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## Latent Structure of the Curriculum for Primary Teacher Education in Serbia

### Abstract

This paper attempts to determine the latent structure of the curriculum for primary school teacher education in the first cycle of studies at Serbian teacher training and education faculties. By applying the factor analysis into the first level of teacher education, four latent dimensions could be identified that could be nominated as General Education, Basic Education, Methodological Education, Specific Education, and one bipolar factor. The results indicate that learning outcomes and competences in certain fields of instruction should be re-examined and re-directed in line with the experience of the EU countries in order to harmonize and modernize the curriculum for primary teacher education in Serbia.

**Keywords:** *education, class teacher, latent structure*

### Introduction

One of the objectives of the Bologna Declaration is the promotion of the necessary European dimensions in higher education, particularly regarding the development of curriculum, inter-institutional cooperation, mobility schemes and integrated programs of study, training and research. Teachers in Europe are educated in a wide variety of institutes and by a wide range of curriculum models. The quality of teachers in Europe varies from country to country. Certain countries have developed and implemented education standards (or related concepts), while other countries do not yet have official standards (ATEE, 2006). The main aim of teacher education throughout Europe is the same – the education of teachers.

However, the underlying ideas and the contexts differ, leading to significant differences between teacher-education curricula (Eurydice, 2002). Teacher education systems in developed countries are based on the concept of lifelong learning and consist of initial teacher education and continuous further training of teachers. It is in this process where dilemmas and challenges related to transnational education appear. For some, the content of education is seen as a means for the creation of European cultural identity. For others, the curriculum represents the ultimate defence of national and, indeed, sub-national identities which the European Union must respect (McLean, 1995, 29).

All over the world, curriculum development is seen as an ongoing process, embedding stages of profound change, stages of implementation and stability of the curriculum, and stages of revision and further improvement. The 'Curriculum', which is a broadly used term worldwide, designates the systematic and gradual process of learning based on clear learning objectives (why should students learn), careful selection and organisation of contents (what, when and in what order students learn), methods of teaching and learning (how should students learn) and the assessment and evaluation of learning outcomes (what did students learn/acquire/achieve/develop, or how effective learning really is).

Education has been a prime mover in changing the quality of life of an individual and society throughout the history of mankind. Currently, teacher education in the education systems of South-East Europe is experiencing a radical change: the challenge consists in aligning the curricula of teacher-education to the European education area and effectively modernising structures such as models and methods in teacher education.

By programming and profiling primary studies at teacher-training and related education faculties in Serbia, namely the curricula that represent the core essence of all work, the goals set in the concept of education are achieved. Solutions that have been sought in changing or partial reductions in the syllabi ended without solving the problem as a whole. Thus, for example, due to partial negligence of the relationship that existed between a scientific discipline and basic study courses, the number of courses in the curricula was increasing from year to year. In recent years, there has been a trend to expand the volume of contents students need to master in order to acquire knowledge and skills, and develop abilities for a professional title of a class-teacher (graduate primary teacher), and at the same time the duration of undergraduate studies (Bachelor's level), remained the same four years (Rodić, N. 2002a). Master's studies last one year, whereas doctoral studies last three years.

The problem is the convergence of basic studies on the whole to the reality of school practice, especially to the so-called classroom instruction. In the cur-

riculum for training teachers to perform class teaching, the ratio between the contents of professional and educational science and instructional methodology contents is approximately 50% to 50%. The structure of the curriculum can also vary in the way that schools are involved in the curriculum. There is a variety of models for cooperative partnerships between schools and teacher education institutes (Maandag et al., 2007). The real test of the competence of individuals is possible only in school, which means that there is a problem of scientifically-based verification of basic faculty studies. The question is what competences, knowledge and skills are required for a teacher as an important factor of school practice, which indicators assess the so-called “teaching” capability. One of the key goals of research activity in this field is to study the model of student teachers’ capability (performance) in the basic studies. In addition, teachers’ qualifications include specific qualifications acquired in basic studies in order to perform better in the classroom teaching practice.

However, teacher education institutes in the various European countries face similar challenges, such as how to support the development of teacher identity, how to bridge the gap between theory and practice, how to find the balance between subject studies and pedagogical studies, how to contribute to a higher status of the teacher, and how to prepare teachers for the needs of pupils in the 21<sup>st</sup> century (European Commission, 2007a).

