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New Horizons in Subject-Specific Education

**RESEARCH ASPECTS OF
SUBJECT-SPECIFIC DIDACTICS**



University of Maribor

Faculty of Education

New Horizons in Subject-Specific Education

Research Aspects of Subject-Specific Didactics

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NEW HORIZONS IN SUBJECT-SPECIFIC EDUCATION

RESEARCH ASPECTS OF SUBJECT-SPECIFIC DIDACTICS

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Abstract Over the past three decades, various research methods have been developed in the field of subject-specific educational research. The individual subject didactics have been consolidated enormously, each in its way and at a different pace. The scientific monograph *New Horizons in Subject-Specific Education* is a study work containing complete and in-depth research of subject-specific didactics, written by several authors from Slovenia, Croatia, Slovakia and the Czech Republic. The monograph presents new ideas and developments in subject didactics, which are of significant importance to those working in the field. It reflects both the diversity of research concerns in this field and the range of methods used to investigate them. The book consists of four thematic parts - STEM Education, Sport and Art Education, Social Science and Humanities Education, and Pedagogy. We hope that the monograph *New Horizons in Subject-Specific Education* will contribute some new information and knowledge to an evolving but extremely important area of research.

Keywords:

quantitative and qualitative methodologies, empirically based research, teaching, learning, knowledge.



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Table of Contents

Foreword Alenka Lipovec, Janja Batič, Eva Kranjec	1
Research Boxes and Science Process Skills Nikolaja Golob	5
Completion of Mathematics Homework Jasmina Ferme, Daša Štesl	31
The Ability to Perceive Initial and Final Sounds in a Word Marija Ropič Kop	53
Development of Professional Vision in Art Education Video Interventions Magdalena Novotná	71
What Do Slovenian and Croatian Teachers Know About Mathematical Modelling? Mateja Sabo Junger, Alenka Lipovec	89
Do Alternative Algorithms for Two-Digit Multiplication Really Help Students to be More Efficient? Izza Javornik, Alenka Lipovec	113
Models Describing Secondary-School Students' Opinions and Attitudes Toward Mathematic Simon Brezovnik, Andrej Šorgo	139
Methodological and Thematic Trends: A Case Study of Two Pedagogical Journals in Croatia Snježana Dubovicki, Tomislav Topolovčan	159
Evaluation of the Practical Pedagogical Training of Students in the Department of Geography at the Faculty of Arts, University of Maribor Karmen Kolnik, Eva Konečnik Kotnik	181
The Use of Textbooks in the Teaching-Learning Process Monika Mithans, Milena Ivanuš Grmek	201

Use of ICT in the Process of Cooperation with Parents Through Student Perspectives	229
Jurka Lepičnik Vodopivec, Marko Gavriloski	
Planned Mathematical Activities in Slovenian Kindergartens	253
Darja Antolin Drešar	
Testing Motor Predispositions and Competences of Primary School Children in the Czech and Slovak Republics	271
Jaromír Šimonek, Nora Halmová, Lenka Vojtková	
Views of Art Education Students on the Inclusion of Artworks in Art Education Lessons	291
Janja Batič	
The Novel and the Film Wonder	309
Dragica Haramija	

Foreword

ALENKA LIPOVEC, JANJA BATIČ, EVA KRANJEC

All school subjects refer to one or more academic fields of study at the research level. The term *subject-specific didactics* refers to this underlying academic field; for example, the didactics of mathematics relates to mathematics. However, the field of subject didactics also draws on findings and results from various educational sciences, which are usually not subject-matter oriented -the didactics of mathematics often relates to psychology as well. Subject didactics generate scientific knowledge itself: this is the case when an academic discipline does not deal with specific areas or issues enough. However, from an academic point of view, subject didactics seem essential for systematic learning. As early as in 1986, Shulman pointed out that mere knowledge of a subject is not enough for teaching. Among other things, he introduced the notion of pedagogical content knowledge (PCK). Shulman defined PCK as a special kind of knowledge that experienced teachers possess, and which constitutes a fusion of subject matter knowledge and the pedagogy suitable for teaching specific topics. It includes knowledge about learners and the presentation of subject matter in a form that makes it understandable to students. According to Shulman, this knowledge distinguishes the subject teacher from the subject specialist.

Over the past three decades, a variety of research methods have been developed in the field of subject-specific educational research. The scientific monograph *New Horizons in Subject-Specific Education* is a study work containing complete and in-depth research of subject-specific didactics, written by several authors from Slovenia, Croatia, Slovakia and the Czech Republic. The monograph presents new ideas and developments which are of significant importance to those working in the field of subject didactics. It reflects both the diversity of research concerns in this field and the range of methods used to investigate them.

