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E-learning Materials for the Slovene Language in Elementary Schools (6th–9th Grade)

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Abstract/Povzetek The theoretical part of the paper presents the project *Slovenščina na dlani* (*Slovene in the palm of your hand*), which is intended for the establishment of an interactive learning environment for the Slovene language (as mother tongue) in elementary and secondary schools. In this paper we limit the research to elementary school. In the empirical section, we focus on freely available e-learning materials for the Slovene language from the 6th to the 9th grade of elementary school and present the results of an analysis of 10,118 tasks according to their types. The findings indicate an unbalanced representation of different types of tasks, with short answer types in the majority, the task type that is least popular among students. By introducing the most advanced linguistic technology into learning processes, we try to overcome the limitations of existing e-resources for learning the Slovene language.

E-gradivo za slovenski jezik v osnovni šoli (6. – 9. razred) V teoretičnem delu prispevka bo predstavljen projekt *Slovenščina na dlani*, ki je namenjen vzpostavitvi interaktivnega učnega okolja za učenje slovenščine kot materinščine v osnovnih in srednjih šolah. V tem prispevku se omejujemo na osnovno šolo. V empiričnem delu se osredotočamo na prosto dostopna e-gradiva za učenje slovenščine od 6. do 9. razreda osnovne šole in predstavljamo rezultate analize 10 118 nalog glede na njihov tip. Ugotovitve kažejo na neuravnoteženo zastopanost različnih tipov nalog, pri čemer prevladujejo naloge s kratkim odgovorom, ki so med učenci najmanj priljubljene. Z uvajanjem najsodobnejših jezikovnih tehnologij v učne procese poskušamo premagati omejitve obstoječih e-gradiv za učenje slovenščine.

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Introduction

The article will explore question types in existing E-learning resources for the Slovene language as mother tongue, and will ascertain which types should be integrated–as being the most desirable, but currently under-used–into a typical textbook to maximise learning opportunities for learners. The project *Slovenščina na dlani* was implemented in August 2017, and its main aim is the creation of an interactive learning environment for the Slovene language in elementary and secondary schools. The creators of the project, however, have set up the project in order to overcome the limitations of existing e-resources for the Slovene language learning, so it is no longer just a transfer of the printed workbooks into an electronic form.

The present article focuses on a review of existing, freely accessible materials for teaching/learning the Slovene language from the 6th to the 9th grade of elementary school and the results of an analysis of current e-learning resources according to question types. The findings show an unbalanced representation of different question types, with a dominant type that is least popular among students. In what follows, the second phase of the project, secondary school materials, will be taken into consideration, using the same criteria.

Slovene experts have carried out research (O kakovosti 2018, p. 8) on the quality of Slovene textbooks, discussed the content-didactic and professional aspects of textbooks at the primary level of elementary school within various subjects, including textbooks for the Slovene language. Four criteria of assessment have been taken into consideration:

(1) *Thinking*–a textbook promotes problem/critical/creative thinking.
(2) *Vocabulary, language*–a textbook encourages the enrichment of the vocabulary to a sufficient extent and includes appropriate professional terminology, as well as illustrating the professional concepts with an example or an illustration, i.e. with an image, a model etc.
(3) *Content*–the examples used in the textbook are related to everyday life, the textbook enables meaningful cross-curricular integration and deals with current scientific knowledge and topical issues.
(4) *Learning, knowledge*–a textbook meets the requirements of an appropriate level of student development and includes an appropriate level of complexity; it enables the inclusion of the student's pre-knowledge and a pre-knowledge check; it increases the difficulty for the progress of the learners; it encourages active forms of learning,

learning by research and collaborative learning; it allows learners to reflect on their own learning, and enables self-evaluation of knowledge.

According to teachers' responses, the researchers stated (O kakovosti 2018, p. 9), on the one hand, that a high percentage of textbooks for the Slovene language at the primary level of elementary school do the following:
(1) stimulate problem solving (79%), critical (78%) and creative thinking (82%);
(2) promote the enrichment of vocabulary (89%), give professional examples with illustrations (85%);
(3) use examples from everyday life (85%), allow cross-curricular integration (82%); (89%), allow the inclusion of student's pre-knowledge (82%), allow students to check their pre-knowledge (68%), and enable student progression (70%).

On the other hand, in the opinion of teachers, the following characteristics of textbooks are represented in a lower percentage:
(1) textbooks promote active forms of learning (57%),
(2) enable self-assessment of knowledge (50%);
(3) allow students to reflect on daily learning (only 6%); and
(4) discuss contemporary scientific findings (52%).

The findings of the research coincide with the main guidelines for the preparation of new learning materials for the Slovene language, and we will strive to achieve the highest possible level of consideration of these goals.

On the Project *Slovenščina na dlani*

The project Slovenššina na dlani (Gradivo za izobraževanje 2017; Internet source: http://projekt.slo-na-dlani.si/sl/) is co-financed by the Ministry of Culture of the Republic of Slovenia and by the European Union, i.e. the European Social Fund. It is carried out at the University of Maribor, including three faculties: the Faculty of Arts, the Faculty of Education and the Faculty of Electrical Engineering, Computer Science and Informatics. It will last four years, until the end of September 2021.

During the project period, fourteen educational institutions (primary and secondary schools) from all over Slovenia will participate in order to improve the responsiveness of the formal education system and increase its attractiveness.

The purpose of the project is to create an innovative, interactive learning e-resource by introducing the most advanced linguistic technology into the learning processes, on the one hand. On the other hand, we seek to offer students an e-environment that is highly automated. It will provide (for certain tasks) an almost unlimited number of individualised exercises and adapt automatically to the needs of each individual user, while being interactive in the sense of automatically providing information to the user on his/her achievement and performance and automatically directing him/her among tasks, using the advantage of gaming elements from the computer environment to motivate students.

The target group comprises students from the 6th to the 9th grades of elementary school and secondary school students, who can produce longer texts, but with deficits in language expression and understanding, especially in the case of non-literary texts. It is precisely these deficits that are targeted in our new learning e-resource, *Slovenščina na dlani*. The learning e-environment will be freely accessible and adapted for use on tablets and smartphones. It will be available to anyone, even without registration, but registration is desirable for use in schools, so that students can take full advantage of all the potential of e-environment adaptation to each individual user.

The e-exercises will be divided into five content sets: (1) orthography (use of commas, capital letters, words written together and apart, etc.), (2) grammar (use of prepositions, conjunctions, pronouns, etc., difficulties in conjugation, declension and comparison), (3) idioms, proverbs, (4) texts (reading and summarizing), and (5) explanation of linguistic topics.

Theoretical insight

Common to all the free e-learning materials for Slovenian language in elementary school (those reviewed for this paper) from the 6th to the 9th grades is that they are designed to provide students and teachers with many (diversified) question types. They differ from each other according to how they are compiled, according to the level of student activity in solving tasks, according to predicted response, and according to demand, namely the taxonomic level. We point out–in our area, the best known–three different classifications of types of tasks that differ in the way they are sorted.

As early as 1965, the Slovenian psychologists Ivan Toličič and Leon Zorman had classified and described the question types in their *Testi znanja in njihova uporaba v praksi* (Tests of Knowledge and Their Application in Practice, 1965). They divided the question types into two groups with several subtypes, using as criteria for the division the composition of the question types and the manner in which students answer them. The first group lists question types for which the answer needs to be written, that is, question types requiring the reproduction of learning material (complement question types and the short answer). In the second group, there are question types in which the answer should be selected (optional type/with subtypes), the linking and editing type, and the alternative type (with subtypes) (Toličič, Zorman 1965, pp. 26–57). They also mention question types with free answers that require a written response but do not classify these in any group. In 1968 (pp. 81–84), Zorman also wrote about interpretational question types, which are more demanding and complex on the level of content and form in comparison to other question types. These are suitable for identifying complex educational components (e.g. knowledge of cause-effect relationships or the ability to develop hypotheses), but among pupils with less reading ability, these are very unpopular, as they usually contain a great deal of text.

In her paper *Pisno preverjanje in ocenjevanje pri pouku slovenskega jezika v tretjem triletju osnovne šole* (Written examination and evaluation in Slovene language classes in the third trimester of elementary school, 2008), Slavist Tamara Vomer divides the question types into two groups:

In the first group, they are classified according to the level of understanding of the text–i.e. factual question types, in which the individual is expected to copy the answers literally from the given text; concluding question types, which require the individual to conclude on an answer that is not literally given in the text, and the critical/creative/applicable question types, requiring a certain pre-knowledge. In the second group, she classifies question types according to the learner's activity–question types of a closed or objective type, requiring the individual to choose an answer from the multiple answers given or specify a specific answer; question types of a semi-open or partially objective type, which the individual needs to answer or solve independently, with the type of answer being specified by the instructions, or question types that are composed of several different question types or sub-questions that are not necessarily interdependent: question types of an open or subjective type (all with several subtypes), which are characterized by an individual showing his/her own ideas and creativity or giving his/her opinion (Vomer 2008, pp. 34, 35).

In 2002, psychologists Barica Marentič Požarnik and Cirila Peklaj divided assignments into two groups in the *Preverjanje in ocenjevanje za uspešnejši študij* (Verification and Assessment for More Successful Study). The first ones are essay assignments, i.e. question types in which an individual responds freely, with a longer answer (a discussion essay, an essay with an element of role-play), and the second group comprises objective question types, which are further subdivided into open-type tasks (question types with short answers and complement question types) and closed-type questions (question types of the optional and alternative type, and the question type of connecting and editing) (Marentič Požarnik, Peklaj 2002, pp. 73, 74, 87).

In her Master's thesis (2017), the Slavist Maja Hadner concludes that, despite these classifications, some question types cannot be subsumed under the given types. Therefore, she upgraded existing classifications and question types according to the activity they require from the individual. The new, extended classification thus encompasses 21 question types, some types from existing classifications being also renamed.

Existing E-Learning Resources for Learning the Slovene Language in Elementary School

The following section presents materials for learning the Slovene language in elementary schools from the 6th to the 9th grades–freely accessible on the Internet (Internet source: http://projekt.slo-na-dlani.si/sl/). The study took place in 2017, from June until December. We were interested in question types and exercises, considering non-literary texts and covering the following topics: the Slovene language in general, the historical development of the Slovene language and its contemporary situation as well as its social and functional varieties, phonetics, orthography, lexicology, word classes, sentence elements and complex sentences etc.

The analysis includes the following textbooks, workbooks and additional interactive materials:

1: *Gradim slovenski jezik* 6 – dodatno gradivo k učbeniku (Additional material to the Textbook, 6th grade);
2: *Gradim slovenski jezik* 6 – dodatno gradivo k delovnemu zvezku (Additional material to the Workbook; 6th grade);
3: *Gradim slovenski jezik* 6 – dodatno gradivo k samostojnemu delovnemu zvezku (Additional material to the autonomous Workbook; 6th grade);

4: *Slovenščina v oblaku*: interaktivno gradivo za slovenščino v 6. razredu osnovne šole (Interactive material; 6ᵗʰ grade);
5: *Od glasov do knjižnih svetov* 6 (6ᵗʰ grade);
6: *Slovenščina*, Vaje za 6.–9. razred (Exercises: 6ᵗʰ–9ᵗʰ grade);
7: *Devetka.net* – Zbirka spletnih nalog (Collection of interactive tasks);
8: *E-učbeniki SIO.si*: 8. razred (8ᵗʰ grade);
9: *Projekt slovenščina* za 8. razred – Neumetnostna besedila (Part: Non-literary texts: 8ᵗʰ grade);
10: *E-učbeniki SIO.si*: 9. razred (9ᵗʰ grade).

Methodology

E-resources were reviewed and analysed according to the question types formulated and completed by Hadner (2017, pp. 25–33; terminology and typology of question types were also adjusted according to Internet source: https://docs.moodle.org/34/en/Category:Questions) that occur in all materials, i.e. textbooks, workbooks and additional interactive materials. Individual question types were checked and counted, and then percentages of all question types in the analysed materials were calculated. Within the analysis, 21 different question types were examined: 1 *Fill in the blank questions*–this question type requires the student to complete or finish a statement by writing in the missing words, phrases or short clause. 2 *Short answer questions*–this question type requires only a brief/short response, i.e. with a word or phrase; no reply with a sentence is necessary. 3 *Multiple choice questions* (one correct answer)–this question type requires only one correct answer from the answers offered. 4 *Multiple answer questions (two correct answers)*–this question type requires two correct answers from the answers offered. 5 *Multiple answer questions (answers where several are correct*–this question type requires several choices, i.e. at least three answers from the answers offered. 6 *Multiple choice questions with varying degrees of correctness*–the individual is expected choose the most appropriate/correct from the offered answers. 7 *Multiple choice questions with an incorrect answer*–the individual is expected to identify the wrong answer from the answers offered. 8 *Multiple choice questions with the best answer*–this question type offers several correct answers, the best of which should be chosen. This question type is very similar to the optional type of question with varying degrees of correctness. 9 *Matching questions*–this question type requires connecting individual elements to meaningful relationships. 10 *Editing questions*–this question type requires organization of given elements by a certain criterion. 11 *Alternative questions*–this question type requires an answer or a definition with one of the two responses offered (for example, true/false, yes/no). 12 *Alternative questions with argumentation*–this question type is composed of an alternative question type, and in addition, it

requires a justification for the selected answer. 13 *Open questions*–this question type requires a longer answer formed in the student's own words. 14 *Oral responses*–this question type requires a response that does not need to be written. 15 *Gap-filling*–this question type requires a specific element to be inserted into the word or text (for example, missing letters or punctuation marks). 16 *Mark correct answer (of the multiple-choice answers)*–this question type requires that something be marked, underlined, circled or coloured in. 17 *Error Correction*–this question type requires that the incorrectly written word, text or incorrectly written punctuation be corrected. 18 *Ordering questions*–this question type requires that the given elements be classified or distributed according to a given criterion. 19 *Reading*–this question type requires that the word or text be read carefully. 20 *A type including in-class activities*–this question type requires classroom activities among students. 21 *A type involving other resources*–this question type provides for the use of other materials and usually relates to a particular topic or substance and seeks to bring it closer to a student's real-life situation. (Hadner 2017, pp. 25–33).

The total number of question types analysed within the e-resources was 10.118. Thus, we sought to obtain data on the representation of individual question types in e-materials and compare the results with those question types that turned out to be the most common in Slovene language learning.

Question Type Analysis of Exercises in Existing E-Learning Resources for Learning the Slovene language

The tables present a set of tasks that represent at least 70.0% of all tasks in individual e-resources. Tasks representing less than 4.0% of tasks are not representative and therefore not included in the tables.

Table 1: Gradim slovenski jezik 6 (additional material to the Textbook; 6th grade).

Question types	Number of tasks	Percentages (%)
Short answer questions	36	46.8%
Fill-in-the-blank questions	12	15.6%
Multiple choice questions	10	10.4%
Gap-filling	5	6.5%
Alternative questions	4	5.2%

Total: 77 tasks. The most common question types appear in 84.5% of all tasks, while other question types appear in 3.9% or less.

Table 2: Gradim slovenski jezik 6 (additional material to the Workbook; 6th grade).

Question types	Number of tasks	Percentages (%)
Short answer questions	97	60.3%
Fill-in-the-blank questions	13	8.1%
Open questions	10	6.6%
Multiple choice questions	8	5.0%

Total: 160 tasks. The most common question types appear in 80.0% of all tasks, while other question types appear in 3.8% or less.

Table 3: Gradim slovenski jezik 6 (additional material to autonomous Workbook; 6th grade).

Question types	Number of tasks	Percentages (%)
Short answer questions	111	59.0%
Alternative questions	20	10.6%
Multiple choice questions	14	7.5%
Open questions	13	6.9%

Total: 188 tasks. The most common question types appear in 84.0% of all tasks, while other question types appear in 3.2% or less.

Table 4: Slovenščina v oblaku: (Interactive material; 6th grade).

Question types	Number of tasks	Percentages (%)
Multiple choice questions	10	14.7%
Mark correct answer	9	13.2%
Open questions	8	11.8%
Short answer questions	7	10.3%
Reading	5	7.4%
Ordering questions	5	7.4%
Fill-in-the-blank questions	4	5.9%
Multiple answer questions (several correct answers)	4	5.9%

Total: 68 tasks. The most common question types appear in 75.9% of all tasks, while other question types appear in 4.4% or less.

Table 5: Od glasov do knjižnih svetov 6.

Question types	Number of tasks	Percentages (%)
Short answer questions	27	44.3%
An oral response	21	34.4%
Alternative questions	4	6.6%
Fill-in-the-blank questions	3	4.9%

Total: 61 tasks. The most common question types appear in 90.2% of all tasks, while other question types appear in 3.3% or less.

Table 6: Slovenščina, Vaje za 6.–9. razred (Exercises, 6th–9th grade).

Question types	Number of tasks	Percentages (%)
Short answer questions	567	36.2%
A classroom activity–listening	398	25.4%
Alternative questions	344	22.0%
Multiple choice questions	130	8.3%

Total: 1566 tasks. The most common question types appear in 91.9% of all tasks, while other question types appear in 2.0% or less.

Table 7: Devetka.net (Collection of interactive tasks).