The development of the primary studies in Serbia was not uniform in all segments due to the lack of a long-term global concept. Some of its parts can be recognized by a practical approach, which resulted in irrational solutions and oscillations in the domain of practical changes in certain elements of the system. On the other hand, certain system solutions were brought at the micro level without adequate prior research done. This is the reason why some of the solutions did not have the exact background, hence they were but of provisional character. This meant a lack of pace in building the system according to the concept of a long-term education (Rodić, N. 2002b). What we need is a systematic change, not only curriculum or pedagogical change; we need a new driving vision for the system and not only a new paradigm for curriculum design and its classroom implementation.

The curriculum of teacher training and related studies in the world consists of four components: (1) Study of instruction subjects (scientific field, professional speciality), (2) Study of educational sciences (educational psychology, educational sociology, educational philosophy, pedagogy, didactics), (3) Study of methodological instruction (curriculum design, curriculum and teaching), and (4) School practice.

The curriculum focused on competencies sees educational objectives as expected learning outcomes or professional competences. Learning outcomes are described as competencies acquired by students after they have met all study requirements, i.e. as values (competencies) that students, in preparation for school practice, must achieve or accomplish for the so-called “classroom-based” teacher education for the profession. In regard to this, the study of teaching areas is structured, according to program structure, into: Basic, General and Instructional methodological education.

According to the available literature, there have been no previous studies on the latent structures of the competence (success) of students who graduated from teacher training and related education faculties in our country and in the world. In their attempts to evaluate competences or success achieved in undergraduate study subjects (fields of instruction), the authors in our country generally applied only descriptive or comparative analyses.

The aim of the research is to identify the latent structure of the curriculum for primary teacher education in the first cycle (Bachelor’s level) studies at the teacher training and education faculties in Serbia. The recent division of subject areas of study indicates that the hypothesis in this paper refers to the number and measure structures of “teacher” competence in the curriculum, to determining the optimum settings and practical solutions in order to build a functional and efficient system of undergraduate studies in accordance with the conceptual demands in this area.

## **Methodology**

As for the methodology of scientific (pedagogical) research in Serbia, for a long period the instructional theory relied exclusively on subjective reasoning; therefore the results were but individual experiences and inductive reasoning. This is the reason why our instructional theory and practice still encounter diametrically opposed beliefs that are based on individual experiences, each of which proclaims objectivity. At the other extreme pole, which too could be reduced to subjectivism, what predominates is the normative and deductive justification of attitudes, decisions, measures taken and the like.

The problem of current methodological orientation in educational theory and practice arises from the unilateral use of research methods and techniques (surveys, interviews, content analyses, etc.). Description of the facts has been the most frequently used method in the process of research. However, this cannot be enough. It is necessary to grasp the causality and the regulations that govern

them. Among them a priority is a real insight into the issues that regulate teacher education, which is organized as a system, defined by a set of associated elements and a set of relationships between them.

The area of empirical research within the framework of educational theory and practice used a variety of methods and appropriate instruments so as to make the conclusions on research results as objective as possible, because they were made on the basis of data obtained from several sources. The following methods have been developed to support empirical studies: (a) content analysis (of instruction documentation, curricula, reports on instructional process and results, studies about teaching, professional and methodological literature, etc.); (b) test (questionnaire, testing and interviewing); (c) observation (planned observation of classes, lectures, teaching in general, etc.).

**The sample of respondents** included 833 students who graduated in the period from 2005 to 2010 and had all results in all variables, namely who have passed all exams covered by the curriculum of the Faculty of Education. The respondents were 735 female students (88%) and 98 males (12%), which indicated the feminization of the teaching profession.

**The sample of variables** for the assessment of undergraduate teacher education included the manifest indicators of success in teaching 24 narrow scientific fields, generated in three relatively independent requirements of the Faculty. Each study programme comprises several instructional courses from the same scientific field. Due to the fact that both students and faculties in Serbia significantly differ, optional modules have not been included in this study.