The basic framework of the monograph was developed at the conference *The role of subject didactics for the competences of the future* held at the Faculty of Education, University of Maribor, in October 2019. The conference presented findings from practitioners and researchers from a wide range of academic fields interested in researching educational issues and contributing to the scientific discourse. This monograph targets a wide readership -scientists, professors, students, teachers, decision-makers, editors of journals and repositories. As such, it creates area-specific questions. Readers working in the field of education could perhaps think about certain aspects of their research and teaching, such as what kind of teaching models they use in their classrooms, whether these models contribute to the success of students in their discipline area, how they learn about the new trends in education research, and what role they, as teachers educators, play in society.

The book consists of four thematic parts. In the first, STEM Education, there are six chapters: “Research Boxes and Science Process Skills,” “Models Describing Secondary-School Students’ Opinions and Attitudes Toward Mathematics,” “Planned Mathematical Activities in Slovenian Kindergartens,” “Completion of Mathematics Homework,” “What Do Slovenian and Croatian Teachers Know About Mathematical Modelling?” and “Do Aternative Algorithms for Two-Digit Multiplication Really Help Students to Be More Efficient?” The second part of the book, Sport and Art Education, consists of three chapters: “Testing Motor Predispositions and Competences of Primary School Children in the Czech and Slovak Republics,” “Views of Art Education Students on the Inclusion of Artworks in Art Education Lessons,” and “Development of Professional Vision in Art Education Video-Interventions.” The third part of the book, Social Science and Humanities Education, consists of three chapters: “Evaluation of the Practical Pedagogical Training of Students in the Department of Geography at the Faculty of

Arts, University of Maribor,” “The Ability to Perceive Initial and Final Sounds in a Word” and “The Novel and the Film *Wonder*.” The final, fourth part of the book, Pedagogy, consists of three chapters: “The Use of Textbooks in the Teaching-Learning Process,” “Methodological and Thematic Trends: A Case Study of Two Pedagogical Journals in Croatia,” and “Use of ICT in the Process of Cooperation with Parents Through Student Perspectives.”

On behalf of the Faculty of Education, University of Maribor, we wish to express gratitude to all the participants (authors, reviewers, editors, and others) who contributed to the development of this monograph.

There is an impressive increase in didactic knowledge and subject-related problem awareness. The individual subject didactics have consolidated enormously in recent years, at various speeds, and in their own respective ways. We hope that the monograph *New Horizons in Subject-Specific Education* can and will contribute a bit of knowledge to this evolving but extremely important area of research.

METHODOLOGICAL AND THEMATIC TRENDS: A CASE STUDY OF TWO PEDAGOGICAL JOURNALS IN CROATIA

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Abstract The aim of the research was to examine the methodological and thematic trends in scientific periodicals in the field of pedagogy. Two Croatian journals for education, *Život i škola* and *Napredak* in the period from 2012 to 2017, were analysed. A total of 370 articles were analysed, 143 from *Napredak* and 227 from *Život i škola*. The research results indicate that the analysed period is dominated by the topics of assessment, teacher competence, and teaching climate, while the topic of the future of education is the least represented in all segments. In methodological terms, the dominant papers are those with empirical quantitative research and categorization of original scientific and review papers. Based on the analysis of the obtained facts, the main conclusions were synthesized, and they show that the methodological and thematic trends in Croatian scientific periodicals occur with an emphasis on the dominance of the positivist paradigm, lack of historical, theoretical and futuristic research, and a small number of studies with a qualitative methodological approach.

Keywords:

analysis,
case
study,
futuresology,
pedagogy,
research
methodology,
trends in
education.

Introduction

The scientific periodical of a particular field of science -branch -has been one of the most significant forms of scientific communication in the last few centuries (Kronick, 1976); it serves as a communication and correspondence device among scientists via scientific discoveries. As science developed, so did the scientific periodical. In the last few decades, information and communication technologies made a great contribution to scientific journals, which significantly accelerated and simplified scientific communication, but also created new challenges for journal publishers and editors.

In this respect, when talking about contemporary scientific journals, especially in the field of education research, there are numerous similarities, but also particularities of each journal. In addition to the particularities and similarities of the thematic and structural concepts of individual journals, some thematic trends can be seen as an indicator of the current problems that are being investigated in a given period of pedagogy, i.e. research of education. In this regard, the dominant phenomena that are being explored, current papers and authors cited, as well as the actuality of the use of certain research methods, are clearly outlined. Apart from the fact that certain research topics appeared as certain trends in research of pedagogy, the need for crystallization of specific topics addressed by individual scientific journals appeared. In other words, individual scientific journals specialize only in certain topics and works with certain types of methodology. Thus, in social sciences, there is a well-known example in psychology, the journal *Psychological Bulletin*¹ (n.d.) which publishes papers that are literature reviews (review papers) and papers with meta-analyses or journals for papers with results obtained through various qualitative methods such as *Forum Qualitative Sozialforschung* (n.d.). In the abundance of research phenomena and topics in pedagogy, certain journals specialize in specific topics, and as such, there are journals specializing only in curriculum research, for example the *Journal of Curriculum Studies* (n.d.). Certain umbrella institutions for the issue of research of education publish their journals as well: The *American Educational Research Association* (AERA, n.d.) publishes a number of relevant editorial journals such as *AERA Open*, *American Educational Research Journal*, *Educational Research*, *Review of Educational Research*,

¹ It should be emphasized that these journals and publishers and institutions are mentioned only for the purpose of listing examples. They are not, in any case, listed as superior journals and institutions. In addition to the mentioned journals and institutions, there are numerous quality and relevant journals and institutions for research of education.