Question types	Number of tasks	Percentages (%)
Multiple choice questions	1003	35.7%
Short answer questions	564	20.1%
Alternative questions	404	14.4%
Fill-in-the-blank questions	196	7.0%
Matching questions	162	5.8%

Total: 2807 tasks. The most common question types appear in 83.0% of all tasks, while other question types appear in 3.1% or less.

Table 8: E-učbeniki SIO.si: 8. razred (8th grade).

Question types	Number of tasks	Percentages (%)
Short answer questions	600	31.3%
Multiple choice questions	290	15.1%
Alternative questions	196	10.2%
Mark correct answer	141	7.4%
Reading	123	6.4%
Open questions	104	5.4%
Fill-in-the-blank questions	89	4.6%

Total: 1919 tasks. The most common question types appear in 80.4% of all tasks, while other question types appear in 3.1% or less.

Table 9: Projekt slovenščina za 8. razred (Part: Non-literary texts; (8th grade)).

Question types	Number of tasks	Percentages (%)
Short answer questions	239	31.9%
Open questions	84	11.2%
Reading	77	10.3%
Alternative questions	76	10.2%
A type involving other resources	58	7.7%
Multiple choice questions	49	6.5%
Alternative questions with argumentation	32	4.3%

Total: 749 tasks. The most common question types appear in 82.1% of all tasks, while other question types appear in 3.5% or less.

Table 10: E-učbeniki SIO.si: 9. razred (9th grade).

Question types	Number of tasks	Percentages (%)
Short answer questions	860	34.1%
Multiple choice questions	269	10.7%
Reading	243	9.6%
Mark correct answer	232	9.2%
Alternative questions	212	8.4%
Fill-in-the-blank questions	142	5.6%
Open questions	138	5.5%

Total: 2523 tasks. The most common question types appear in 83.1% of all tasks, while other question types appear in 3.0% or less.

Interpretation of Question Type Analysis

It can be noted that simpler question types are repeated very often, while those that are more demanding, and require more complicated mental processes, are rare. Simpler question types are–unquestionably–necessary for accustoming students to thinking, but too frequent usage of these types does not stimulate in-depth thinking and leads to a decline in motivation to answer this type of question. During the process of analysis, particularly while determining the question types, we discovered a gap in the classification of question types, which we want–as much as possible–to fill with expanded question types.

The review covered ten sets of e-resources, and 10.118 tasks were analysed:

(1) in the additional material (77 tasks) to the textbook *Gradim slovenski jezik* 6 the *Short answer questions* type is presented in 46.8% of tasks (36 tasks);
(2) in the additional material (160 tasks) to the workbook for the same text-book the *Short answer question* type prevails, with 60.3% of tasks (97 tasks);
(3) similarly, in the additional material (188 tasks) to the autonomous workbook for the same text-book, i.e. 59.0% (111 tasks);
(4) in the interactive material (68 tasks) for the text-book *Slovenščina v oblaku* for 6th grade, *Multiple choice questions* amounted to 14.7% (10 tasks);
(5) in the text-book *Od glasov do knjižnih svetov* 6 (61 tasks), the *Short answer question* type was present in 44.3% (27 tasks);
(6) among the exercises for the text-book *Slovenščina* (1566 tasks), the *Short answer question* type occupies 36.2% (567 tasks);
(7) the collection of interactive tasks (2807 tasks) accompanying the text-book *Devetka.net* includes 35.7% (1003) of the *Multiple-choice question* type;
(8) in the e-text-book (1919 tasks) *E-učbeniki SIO.si* for the 8th grade, 31.3% of tasks (600 tasks) comprise the *Short answer question* type;
(9) in the Non-literary texts section (749 tasks) of the text-book *Projekt slovenščina* for 8th grade, the *Short answer question* type prevails again at 31.9% (239), as well as in
(10)   the e-text-book *E-učbeniki SIO.si* for the 9th grade, in 34.1% (860 tasks).

The results of the e-resources analysis reveal a shortage of the following question types: *Gap-filling, Mark correct answer of the multiple-choice answers, Error Correction, Ordering questions, Alternative questions with argumentation, Editing questions, Multiple answer questions (two correct answers), Multiple answer questions (several correct answers)*, and *Multiple choice questions with an incorrect answer*. Since all these are question types that are more than suitable for e-environments, and they also enable the realization and achievement of higher taxonomic levels (use, analysis and synthesis), both the results of the analysis and the teachers' perceptions will help us to design appropriate e-resources within the framework of the project *Slovenščina na dlani*.

Bernik (2011, p. 209) emphasizes, according to all the analyses carried on Slovene and foreign textbooks, in his case, for history, that "/.../ an ideal textbook cannot be made, because students have different styles of learning, and teachers have different teaching methods, so they should have different methodologically designed textbooks /.../". This is undoubtedly true for textbooks of the Slovene language as well. That is why, when composing e-materials and tasks, we will–as far

as possible–take into account different types of perception, which is divided into five senses: visual perception, auditory (hearing) perception, kinaesthetic (movement, touch) perception, olfactory (smell) perception and gustatory (taste) perception (known as the VAKOG model). Depending on the different types, we could also suggest words (verbs for instance), used in speech patterns within the instructions, while remaining fully aware of the different effect of a given message on different groups of recipients.

Conclusion

The results show that, in the majority of e-resources, the type *Short answer questions* is most often represented, i.e. in 30.72% of cases (3108 tasks; in individual sources 10.3%–60.3%), followed by *Multiple choice questions* in 35.7% (1783 tasks; in individual sources 5.0%–35.7%) and *Alternative questions* in 10.52% (1064 tasks; in individual sources 5.2%–22.0%).

In extreme contrast to the most frequent question type (*Short answer questions*) present in e-resources, student answers to the questionnaire about their most/least liked question types revealed that the *Short answer question* type is the least popular among the elementary school population (Internet source: http://projekt.slo-na-dlani.si/sl/). Considering the typology of questions comprises 21 different types, it is reasonable to follow the guidelines in the preparation of e-resources in the future, which will focus on a more balanced representation of all question types.

Some very good suggestions about question types for textbook writing have been offered by experts in the analysis of history textbooks (Bernik 2011, pp. 208–9), some of which could be used in preparing the Slovenian language learning material. Let us support them with concrete proposals related to the Slovenian language: *content in the form of comics* (exercises for interjections), *instructions for project work* (mini projects: search for linguistic–spelling/morphological–mistakes in online editions of newspapers, in e-mails, advertisements etc.), *work with pictorial materials* (to write down all the nouns in the picture, adjectives used with–selected–nouns, verbs– activities of people/animals in the picture etc.), *blank maps* (map of Slovenia–to enter multi-word geographical names with respect to capital letters etc,), *a glossary of terms* (a glossary of unknown/new words that can be supplemented by students themselves), *social games* (dominoes for word-formation, phraseology etc.), *Internet addresses* (search for language manuals, language counselling etc.).

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RE|

THE NATIONAL ASSESSMENT OF MATHEMATICS IN HIGH SCHOOLS IN ITALY WITH SLOVENE AS THE LANGUAGE OF INSTRUCTION

DANIEL DOZ

Liceo Scientifico Statale »France Prešeren« with Slovene teaching language

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Povzetek/Abstract In the following paper, we analyzed the question types in the INVALSI national mathematics assessments in Italian high schools with Slovene as the language of instruction. Through a statistical analysis, we found that closed-type questions were more frequent than open-type questions. A greater presence of closed-type questions could lead to the issue of guessing and cheating. Moreover, a greater quantity of closed-type questions could lead to a partial evaluation of knowledge, since procedures and other mathematical competences are not considered. In our research, we also considered the topics of the questions that were presented in national assessments.

Nacionalni preizkus znanja iz matematike na višjih šolah s slovenskim učnim jezikom v Italiji
V prispevku predstavljamo tipologijo vprašanj v vsedržavnem preverjanju znanja iz matematike INVALSI. S pomočjo statistične analize lahko ugotovimo, da so vprašanja zaprtega tipa pogostejša od vprašanj odprtega tipa. Prisotnost večjega števila vprašanj zaprtega tipa lahko privede do problema ugibanja in prepisovanja. Poleg tega pa lahko večje število vprašanj zaprtega tipa privede to nepopolnega preverjanja znanja, saj se pri teh vprašanjih ne oceni postopkov in drugih matematičnih kompetenc.

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Introduction

National assessments have the purpose of evaluating learning outcomes, which are based on criteria and expectations set by various national education authorities (Benavot & Tanner, 2008). These assessments should describe the level of achievement and competences of the education system in its totality, or a specific part of it, such as 11-year-old pupils (Kellaghan & Greaney, 2001). National assessments also play an important role in providing national policymakers with objective information about the status of the education system (Benavot & Tanner, 2008). Since they are typically subject-oriented (mathematics, language, science etc.), and since they evaluate a particular grade level, they are an important diagnostic tool, used to identify which areas in the school systems need more attention (ibid.).

Discussions regarding standardized tests have long been part of the overall concern in relation to their ambiguity and validity (Powell & Gillespie, 1990). Despite this, the spread and growth of such tests has not diminished in recent years. On the contrary, such tests are still very much in use, and the growing concern is that they are no longer a true representation of a student's knowledge, but focus instead only on the techniques needed to pass the tests. In fact, as Roberts (2006) suggests, learning has been focused on the assessments themselves, on "passing tests", as it were.

Assessments are usually divided into two main categories: formative and summative (Garrison & Ehringhaus, 2010). Summative assessments are periodic tests of student knowledge. Their aim is to measure students' knowledge and acquisition of standard curricular content. They are also tools to evaluate the effectiveness of curricula and school programs (Leung, Leung & Zuo, 2014). Examples of such summative assessments, as Garrison & Ehringhaus (2010) explain, include state assessments, end-of-unit or chapter tests, semester exams and other types of tests. According to the authors, this kind of assessment is helpful for the school and teacher, specifically when they need to make instructional adjustments and interventions.

Formative assessments, on the other hand, can be used in classroom practice as a tool to understand how to adjust both teaching and learning. This kind of assessment can be formal or informal; in both, it is nevertheless important that the teacher give students feedback that shows the presence of a 'gap' between the level of the assessed work and the required standard (Taras, 2005).

The Italian national examination of knowledge, INVALSI, is a summative assessment. Since 2010, grade 10 students in Italian high schools are supposed to take an examination in both mathematics and the Italian language (Italian is replaced by Slovene in schools with Slovene as the language of instruction). The questions in these assessments can be either open- or closed-type. There are several reasons for preferring one type to the other: for example, closed-type questions are easier to grade; on the other hand, open-type questions do evaluate students' knowledge and abilities in a more complete way. When students answer closed-type questions, there is a greater chance of guessing, since in the INVALSI examinations, there are no penalties for answering a question incorrectly.

In order to establish which question type (open- or closed-type) was more frequent in the INVALSI assessment of knowledge of mathematics over the last 8 years, we decided to conduct a study based on seven INVALSI mathematics assessments for grade 10 students in Italian high schools. We were additionally interested in finding out which mathematical topic was more common in the INVALSI national assessments of mathematical competence. In particular, we wanted to understand whether there had been a shift in interest over the last three years from more theoretical topics (functions, equations, radicals etc.), to more applied topics (statistics, data representation, modeling with linear functions etc.). If some mathematical topics were being neglected by the national assessment of knowledge, the issue could emerge of more marginal students' knowledge of certain mathematical content, which could lead to mathematical illiteracy and to the impossibility of a deeper understanding of mathematical topics. In fact, teachers that base their programs on assessment of knowledge could omit some of the more theoretical content and concentrate only on those mathematical topics that are somehow "hot" and statistically more common in the examinations.

Theoretical Framework

Which evaluation?

In education, evaluation is necessary in order to gauge what students understand and what they can do (Kartianom & Mardapi, 2017). National evaluations are done to measure the level of knowledge and competence of students, as well as to diagnose the status of the school system (Bansilal, 2017; Kartianom & Mardapi, 2017), and the national competences and achievements in specific subjects (Sulistyaningsih & Sugiman, 2016). National assessments, which are equal for the whole population, guarantee objective information about student knowledge (Cankar, 2008).

Assessment practices are rapidly transforming, since today we use more open-ended problems, hands-on problems, essays and information technology (such as computer simulations of real-world problems) (Linn, Baker & Dunbar, 1991; Stecher et al., 1998). On the other hand, some national assessments also include closed-type questions, such as multiple-choice questions, as can be seen in the INVALSI examination (Quadro di Riferimento, 2017).

The INVALSI assessments in mathematics do not take into account open-ended problems, or essays. There are no hands-on problems that might be evaluated just by solving the INVALSI assessment of knowledge. Hence, if we compare the structure of the INVALSI examinations with the ideas present in Linn, Baker & Dunbar (1991) and in Stecher et al. (1998), we could conclude that the INVALSI national assessments do not evaluate students' abilities, knowledge and competences in the ways described by the authors, since they diagnose only the student's ability to solve a certain type of problem.

As stated by Cankar (2008), some national examinations assess only the cognitive achievements of students, and only in specific subjects. In the case of the Italian assessment, the INVALSI examinations evaluate only student knowledge of mathematics and languages.

Nevertheless, national assessments of mathematics might help teachers and educators to modify, and hence improve, their teaching (Felda, 2018). Moreover, national assessments are useful in identifying the strong and weak points of teaching mathematics, and they help to monitor the developing factors in education, such as lesson programs, textbooks and teachers' learning and training (Magajna & Žakelj, 2011; Žakelj, Ivanuš Grmek, Cankar, 2012).

Parveva, De Coster & Noorani (2009) stated that national assessments can be divided into three groups:

- in the first group we consider all the national assessments that have the goal of grading students' knowledge: the results of national assessments also have an impact on the grades of individual students. This kind of assessment also has an impact on the future choices of students, determining, for example, which school a student can attend;
- in the second group, there are national assessments that are done mainly to assess the school system and identify reforms regarding schooling;

- in the third group, we consider those assessments which are a supplement to teaching processes. Based on the results of the examinations, educators and schools can identify their weeks points and teaching needs, while seeking improvements. In this category, we could place the national assessments in Italy.

Some authors are concerned by the fact that students who are not motivated perform worse in national and international assessments than those who are motivated (O'Neil Jr., Sugrue & Baker, 2010). In this respect, Cankar (2008) states that national assessments may seem to many a waste of time, since they are "not for a grade". In Italy, the national assessment of knowledge does contribute partly to the final grade in grade 9 (INVALSI, 2010), but with the new school reform, the INVALSI examinations have only a diagnostic function and not a grading one (Studenti, 2019a, 2019b). In grades 10 and 13, the INVALSI examinations are obligatory, but they do not influence the final grading of the student (Studenti, 2019; Studentville, 2019). Considering these affirmations and the conclusions of Cankar (2008), we can observe that many students are demotivated while sitting the INVALSI assessment tests, which is congruent with what was stated by the Italian educator Daniele Novara (Repubblica, 2018).

Open- and closed-type questions

Stankous (2016) points out that the issue of measuring student performance has often been at the center of several debates. In order to evaluate students' knowledge, teachers can prepare tests with different typologies of questions: open (constructed-response) and closed (selected-response) questions.

In open questions, students must construct their own responses, organizing and applying their knowledge (Powell & Gillespie, 1990). Preparing such questions is easy, while grading them seems to be much more difficult, since clear criteria and scoring tables are difficult to prepare (ibid.). In these types of questions, there is less chance of students answering by guessing. In closed questions, on the other hand, students need to select the answers among various alternatives. Grading such questions is much easier and faster, but their preparation is time consuming. Guessing in closed-type questions is also an important issue (Klůfa, 2015). Students, who face a multiple-choice question with 4 options, have a 25% chance of guessing the correct answer. If there is no penalty for a wrong answer, students are more likely to guess a correct answer, in order to collect more points (Espinosa & Gardeazabal, 2010).

National assessments can have both open- and closed-type questions. Scoring assessments with multiple-choice questions is cheaper than those with judgement-based tasks, but the gains to student learning are greater (Wiggins, 1990). Similarly, Stankous (2016) has shown that constructive-response tests do more to encourage student learning than multiple-choice tests. The author affirms that open-type tests are more reliable and valid than closed-type tests and that student success cannot be measured by multiple-choice tests alone. In her research, the author found that many teachers want their students to recognize questions and question types, memorizing the correct answers, so that they can "meet certain educational performance standards" (ibid., p. 315), forgetting this information when the tests are over. Conversely, Roberts (2006) thinks that multiple-choice tests could be used to enhance the learning process. On the other hand, students might leave the multiple-choice testing having assimilated false or incorrect knowledge, (Roediger III & Marsh, 2005).

We would like to present an example of the application of concerns voiced by Stankous (2016) about mere memorization, an example taken from the INVALSI examinations.

Example 1: Example of a multiple-choice question form the INVALSI examinations.

School year 2010–11
Term $10^{37} + 10^{38}$ it's the same:
    A.   □ 20^{75}
    B.   □ 10^{75}
    C.   □ $11 \cdot 10^{37}$
    D.   □ $10^{37 \cdot 38}$
School year 2011–12
Term $a^{37} + a^{38}$ it's the same:
    A.   □ $2a^{75}$
    B.   □ a^{75}
    C.   □ $a^{37}(a + 1)$
    D.   □ $a^{37 \cdot 38}$
School year 2014–15
Term $a^{43} + a^{44}$ it's the same:
    A.   □ $a^{44 \cdot 43}$
    B.   □ $a^{43}(a + 1)$
    C.   □ a^{87}
    D.   □ $2a^{87}$

In Example 1, we note that the structure (or the "Question type", Stankous, 2016) is similar, and the answers are constructed on the same basis; the numbers involved are also often repeated. Students could just "recall" the answer form previous exercises and "drills", forgetting how to get to the correct answer.