1. *General education*: 1. Serbian Language, 2. English, 3. Mathematics, 4. Pedagogy, 5. Sociology, 6. Developmental Psychology.
2. *Basic education*: 7. Literature and Literature for Children, 8. Culture of speech with Rhetoric, 9. Fundamentals of Natural Sciences, 10. General History, 11. General Didactics, 12. School and Family Education, 13. Educational Psychology, 14. Sociology of Education, 15. Philosophy of Ethics, 16. Health Education, 17. Computers in Education.
3. *Methodological education*: 18. Methods of work with disabled children, 19. Methods of Teaching Mathematics, 20. Methods of Teaching Natural and Social Sciences, 21. Methods of Teaching Serbian Language, 22. Methods of Teaching Visual Arts, 23. Methods of Teaching Physical Education, 24. Methods of Teaching Music.

Learning outcomes and competences acquired, which should be recognizable and objectively measurable, are grades given by university teachers for each study program, based on the five-point assessment scale from six (6) to ten (10). The sub-

ject of measurement cannot be defined by sole evaluator, but is rather determined according to the objectives set by the Faculty.

Factor analysis using principal component extraction and oblimin rotation was utilized. The data were processed in the computer software SPSS (Statistical Package for Social Sciences).

## Results and Discussion

According to grades given by subject teachers, the respondents were the most successful in Methodological Instruction (Methods of Teaching Mathematics, Methods of Teaching Serbian Language and Methods of Teaching Visual Arts), and less successful in the General Education (Mathematics, Developmental Psychology and Philosophy of Ethics). The characteristic of the sample is that the average of students who have completed undergraduate studies is 7.95. Average length of the four-year study programme (240 ECTS) is 64 months, or 5 years and four months.

Indicators of the latent structure of primary teacher education in the first cycle of undergraduate studies were found with the use of a component factor analysis. The number of eigenvalue ( $\lambda$ ), calculated from the overall correlation matrix of indicators of teacher education, equal to or greater than 1.00, was considered a significant number of latent dimensions. The value of Kaiser-Meyer-Olkin Measure of Sampling Adequacy was .92, which exceeds the recommended value of .60, while Bartlett's Test of Sphericity reached statistical significance, suggesting that factor analysis was justified. By calculating the correlation matrix main components, after extraction of both pattern and structure matrix factors and after oblimin rotation, five factors were obtained, which explain about 50% of the total variance of the system.

The structure of primary school teacher education (Table 1) was obtained after the main components had been derived by the oblimin rotation method, which was applied in order to get a simpler solution. The structure proved the actual existence of the latent dimensions of primary teacher education, which undoubtedly could be interpreted in accordance with the commensurable research.

**Table 1.** Pattern matrix (A) and structure matrix (F) of variables of teacher education

Variable	A1	A2	A3	A4	A5	F1	F2	F3	F4	F5
1. Serbian Language	.28	.24	-.13	.46	-.05	.50	.35	.16	.58	-.09
2. English Language	-.09	.09	-.05	.72	.03	.23	.15	.16	.67	.00
3. Mathematics	.23	-.21	.22	.38	.00	.43	-.06	.39	.53	-.01