Educational Evaluation and Policy Analysis, *Journal of Educational and Behavioural Statistics*, and *Review of Research in Education*. Furthermore, the crucial element of scientific journals is their indexation, their impact factor (IF), or bases in which they are indexed, such as *Current Contents*, *Web of Science*, and *Scopus*. The indexation in databases and IF journals essentially determines the interest of scientists in a particular journal of publication and publishing work, hence there are trends of refinement in specific scientific journals. The IF is not just a question of indexing (reputation) of a certain journal, but it can also have repercussions for further research of a particular issue. The IF is often the criterion for accepting/excluding certain scientific papers on the same or similar topic in meta-analysis. That is, the coefficient (size) of the IF of a journal in which the particular paper has been published determines whether that paper (and research results) will be accepted in the mentioned meta-analysis (Field & Gillett, 2010). This may result in a deviation of the synthesis results of such studies. That is, here we can clearly see that the recent trend of discussing the indexation bases and the IF's scientific journals is not a superficial and trendy publication, but a question of serious scientific contributions and discoveries.

Such trends show what was current in the past, and they also make it possible to predict the new research actualities of the time to come. In today's time it is necessary to reflect on, research and write about the future of one's profession (Dubovicki, 2017). Numerous sciences (Technical Sciences, Natural Sciences) have been exploring and anticipating, for many years, possible future challenges, considering possible solutions, and seeking answers. In relation to the aforementioned, we were concerned about the state of pedagogy, which should be the first field to warn about, but also answer (offer solutions) the upcoming challenges in the field of education. It is obvious that such research in the Republic of Croatia is still insufficient in continuously monitoring the content and methodological analysis of trends in the field of pedagogy with projection trends in the future. The emergence of trends in pedagogy has also been discussed at round tables in recent times (Raman, 2016)². Ideas on the various innovative aspects of higher education pedagogy that would go

² A collection of papers on the broad theme of "Emerging Trends in Higher Education Pedagogy: Innovative Learning Environments in Higher Education" (Raman, 2016) aims to review the research done in the area of higher education pedagogy. The papers were given at a Roundtable Workshop entitled "Emerging Trends in Higher Education Pedagogy" that the School of Education, Languages and Communications organised on February 25-26, 2016, to bring together a group of experts in order to explore new forms of teaching, learning and assessment for an interactive world.

hand in hand with the contemporary understanding of education, which would successfully deal with upcoming social scenarios, have been presented.

Earlier researches (Gal et al., 1997; Haslam & McGarty, 2014) show that the selection of research methods and statistical procedures can have a stressful impact on the anxiety of students who, most often, are faced with such challenges when writing and researching for the purpose of their graduate thesis. Rock et al. (2016) take a critical approach in researching how e-learning systems could involve psychology students in research methods and statistics. We can say that this paper is another contribution of the thesis that psychology research mainly relies on quantitative methodology -research techniques by which we quantify data -and statistics as an indispensable part of the interpretation of results. The problem becomes more complicated if we consider that the phenomena of education in the research process cannot always be accurately measured or statistically “calculated”.

Dubovicki et al. (2018) researched 159 graduate theses of students of Teacher Education at the Faculty of Education, University of Osijek. Of the total number, 132 (83 %) contain actual research. Furthermore, the most represented scientific field in research are social sciences (36, 47 %), and within them, pedagogy (46, 55 %). According to the type of research, empirical, fundamental, transversal and contemporary research are the predominant ones. Of all the explored scientific paradigms, the most represented is the positivist (60, 6 %), then the constructivist (17, 43 %) and post-positivist (15, 91 %) paradigm. Applied research (78 %) dominates, while developmental research (5 %) is still insufficiently represented and accepted by students. Topolovčan (2017) highlights the importance of the established theory in research of education.

Drysdale et al. (2013) conducted an analysis of doctoral dissertations and master theses in which they explored methodological and thematic trends. They noted a growth in the context of research of the combined learning. Dubovicki (2017) emphasizes that research of education rarely uses futurology methods (especially in the Republic of Croatia). Chang (2017) conducted a review of articles in four journals: *Journal of Advertising*, *Journal of Advertising Research*, *International Journal of Advertising*, and *Journal of Current Issues and Research in Advertising* from 2001 to 2015 and found that with the help of mentioned analysis it is possible to offer solutions

to some methodological questions, but also to track progress and trends in research since the beginning of this century.