Topics in Mathematics Assessment

Mathematics literacy is defined by the OECD (2018, p. 51) as follows: "an individual's capacity to formulate, employ and interpret mathematics in a variety of contexts. It includes reasoning mathematically and using mathematical concepts, procedures, facts and tools to describe, explain and predict phenomena. It assists individuals to recognise the role that mathematics plays in the world and to make the well-founded judgments and decisions needed by constructive, engaged and reflective citizens".

Following this basic concept, there are four categories of mathematical knowledge and the mathematics program that are assessed in the PISA and PISA-D. These are (OECD, 2018):
- change and relationships;
- space and shape;
- quantity;
- uncertainty and data.

The OECD document (ibid.) states that the proposed problems should be challenging and based on real situations. The categorization of the content into the four presented categories is important for the development and selection of items, but some problems might be transversal and would thus fit into more than one category: for example "space and shape", "change and relationships" and even "quantity". The interdisciplinarity of the proposed problems is also important, in order to underline the coherence of mathematics as a discipline (ibid.).

The situation in Italy: the national INVALSI examinations

Italian schooling comprises five school levels: kindergarten, primary school (five years, from level 1 to 5), middle school (three years, from level 6 to level 8), high school (five years, from level 9 to level 14), and university. After the third year of middle school, students are supposed to pass a state exam, in order to proceed to a high school; after the fifth year of high school, students must sit the "*Esame di stato*" (State Exam) to get their diploma.

The National System for Evaluation (*Sistema Nazionale di Valutazione*) works inside the National Institute for the Educational Evaluation of Instruction and Training (INVALSI). The INVALSI also works under the supervision of the Ministry for Education, University and Research (*Ministero dell'Istruzione, Università e Ricerca,*

MIUR); its aim is to investigate and periodically assess student knowledge on the whole Italian national territory, as proposed in the decree D.Lgs. n. 286/2004. In the directive of the MIUR 76/2009, INVALSI must assess the level of knowledge among primary school pupils, as well as middle school and high school students. Student knowledge is measured through standardized tests of Italian language and mathematics (Martignone, 2016; Quadro di Riferimento, 2017). As written in the Quadro di Riferimento (2017), these tests are currently applied in the second and fifth years of primary school (levels 2 and 5), the third year of middle school (level 8) and the second and fifth years of high school (level 10 and 13). INVALSI prepares the examinations considering the curricula for primary and secondary schooling, i.e. "*Indicazioni Nazionali per il curricolo della scuola dell'infanzia e del primo ciclo di istruzione*" and the "*Indicazioni Nazionali e Linee guida per le scuole secondarie di secondo grado*" (Martignone, 2016; Quadro di Riferimento, 2017).

The decree MIUR-MEF n. 211 from the 7th October 2010 and the directive MIUR n. 57 from 15th July 2010 are the two documents that regulate the curricula in Italian high schools. In these documents it is stated that students, at the end of five years' schooling, should know the basic concepts and methods used in mathematics, not only from a theoretical point of view, but also to model and describe various phenomena from the real world. It is also stresses that students should be able to use logical and coherent argumentation and apply mathematical concepts in everyday life. In these documents it is also stated that, while formulating problems for students in high schools, it is important to show them the connections between theoretical knowledge and other sciences (economics, sociology, technology, physics, biology, etc.) or the real world. The documents invite teachers to show students how to use formal language and how to prove theorems, how to analyze data and predict the evolution of phenomena, use mathematical knowledge in other sciences, introduce new concepts using elements form the history of mathematics, history of science, technology and cultural development.

During the second year of high school, students at all Italian high schools are required to write a national assessment of Italian language and mathematics. However, these standardized tests:

- cannot evaluate students' metacognitive or non-cognitive achievements, such as that embodied in "the students develop a positive attitude toward mathematics" (Quadro di Riferimento, 2017);
- cannot evaluate students' ability to argue, prove or solve certain problems (that would require more time or a greater number of steps), formulate

hypotheses, or model real-world situations and analyze them from a mathematical point of view (Quadro di Riferimento, 2017);

– are objective; hence, they do not take into account the affective and conative aspects, which are also important in evaluating student work and assessing competence (Quadro di Riferimento, 2017).

Until the school year 2017-18, the INVALSI examinations for schools with Slovene as language of instruction were printed. Every year, the printed dossier had a variable number of questions, which were divided into different items (Quadro di Riferimento, 2017). Questions in the INVALSI examinations, as expressed in the Quadro di Riferimento (2017), can be

– closed: multiple choice questions, where there are four alternatives (only one answer is correct); true-false questions, composed of several sub-questions (see Example 2);

– short, open questions: these require a simple, rapid open answer, such as the result of a computation, or some graphic answers (see Example 3);

– open: these require simple argumentation or short computations;

– *cloze*: the student is required to complete a sentence, computation or expression.

Example 2: Example of a multiple-choice question from the INVALSI examination for the school year 2017–18.

The result $16^{100} : 2$ is the same:
A. □ 8^{99}
B. □ 8^{100}
C. □ 16^{50}
D. □ 2^{399}

Example 3: Example of a short answer question from the INVALSI examination for the school year 2017–18.

The equation is given $(2k - 3)x + 1 - k = 0$, with unknown x in real number k.
The equation solution is 1, if $k =$........

Students were allowed to use their calculators during the tests, but not devices that could connect to the internet, wireless or Bluetooth. They could also use compasses, rulers and goniometers.

In the Quadro di Riferimento (2017) it is also stated that simple language must be used in writing the problems proposed to the students; no dialectal or regional expressions are used, and the testers try to avoid useless technological jargon. Pictures are used only when particularly explicative; the data provided in the problems are mainly taken from real data and statistics. Questions are also equally distributed among the various topics.

The proposed problems have two dimensions: the cognitive dimension and the topic dimension. Topics are divided into four categories: numbers, geometry, algebra and data analysis (and probability). The cognitive dimension is divided into three categories:

- knowing: the student understands the facts, concepts and procedures;
- applying: the student should know how to apply their knowledge and acquired concepts to solve problems and answer questions;
- reasoning: the student solves problems related to complex and unfamiliar contests.

Empirical Research

Aim of the Research

The aim of the present research is to analyze several INVALSI examinations in mathematics in the Slovene language, in order to understand the typology of their questions and the mathematics field to which each question is related. This research could have practical applications: teachers and students could be informed of the mathematical topics that are more common on the INVALSI examinations and the question types. On the other hand, this research could show which knowledge and competence in mathematics Italy requires from its students.

We wanted to investigate whether there have been changes in the types of questions and the interest field from 2011 to 2017. And, if so, what these differences were. Our research questions were the following:

- Is there a prevalent typology for questions on the INVALSI examinations? Are there more closed-type questions (e.g. true-false questions or multiple-choice questions) or open-type questions (e.g. short answer questions)?

– Is there any mathematical topic that appears more often in the INVALSI examinations than others? And if so, has there been any change in the topics of interest over the years?
– Have theoretical fields, such as functions, set theory and logic, become gradually less common on the INVALSI mathematics examinations?

Methodology

Research method

In the research, we used the descriptive statistical method and the non-experimental method for causal analysis. We decided to use these methods, because they are best suited to answer the research questions.

Statistical sample

In the research we considered seven INVALSI mathematics examinations for the second year of high schools with Slovene as the language of instruction, i.e. all the examinations from the school year 2010–11 to the school year 2016-17. We omitted from our sample the INVALSI examination from the school year 2017-18 because it was almost identical to the one from 2013–14. The samples cannot be found online, since they are prepared *ad hoc* for schools with Slovene as the language of instruction; the samples in Italian can be found on the website https://www.engheben.it/prof/materiali/invalsi/seconda_superiore_matematica. htm. These versions are similar to those in Slovene.

Analysis of the Data

We first looked at the types of questions appearing on the various INVALSI examinations. Next, we sought to identify the mathematical topic to which the question referred, in order to understand which topic is the most popular.
The collected data was analyzed using the descriptive statistical method, expressing frequency of appearance. All data was analyzed with the help of the statistical software *Jamovi*.

Results and Discussion

The Typology of the Exercises

In Table we present the typology of the various questions on the INVALSI examinations from the school year 2010–11 to the year 2016–17. In the table we present the number of questions (and sub-questions) for each type: multiple-choice, true-false, long answer questions (a procedure is evaluated and scored), fill-in the blank, short answers (only a numerical answer is required, no procedure is evaluated), connect the terms, and the total number of questions on the examination. In brackets, we give the percentage of that type for that year's examination.

Table 1: Typology of exercises in various school years.

School year	Multiple-choice	True-false	Long answer	Fill-in the blank/complete	Short answer	Multiple-choice and discussion	Connect	Total
2010–11	23 (56.1%)	3 (7.3%)	3 (7.3%)	1 (2.4%)	11 (26.8%)	0 (0.0%)	0 (0.0%)	41 (100.0%)
2011–12	21 (46.7%)	4 (8.9%)	2 (4.4%)	4 (8.9%)	11 (24.4%)	3 (6.7%)	0 (0.0%)	45 (100.0%)
2012–13	28 (63.6%)	2 (4.6%)	0 (0.0%)	1 (2.3%)	11 (25.0%)	2 (4.6%)	0 (0.0%)	44 (100.0%)
2013–14	13 (34.2%)	6 (15.8%)	0 (0.0%)	2 (5.3%)	16 (42.1%)	1 (2.6%)	0 (0.0%)	38 (100.0%)
2014–15	18 (42.9%)	4 (9.5%)	0 (0.0%)	2 (4.8%)	16 (38.1%)	2 (4.8%)	0 (0.0%)	42 (100.0%)
2015–16	17 (42.5%)	3 (7.5%)	0 (0.0%)	3 (7.5%)	15 (37.5%)	2 (5.0%)	0 (0.0%)	40 (100.0%)
2016–17	14 (35.0%)	6 (15.0%)	2 (5.0%)	4 (10.0%)	13 (32.5%)	0 (0.0%)	1 (2.5%)	40 (100.0%)
Total	134 (46.2%)	28 (9.7%)	7 (2.4%)	17 (5.9%)	93 (32.1%)	10 (3.4%)	1 (0.3%)	290 (100.0%)

From Table 1, we can see that the most frequent type of question on the INVALSI mathematics examinations for the second year of high school is the multiple-choice question (46.2%). The second most frequent type is the short answers (32.1%), followed by true-false questions (9.7%). In the last three years, there has not been any significant increase in the frequency of multiple-choice questions, or true-false ones, but it is still clear that the most frequent type of question is the multiple-choice; it is also the most frequent in each school year examination, with the only

exception being the school year 2013–14, when short answer questions were the most frequent.

In order to understand which type of question was the most frequent, we grouped multiple-choice, true-false and connect in the category "closed-type questions", and long answer, short answer, fill-in the blank, and "multiple-choice and discussion" in the category "open-type questions". These results are shown in Table 2. Form the analysis, we see that closed-type questions (56.2%) are more frequent than open-type ones (43.8%). In particular, in the school years 2010–11 and 2012–13, closed-type questions were significantly more frequent than open-type ones, whereas on the other examinations, the frequency was slightly higher. No significant increase in the frequency of closed-type questions can be seen in the last three years. Every year, the number of closed questions was greater than or equal to those of the open-type.

Table 2: Open- and closed-type questions on the examinations.

School year	Closed-type questions	Open-type questions	Total
2010–11	26 (63.4%)	15 (36.6%)	41 (100.0%)
2011–12	25 (55.6%)	20 (44.4%)	45 (100.0%)
2012–13	30 (68.2%)	14 (31.8%)	44 (100.0%)
2013–14	19 (50.0%)	19 (50.0%)	38 (100.0%)
2014–15	22 (52.4%)	20 (47.6%)	42 (100.0%)
2015–16	20 (50.0%)	20 (50.0%)	40 (100.0%)
2016–17	21 (52.5%)	19 (47.5%)	40 (100.0%)
Total	163 (56.2%)	127 (43.8%)	290 (100.0%)

As presented, closed-type questions are easier to correct, but they have several limitations. A unavoidable limitation of multiple-choice questions is that it is possible for students to guess the correct answer (Burton, 2001). Furthermore, closed-type questions cannot completely evaluate students' knowledge and abilities.

The Mathematical Topics

We first sought to understand which mathematical topics are covered by the national INVALSI examination; we therefore analyzed the content of each question and sub-question. From the content of such questions, we decided to distinguish among the following topics:

– statistics: sampling, data organization, data representation (tables, graphs, etc.), relative and absolute frequency, percentage frequency, means, standard deviation, variance;
– probability: definition of classical probability, events, disjoint events, dependent and independent events, computation of probability of elementary events, *a priori* and *a posteriori* probability, binomial tree;
– geometry: principal geometrical shapes and objects, definitions, relations between geometrical objects, congruence, parallelism, perpendicularity, geometrical constructions, segments, distance in the plane, measuring with the ruler, angles (internal, external, vertically opposite angles, supplementary, complementary, explementary, etc.), measuring with the goniometer, translations, rotations, symmetries, similarity, Pythagorean theorem, Euclid's theorem and equivalency, Thales' theorem and similarities, perimeters and areas of plane shapes (square, rectangle, triangle, parallelogram, circle, trapezoid, etc.);
– arithmetic: natural numbers, integers, rational and real numbers, operations between numbers, properties of the operations, representations of numbers on the number line, fractions, proportions and applications, powers and their properties, square roots and cube roots, decimal and scientific notation, rounding and positions, numerical expressions, symbolic expressions;
– approximation: approximation of real and rational numbers, operations with approximated numbers, working with big or small numbers, scientific notation;
– diagrams: line diagrams, histograms, bar diagrams, pie charts, representation of numbers, reading diagrams, interpretation of a diagram;
– Solid geometry: solids (cube, parallelepiped, cone, sphere, cylinder, pyramid, prism, etc.), volume and surface area, diagonals and sections;
– analytic geometry: coordinate plane, points and coordinates of points, distance between points, areas of shapes in the coordinate plane, triangles in the coordinate plane;

- algebra: unknowns, polynomials, factorization of polynomials and binomials, equations, equalities, inequations and inequalities, squares and square roots of expressions;
- percentages: interpretation of percentages, discounts and marketing, application of percentages;
- functions: definition of functions, plots of functions, roots of functions, modeling with functions, domain and codomain of functions, polynomial and rational functions, parabola and hyperbola;
- linear functions: definition of linear function, plot of linear functions in the coordinate plane, lines, intersection of lines, parallel lines and perpendicular lines, slopes and lines through two points, equation of a line in the coordinate plane, modeling with the linear function, increasing rate;
- logic: propositions, logical connectives, negations, conjunctions, disjunctions, implications and equivalences;
- set theory: sets, elements, operations with sets (union, intersection, etc.), complementary set, power set, cardinality of a finite set.

Our findings are shown in Table 3. In the last column we presented the relative frequency percentage of the topic among all 290 questions analyzed.

Table 3: Content of INVALSI examinations.

	2010–11	2011–12	2012–13	2013–14	2014–15	2015–16	2016–17	Total
Statistics	3	1	4	6	6	6	2	27 (9.3%)
Probability	1	3	2	2	6	2	5	21 (7.2%)
Geometry	6	4	7	8	5	6	6	42 (14.5%)
Arithmetic	13	8	9	6	3	5	6	51 (17.6%)
Approximation	3	0	1	0	0	1	0	5 (1.7%)
Diagrams	6	2	2	3	2	3	4	22 (7.6%)
Solid geometry	2	2	3	0	2	1	2	12 (4.1%)
Analytic geometry	2	1	0	1	1	0	0	5 (1.7%)
Algebra	2	3	1	4	5	3	2	20 (6.9%)
Percentages	1	8	6	3	4	4	2	28 (9.7%)
Functions	1	5	2	0	0	1	0	9 (3.1%)
Linear functions	1	7	7	4	8	6	11	44 (15.2%)
Logic	0	1	0	0	0	0	0	1 (0.4%)
Set theory	0	0	0	1	0	2	0	3 (1.0%)
Total	41	45	44	38	42	40	40	290 (100.0%)

From table we can conclude that the most frequent topic is "Arithmetic" (17.6%), followed by "Linear functions" (15.2%) and "Geometry" (14.5%). It is also possible to see that the number of exercises on the topic "Linear functions" grew and almost doubled in the school year 2016-17. In the last three years, only one question was related to functions in general terms, while "Linear functions" has become a more popular topic. Considering merely linear functions and problems from linear modeling, it is therefore possible to conclude that interest has shifted form a more "theoretical" analysis of functions, to a more "concrete" and "explicative" one, in the last three years.

As explained in the Quadro di Riferimento (2017), some questions could cover more than one mathematical topic. For example, while working with a certain statistical problem, a knowledge of percentages was required. Plotting a line in the coordinate plane also requires a knowledge of analytic geometry itself. Since many questions could have been included in two or more categories at the same time (for example, in the category "Linear functions" and "Algebra"), we decided to include a given question in the category that was most indicative of that problem.

