <http://www.educationaldesigner.org/ed/volume2/issue5/article19/> [11 October 2020]
- Törnroos, Jukka (2005), “Mathematics textbooks, opportunity to learn and student achievement”, *Studies in Educational Evaluation*, 31(4), pp. 315–327. doi: <https://doi.org/10.1016/j.stueduc.2005.11.005>
- von der Embse, Nathaniel P.; Pendergast, Laura L.; Segool, Natasha; Saeki, Elina; Ryan, Shannon (2016), “The influence of test-based accountability policies on school climate and teacher stress across four states”, *Teaching and Teacher Education*, 59, pp. 492–502. doi: <https://doi.org/10.1016/j.tate.2016.07.013>
- Žauhar, Goranka; Dresto-Alač, Branka; Lekić, Andrica and Ravlić-Gulan, Jagoda (2016), “Upisi na visoka učilišta Sveučilišta u Rijeci prije i poslije uvođenja državne mature”, *Medicina Fluminensis*, 52(1), pp. 102–115.

## STAVOVI SREDNJOŠKOLSKIH NASTAVNIKA MATEMATIKE O ISPITIMA DRŽAVNE MATURE IZ MATEMATIKE

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*U ovom radu predstavljena su mišljenja i stavovi nastavnika matematike o ispitima iz matematike na Državnoj maturi u Hrvatskoj. Cilj rada bio je ispitati mišljenja nastavnika o prikladnosti srednjoškolskih udžbenika matematike za pripremu učenika za ispite državne mature, općim zahtjevima ispita, ocjenjivanju i bodovanju na ispitima te o uspjehu učenika. Istraživanje je provedeno putem upitnika na prigodnom uzorku od 308 nastavnika matematike koji poučavaju u srednjim školama u Hrvatskoj. Rezultati pokazuju da nastavnici matematike školske udžbenike ne smatraju prikladnima za pripremu učenika za ispit više razine. Nastavnici smatraju da je vrijeme predviđeno za ispit više razine nedovoljno.*



*Većinom su zadovoljni rezultatima svojih učenika, no neopredijeljeni su po pitanju kriterija i bodovanja na maturi. Nastavnici strukovnih škola u većoj su mjeri nezadovoljni zahtjevima i postavkama državne mature u odnosu na gimnazijske nastavnike. Rezultati ovog empirijskog istraživanja mogu poslužiti kao polazište za ponovno razmatranje općih zahtjeva državne mature iz matematike nakon više od deset godina nakon njezina uvođenja.*

**Ključne riječi:** *Državna matura, nastavnici matematike, stavovi nastavnika, školski udžbenici, ispit iz matematike*

## Appendix

**Table 2.** Questionnaire items

1. The tasks in the textbook are suitable for preparing students for the higher level Matura exam.
2. The school textbook provides a sufficient number of tasks for me to prepare my students for the higher level Matura exam.
3. The tasks in the higher level Matura exam are of the same type as the tasks in the school textbook.
4. I believe that students can prepare quite well for the higher level exam using only the tasks from the textbook.
5. The tasks in the textbook are suitable for preparing students for the basic Matura exam.
6. The school textbook provides a sufficient number of tasks for me to prepare my students for the basic level Matura exam.
7. The tasks in the basic level Matura exam are of the same type as the tasks in the school textbook.
8. I believe that students can prepare quite well for the basic exam using only the tasks in the textbook.
9. I believe that the tasks in the higher level exam are more appropriate for grammar schools than for vocational schools.
10. I believe that the tasks at the basic level Matura exam are more appropriate for grammar schools than for vocational schools.
11. I believe that the complexity of the Matura tasks is increasing from year to year.
12. I think that the tasks at the higher level Matura exam are too demanding.
13. I think that the tasks at the basic level Matura exam are too demanding.

14. The content items in the Matura do not deviate significantly from each other from year to year.
15. I believe that the complexity of the Matura tasks is the same every year.
16. I think that the time allowed for completing the higher level Matura exam is sufficient given the complexity of the tasks.
17. I think that the time allowed for completing the basic Matura exam is sufficient given the complexity of the tasks.
18. I believe that there is no difference in the complexity of the tasks in the first and current Matura exams.
19. I can make assumptions on the content of the next Matura exam based on the content of previous exams.
20. I believe that the criteria for scoring the tasks at Matura are appropriate.
21. The criteria for scoring the Matura tasks align with my criteria for exams
22. I think that it is appropriate to score most tasks at the Matura on the principle of correct-incorrect.
23. I believe that the solution procedure should be evaluated in a greater number of tasks.
24. I believe that the existing criteria for evaluating tasks give a real picture of students' knowledge.
25. I believe that the existing criteria for scoring tasks reduce the overall result in Matura exams in mathematics.
26. I believe that the overall results of the Matura would be better with a change in the existing scoring criteria.
27. I believe that the scoring of tasks with 2 or more points does not match the number of task outcomes and the complexity of the task.
28. I believe that the low criteria for passing the exam affects the motivation of students to prepare for the exam.
29. I believe that the results of the Matura exam would be improved if the solution procedure were scored in a greater number of tasks.
30. I believe that scoring the complete solution procedure in a greater number of tasks would make marking the exam more difficult.
31. As a teacher, I am satisfied with the results of my students at the Matura.
32. I believe that the grades at the Matura agree with my school grades.