Bouillet and Jokić (2019) show -using abstract analyses of 2395 papers published in 265 journals indexed in *Scopus* between 1996 and 2013, in 15 countries of Central and Eastern Europe -that the specifics and dynamics of the present topics and contents throughout the above-mentioned time period in the field of education has changed over time, in terms of quantity, content and methods. These changes have resulted in more expansive and diverse research methods, whose plurality has been recognized in works published both in international and Central and Eastern Europe journals.

Previous research results of certain topics in education show that there are certain differences, accents and trends in pedagogical periodic publications on the international level. It is therefore scientifically interesting to investigate whether certain trends also exist in the Croatian pedagogical periodicals. The journals *Život i škola* [*Life and school*] and *Napredak* [*Progress*] are the two Croatian journals that primarily deal with publishing works from the field of education at all levels, especially pedagogical works, and are, for these reasons, worth exploring. These journals are interesting because they already contain some studies, that is, systematic analyses of their bibliographies -*Napredak* (Strugar, 2019) and *Život i škola* (Dubovicki & Munjiza, 2019; Lavrnčić et al., 1982; Petrović, 1981; Subotić, 1972), which confirms their historical relentlessness for practice and science of education. Munjiza and Dubovicki (2012) follow the launch and development of *Život i škola*. Through research, they analyse, explain and interpret the contribution of *Život i škola* in the field of educational practice and pedagogical theory in the past sixty years (1952 - 2011). Following the contents of *Život i škola*, the authors followed the external and internal changes that took place in the school system in Croatia (as well as worldwide).

Methodology

Methodological trends have been described by qualitative, inferential statistics, descriptive statistics, and combined approaches to data analysis. Research is based on a case study of two Croatian educational journals. Research covered 370 papers (scientific and professional) that were published in the period from 2012 to 2017 in

the two Croatian journals *Život i škola* (herein after also referred to as "ŽiŠ") and *Napredak* (herein after also "N"). The six-year period was chosen because this is the minimal time period for quality research of evolutionary trends within a time period. The analysis did not include the year, 2018 because at the time of writing, not all 2018 issues for both journals were available. In the mentioned period, there were 227 analysed papers from the journal *Život i škola*, and 143 from the journal *Napredak*. Our research covered 370 papers that were analysed according to the following parameters: year of publication, type of journal, science area, work categorization, has/does not have research, type of methodology within which the appropriate research techniques were used, used research techniques, and paper title (which determined the thematic area).

The aim of the analysis was (1) to investigate all published papers in both journals over the period from 2012 to 2017 in order to observe the pedagogical and methodological preferences of the authors, as well as the thematic trends visible from the title analysis; (2) to single out the papers that used empirical research; (3) to single out research techniques, their numeracy, and then the dominance of the qualitative/quantitative methodology; (4) to detect papers from methodology, as well as the representation of the papers of a certain categorization, whose insight is the starting point for referring the journals towards the reference bases. The purpose of the research was to identify the specifics and dynamics of the present topics and content over a certain period of time, and to develop methodological approaches in pedagogical research.

In relation to the set goals of the analysis, we start from the following research questions:

1. What is the most common categorization of papers in research journals?
2. What is the percentage of papers that use empirical research?
3. What kind of methodology prevails in papers which use research?
4. Which areas of science are most published by researchers?
5. What research technique is the most represented in works that use empirical research?
6. On average, how many research techniques do researchers use in their empirical research?
7. What is the most common topic in the field of social sciences?

Research results and interpretation

Research results will show trends during six years of research (2012-2017) of the two Croatian journals in relation to the above-mentioned criteria with which we will be able to determine the presence of trends in relation to the categorization of papers, dominance of methodology by type, representation of research techniques, scientific areas and thematic preferences.

Table 1 shows how out of 370 published papers, 79.7 % are scientific and 20.3 % are professional papers. The highest percentage (38.3 %) goes to the original scientific papers, followed by review papers (29.98 %). This information answers our research question: “What is the most common categorization of papers in research journals?”

Table 1: Categorization of research papers

Categorization	ŽiŠ*	N**	ŽiŠ	N	ŽiŠ	N	ŽiŠ	N	ŽiŠ	N	ŽiŠ	N	Sum	
	2012		2013		2014		2015		2016		2017		f	%
Original scientific paper	3	8	9	11	21	12	6	13	25	15	7	11	141	38.2
Preliminary communication	10	3	14	5	0	0	7	3	10	1	11	5	69	18.7
Review paper	10	5	13	6	0	7	9	2	22	7	2	2	85	29.98
Professional paper	13	10	8	3	0	4	12	5	6	2	8	4	75	20.3
Sum ŽiŠ	36		44		21		34		63		28		227	61.4
Sum N		26		25		23		23		25		22	143	38.6
Total sum													370	100

Looking at the comparative results for each year during six years of research, it is evident that more papers were published in *Život i škola* (61.4 %) than in *Napredak* (38.6 %). The largest number of original scientific papers was published in 2016. The reason for that might be because *Život i škola* has one extra issue, so the number of papers published in that year reflects the above-mentioned situation. As an illustration, we can state vivid examples of the ratio between professional and scientific papers in *Život i škola* (Munjiza & Dubovicki, 2012). The ratio between professional and scientific papers in 1994 was 80.4 %: 19.6 %, and in 2006, 29.4 %: 70.6 %.