In Example 4, a question taken from the INVALSI examination for 2012–13 focuses on areas and sides of squares. In order to solve this mathematical problem, the student needs to understand percentages as well as geometry; this question could thus be considered both a geometry problem and a percentages problem. Since the question is about "squares", it seems more natural to consider it as a "geometry-related" topic.

Example 4: Example of an interdisciplinary question.

 A square is given with the side a.
   a. **If the side a is 20%, a new square emergens with the side b. Which of the following expressions represents the lenght of b?**
   A. □ $20a$
   B. □ $1,20\ a$
   C. □ $a + 20$
   D. □ $a + 0,20$

   b. **By how many per cent is the surface of the square with the side b larger than the surface of the square with side a?**
   A. □ by 20%
   B. □ by 40%
   C. □ by 44%
   D. □ by 120%

In order to limit the number of mathematical topics, we decided to group together those categories with similar mathematical content. We decided to distinguish the following macro-categories:

- data representation, data analysis and uncertainty (DRDAU): we joined the topics "Statistics", "Probability" and "Diagrams";
- geometry: we joined the topics "Geometry" and "Solid geometry";
- linear functions: we grouped the topics "Analytic geometry", "Linear functions" and "Functions";
- logic and set theory (LST): this combines the topics "Logic" and "Set theory";
- algebra: comprising only the topic "Algebra";
- numbers and quantities (NQ): we joined the topics "Arithmetic", "Approximation" and "Percentage".

Table represents a graphic illustration of the questions divided into the macro-categories that we proposed. Each column gives the percentage of questions in a category with respect to the total number of questions in that year. In contrast, the last column gives the percentage of the category's question among the 290 total questions that we analyzed.

Table 4: Macro-categories in the INVALSI examinations.

	2010–11	2011–12	2012–13	2013–14	2014–15	2015–16	2016–17	Total
DRDAU	10 (24.4%)	6 (13.3%)	8 (18.2%)	11 (29.0%)	14 (33.3%)	11 (27.5%)	11 (27.5%)	71 (24.5%)
Geometry	8 (19.5%)	6 (13.3%)	10 (22.7%)	8 (21.1%)	7 (16.7%)	7 (17.5%)	8 (20.0%)	54 (18.6%)
NQ	17 (41.5%)	16 (35.6%)	16 (36.4%)	9 (23.7%)	7 (16.7%)	10 (25.0%)	8 (20.0%)	83 (28.6%)
Linear function	4 (9.8%)	13 (28.9%)	9 (20.5%)	5 (13.2%)	9 (21.4%)	7 (17.5%)	11 (27.5%)	58 (20.0%)
Algebra	2 (4.9%)	3 (6.7%)	1 (2.3%)	4 (10.5%)	5 (11.9%)	3 (7.5%)	2 (5.0%)	20 (6.9%)
LST	0 (0.0%)	1 (2.2%)	0 (0.0%)	1 (2.6%)	0 (0.0%)	2 (5.0%)	0 (0.0%)	4 (1.4%)
Total	41 (100.0%)	45 (100.0%)	44 (100.0%)	38 (100.0%)	42 (100.0%)	40 (100.0%)	40 (100.0%)	290 (100.0%)

From Table we can see that problems in the category "Numbers and quantities" are the most frequent (28.6%). The second most frequent macro-category is "Data representation, data analysis and uncertainty" (24.5%); the third most frequent problems are from the macro-category "Linear functions" (20.0%). The least frequent, and almost neglected in every year's examination, is "Logic and set theory" (1.4%).

Conclusions

In the paper we analyzed seven INVALSI examinations for mathematics in the second year of high schools with Slovene as their language of instruction. We analyzed the questions from two perspectives:

– the typology of the questions: in particular, we sought to understand which question type (open-type and closed-type) was more frequent;
– the content of the questions: we sought to understand which mathematical topic was the most frequent on the INVALSI examinations.

From the analyzed data, it is evident that many closed-type questions, i.e. multiple-choice questions, true-false questions, or connect questions occur more frequently. Among the closed-type questions, multiple-choice questions are the most popular and represent 46.2% of the total questions. This answers our first research question: closed-type questions are the most frequent on INVALSI mathematics assessments.

Using mainly closed-type questions on an examination could lead to an emerging issue with guessing, (Haladyna, Downing & Rodriguez, 2002; Lau, Lau, Hong & Usop, 2011). Instead of evaluating procedures and the deeper knowledge that students have achieved, these national assessments are evaluating mainly the numerical result. Students who answer multiple-choice questions have a 25% chance of guessing the correct answer rather than showing their actual work and ability (Lau et al., 2011). Hence, it could be argued that guessing lowers the assessment's reliability (Burton, 2001).

We have shown that the most frequent mathematical topic present in the seven analyzed INVALSI assessments is "Number and quantities" (28.6%). We noted that in the last three years, the assessed topics favoured more "applied" mathematical fields, such as "Linear functions" and "Data representation, data analysis and uncertainty".

Our work points to the emergence of a critical situation, in that there are very few questions concerning mathematical logic and set theory. Teaching and learning only those topics that are the most frequent in national assessments, could lead to mathematical illiteracy and to the impossibility of understanding deeper mathematical topics. For example, very few questions on the INVALSI examinations focused on the general concept of function (i.e. not specifically on linear functions); therefore, it could happen that teachers just bypass this topic, centering their lessons more on linear functions than on functions in general. No question on injective, surjective or bijective functions was found in our analysis.

There is no reported evidence that the INVALSI assessments do influence the teaching of certain mathematical topics or dictate which topics should be studied in class. Limiting questions to a few topics, such as linear functions, arithmetic and data analysis, could lead to a more marginal knowledge of other topics, such as functions, logic, set theory and algebra.

More research should be carried out to understand whether national assessments regulate and direct modern tendencies in the learning and teaching of mathematics.

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USING MARK CHAGALL'S VISUAL ART IN TEACHING VISUAL ARTS

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Abstract/Povzetek This paper focuses on the importance of visual arts in the education of students, while also analyzing the need for using a work of visual art as material in teaching visual arts. The works of Marc Chagall, one of the most significant artists of the 20th century, were chosen for the purpose of the research. The aim of the paper was to reveal the visual and verbal reactions of students to the works of Marc Chagall in teaching visual arts, using the method of aesthetic transfer and game activities during contact between the students and the artworks. For this purpose, we conducted a study involving students in the first and third grades of the "Spinut" primary school in Split, the Republic of Croatia. Based on the works they made, we confirmed the hypotheses that students would gladly accept the works of Marc Chagall and successfully express themselves when inspired by this artist.

Uporaba umetniškega dela pri poučevanju likovni umetnosti (Marc Chagall) Prispevek se osredinja na pomen likovne umetnosti pri izobraževanju učencev, hkrati pa analizira rabo izvirnih likovnoumetniških del kot nujno gradivo pri poučevanju. Za namene raziskave so bila izbrana dela Marca Chagalla, enega najpomembnejših umetnikov 20. stoletja. Cilj prispevka je predstaviti vizualne in verbalne reakcije učencev na umetniško delo Marca Chagalla s pomočjo metode estetskega transferja in animiranih iger ob stiku učencev z likovnimi deli. V ta namen smo izvedli študijo primera, ki je vključevala učence prvega in tretjega razreda OŠ Spinut v Splitu v Republiki Hrvaški. Na podlagi rezultatov smo potrdili hipotezi, da učenci z veseljem sprejemajo dela Marca Chagalla in se uspešno izražajo s pomočjo umetnika.

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Introduction

A child spontaneously expresses herself/himself through visual arts, even before the expression through words, in order to show her/his feelings and knowledge (Danko-McGhee and Slutsky, 2003). Greene (1995) believes that creativity in visual arts is developed not only through students' creative work but also through the observation and analysis of artworks. When presenting a work of art, attention should be paid to the child's ability to understand the work, i.e. the stages of aesthetic development through which the student passes in her/his understanding of art. The student's experience with and interpretation of the work of art is experientially determined. A work of art is a specific teaching tool in teaching visual arts. In communication with an artwork, students develop aesthetic and cultural awareness, learn about other cultures, and use the artworks as a stimulus for their own visual art expression. To achieve this, teachers use a range of teaching methods and game activities in the contact between students and an artwork. During visual art classes, it is important to present many artistic reproductions. In this way, the child develops her/his creativity and reaches the culmination of aesthetic development. A student will become an individual who will both experience a work of art on a personal level and be able to evaluate it critically.

For many authors (Roca (1979), Althouse et al. (2003); Ronald (2007); Petrač (2015) a child's encounter with an artwork is most directly realized through visits to museums and galleries. Such visits are an excellent opportunity to experience a range of artistic achievements that can stimulate imagination in children and incite curiosity for further activities (Whitten and Kenyon, 2010). Unfortunately, this is not always possible, given the financial and practical problems. Therefore, students in the classroom environment should be presented with artistic reproductions. Ronald (2007) emphasizes that it is important to explain to students the difference between an artwork and its copy, or artistic reproduction. When encountering either original artwork or its reproduction, it is important to provide immediate observation that will inspire students' perception and analysis of the work. Adults have an important role here-- primarily parents and teachers. Their viewpoint and guidance in communicating with an artwork will influence the child's experience with art (Zimmerman, Zimmerman, 2000).

Artwork is one of the most prominent proofs of the past and the legacy that requires observation from different perspectives. The need for this derives from the fact that the artist lives in a certain time and space; thus the work that s/he creates has a causal connection with the time, space and culture in which the work was created (Petrač, 2015). The visual aspect is just one of a number that need to

be considered when observing a work of visual art. Also required is a knowledge of history, religion, anthropology, etc. It is important to observe the visual aspect in the socio-historical context in which the work was created (Levačić, 2011). Regarding this, Karlavaris similarly states: "In order to aesthetically experience one painting, we must presuppose the observer's emotional development, life experience, sensitivity to human problems and visual art phenomena, and on the other hand, the understanding of and sensitivity to the language of visual art expression used by the artist" (Karlavaris 1991, p. 64). For children to understand the meaning of artworks that are not primarily intended for them, it is necessary to introduce children gradually to the complexity of the artwork, developing their visual and cultural-aesthetic sensitivity. Eckhoff (2008) believes that a valuable artwork should be presented to students in a way that they can experience it. Eckhoff notes, in this regard, that children's artistic experiences should include activities designed to introduce children to high-quality works of art, which are simultaneously appropriate to their developmental phase.

Communicating with an artwork is done through asking stimulating questions. The goal of these questions is to encourage students to be active observers, to broaden their knowledge and to express their attitudes. The teacher, on the one hand, should teach the students skills, techniques and use of materials, while on the other hand, s/he should be a student who will listen and respect students' ideas, questions and thoughts. "In developing students' creative abilities, teachers must be aware that creativity develops through their own activity and that students are different from one another" Herzog (2008, p. 88). Tickle (1996) suggests first asking questions about what the work represents, then questions about the aesthetic characteristics, followed by technical features of the painting, and finally data about the artist. Ronald (2007) lists questions that can be posed to students while observing the work. These are organized into 6 categories, whereby the students should: describe (*What do you see in the painting? What else do you see?*); link (*What does this painting remind you of?*); analyze (*What colour dominates the painting?*); interpret (*What would you call this painting?*); and evaluate (*What mark would you give the artist for this painting? Why?*). In this way, the work of both abstract and figurative art can be put before the student. The choice in any case should be in accordance with the artistic activities and the students' age (Brajčić and Kuščević, 2016).

The method of aesthetic transfer and the play method in teaching the visual arts

Duh and Zupančič (2011) believe that specific teaching methods are required when introducing a child to an artwork. They emphasize the aesthetic transfer method. This method is applied when introducing students to visual artwork (Brajčić and

Kuščević, 2016), allowing the artwork to transmit not only information but also its aesthetic components. When employing this method, it is necessary to present works of art that stimulate the interaction of students with the works, so that the experience will remain etched in the students' memories, experiences, feelings and associations. Since this interaction differs from one child to another, it is necessary for each child to be able to express their opinion without fear of being incorrect. While a student expresses her/his impressions, other students broaden their perception (Duh and Zupančič, 2011). Reaction or acceptance can occur on three levels: the emotional, associative and formal-intellectual. These three types are variable and depend on the observer and the artwork observed. For the aesthetic transfer method to lead to a new aesthetic experience, the work of art should be realistic and of high quality, so that it does not lose much of the original information in its reproduction. The method of aesthetic transfer consists of three phases: *perception*: perception of an artwork with all the senses; *reception*: expression of the painting through words, and *reaction*. Reaction is "an individual productive response to the work of art is a psychomotor component of the aesthetic transfer method (Duh and Zupančič 2013, p. 76). The first phase is directed towards students and is necessary to stimulate their aesthetic experience. The second stage is directed towards the outcomes of perception that are expressed in words. The combination of these two phases--perception of the artwork and receptive abilities, is defined in Duh and Zupančič (2011) as an approach to the artwork. The perception of an artwork can only be appropriate when the artwork is well presented and explained. Duh and Zupančič (2011) state that students' perceptions can be reduced to comparing what they have heard with what they will see. What is certain is that, in contact with an artwork, children/students invest their own mental abilities and react emotionally. "The emotional response is the result of various factors important for each individual and leads from visual experience to visual thinking" (Duh and Zupančič, 2011, p. 51). In developing perception, students encounter visual problems; they can see and understand them (Duh and Zupančič, 2011). Reception refers to the internal reaction to a work of art and implies the overlapping of affective and cognitive components. It is the result of what the child/student has received (presentation of an artwork) and experienced. The process of receiving the artwork presupposes the gradual inclusion of rational and conscious experiences, but without neglecting the emotional and spontaneous ones, which are usually the first to occur (Duh and Zupančič, 2011). The reaction represents a productive reaction to a work of art and represents a psychomotor component of aesthetic transfer. It depends on the age of the children and students, their artistic knowledge, but also other types of knowledge, as well as their abilities and skills. It depends on the area of visual art design and the chosen art technique. At this stage, the role of educators and teachers should be emphasized, as it is important that they work in

accordance with a modern understanding of teaching the visual arts (Duh and Zupančič, 2011). The aim of the aesthetic transfer method is not to mark or remember data about various artworks but to identify complex relationships using a few examples of artworks in which the individual components are firmly connected so that the students can remember them (Duh and Zupančič, 2011).

Zupančič and Duh (2009) conducted a study on whether teaching about Pablo Picasso's works using the aesthetic transfer method provided original, individual solutions to students, or if those solutions were similar in various children. Participants were pre-school children from a kindergarten in Opatija, and the study formed part of a longitudinal project. In different ways, the students approached the active observation of artworks, while the same works served as the basis for their artistic expression. Various teaching methods were applied, with an emphasis on the aesthetic transfer method (Duh and Zupančič, 2011). The conclusion of the study was that "visual reaction as a component of the aesthetic transfer method provides quality individual solutions that justify the use of this method" (Duh and Zupančič, 2011, p. 75).

Brajčić and Kuščević conducted a study of children with disabilities, one of the goals being to determine whether the method of aesthetic transfer was applicable to working with children with developmental difficulties. Works by Edo Murtić were used in the study. At the end of the study, the authors concluded that the method of aesthetic transfer was applicable to working with children with developmental difficulties and that these children can present their impressions of the encounter with an artwork in unique ways (Brajčić and Kuščević, 2016).

Playing is a natural form for children's expression. From its earliest days, a child spontaneously expresses herself/himself through playing. Apart from offering enjoyment, games are an integral part of a child's cognitive development and maturation. These change as the child grows up, becoming more and more conditioned by rules. Spontaneous, honest and imaginative achievements in a game can be linked to artistic expression. While playing, a child completely concentrates on the activity; similarly, an artist while creating enters her/his thoughts, feelings, and impulses in the artwork. Moreover, play is what makes a child feel like a child. Ivon (2009) therefore concludes that play occurs only because of the joy of playing. Vidanec (2006) states that games are not pure fun, since during the game, an individual sets a goal and uses reason to accomplish it. The achievements of games are wide-ranging, and it is important to encourage the honest and spontaneous approach the child has during play, doing everything to satisfy the need for expression. This is important since, among other things, it is the backbone of artistic

expression. We can conclude that games offer the pleasure of adopting new content, because children thus easily learn and understand. Precisely because of this biological need of a child, it is advisable to use games in teaching (Skender and Karas, 2017). One of the basic principles in visual-educational training is play as a method and attitude; it should therefore be applied whenever possible (Grgurić and Jakubin, 1996). "Playfulness, freedom to independently structure their own artistic activity, openness to new art experiences, curiosity, all these present aspects of children's approach to the visual art process and learning" (Grgurić and Jakubin, 1996, p. 104).

Apart from the fact that a child, through play, creates her/his own artwork, s/he also discovers works of art through games. S/he begins to spontaneously notice artworks, observe them and fit her/his own scenarios into them. The child then introduces her/his experience, stimulates imagination and realizes the primary communication with the artwork. This communication is based on a thematic analysis of an illustrative retelling of an artwork. Damjanov (1991) argues that game-based communication should continue in the later development of the child. The game should have its didactic-methodological role, based on which we draw the child's attention to adopting the language of visual art.

Research problem, objective and hypotheses

This study aims to explore students' visual art responses to the works of Marc Chagall. Chagall is one of the most significant artists of the 20th century. For almost a century, Chagall (1887–1985) used painting, writing, designing and illustrating in original and imaginative ways. He is one of the great artists of the previous century, who created in various artistic fields such as drawing, painting, graphics and sculpture. His works of art are a real treasury of creativity, uniqueness and reflection of emotions, where he presented real motifs from his life in realistic and distinct ways. It is as if his works tell a fairy tale, as if his canvas were a place where amazing wonders happen, involving a series of unusual creatures. Characters are most often depicted completely realistically or unusually. His paintings are dominated by floating, green faces of people, animals playing violins, upside down houses, paintings without spatial determinants. We dare to say that his creation reminds us of children's creations.

The aim of this paper was to bring the artwork of Chagall closer to students, using the method of aesthetic transfer. With the help of game activities, students learn the language of visual arts, and then we explore the student's reactions through oral and visual expression in relation to the this artwork.

Accordingly, the following hypotheses have been set:

H1: *The students will respond positively to works by Marc Chagall in visual art classes.*
H2: *Students will successfully perform a visual art task, stimulated (motivated) by applying the aesthetic transfer method.*
H3: *By applying game activities, the students will awaken the visual art language (of colour) which will be their guide in creating works of visual art.*

Research sample and instrument

The research included the study of works of visual art created by students attending the "Spinut" primary school in Split, the Republic of Croatia. The total of 48 students included 27 first graders and 21 third graders.

For the purpose of this study, we employed the interpretative approach, in this case the approach to student work that forms an integral part of the qualitative analysis. "The aim of qualitative research is to analyze and interpret various non-numerical data, words, images and documents. Based on these non-numerical data, we try to get a certain message and meaning. In qualitative research, there is a combination of information gathered from respondents and about respondents with observations and interpretations of the researchers, since both are actively involved in the research process" (Mejovšek, 2008, p.161).

Research process

Students encounter artworks while visiting galleries and museums, but often they also communicate with artworks by observing art reproductions. Starting from this assumption, we sought to establish whether using the aesthetic transfer along with game activities would result in the work of art becoming a stimulus for students' creative work, and whether this approach would be interesting in class.

The study was conducted in June 2018 during four school hours. A block hour lesson was held in the first grade and then in the third grade. The visual arts activities in both grades were designed according to the phases of the aesthetic transfer method, adding to this the game that was performed before the last stage of the method.

First, we briefly learned about the life of Chagall and the main motifs depicted in his works, closely related to his life. After that, the students observed four works of art that were consistent with the visual art language that the students had to get to know during the class. First grade students had two school hours, which included repetition of two teaching topics related to painting: *Names of colours, basic and derived colours*, and *Colour tones*. Third grade students also had two school hours that included repetition of a topic related to painting: *Chromatic-achromatic contrast*. The observation was followed by a discussion about these works, about what the works showed, whether the students liked them and why, and what feelings they inspired. Their impressions about Chagall's works as well as first-grade interpretations were collected in writing during the conversation, while in the third grade the students wrote down their impressions anonymously. The impressions the students stated or read helped us to move from the affective component to the visual art component. By asking stimulating questions, we focused their attention on Chagall's style of painting, letting them notice all the features of his artistic expression: colours, shapes and relations of size and floating characters. The emphasis was always on visual art language--colours and contrasts. After noticing the visual art language used in a particular artwork, the students received instructions for a game related to one of the four works presented. In both grades, this included a work based on which they subsequently painted. The game was followed by the announcement and the process of painting. During painting, the art reproduction was exhibited, so that the students could at any time recall the main features of Chagall's painting and use those as a stimulus for further work.

Description of the visual art activities and analysis of student work in the first grade

Visual art motif: Marc Chagall's "Cows over Vitebsk", which served as a stimulus for expression. *Visual art language:* Names of colours, basic and derived colours; Tones of colours. *Art technique:* tempera.

The students were prepared for the activities with tempera before the lesson and received additional material (coloured paper). On the projection screen, we then showed Marc Chagall in the painting process and asked what the painting was about. We pointed out that this was an artist, and they concluded that he was a painter. We presented a short biography of Chagall. Students found out he was born in a small Belarusian town and that, when he went to school, he began to like drawing. He decided that he would become an artist when he grew up; thus, he went to Paris, where there were many artists at that time. There he studied and became an artist. Afterwards, he moved to New York and some other cities. Sometimes he would miss his homeland, so he would often paint the scenes he

remembered while he was there. The students then observed the artistic reproduction in *Figure 1*. Additionally, he had a wife and he painted her in many of his works.
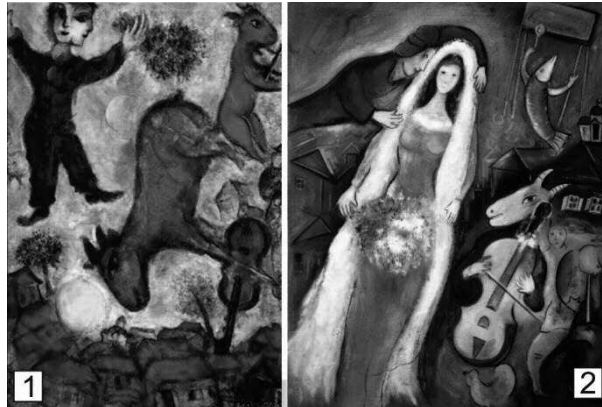
Figures 1 and 2: Cows over Vitebsk and The Bride.

We showed two more artwork reproductions, shown in *Figure 2* and *Figure 3*. The students learnt that Chagall would also paint circus scenes and, given the reproduction shown in *Figure 4*, the students showed interest in listening to the story about the painter.

Figures 3 and 4: Couple and Fish and Multicolor Clown.

When we showed all four Chagall works to the students, we gave them a moment for observation. Then we asked them the following questions: "Do you like these works?" All the students responded positively. But when we asked them why, they did not immediately know how to explain their answers. Together, we encouraged the students to express their impressions. These were some of their impressions: *I like this work because the artist used imagination. He beautifully showed this city, it is beautiful and unusual that he did not paint the city, but all the people and animals in it. I like the colours the clown has. He has a lot of colours. How are these people standing on a tree? I like that the painter shows strange and unseen images.* When asked what the paintings were about, the students observed floating people and animals, even though they did not give them their real names. The student replies included, *See this animal playing a violin, very interesting. The squirrel playing the violin, and the goat as well. The horse is upside down and playing the guitar. A fish that stands just miraculously.* Asking motivational questions, we drew students' attention to the motifs - characters and their placement, as well as the colours the artist used. In order to better understand the structure of Chagall's painting, the reproduction of "Cows over Vitebsk" was rotated. Students noted that the cow in the picture seemed to be painted from the horizontal position of the paper. They were delighted that the painter had placed characters in this way. In order to recall the basic and derived colours that they would be using during their creation, we told the students they would be playing a game with the reproduction in *Figure 1*.
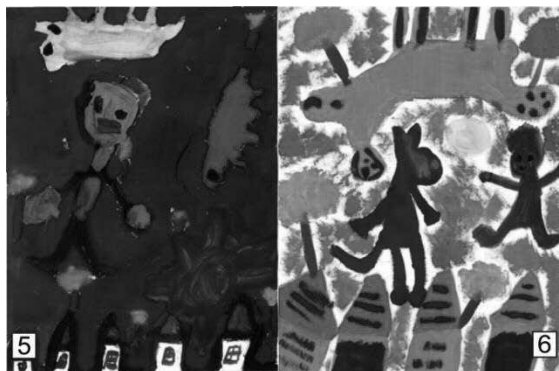
Figures 5 and 6: Student work.

At the beginning of the lesson, each student received a piece of red, blue or yellow paper. When a colour in the reproduction was indicated, the task of the student was to raise the paper of that colour if they happened to have it. In addition to the basic colours, during the game the students were reminded of how derived colours are created. Then, for example, when a purple t-shirt is shown, all students with red and blue papers would raise them because purple is created by mixing the two.

Through the game, the students liked to name the basic and the derived colours. In addition to the pieces of paper, the students imitated the moves (strokes, stains) of the artist, by having one students come to the board and show a brush stroke or stain for a certain part of the reproduction. Since the students used sponges along with brushes for tempera, this included comments while imitating the artist's moves related to what they themselves would use. After the game ended, another announcement was made: *You will now be little artists and imagine that you are Chagall, painting unusual floating characters with lots of different colours, and looking at this work while painting* (*Figure 1*).The emphasis was not on copying an artwork but on painting inspired by Chagall's motifs, floating characters, and the use of strokes and stains when painting with basic and derived colours.
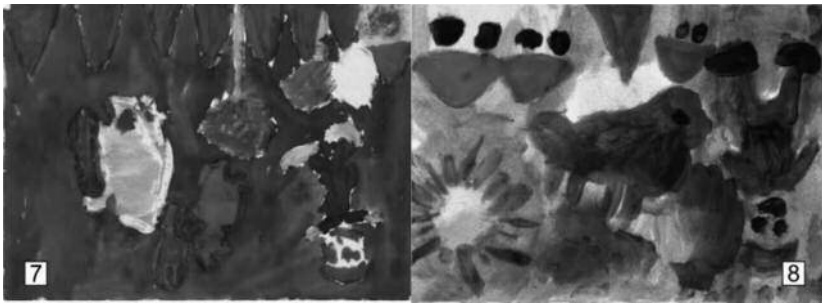
Figures 7 and 8: Student work.

The students were first afraid they would not be able to paint following Chagall's model. The comments were most often related to shapes: *I do not know how to paint a cow! That's hard, I cannot do it!* But when they started, they asked a lot of questions about whether they could paint other animals. They were uncertain about how to rotate the paper, how to start, and how to paint animals and violins. One student asked if he could paint a clown, another if he could paint another instrument, and so on. They liked that they could use their imagination and paint the characters anywhere on the paper, using any colour. When they started painting, there were new questions, such as: *Did I begin well? Is what I painted good? Can I use this colour for painting the house?* and so on.

Figures 9, 10, 11 and 12: Student work.

A review of children's work in first grade:

a) the realization of the language of visual art

The students completed the task related to visual art using basic and derived colours in painting. Derived colours were used less than primary colours, especially purple. Orange was the most common colour in all the works. The basic colours are present in all the works, dominated by blue. In some works, there is also black (especially present in work *no. 13*).
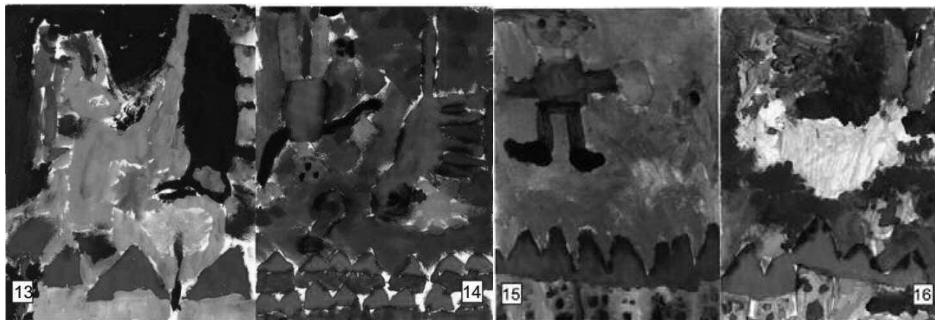
Figures 13, 14, 15 and 16: Student work.

A review of children's work in first grade:

b) the relation between the artwork and students' work

Almost all the students rotated the paper when painting in a vertical position as in the artwork. The students painted while inspired by Chagall, and all the works featured floating characters and a multitude of colours. In all the works (see *Figures*

7 to 16), the students began to imitate the artwork, which is seen in the painted houses. But apart from the fact that the paintings were reminiscent of Chagall's painting in their composition, the students were able to realize their own visions following Chagall's model.

c) visual art technique

The students used a brush for movement and a sponge for the staining. The sponge was most commonly used to paint the background. Students can paint with tempera; only one female student in her work used tempera with a greater amount of water, her work in the end resembling a gouache.

d) originality

The students were guided by the observed artwork while painting, but it was noticeable that they showed creativity in the choice of colours and the composition of the shapes they chose.

Description of the visual art activities in the third grade

Visual art motif: Marc Chagall's work "The Green Violinist", which served as a stimulus for expression. *Visual art language:* Chromatic-achromatic contrast. *Art technique:* pastels.

On the projection screen, we showed Chagall in the process of painting. We pointed out that this was an artist, and they concluded that he was a painter. We presented a short biography of Chagall. Students found out he was born in a small Belarusian town and that, when he went to school, he began to like drawing. He decided to become an artist when he grew up; thus, he went to Paris, where there were many artists at that time. There he studied and became an artist. Afterwards, he moved to New York and some other cities. Sometimes he would miss his homeland, so he would often paint scenes he remembered while he was there (*Figure 17*). The students found out that Chagall often painted a man who played at celebrations in his place of birth. On the school board, we showed an artistic reproduction (see *Figure 18*), asking the students the following question: "What is the man playing?" They immediately responded that he was playing a violin and that this was a violinist. Then the students encountered the following reproduction in this way: "He had a wife with whom he was very much in love, and he would often show her in many works." The artistic reproduction shown in *Figure 19* was then displayed on the school board. The last reproduction was displayed showing the painter's

painting of himself (see *Figure 20*). The students concluded this was a self-portrait. The students listened carefully to the artist's story and observed his works.
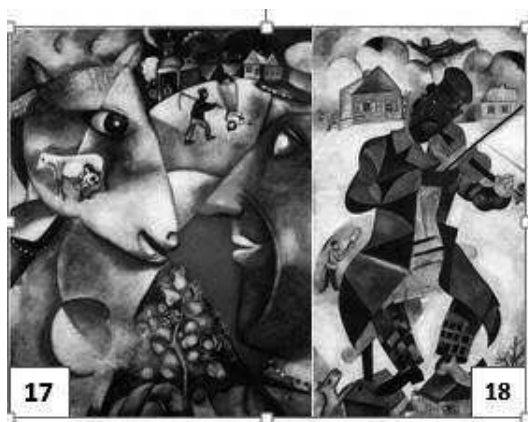
Figures 17and 18: I and the Village and Green Violinist.

When all four art works were displayed, we gave the students a moment to observe them. Then we asked them the following questions: "Do you like these works?" Some of the students answered, yes. When asked why, unlike the first-grade students, they immediately stated their reasons. They wrote down their impressions. The most frequent comments were about unusual characters and shapes, different colours, contrasts, flying characters, the mismatched shoes on the violinist, which they found weird, imaginative and unusual, and so they liked them. Two students commented that they did not like the "Green Violinist", while they liked the other reproductions because they were unusual. Several students drew attention only to "Promenade" because it was apparent that the woman in that painting was flying.

Figures 19 and 20: The Promenade and Self-portrait with Seven Fingers.

Some of them paid attention to a series of scenes; thus these two comments: *In the painting* (*Figure 17*) *he showed this city beautifully. Nice and very interesting and original is the way the artist painted an animal in an animal.* When asked why the works were unusual, some of the comments were as follows: *The man flying, I see it for the first time in my life. Because he has different legs, one with circles, the other with squares on the pants. I liked it because the paintings are unusual, and I rarely see something like this. His wife is flying, and he painted himself unusually. What's unusual in the second painting* (see *Figure 18*) *is that he has a dark greenish face and mismatched shoes, and he is flying.* Since the students noticed the features of Chagall's painting, stimulating questions during and after the expression of student impressions served to revisit the unusual and special features of the artist's style. To remind the students of the chromatic and achromatic colours and contrast, which some of them had already noticed, and which would later serve them for their own painting, we announced a game based on the artistic reproduction in *Figure 18*. Through the game, the students noticed once again which colours were used, which ones were chromatic and which achromatic. These colours were shown on the projection screen in two columns. The students were divided into two groups and received the following instructions: "One group presents chromatic and the other group achromatic colours. Each colour and non-colour is named and displayed on the projection screen. When I point to a certain part of the artistic reproduction, the group to whom the colour belongs to must sing the given word. The dynamics of singing (loud, moderately loud or silent) will depend on the colour tone. If it is lighter, the group will sing high tones, while if it is a darker colour or a non-colour, the group will sing deeper for the given word." The game lasted 2–3 minutes, enough for the students to notice the colours used when in painting the violinist and the non-colours used when painting the background of the artist's work. Then we focused on what the students saw, i.e. where colours were used, and where non-colours were used in the work. Thus, the chromatic-achromatic contrast was observed.
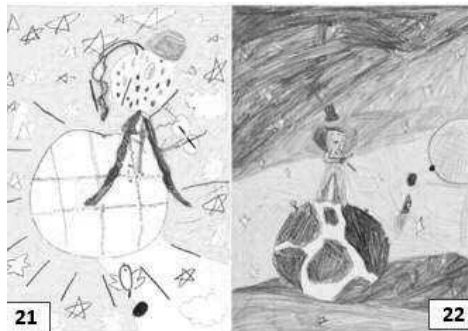
Figures 21 and 22: Student work.