The next criterion according to which the analysis was conducted was the observation of papers that have/do not have empirical research³. Table 2 shows that in 63.8 % of the papers empirical research is present, which is certainly important for determining the state, but also for providing opportunities for improvement. The stated result answers our next research question: “What is the percentage of papers that use empirical research?”

Table 2: Has/does not have empirical research

	ŽiŠ	N	ŽiŠ	N	ŽiŠ	N	ŽiŠ	N	ŽiŠ	N	ŽiŠ	N	Sum	
	2012		2013		2014		2015		2016		2017		f	%
It has empirical research	12	15	29	19	16	13	22	17	37	16	21	19	236	63.8
It does not have empirical research	24	11	15	6	5	10	12	6	26	9	7	3	134	36.2
Sum	36	26	44	25	21	23	34	23	63	25	28	22	370	100

³ It should be emphasized that the research papers in pedagogy and didactics include theoretical, empirical and historical research (Poljak, 1991). But, in this case, for the purposes of this analysis, special emphasis has been put on empirical research

Considering the years, we can say that the number of papers that use research has increased with the years, so a similar situation is expected in the future. For the next criterion, type of methodology, we divided the papers according to whether it uses qualitative or quantitative methodology research techniques, that belong to both types of methodology, and we named that category combined. The combined methodology can be found under the name mixed methodology (Bamattre et al., 2019). In the qualitative type of methodology, we included papers which used, in the research part, the following research techniques: interview, systematic observation, paperwork analysis (textbooks, pedagogical documentation, analysis of notes, comparison of programs), qualitative futurology research methods, formative evaluation (analysis of evaluation sheets) and case analysis. Regarding the quantitative methodology, we focused on the following research techniques: survey, evaluation and assessment (various scales), test and sociometric procedures. In the category of combined methodology, there were papers that used at least one research method from both methodologies, as well as the papers in which the methodological part was done and presented via action research.

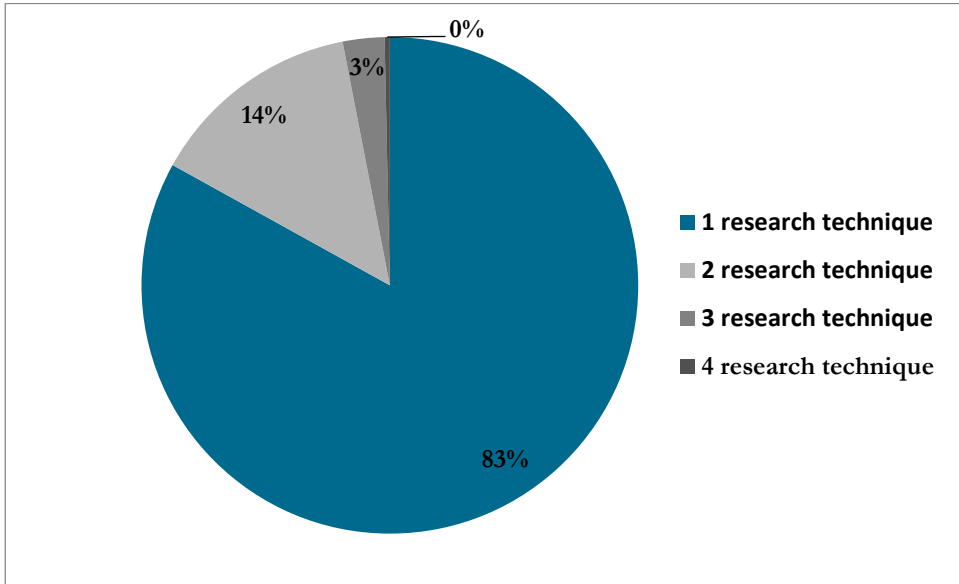
Table 3 shows the dominance of papers using quantitative methodology (72.9 %), while the category of approaches to research with the help of a combined methodology -which we consider to be most desirable in pedagogical phenomena research -is the least and insufficiently represented with only 9.7 %. That also answers our next research question: “What kind of methodology prevails in papers which use research?” Nowadays, combined or mixed methodology is considered to be the most desirable in the research of pedagogical phenomena (Ivankova & Plano Clark, 2018).

Table 3: Type of methodology

Methodology	ŽiŠ	N	ŽiŠ	N	ŽiŠ	N	ŽiŠ	N	ŽiŠ	N	ŽiŠ	N	Sum	
	2012		2013		2014		2015		2016		2017		f	%
Quantitative	8	13	17	15	10	13	15	14	29	10	16	12	172	72.9
Qualitative	2	1	6	3	3	0	5	3	4	5	4	5	41	17.4
Combined/Mixed	2	1	6	1	3	0	2	0	4	1	1	2	23	9.7
Sum	12	15	29	19	16	13	22	17	37	16	21	19	236	100

The observed situation in the researched papers with a percentage of the quantitative methodology of 72.9 % again reminds us of the dominance of the "detection" of a state (Dubovicki et al., 2018), but also the subjectivity in the research contributing to the use of one research technique (83 %) and domination of one type of methodology (72.9 %8) see Graph 1 and Table 3). The obtained results answer the following research question: "How many research techniques do researchers mostly use in their empirical research?"

More recently, researchers (McChesney & Aldridge, 2019) discussed a more flexible approach to the scientific paradigm and types of methodology, considering the desirable positioning of researchers in favour of the flexible (but intentional) integration of any research method within any research paradigm.



Graph 1: Presence of research techniques in the researched papers

We believe that in the research of the pedagogical phenomena it would be best to use the triangulation procedure (Bekhet & Zauszniewski, 2012; Honorene, 2016; Leech & Onwuegbuzie, 2007; Oliver-Hoyo & Allen, 2006), which would allow the researcher a more comprehensive approach to the research problem, and achieve a more accurate and valid evaluation of qualitative results. In addition to the above, more representative results would be obtained by combining qualitative and quantitative research methods, which -through their advantages and disadvantages - mutually complement each other and add to a research. Aside from the review of the current state, these research methods also provide more specific explanations and ideas for solving the mentioned state. Table 4 gives us insight into all the research techniques used during the six-year period in both journals.

Table 4: The presence of research techniques in research papers (236)

	ŽiŠ	N	ŽiŠ	N	ŽiŠ	N	ŽiŠ	N	ŽiŠ	N	ŽiŠ	N	Sum	
	2012		2013		2014		2015		2016		2017		f	%
Survey	6	10	16	10	7	5	8	7	21	3	15	10	118	40
Assessment scale	6	3	6	8	8	8	8	7	13	8	0	0	75	25.5
Test	1	2	4	2	2	1	4	3	5	2	0	3	29	9.8
Paperwork	2	0	3	4	2	0	4	1	5	3	3	2	29	9.8
Interview	1	1	5	0	3	0	2	2	1	5	0	2	22	7.6
Systematic observation	1	1	6	0	2	0	1	1	2	0	0	0	14	4.7
Futurology methods	0	0	0	0	0	0	0	0	0	0	1	1	2	0.6
Evaluation forms	0	0	0	0	1	0	0	0	1	0	0	0	2	0.6
Action research	0	0	0	0	0	0	0	0	0	0	1	1	2	0.6
Sociometry	0	0	0	0	0	0	1	0	0	0	0	0	1	0.4
Case study	0	0	0	0	0	0	0	0	0	0	0	1	1	0.4
Sum	17	17	40	24	25	14	28	21	48	21	20	20	295	100
%	11.5		21.7		13.2		16.6		23.4		13.6		100	

The most dominant research technique is the survey, by as much as 40 %, and it is followed by other research techniques belonging to the quantitative methodology: assessment scale (25.5 %) and test (9.8 %). The given data answers the following research question: “What research technique is the most represented in works that use empirical research?” When it comes to qualitative methodology, the most dominant is the analysis of documentation (9.8 %) which includes textbooks analysis, paperwork analysis, analyses of curricula, programs and so on. Research conducted by Dubovicki et al. (2018) also shows that the students of Teacher Education most often use the aforementioned research technique in their graduate theses-the survey, up to 60.6 %. Bearing in mind that the authors of the research are mainly university professors (most of them from Croatian universities), we can hereby draw the link and say that students partially “copy” their professors or their research, according to their suggestions; their methodological preferences are outlined in their papers. The analysis that matches our research in the time period of 2015 until 2017 goes hand in hand with the mentioned connection.

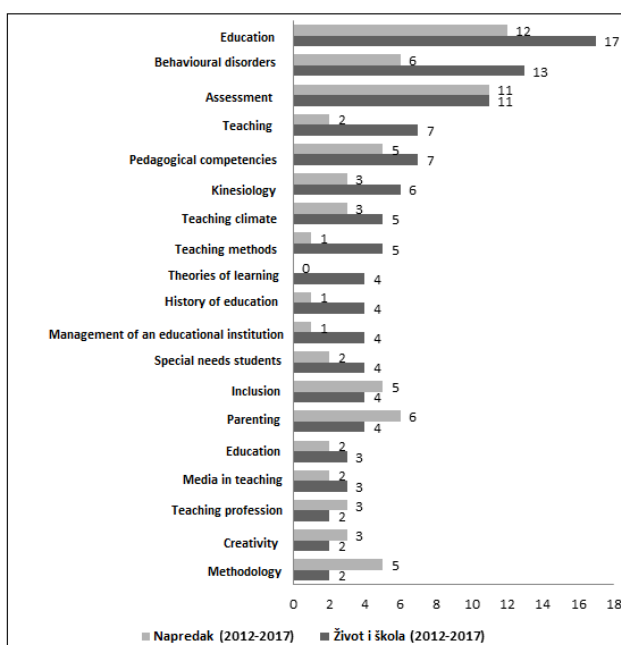
The following criterion for analysing the papers was their representation in certain scientific areas. Table 5 shows us the state over the years.