After the game ended, another announcement was made: "Now, just like Chagall, you will paint your unusual violinist, observing this work" (*Figure 18*). The emphasis was not on copying the artwork but on making a painting inspired by Chagall's motifs, floating characters, and the use of chromatic and achromatic colours when painting. The students, just like thr first graders, were first afraid they would not be able to paint following Chagall's model. The comments were mostly related to shapes: *I do not know how to paint a violinist! I do not know how to draw a violin!* But when they started, they asked a lot of questions about whether they could paint the violinist somewhere else, if they could paint a female violinist, etc.
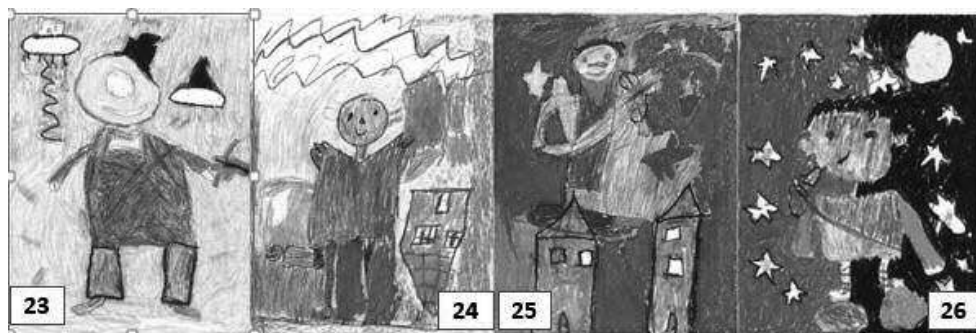
Figures 23, 24, 25, 26: Student work.

One student asked if another instrument could be painted. They liked that they could use their imaginations and paint the way they wanted, and especially because it should be unusual. When they started painting, there were new questions and comments like: *Can I use red? My violin will be connected to the amplifier. Can the violinist's ears be of different colours? My violinist will be flying in a rocket. Can he stand on an ice cream?* The students were free to approach the reproduction and observe the details. In the end, students were delighted with this way of painting.
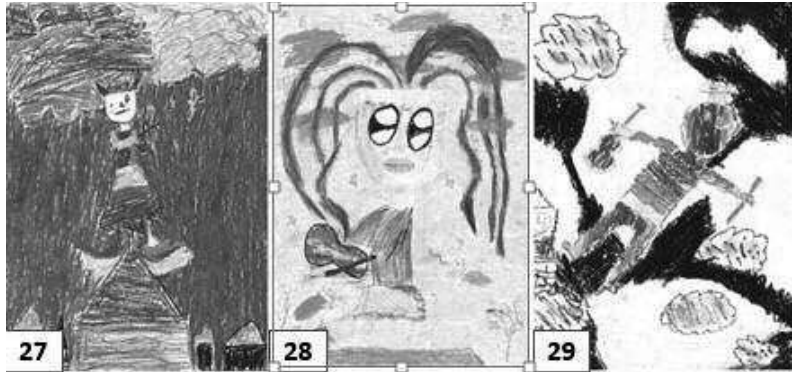
Figures 27, 28, 29:Student work.

This review refers to analysis of the following items:

a) the realization of the visual art language

The students successfully used chromatic-achromatic contrast in all their works.

b) he relation between the artwork and student work

All the students rotated the paper vertically, as expected, since the motif of the art reproduction was set accordingly. During the painting process, the students were guided by the features of Chagall's painting, rather than copying the chosen artwork; thus, the violinist in some works was female. Furthermore, besides floating over the roofs in the artwork, we found the violinist placed in the universe in certain works. The students used colours rather than non-colours in the whole composition. One student, like Chagall, highlighted his violinist with colours, and all around him was painted using only achromatic colours (*Figure 29*). There are details such as stars, houses, clouds, bell towers, rockets and babies.

c) art technique

Students successfully used pastels, applying colours to the paper intensely, but in some places, they painted somewhat messily.

d) originality

These works show imagination and freedom from copying.

Conclusion

A child has creative potential since the earliest age, potential which then needs to continue to develop upon her/his arrival at school, visual arts education being one of the subjects directly providing this development. Communication of students with a work of visual art should be encouraged by the teacher from the earliest age, as it activates a child's thinking, opens new horizons of vision, creates the basic prerequisites for thinking and imagination development. In order to establish communication between a student and a work of art, the teacher should use various methods in her/his work.

The research carried out shows that the students are curious to observe and respond positively to the works of Marc Chagall, which confirms the first two hypotheses. The unusual characteristics of the works inspired a series of curious questions, which we used for motivation. Since the motivation stage in this way, through the aesthetic transfer method, was different from the usual, the students quickly adopted this mode of work and participated by expressing their opinions and impressions. The visual art problem in both classes was presented through games. As soon as they found this was a game, the students were interested in performing the task. The game was both fun and educational and thus allowed students to remind themselves of the necessary visual arts knowledge. The students successfully created artworks following Chagall's model, thus highlighting certain types of artistic knowledge.

In order to promote communication with students during the observation of Chagall's artworks, we used the method of aesthetic transfer and a game when observing the artwork. Since the method of aesthetic transfer involves perception, reception and reaction, these phases served as stages of the lesson in visual arts education during this study. The works by Chagall served as a motivational stage of the lesson, encouraged interest in creating as a response to the artist's model and became a source of originality in visual art expression.

Considering the given hypotheses, using an interpretative approach to children's artwork, we have come to certain conclusions. The first hypothesis *The students will respond positively to the works of Marc Chagall in visual art classes* was confirmed, which is seen in the number of curious questions and comments during the observation of the works of art. The study has shown that the works of Chagall are close to the students and that they gladly accept them as being unusual and imaginative. The second hypothesis *Students will successfully perform a visual art task, stimulated (motivated) by applying the aesthetic transfer method* relates to the third stage of the aesthetic transfer

method, which involves students' reactions, that is, their works. Student artworks were successfully created, inspired by Chagall. In the first grade, students were guided by their own experience, but also by observing the reproduction while painting, whereas third-grade students were guided by experience unrelated to the artwork. However, in both the first and third grades, students made creative works. It is important to point out that students should not be shown artwork in schools or galleries with the intent of having them make copies. The works should be presented in to enhance their aesthetic development in contact with art, to develop a positive attitude towards art while at the same time stimulating their own artistic expression (Brajčić, Kuščević, Katić, 2011), which is reflected in these activities. The third hypothesis *By applying games, the students will awaken the visual arts language (of colours) which will be their guide in creating works of visual art* was also confirmed. Through the animation game, first-grade students were reminded of the basic and derived colours that were then used in their works, while the third-grade students were reminded of the chromatic-achromatic contrast. The game is the main driver; it produces pleasure in adopting new content, because children approach learning and understanding with no sense of pressure. Through the examples of game activities for the encounter between a student and a work of visual art, the child becomes acquainted with the visual art problem. These games can serve students to revise certain visual art elements and visual problems. In addition to repetition, some games are designed to teach new visual art concepts or to adapt them. Marc Chagall's artwork should find its purpose in teaching the visual arts because of its closeness to children's art expression. Art activities involving contact with artwork should be implemented more frequently with students, as such activities enable the acquisition of experiences that develop many students' abilities.

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RE

STUDENTS' ATTITUDES TOWARDS DIDACTIC CHARACTERISTICS IN GRAPHIC DESIGN CLASSES

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Abstract/Povzetek Contemporary education enables the development of creative expression in students, while the role and significance of didactic approaches in secondary school have not yet been comprehensively studied. The article presents the results of research into students' attitudes towards didactic characteristics of Graphic Design classes in secondary school. We were interested in the attitude of 3rd-year students (17-18 years old) towards the characteristics of the subject Graphic Design, and their level of satisfaction with the use of teaching methods, learning techniques and didactic communication in Slovenian schools. The results show that little attention is paid to the concept of effective methodologies in practice. There is a need for a range of didactic approaches that would contribute to active, interesting, creative and dynamically based Graphic Design classes.

Stališča dijakov do didaktičnih značilnosti pri pouku grafičnega oblikovanja Sodobno izobraževanje omogoča razvijanje ustvarjalnega izražanja dijakov, vloga in pomen didaktičnih pristopov v srednji šoli pa celoviteje nista raziskana. V prispevku predstavljamo rezultate raziskave odnosa dijakov do didaktičnih značilnosti pouka grafičnega oblikovanja v srednji šoli. Zanimala so nas stališča dijakov 3. letnikov (17–18 let) do značilnosti predmeta *Grafično oblikovanje* in nivo zadovoljstva z uporabo učnih metod, učnih oblik in didaktične komunikacije v slovenskih šolah. Rezultati kažejo, da se konciparanju učinkovitih metodičnih postopkov v praksi namenja malo pozornosti. Nakazuje se potreba po drugačnih didaktičnih pristopih, ki bi prispevali k aktivnemu, zanimivemu, ustvarjalnemu in dinamično zasnovanemu pouku grafičnega oblikovanja.

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Introduction

Modern pedagogical theories define learning as a personal creative process, involving active acceptance and processing of facts, individual interpretation and organization of knowledge and its use in varied situations, whereas teaching is defined as a process of appropriate support for learning (Smith, 1999; Senge, 2000; Marentič-Požarnik, 2004; Pluto Pregelj, 2008). A shift from the transmission approach to teaching and learning - where students passively accept the teacher's knowledge - to a transactional approach, where the teacher uses a problem-based approach and promotes creativity and research, solving problematic artwork with diverse methods and work procedures, while stimulating the active participation of pupils and contributing to greater student satisfaction. This kind of learning stimulates critical thinking and is characteristic of holistic, reflexive, interactive, personal, experiential and lifelong learning (O'Sullivan, 1999; Marentič-Požarnik, 2000; Mezirow, 2000). It is important that curricula in secondary schools include more than just the competences of knowing formal art language and practical work by students, since it is of utmost importance that the work in school relates to current events in fine arts (Zupančič, 2015).

Quality and comprehensive learning depend to a large extent on the teachers' choice of teaching methods, learning techniques, didactic communication, etc. with which they influence student activity, motivation and learning. When delivering content, the teacher should proceed from an integrated approach, combining elements of different strategies into an integrated teaching method (Shepherd, 2005). The results of research at the elementary school level showed that a didactic approach with a dynamic, diverse mix of learning methods, forms and didactic communication has a positive effect on artistic development, as well as creativity, knowledge and appreciation abilities (Spirit, 2004). At the secondary school level, we also established the positive effect of introducing an innovative approach in the form of minor didactic changes (Kač Nemanič, 2017) on the development of artistic appreciation and artistic creativity (Duh and Kač Nemanič, 2018), which enables the creation of quality Graphic Design classes that contribute to greater student satisfaction.

Didactic characteristics of Graphic Design classes

The choice of teaching methods at the level of the educational process in the fine arts classes (Karlavaris, 1991) is determined by the characteristics of this subject or the specifics of aesthetic communication and creative processes, the complexity and individual, subjective characteristics of the artistic phenomenon. By using modern

teaching methods, we adapt the process of teaching and learning to the needs and development potential of each student, promoting their curiosity and intrinsic motivation, and contributing to the reduction of decontextualized learning. Students should be given a learning experience which, by activating both brain hemispheres, stimulates holistic (cognitive, emotional and motor) development (Terhart, 2001).

Methods in the field of art must be adapted to the peculiarities of fine arts classes, since the specifics of the phenomenon also dictate the specificity of the path (Karlavaris, Berce Golob, 1991). Meyer (2005) emphasizes that one of the conditions for quality teaching is diversity of teaching methods. "Dynamically changing and interweaving individual learning methods encourage pupils to visualize evaluation criteria and to discuss the criteria and compare them with exhibited artwork" (Duh, 2004, p. 193). The use of learning methods and learning forms is effective when it develops the interests of students, motivates them to act and activates their capacities in the learning process (Mušanović, Vrcelj, 2001). Herzog and Strnadova (2014, p. 85) furthermore point out that in persons with special needs, a significant pedagogical approach to the perception of art is [...] "adapted to the individual art piece as well as to the recipient, as the essence of aesthetic experience is the dialogue established between the art and the person."

In addition to the general teaching methods, Karlavaris (1991) lists specific learning methods in fine arts classes, which can be used by adapting to the methodological particulars and characteristics of Graphic Design classes. Duh (2004, p. 74) adds that, in order to achieve [...] "active creative work, it is, in addition to the general teaching methods, also worthwhile to include some specific teaching methods in the pedagogical practice. Specific artistic methods are working methods that have emerged from the peculiarities of the art field, its characteristics and problems." In art education, it is not only intellectual development that is promoted, but also qualitative processes, which act as a factor in the cultivation of personality, and which are generated by stimulating the emotional and creative component (Berce Golob, 1993; Karlavaris, 2007). The significance of specific artistic methods is therefore reflected in the promotion of aesthetic and creative aspects of personality, since general methods are mainly aimed at promoting intellectual activity (Duh, 2004).

Specific artistic learning methods, combined with general teaching methods, allow for greater flexibility and dynamism in teaching and learning. However, at the same time, for the successful implementation of specific teaching methods, it is necessary to increase teachers' competence in the knowledge of visual language, differences

in the potential for artistic expression, the way of perceiving artistic concepts, and the specifics of handling fine arts, as well as the students' interests and inclinations (Duh, 2004; Tacol, 2003). When these methods are employed, learners are better able to develop the ability to observe, their imagination, the ability to think and express their thoughts in an artistic way, their free creative expression and the independent and creative handling of fine arts and tools (Duh, 2004; Berce Golob and Karlavaris, 1991; Tacol, 2003). The aesthetic communication method thus has a broader useful value for various art disciplines, since students using the aesthetic communication method [...] "spread sensitivity for individual artistic components, design structures and thought elaborations" (Duh, 2004, p. 60). "It is a set of didactic decisions aimed at creating optimal conditions for the development of aesthetic sense and aesthetic activity among the participants in the pedagogical process" (Duh and Zupančič, 2013, p. 73). For classes in graphic design, the method is important because, with its help, students learn about design structures, observe characteristics, seek solutions to design problems and explain their experience regarding the design products of other students. Duh and Korošec (2009) add, "Perceiving, experiencing and accepting works of art is an important part of the art of children, as it promotes the development of man in order to be able to establish a critical attitude towards contemporary art, visual communications and other information that we receive from the environment." The method of complexity and interweaving is important because it directs the attention of students to different layers of artistic creativity, as well as other aspects of design. In designing design products, it is necessary to consider other aspects such as technical limitations, the wishes of the client, purpose, etc., in addition to visual arts. Also interesting in terms of the nature of the work of graphic design is the method of transposing and alternatives. Students with transposed reality in the process of abstraction and stylization create their own design expression. In the creative sense, the use of the indirect stimulus method is often very effective, which is expressed in the form of unexpected impulses that can lead to a jump in quality in a creative act (Duh, 2004). Its use is extremely important in Graphic Design classes, as it encourages students to find new design solutions.

Blažič et al. (2003) state that forms of learning during the educational process appear as an integral part of methods that regulate the relation between the positions and roles of teachers and those of pupils. Applying varied learning methods and learning forms can provide more meaningful and more persistent knowledge, along with understanding (Plut Pregelj, 2008). Given the importance of the role of the teacher and the work of the students themselves, we recornise direct and indirect forms of work, which include frontal work, working with individuals (individual work), group work and work in pairs (Blažič et al., 2003; Bognar,

Matijević, 1993). Graphic Design classes are mostly characterised by the use of individual, independent work, while group and pair work are used to a lesser extent. The researchers Pibernik, Milčić and Bonta (2010) believe that teachers should train students for group work: "[...] the benefits of group work are a more in-depth analysis of ideas, a more diversified approach to the conception of concepts, greater criticality at work, abundance and diversity of knowledge, faster manufacture of the art piece, creation of a sense for community and a special atmosphere, etc." (ibid., 2010, p. 5).

The authors Littlejohn and Foss (2007) emphasise that the development of interaction and communication activities between teachers and students is of great importance in the design of modern classes. The sincerity, coherence and symmetry of didactic communication contribute to the creation of a relaxed climate and to the active evaluation of one's own artistic efforts (Duh, 2004). What is important is a two-way and reciprocal, empathic "[...] creative, open communication that is targeted, direct, clear, responsible, positive, honest, attentive and cooperative" (ibid., p. 66). Bognar (2012) also believes that creativity can be promoted through appropriate didactic communication and is committed to changing the relationship by asking unusual questions and initiatives and using special methods and procedures. To achieve successful didactic communication between the teacher and the students, it is important that the teacher adapt their professionalism and terminology to the developmental level of the students, use both verbal and non-verbal communication and regularly check the effectiveness and comprehensibility of communication through feedback. Successful didactic communication requires of a teacher the ability to project empathy, that is, the ability to project into the internal states or the personality of the participants (Duh, 2004).

Certain sets of didactic guidelines in Slovenia are intended for the wider field of artistic didactics at all levels of education. In the field of graphic design, these can be used as a basis for the design of an approach to planning and delivering lessons, and effective learning and teaching. The basic starting point for the conception of an effective didactic approach may be the ability to translate and adapt teaching methods, teaching forms and didactic communication to the graphic design area, which could contribute to greater student satisfaction with didactic characteristics.

Methodology

Research method

We designed a survey questionnaire consisting of three closed-ended questions and one open-ended question on student attitudes towards the features of the Graphic Design subject, which is followed by four closed-type questions about the satisfaction of pupils with the didactic characteristics (a five-point Likert type scale). In the study, we used the descriptive empirical non-experimental method of pedagogical research. The survey was conducted in classes of Graphic design. The selected education program for Design Technicians runs at the Secondary School of Design and Photography in Ljubljana, the Secondary School of Design in Maribor and the Secondary Vocational and Technical School in Murska Sobota.

Analysis of the measurement characteristics of the questionnaire

The objectivity of the questionnaire for students was ensured by specifying detailed and simple instructions for its completion, as well as with unambiguous, clear-cut categories on the objective scale. The answers to the open-ended question were categorized and the categories sorted by frequency of repetition.