Table 5: Analysis by scientific areas

	ŽiŠ	N	ŽiŠ	N	ŽiŠ	N	ŽiŠ	N	ŽiŠ	N	ŽiŠ	N	Sum	
	2012		2013		2014		2015		2016		2017		f	%
Social Sciences	16	14	27	18	21	14	18	16	41	16	18	8	227	61.4
Field of Art	1	0	7	1	0	5	5	0	11	4	1	4	39	10.5
Interdisciplinary Areas of Knowledge	7	6	3	1	0	3	4	1	6	2	1	2	36	9.7
Humanistic Sciences	10	2	2	2	0	1	3	3	1	0	5	3	32	8.6
Natural Sciences	1	3	3	3	0	0	3	1	2	3	2	3	24	6.5
Technical Sciences	0	0	2	0	0	0	1	2	1	0	1	1	8	2.2
Religious sciences	1	1	0	0	0	0	0	0	1	0	0	1	4	1.1
Sum	36	26	44	25	21	23	34	23	63	25	28	22	370	100

Table 5 shows the most dominant scientific area during the six-year analysis - the area of social sciences (61.4 %), which was expected since both researched journals are on *Hrčak*⁴ listed into the social areas, the field of pedagogy. The field of social sciences has been continuously the most represented in all the years in both journals, which also answers our next research question: “Which areas of science are most published by researchers?” Second place goes to all the papers published in the art field (10.5 %), seeing that from the whole number, 25 papers have been published in the journal *Život i škola*. Compared with the papers from the art field, Topolovčan (2016) stresses the importance of the qualitative approach especially in research that is artistically based. Such research is part of a recent methodological strategy that by further development, improvement, and expansion can be relevant to research of social and human sciences.

The last criterion based on which the analysis was made relates to the representation of certain thematic areas (Graph 2).



Graph 2: Analysis of papers in the field of social sciences

⁴ *Hrčak* - a portal of Croatian scientific and professional journals, retrieved May 13, 2019, from <https://hrcak.srce.hr/>

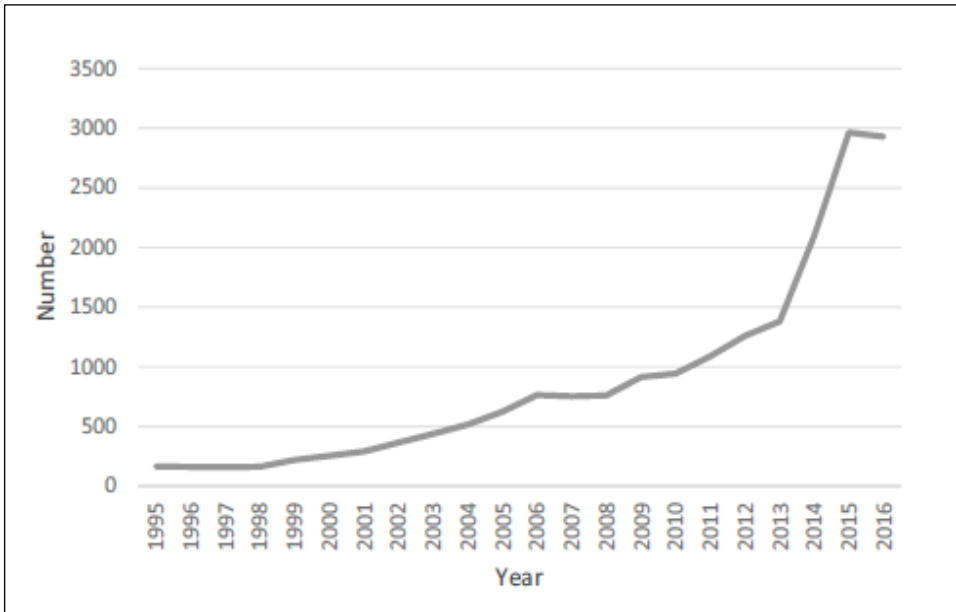
Graph 2 shows a comparative analysis from which it is apparent that the subject of education is (as expected) the most represented, followed by papers dealing with assessment and behavioural disorders, which also answers the following research question: “What is the most common topic in the field of social sciences?” *Napredak* publishes more papers dealing with the topic of parenting, inclusion and methodology, while the journal *Život i škola* focuses mostly on the topics regarding teaching, pedagogical competences and kinesiology.