To determine the constructive validity of the questionnaire (for questions with a five-level Likert type scale), factor analysis was used, namely the percentage of variance explained by the first common factor. When testing the questionnaire, the percentage of variance explained by the first factor of the variable is as follows:

- – satisfaction with general learning methods, 22.86%;
- – satisfaction with specific learning methods, 30.99%;
- – satisfaction with learning forms, 38.64% and
- – satisfaction with didactic communication, 31.30%.

Their values are therefore higher than the assumed lower limit criterion (20%), which means that these are satisfaction scales that are appropriately valid; that is, they measure the expected satisfaction of pupils with the learning methods, learning forms and didactic communication to an adequate extent.

The reliability of the questionnaire was checked using the Cronbach alpha reliability coefficient (α). The value of the coefficient of the alpha variable was as follows:

- satisfaction with general methods, 0.62,
- satisfaction with specific methods, 0.66,
- satisfaction with learning forms, 0.64 and
- satisfaction with didactic communication, 0.61.

The values are therefore sufficiently high and confirm the satisfactory reliability of the instrument.

Research sample

The study included 73 randomly selected third-year students (17-18 years old) from three secondary schools in the Osrednjeslovenska, Podravska and Pomurska regions. The sample comprised 36 boys (49.3%) and 37 girls (50.7%). Twenty-five (34.2%) students from Ljubljana, 24 students from Maribor and 24 students (32.9%) from Murska Sobota secondary school were included in the survey.

Data processing

We used the parameters of basic descriptive statistics: sample size - N, frequencies - f, percentage -%, average grade - x, standard deviation - s. The data were processed using the SPSS computer program for statistical data processing.

Results and interpretation

We were first interested in whether the Graphic Design subject is popular among students.
(t1) Do you generally like Graphic Design classes?

Table 1: Perception of the importance or the popularity of the subject Graphic Design.

	f	f%
I don't like it	3	4,1
Yes, I like it	4	5,5
Yes, I really like it	5	6,8
Not particularly	28	38,4
I like it a lot	33	45,2
	73	100,0

The results of the survey show that the largest share comprises those (45.2%) who like Graphic Design averagely. A very small number of students (6.8%) said that they were very fond of Graphic Design classes, and as much as 38.4% that they did not particularly like Graphic Design classes. From this point of view, the need for different didactic approaches and an improvement in the efficiency of graphic design didactics is demonstrated and confirmed. We were additionally interested in student attitudes towards the importance of individual goals in Graphic Design classes. Regarding this issue, students had the opportunity to encircle multiple responses.

(t2) What do you find very important in Graphic Design classes?

Table 2: Perception of importance in individual goals of graphic design instruction.

		f
1	development of creativity	60
2	special knowledge	58
3	sensitivity to aesthetics	44
4	personal development	35
5	practical knowledge	11
f = number		

For these students, the most important goal in Graphic Design classes is the development of creativity, which is consistent with the statements of many contemporary researchers, who agree on the importance of integrating creativity in school (Hennessey and Amabile, 2010; Flint, 2014). Williams and Askland (2012) add that creativity is an important part of design and education. We allow the possibility that the listing of personal development in penultimate place shows the neglect of educational goals in practice. Other possible reasons could be the individually different and overall lower level of social maturity among the students, the discouraging influence of the environment, a negative atmosphere in the class, etc. The listing of practical knowledge last among the goals was partly anticipated, since these students do not have much practical content included in the curriculum (Curriculum, 2006). This was followed by the question regarding the development of creativity in the classroom.

(t3) Is creativity sufficiently developed in Graphic Design classes?

Table 3: Perceptions of effectiveness in the development of creativity.

		f	f %
1	Yes	10	13,7
2	I do not know	30	41,1
3	No	33	45,2
		73	100

f = number; % = percentage

To the question of whether creativity was sufficiently developed in Graphic Design classes, student responses were mostly negative (45%) or undecided (41.1%). The researcher Tudor (2008) similarly notes that little attention is paid to improving learning approaches in promoting creativity.

We were also interested in suggestions from students for improving their lessons. The responses were categorized and ranked by frequency of occurrence.
(t4) What could the teacher improve in class?

Table 4: Ranges of suggestions from students for improving their lessons.

		f	f %
1	evaluation criteria	38	52,1
2	demonstration of diverse fine art techniques	19	26,0
3	dynamism and attractiveness of lessons	8	11,0
4	connection with practice	5	6,8
5	diversity of design topics	3	4,1
		73	100

f = number; % = percentage

Student proposals are most often related to the integration of evaluation or more clearly defined evaluation criteria (52%). The results for the student perception of evaluation criteria are related to theoretical findings that the evaluation criteria in schools are not of high quality or clearly defined (Duh, 2004). The latter is followed by the suggestions by the students to include a demonstration of diverse fine art techniques (26%). One possible reason that teachers are less likely to perform demonstrations of fine arts is that they lack skill in a variety of fine art techniques. The demand for greater dynamism and attractiveness of lessons (11%) may be related to the rare use of specific methods, which could be one reasons why classes of Graphic Design do not seem to be sufficiently attractive and dynamic for the students. The diversity of design topics in the curriculum is rich (Curriculum, 2006), which is why the students' proposal for greater diversity of design topics (4.1%) is surprising.

The latter is followed by a set of questions about satisfaction with didactic characteristics. We first asked the students what they thought about using general teaching methods.

(t5) How satisfied are you with the use of general teaching methods in Graphic Design classes?

Table 5: Satisfaction level with the use of general teaching methods.

		$\overline{x}$	s
1	Method of demonstration	3,986	1,047
2	Method of practical work	3,958	0,422
3	Method of conversation	3,561	0,833
4	Method of explanation	3,082	0,276
5	Method of explanation	2,890	0,393
6	Method of conversation	2,397	0,877
7	Method of conversation	2,397	0,877

$\overline{x}$ = mean score, s = standard deviation

The students are most satisfied with the use of the demonstration method (3.98) and also with the method of practical work (3.95). We assume that the method of demonstration motivates the students, who get to observe interesting expressive opportunities, primarily with the potential for their own individual work and artistic expression. The students are most satisfied with this method; on this basis, we can confirm that they are very satisfied with the demonstration of work procedures, tool use and art techniques. Students are very satisfied with the method of practical work, as they can create independently while the teachers unobtrusively help them. Student satisfaction with the method of conversation (dialogue between the students and the teacher) is interpreted as the fulfilment of one or more aspects of the quality of the performance with the method of conversation, for example: two-way communication between the students and the teacher, creating a trustworthy and emotional relationship, which helps create a pleasant and stimulating atmosphere in the classroom. The students are least satisfied with the method of writing (2.38%). We allow the possibility that the method of writing is used unimaginatively, or that the students find it unusual to write about design work.

Furthermore, we were interested in satisfaction with specific learning methods, which are of great importance for both wider artistic as well as design development, as they derive from the particularities of the artistic field, its characteristics and problems. In order to facilitate understanding and answering the questionnaire, the

students received a table of specific methods with explanations and examples of their use.

(t6) How satisfied are you with the use of general teaching methods in Graphic Design classes?

Table 6: Satisfaction level with using specific teaching methods.

		$\bar{x}$	s
1	Method of aesthetic communication and cultivation	4,397	0,812
2	The method of raising your own sensibility	3,643	0,631
3	Method of complexity and interlacing	3,616	0,679
4	Method of spreading and elaboration	3,589	0,703
5	Method of alternative impact	3,575	0,599
6	Method of autonomous fine arts	2,684	0,940
7	Method of transposing and alternatives	2,534	1,259
8	Method of indirect stimulus	1,328	1,054

$\bar{x}$ = mean score, s = standard deviation

Regarding their views on satisfaction with specific methods of work, the students expressed greatest satisfaction with the method of aesthetic communication and cultivation (4.39). Based on this, it can be concluded that appropriate aesthetic communication has been established between the teachers, the students and the fine art design, so that, through the learning process, the aesthetic values of artistic design can be realized and adopted. The students are least satisfied with the use of the indirect stimulus method (1.32), which can be traced to several possible reasons, one being that the teachers themselves do not feel competent to use this method properly.

In the last three questions, we were also interested in the use of learning forms and didactic communication.

(t7) How satisfied are you with learning forms in Graphic Design classes?

Table 7: Satisfaction level with forms of learning.

		$\bar{x}$	s
1	Individual form	2,356	0,805
2	Group form	2,274	0,507
3	Pair work	1,917	0,276

$\bar{x}$ = mean score, s = standard deviation

The students are most satisfied with the use of the individual form (2.35), which is followed by the group form (2.27) and lastly by pair work (1.91). Student satisfaction with the use of the individual form can be interpreted to mean that students often enjoy creative work, as they have more opportunities for independent work.

(t8) How satisfied are you with the didactic communication in Graphic Design classes?

Table 8: Satisfaction level with didactic communication.

		$\overline{x}$	s
1	Honest, equal and equivalent communication	3,082	0,276
2	Open, clear, responsible, positive, attentive and cooperative communication	3,027	0,499
3	Interesting and imaginative approach	2,753	0,434
4	Empathic communication	2,712	0,513
	x = mean score, s = standard deviation		

The students are most satisfied with didactic communication with honest, equal and equivalent communication between the teacher and the student (3.08), which means that there is an emotional attitude and trust between teachers and students; the communication climate includes open, spontaneous behaviour; the teachers treat the students as equal interlocutors. The results of the research confirm the problem of adequacy of evaluation, which is shown by the perception of the students about the smallest share of satisfaction with regular feedback on their work and at the conclusion (2.21).

Conclusion

With a descriptive survey of student attitudes and opinions, we recognised the attitude of students toward the characteristics of the subject Graphic Design and the level of satisfaction through the use of teaching methods, forms of learning and didactic communication in classes of Graphic Design.

The results of the study of the first set of student views and opinions regarding the characteristics of the subject Graphic Design show that a considerable proportion of the students (86.4%) stated that they generally like the classes of Graphic Design, like it less or do not particularly like it. This points to the need to improve the efficiency of graphic design didactics, which was also noted by Alhajri (2013), who

argues that more attention should be given to the improvement of learning approaches.

Furthermore, we find that the development of creativity is the most important goal for students in Graphic Design classes. The perception of the students is consistent with the findings of foreign researchers (Williams and Askland, 2012), who find that creativity is a very important part of design and education.

When asked whether in Graphic Design classes creativity is sufficiently developed, students mostly gave negative (45%) or undecided (41.1%) responses. Foreign researchers, e.g. Tudor (2008), similarly note that little attention is paid to improving learning approaches to promoting creativity.

We were also interested in suggestions from students in Slovene secondary schools about teachers' improvements in class. These are most often associated with the integration of evaluation and more clearly defined evaluation criteria (52%). The results for student perception of the evaluation criteria are related to theoretical findings that the evaluation criteria in schools are not of high quality or clearly defined (Duh, 2004). The diversity of design topics in the curriculum is rich (Curriculum, 2006), which is why the student proposal for greater diversity of design topics (4.1%) is surprising.

In the second set of questions on didactic characteristics, we analysed student perceptions of their satisfaction with general methods. The greatest satisfaction was expressed by the students regarding the use of the demonstration method (3.98%). The students are therefore very satisfied with how the work procedures are demonstrated, the use of tools and art techniques. We assume that when this method is in use, students are primarily motivated by the opportunity to do their own individual work and artistic expression. The students are very satisfied with the method of practical work (3.95%), as they can create independently while the teachers unobtrusively help them. The students are least satisfied with the method of writing (2.38%). We allow the possibility that the method of writing is used unimaginatively, or that students might find it unusual to write about design work.

Regarding their views on satisfaction with specific methods of work, the students expressed the greatest satisfaction with the method of aesthetic communication and cultivation (4.39 %). Based on this, it can be concluded that appropriate aesthetic communication has been established between the teacher, the students and the fine art design, so that, through the learning process, the aesthetic values of artistic design can be realized and adopted. The students are least satisfied with the use of the indirect stimulus method (1.32 %), which could be related to several possible

reasons, one being that the teachers themselves do not feel competent to use this method properly. Regarding the analysis of student satisfaction with forms of learning, the results are predictable. According to the nature of the work, the students feel closest to and favour the use of individual work (2.35%), which is followed by group work (2.27%), and lastly by pair work (1.91%). Student satisfaction with the use of individual work can be interpreted to mean that students often enjoy creative work, as it offers more opportunity for independent work. The students are most satisfied with didactic communication with honest, equal and equivalent communication between the teacher and the student (3.08), which means that there is an emotional attitude and trust between the teachers and the students, and the communication climate comprises open, spontaneous behaviour; the teachers treat the students as equal interlocutors. The results of the research confirm the problem of adequacy of evaluation, which is shown by student perceptions about the smallest share of satisfaction being with regular feedback on their work and at the conclusion (2.21).

The results show that little attention is paid to the conception of effective methodologies in practice. There is a need for different didactic approaches to learning and teaching in Graphic Design classes, which would contribute to greater student satisfaction and present a special challenge for both researchers and teachers of art subjects.

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Explaining Preferences for Illustration Style and Characteristics in Early Childhood

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Abstract/Povzetek The purpose of this study was to explore how children perceive the style and characteristics of illustrations in picture books. It was found that six-year-old children preferred expressionist and surrealist illustrations, whereas four-year-old children preferred expressionist and romantic illustrations. They liked illustrations mostly because they were colorful, but also because they saw familiar motifs and actions in those illustrations. Children are also likely to prefer illustrations that are textile-shaped, illustrations that resemble children's drawings, and naive, happy illustrations. These findings are consistent with previous studies of children's preferences for illustrations and serve as a reference point for future studies.

Razlaga preference za slog ilustracije in značilnosti v zgodnjem otroštvu
Namen raziskave je bil raziskati, kako otroci dojemajo sloge in značilnosti ilustracij v slikanicah. Ugotovili smo, da so šestletni otroci dajali prednost ekspresionističnim in nadrealističnim ilustracijam, medtem ko so štiriletni otroci dajati prednost ekspresionističnim in romantičnim ilustracijam. Ilustracije so bile izbrane predvsem zaradi barvitosti ter znanih motivov in dejanj. Otroci najverjetneje preferirajo tudi ilustracije tekstilnih oblik, ki so podobne otroškim risbam, in preproste, srečne ilustracije. Te ugotovitve so skladne s prejšnjimi študijami otroških preferenc za ilustracije in služijo kot referenčna točka za prihodnje študije.

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Introduction

The first type of book a child encounters is the picture book, which is intended to tell a story through a series of images combined with little or no text, and that combination of images and text conveys information differently than when the two are used separately (Batarelo Kokić, 2015). It can be a toy, an album of images with or without text, an illustrated poem for children, or a depiction of a fairy tale (Crnković, 1990). However, there is no single formal definition of the picture book. Nodelman's (1988) definition emphasizes the dominant role of illustrations in storytelling through picture books, whereas Marantz (1977) considers the combined effect of illustrations and text to be more important than either of the two elements on its own. Martinez and Harmon (2012) suggest that the definition of a picture book should be extended to include both definitions. Zalar (2013) agrees with the notion that illustrations and text can be equally important in a picture book or that illustrations can have a leading role and also includes a definition of wordless picture books that allows for the possibility of visual communication without any verbal text at all. The duality of visual images and writing is what requires readers to perceive and experience information via two different means of communication (Landes, 1985; Martinez & Harmon, 2012). That is why Kiefer's (2008) definition emphasizes the relation between illustrations and text, as well as the interaction between scenes that occurs as the reader/viewer turns the pages. It is also important to note that children experience picture books in different ways (Kiefer, 1986). According to Zalar (2013), illustrations have an abundance of information that cannot be matched by verbal text, which is why contemporary theorists define picture books as a dual discursive genre that combines the verbal and visual arts. As a general rule, illustrations are dominant in picture books because they are easier to process than words and can be perceived as complete symbols; the recipient can thus experience a chain of associations immediately upon viewing them (Hlevnjak, 2000). These definitions of picture books are based on traditional concepts, but contemporary picture books are conceived as multimodal because, in addition to combining verbal and visual elements, they can also introduce auditory, tactile and performance elements into one picture book (Težak & Gabelica, 2015).

Picture books can also be categorized based on a range of criteria. A general categorization of picture books by their format, the structure of their presentation, content, visual techniques and involvement of the recipients was presented in 2008 by Majhut and Zalar (as cited in Martinović & Stričević, 2011). Because picture books can cover a wide range of topics, their content is diverse, but the most common themes that can be used to categorize them are animals, daily life, the alphabet, games and fantasy. Based on the visual techniques used to shape

illustrations, picture books can contain photography, puppetry, collections of real children's drawings or works of art, comic book styles and interactive content. The involvement of the recipient can be used to categorize picture books as those with which children engage on their own and those for which they need the intervention of their parents. Matulka (2008) introduces a classification of different types of picture books into the following categories: picture books for beginning readers, picture books associated with a specific concept, digital picture books, toys, and lyrical picture books.

The picture book has several purposes and benefits: it helps children discover the world of written of written works, supports their cognitive and emotional development, expands their speech and vocabulary and provides them with novelty. Picture books help build literary skills such as imagination, creativity and critical thinking because the reader needs to process text and illustrations independently and to integrate these to experience the story (Agosto, 1999). Picture books introduce children to books, develop their need for books and help them to perceive the world through the artist's eyes (Zalar, 2009). Landers (1985) emphasizes the importance of asking children simple questions ("e.g., What do you see?") to direct their attention between text and images, which helps them experience all elements of the story. Nodelman (1988) also recognizes the value of "reading pictures" and points out that the role of illustrations in picture books is a "communication of narrative information, and not aesthetic beauty for its own sake; [illustration] is more significantly meaningful than either accurate or beautiful" (p. 98).

Illustrations from picture books are the first works of art with which children come into contact during their early childhood and preschool education, and their interaction with those illustrations will facilitate their artistic and aesthetic development, as well as positive attitudes towards art in general. Using a modern teaching method in art education, such as the method of aesthetic transfer, ensures that the presentation of artwork to children leads to interaction between the observer and the artwork (Duh & Zupančič, 2011, 2013). In addition to providing observers with information about art, this method stimulates memory, experience, emotion and associations, which are unique to each child, so it is important to allow children the freedom to express their opinions without fear or reservation. "The experienced artwork can lead to an artistic reaction, which will be the individual solution of each child and will represent a new aesthetic experience" (Duh & Zupančič, 2011, p. 49).
Teachers who work with younger children report that the visual dimension of picture books is more important to children than the verbal dimension, and they

emphasize the importance of colour to children (Visinko, 2000). Picture books are important because they show children how relationships work in society, develop their ability to memorize and recall logical relations, and enable children to conceive phenomena they have not yet experienced. Contemporary picture books cover a variety of life activities such as experiences in the family, kindergarten and other settings. According to Zalar (2008), picture books are not restricted to positive life events and experiences, so they also try to illustrate all aspects of life using words and illustrations.

One of the greatest English fantasy writers, J. R. R. Tolkien, rejected the possibility of illustrating his work for years so that readers could create their own visual representations of his imagery rather than depending on existing illustrations (Hlevnjak, 2000). It is hard to say whether or not Tolkien was right, but Hlevnjak (2000) explains that good illustrators do not create boundaries for interpretation. They can instead reinforce and amplify the experience of reading the text, which makes it a work of visual art with a unique experience for everyone. According to Nodelman (2008, as cited in Narančić Kovač, 2015), illustrations "provide visual and emotional information that texts cannot convey" (p. 66).   Therefore, illustrations in picture books are not subordinated to the text because they complement it and give it new meanings so that readers and listeners can experience new depths of the story (Zalar, 2009). In some cases, the text and illustrations can convey conflicting messages to create humor, on which children enjoy commenting (Zalar, 2009). Nikolajeva and Scott (2006) mention symmetrical picture books in which words and pictures tell the same narrative, but they also recognize complementary picture books (i.e., the words and illustrations tell different parts of the same story) and counterpointing picture books (i.e., the text and illustrations tell two independent narratives).

There is increasing interest in learning more about how children interact with picture books, understand them and derive meaning from them. According to Kiefer (1995, as cited in Narančić Kovač, 2015), children have no difficulty reading and understanding picture books, and they are willing to participate in games aimed at exploring hidden meanings and details that adults miss. Although children at an early age do not have the ability to articulate their experiences with picture books, they are able to derive meaning from extremely complex illustrations, especially if they are provided with assistance (Nikolajeva, 2010, as cited in Narančić Kovač, 2015). Children can always find meaning in visual and verbal elements, through active participation in events from readings, and by playing with numerous possibilities provided by the text, so Narančić Kovač (2015) concludes that doubts about children's ability to work with contemporary picture books are unfounded.

The time adults spend reading from picture books to children provides children with satisfaction, improves their self-confidence and enhances mutual love and respect (Zalar, 2008). Reading picture books is an opportunity to communicate with children while they guess the content of the story from the illustrations and after having the picture book read to them (Zalar, 2009).

Several artistic styles can inspire how illustrations are created. Balić-Šimrak and Narančić Kovač (2011) identified the following styles in picture books:

- Abstract style – simple, concise, emphasizes visual elements such as colour, form and concepts (e.g., Metsola, 2015a, 2015b);
- Comic book style – playful and often humorous, similar to comic books (e.g., Marinković & Pavlić, 2008);
- Expressionism – emotions are expressed with colour and mannerist composition (e.g., Horvat & Divković, 2016);
- Impressionism – focuses on a moment from the story with an emphasis on lighting effects (e.g., Howitt & DiTerlizzi, 2002);
- Folk art – an extension of tradition that uses traditional techniques to create illustrations (e.g., Nordqvist, 2015);
- Naive style – appears childlike and is often two-dimensional (e.g., Zlatković & Zlatković, 2016);
- Realism – objects and characters are depicted precisely and in an orderly and realistic manner (e.g., Cooper, 2008);
- Surrealism – surprising and imaginary scenes with creative details (e.g., Browne, 2001);
- Romanticism – opulent decorations in the style of the old masters (e.g., Sanderson, 2002).

According to Balić-Šimrak and Narančić Kovač (2011), it is difficult to determine if children prefer one artistic style in picture books over another style because illustration styles also depend on the authors' unique personalities, skill and composition style, as well as their ability to harmonize illustrations and verbal text. Furthermore, illustrators and authors of picture books show different sensibilities in their expression, choose distinct materials and techniques, and are different in many other ways that make their illustrations unique and authentic. Novitzu (1977, as cited in Sipe, 2001) defines three levels of illustration style: visual style, artistic style and personal style. Visual style is recognizable and can be associated with a specific time or place (Novitzu, 1977, as cited in Sipe, 2001). The artistic style involves "changes in emphasis or in subject matter but not in overall methods of

depicting" (Kiefer, 1993, as cited in Sipe, 2001, p. 76). Finally, personal style is unique to every author and can be combined with visual and artistic styles to create a unique illustration (Zolotow, 1962, as cited in Sipe, 2001). Overall, when it comes to illustration styles, the most important thing is to consider whether or not a specific style is appropriate for the topic of the picture book, how effectively it conveys the meaning behind the story and how it complements the text (Sipe, 2001).

Methods

Purpose and aims

The purpose of this study was to explore how children perceive the style and characteristics of illustrations in picture books. The aims were to identify which styles are the most preferred, to learn why children prefer those particular illustration styles, and to determine which characteristics of illustrations children prefer when given a choice between two illustrations with different characteristics.

Research Hypotheses

In accordance with the purpose and aims, the data was analyzed to test the following research hypotheses:

H1: There is a statistically significant difference between the frequency of preference for different illustration styles.
H2: There is a statistically significant difference in children's preference between textile-shaped and sculpture-shaped illustrations.
H3: There is a statistically significant difference in children's preference between black-and-white illustrations and illustrations in colour.
H4: There is a statistically significant difference in children's preference between digitally-shaped illustrations and illustrations with children's drawings.
H5: There is a statistically significant difference in children's preference between naive, happy, children's illustrations and scary, mystical, surreal illustrations.
H6: There is a statistically significant difference in children's preference between exciting illustrations and relaxing illustrations.

Participants

A total of 37 children, 17 boys and 20 girls, participated in the study. The participants were recruited as a convenience sample from two kindergarten groups,

a medium-sizred group and a big group that consisted of children ages 4 and 6. The average age of children in the entire sample was 4.5 years.

Materials

A representative set of illustrations from children's books was assembled. For investigating whether children prefer kitsch or simple illustrations, a set of three simple illustrations (Bruna, 2007; Huseinović, 2010; McKee, 2005) and a set of three kitsch illustrations (Belineau, Beaumont, & Michelet, 2013; *Otvori prozorčić i nauči*, 2017; Videau, 2017). To investigate which art style children most prefer, one illustration was used for each of the styles included in the study: naïve style (Zlatković & Zlatković, 2016), expressionism (Horvat & Divković, 2016), romanticism (Sanderson, 2002), realism (Cooper, 2008), abstract style (Metsola, 2015a, 2015b), folk art (Nordqvist, 2015), comic book style (Marinković & Pavlić, 2008), surrealism (Browne, 2001) and impressionism (Howitt & DiTerlizzi, 2002).

Data Collection

Data collection began once the details regarding research methods were arranged with the kindergarten from which the sample was drawn.

To keep the children interested during the study, the data was collected while children played a game of modified monopoly, which was designed for this particular study. Before starting the game, the children were told that they were art experts who needed to evaluate the quality of illustrations. A maximum of four players per game was set. Three players participated in games with children four years of age, and four players participated in games with children six years of age. Each player started the game with nine envelopes containing questions and sample illustrations. They opened the envelope and answered the questions inside whenever they landed on a square featuring an envelope. Players moved with figurines and landed on squares with different instructions to follow: (a) two steps forward, (b) one step forward, (c) envelope, (d) get 1/2/3 houses to build, (e) lose a house, (f) land for construction, and (g) group assignment. The aim was to collect as many houses as possible and to answer all the questions. The game was over when each player answered all the questions.

The interviews were semi-structured, with open-ended questions to allow further exploration of why children chose a certain illustration style or an illustration with certain characteristics. Each child recorded their responses on an anonymous survey during the game, but conversations with the children were also recorded

during the game. The recorded responses were transcribed, and a content analysis was performed to identify common themes in their responses.

To determine which style was their favorite, children were asked to eliminate the illustration they liked the least until they were left with only one illustration. Examples of questions used are as follows: (a) Which of these illustrations do you like the least/find ugly? (b) Which one would you eliminate? When the children were left with their favorite illustration, they were asked questions such as (a) Why did you choose this illustration? (b) What do you like about it? (c) Why do you like this illustration the most?
To determine which characteristics children prefer in illustrations, they were presented with two choices. The illustrations had opposing characteristics (e.g., black-and-white vs. colour), and the children were asked a question such as (a) Which one do you like best? (b) Which one do you think is prettier? (c) Which one is your favorite?

Results

Preferred Illustration Styles

The results showed that children six years of age most preferred the expressionist style of illustration, since 11 of them (50%) chose that illustration as the prettiest. The second most popular style among six-year-old children was surrealism, which was selected as the best illustration by 22% of the participants. Children four years of age also most preferred expressionist illustrations (n = 5, 33.33%), but their second most liked style of illustration was romanticism (n = 3, 20%). The least liked artistic styles were realistic, folk art and impressionism. Hypothesis H1 (There is a statistically significant difference between the frequency of preference for different illustration styles) was confirmed because the children preferred certain styles of illustration significantly more than others, $\chi^2(5) = 24.30$, p < .001.

Eleven out of 22 (50%) six-year-old children chose the expressionist illustration as the most beautiful one, followed by the surrealistic illustration (22%). The children liked the vibrant colors they saw in the illustration (n = 5), they liked the illustration because it was pretty (n = 4), and they liked it because it showed a cat (n = 3).

Because it's pretty and colorful, and I like the kitty.

Because the colorful and pretty grass is around it. And the kitty is cute.

The children preferred the surreal illustration mostly because they liked the motifs in the illustration (n = 3), which included a rocket, a bear and a rabbit. In three cases, children also explained that they liked the illustration because it was pretty.

Because it is cute, this rocket, this bear and bunny going to space.

I like these towers. This rocket is very beautiful. And I like the bunny and the bear.

I like this here building and the moon, also the rocket.

Children who were four years of age preferred expressionist illustrations (n = 5; 33.30%) and romantic style illustrations (n = 3; 20%). Although the reasons for preferring a certain style of illustration varied, they preferred expressionist illustrations mostly because these were colorful and included familiar motifs.

Because I like colourful colours. And because I like butterflies.

Because it has pretty ears ad pretty little paws.

I would take it with me to show everyone at the park.
OK, what do you like about it so much?
This kitty.

Four-year-old girls were the most likely to prefer romantic art illustrations (n = 3) because they saw a beautiful dress, and they also thought Cinderella was beautiful. Two girls also associated the picture of Cinderella and her dress with a cartoon they watched on television.

Because the dress is spinning and pretty.

Because it's pretty. I watched that one on the television. And it was dancing.

– Because the dress is spinning.
– Is there any other reason?
– Because it was in the cartoon.

Preferred Illustration Characteristics

The responses of children to illustrations with different characteristics are shown in Table 1.

Table 1: Frequency of choices between two illustrations with opposing characteristics.

Measurement	Illustration	f (%)	N
1	Textile-shaped	33 (91%)	36
	Sculpture-shaped	3 (9%)	
2	Black-and-white	16 (43%)	37
	In colour	21 (57%)	
3	With children's drawings	28 (76%)	37
	Digitally-shaped	9 (24%)	
4	Naive, happy, for children	25 (69%)	36
	Scary, mystical, surreal	11 (31%)	
5	Exciting	18 (49%)	37
	Relaxing	19 (51%)	

The chi-square test was used to test hypotheses H2-H6, and three hypotheses were confirmed. Hypothesis H2 (There is a statistically significant difference in children's preference between textile-shaped and sculpture-shaped illustrations) was confirmed because children preferred textile-shaped illustrations (n = 33) over sculpture-shaped illustrations (n = 3), $\chi^2(1) = 24.03$, $p < .001$. H4 (There is a statistically significant difference in children's preference between digitally-shaped illustrations and illustrations with children's drawings) was confirmed because children were more likely to prefer illustrations with children's drawings (n = 28) compared to digitally-shaped illustrations (n = 9), $\chi^2(1) = 11.90$, $p < .001$. Hypothesis H5 (There is a statistically significant difference in children's preference between naive, happy, children's illustrations and scary, mystical, surreal illustrations) was also confirmed, $\chi^2(1) = 5.44$, $p < .005$, which means that there was a significant difference between the children's preference for naive, happy illustrations (n = 25) and scary, mystical illustrations (n = 11).

Hypotheses H3 (There is a statistically significant difference in children's preference between black-and-white illustrations and illustrations in colour) and H6 (There is a statistically significant difference in children's preference between exciting illustrations and relaxing illustrations) were not confirmed. Therefore, no significant differences were observed between the preference for black-and-white illustrations and illustrations in colour or between exciting and relaxing illustrations.

Discussion

Children ranked expressionist illustrations as their favorite style of illustration, and they were significantly more likely to prefer expressionist illustrations compared to

other styles. Qualitative analysis of their open-ended responses was used to determine why they preferred expressionism to other styles in illustrations, and it was found that most participants, regardless of their age, preferred those illustrations because they were colourful. The illustration they chose as the most beautiful contained the entire spectrum of colours in a range of tones, from deep to pastel colors, so it comes as no surprise that children are attracted to the liveliness of that style. The motif of the illustration was also intriguing because it featured a cat, one of their favorite pets.

It is difficult to determine if children prefer certain styles and characteristics of illustrations over others because several other elements contribute to the final illustration, including the author's personality, skill, approach to creating a composition and ability to combine illustrations with verbal text to tell a story (Balić-Šimrak & Narančić Kovač, 2011). Each artist also has their own, unique style that can be combined with existing visual and artistic styles (Novitzu, 1977, cited in Sipe, 2001). Therefore, there are many nuances besides visual and artistic styles that can affect how children perceive an illustration and why they prefer it to other illustrations.

Another important consideration is the role of motifs in children's decisions to prefer one illustration over the other. House and Rule (2005) found that children prefer illustrations they can identify with because they are familiar with the objects and settings, as well as the actions depicted by the illustration, whereas colour had the least impact on their choices. This study found that children prefer colourful illustrations, but they also mentioned familiar motifs and actions in the illustrations to explain why they liked a given illustration or chose it over another. Therefore, it is consistent with previous reported findings that colour is an important element of illustrations to children (Visinko, 2000) and that they like to see familiar motifs in illustrations (House & Rule, 2005).

Children were also likely to choose illustrations with certain characteristics over other illustrations. Specifically, illustrations with children's drawings were preferred to digitally-shaped illustrations; textile-shaped illustrations were preferred over sculpture and naive, happy illustrations were preferred over scary, mystical illustrations. Several characteristics can influence children's preference for visual artwork. For example, Kuscevic, Kardum, and Brajcic (2014) found that "pupils better preferred those directions with recognizable motive, cleaner colors, and three-dimensional representation of the shapes and space" (p. 301), whereas they did not like abstract art or artwork in which it is difficult to observe clear spatial relations. Therefore, it is possible that the children who participated in this study

applied a similar set of criteria when they chose between two images, e.g., a naive, happy illustration contains a recognizable motif and has cleaner colours than the surreal image.

The findings of this study are difficult to generalize with confidence because a convenience sampling strategy was used to recruit participants from two kindergarten groups. However, these findings provide insight into children's preferences for illustrations and can be used as a reference point for exploring why children prefer certain illustrations in picture books.

Conclusion

The purpose of this study was to explore how children perceive illustration styles and the characteristics of illustrations found in picture books. The children participating in the study were four and six years of age, and they all preferred expressionist illustration to other styles of illustration. According to their responses to open-ended questions, the participants liked those illustrations because they are colourful and pretty. They also preferred illustrations in which they saw familiar or interesting objects, such as a cat, rocket or a similar motif, as well as illustrations with certain characteristics. Textile-shaped illustrations were significantly preferred to sculpture-shaped illustrations; illustrations with children's drawings were significantly preferred to digitally-shaped illustrations, and naive and happy illustrations were significantly preferred to surreal and scary illustrations. The findings reported in this paper cannot be generalized, given the limitations of the sampling strategy, but they establish a good starting point for further investigations of children's preferences for certain illustrations.

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