Discussion and Conclusion

Based on the obtained results, their interpretation and comparison with the results of some recent research on this topic, we can point to several facts. Namely, it is apparent that the journal *Život i škola* has published more papers than the journal *Napredak* in the mentioned six-year period. Furthermore, no matter which journal has the majority of published papers, the predominant ones are the scientific papers with the dominant categorization of the original scientific work. The most original scientific papers were published in 2016. This information may also be the result of publishing one extra issue of the journal *Život i škola* that year, which could have affected the final number of papers.

Globally speaking, we can say that the categorization of papers varies from year to year, but there has been a decrease of professional papers during the six-year period. One of the reasons for this situation may be the attempt of the two journals to get as close as possible to the potential databases that are valued for advancement, and which are conditioned by a smaller number of professional and a larger number of scientific papers. Furthermore, the analysis has shown that the number of papers has increased over the years (the total in both journals). Empirical research with quantitative methodology is the predominant type of research in the papers. In other words, in the field of social research, which is thematically most closely related to pedagogy, the quantitative methodology prevails. The obtained results imply that, in pedagogy, the application of quantitative methodology is still dominant, while things change dramatically in some other fields of social sciences. For comparison, psychology is a field of interest. Specifically, intriguing data were reported by the *American Psychologist* (Kazak, 2018) saying that the number of words in the headlines or keywords of articles (based on *PsycNET*) increased drastically over twenty years (Figure 1). That is, with just over 200 articles per year including the word qualitative

(in the title or keywords) in 1995, just under 3000 articles (which include the word qualitative) came up. This represents almost a fifteenfold increase over a 20-year period, or an increase of over 1000 %. It indicates that in some other fields of social sciences, such as psychology, qualitative methodology is beginning to take a more prominent place as a research approach.



Picture 1: Qualitative in title or keywords in PsycNET 1995-2016

(source: Kazak, 2018, p. 2)

In comparison with other social fields of science, we believe that an approach to pedagogical research which only delivers quantification of data with the need of most often (in 83 %) just one research technique, is something that should be avoided in scientific research because we cannot generalize such results or apply them globally to similar problems.

Compared to papers published over the period from 2012 to 2017, it is evident that the trends changed in line with the changes that (directly and/or indirectly) affected our educational system at all levels of education. In addition to the prominent trends, there is a continuous presence of the topics of assessment, teacher competence and teaching climate. The subject that is the least represented in all segments deals with

the reflections on the future of education. It should also be pointed out that the analysed journals published no papers with meta-analyses, complex qualitative methodologies (art-based research, grounded theory), and complex constructions of instruments for data collection, which are some of the recent research trends in education and publication in relevant international educational scientific journals.

Based on the analysis of these parameters, we predict that in the future, most research in the field of pedagogy will be done with the help of quantitative methodology and research techniques that require quantification of data and numerical indicators, and that those techniques will continue to be survey, evaluation and assessment as the most dominant ones. Regarding the thematic research trends, it is predicted that in the coming period, more and more papers will continue to be in the field of social sciences, if we are talking about the mentioned journals, because those are the journals that focus on publishing papers mostly from the area of education at all levels. Possible trends in pedagogical topics research are also predicted in the time to come. The best way for universities to remain relevant is innovation and the introduction of dynamic and new teaching methods; innovative pedagogy-defined as theories and pedagogy and practice of teaching, learning and assessment for the world of modern technology (Sharples et al., 2015) -is the future.

In addition to the implications made in the discussion of the results of this analysis, the general conclusion of this study is that the two analysed journals play an important part in the development of Croatian pedagogy and research of education. Results imply that it is desirable to intensify the publishing of theoretical-comparative studies, historical studies, and research papers with qualitative methodology. It is also important to point out the lack of papers that were from the field of methodology (1.9 %). Given the number of research tools used in the empirical part of the research, and in relation to the preference of the positivist paradigm and the overcoming of the quantitative methodology, there is a more than obvious need for the popularization of research tools and methodological approaches that can be applied in pedagogical research, but also in general research of education.

It is important to mention that researching the journals in Croatian and world contexts can significantly contribute to the monitoring of external and internal changes that took place in Croatian (and world) education and pedagogy. Such

indicators can represent a kind of a "hidden" curriculum of pedagogy and methodology of papers from the educational corpus, which can explain the origins, disappearances and solutions of certain pedagogic problems.

Further research should focus on monitoring the published papers in these two journals, as well as their comparison with journals of similar nature outside the Republic of Croatia. It would be important to explore the kind of methodology and the kind of research techniques prevailing in pedagogy in journals that are referred to in bases such as *Scopus*, the *Web of Science Core Collection (WoSCC)* or *Current Contents (CC)*. Finally, one should point to one possible prediction, which is that in the coming period, the journals *Napredak* and *Život i škola* are faced with a significant publishing challenge since, at the moment, neither of these two journals are referred to in the mentioned bases. This is possible to achieve through the use of various research tools that contribute to a thorough research of a problem, different methodological approaches and their combinations, and even representation of the papers of all categorizations and of all scientific paradigms (positivist, post-positivist, critical theory, constructivism and participatory paradigm).

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