Variable	A1	A2	A3	A4	A5	F1	F2	F3	F4	F5
4. Pedagogy	-.01	-.09	.15	.61	-.05	.30	.03	.32	.64	-.07
5. Sociology	.21	-.01	.00	.56	.21	.46	.11	.28	.65	.18
6. Developmental Psychology	-.03	.02	.09	.69	-.03	.31	.12	.30	.71	-.06
7. Literature and Literature for Children	.58	.29	-.05	-.03	-.10	.62	.42	.20	.27	-.14
8. Culture speech with Rhetoric	.63	-.31	-.03	.18	-.23	.63	-.13	.19	.41	-.22
9. Fundamentals of Natural Sciences	.52	.21	.18	.01	.02	.63	.36	.40	.33	-.02
10. General History	.66	.05	.02	-.11	.22	.62	.17	.21	.19	.20
11. General Didactics	.56	.06	.08	.20	-.01	.69	.23	.34	.48	-.04
12. School and Family Education	.40	.03	.16	.23	-.24	.57	.20	.38	.47	-.27
13. Educational Psychology	.13	.40	.25	.22	.20	.39	.48	.43	.40	.14
14. Sociology of Education	.47	.02	-.01	.35	.06	.63	.17	.28	.56	.03
15. Philosophy and Ethic	.09	.03	-.03	.29	.65	.20	.02	.08	.30	.64
16. Health Education	.40	-.10	.31	.05	.03	.51	.06	.44	.31	.02
17. Computers in Education	-.01	.75	-.15	.19	-.12	.21	.76	.06	.25	-.20
18. Methods of working with disabled children	-.13	.70	.30	.03	-.02	.14	.73	.39	.16	-.09
19. Methods of Teaching Mathematics	.17	.77	-.02	-.13	-.03	.29	.79	.15	.05	-.11
20. Methods of Teaching Natural and Social Scien.	.37	.40	.29	-.03	-.01	.55	.54	.48	.28	-.07
21. Methods of Teaching Serbian Language	.18	.22	.42	.10	-.17	.42	.37	.56	.35	-.21
22. Methods of Teaching Visual Arts	-.02	-.10	.72	.08	.05	.24	.04	.72	.29	.03
23. Methods of Teaching Physical Education	-.03	.12	.76	-.03	-.07	.24	.26	.76	.21	-.10
24. Methods of Teaching Music	.06	.18	.03	.22	-.57	.23	.28	.18	.30	-.60
Eigenvalue ( $\lambda$ )	6.84	2.09	1.13	1.01	1.01					
% of Variance	28,50	8,73	4,73	4,22	4,21					
Kaiser-Meyer-Olkin Measure of Sampling Adequacy = .925										
Bartlett's Test of Sphericity = 5546.98 Sig. = .000										

The first factor is defined by the manifest indicators of teacher education in Culture of Speech with Rhetoric, Literature and Literature for Children, General

History, General Didactics and Fundamentals of Natural Sciences. Learning outcomes, namely variables that have a significant impact on the first factor are students' capacity to master concrete speech and communication system, to apply knowledge of language and linguistic culture systems, to master fundamental knowledge about the nature of poetics and literature for children and young people; to have knowledge of the present and anticipate the future on the basis of their ability to analyse past events and processes; to recognize specific and different modes of modern teaching strategies, innovative models of teaching and learning technologies, and to solve various non-academic problems that commonly represent obstacles in the professional work of teachers. Given that this factor is dominantly determined by the competence of cultural awareness and expression, and social and civic competences (Council and the European Parliament, 2006), respective variables of fundamental teacher education, the first latent dimension could be defined as BASIC EDUCATION.

The second latent dimension is defined by the manifest indicators of teacher education with a high projection of variables including Computers in Education, Methods of Teaching Mathematics and Methods of working with disabled children. The learning outcome of the first variable, which has a significant projection on the second factor, is the competence to use the acquired knowledge in order to handle the computer equipment and individually apply information technology to processes of searching, providing and analyzing data and information for production of high quality media in education (Digital competence). Learning outcomes of the second variable are the ability to integrate pedagogical, psychological and general didactic knowledge into the didactics of Mathematics, the ability to link theory and practice in Maths instruction, and to master the regularities of functionally organized transfer of Mathematics culture onto pupils, as well as to deliver contents of modern Mathematics (Mathematical competence). The learning outcomes of the third variable having a significant projection on this factor are the ability to work with children with special needs in the process of inclusive education, and to apply special methods in everyday work with disabled children (Inclusive competence). Since this factor determines different specific competences in teacher education, the second latent dimension could be defined as SPECIFIC EDUCATION.

The third latent dimension is defined by the manifest indicators of teacher education with a high projection of variables including Methods of Teaching Physical Education and Methods of Teaching Visual Arts. The learning outcome of the first variable with a significant projection on the third factor could be described as the ability to implement methodological and didactic requirements necessary



for independent conduct of a practical Physical Education class that should be adjusted to capabilities and interests of younger school age children, or in other words, a methodological approach where teaching is focused on the goal, which is the development of motor skills and knowledge (Motor competence). Learning outcomes of the second variable are the ability to teach art in primary school independently, to design the curriculum of art instruction, to be able to select a representative piece of art that best illustrates the related visual art problems and to perform a detailed, verbal and visual analysis, and to be aware of the psychological stages of children artistic expression, artistic development and their creative skills (Art competence). Statistically significant projection of variables such as Methods of Teaching the Serbian Language contribute to defining this factor. Given that the dominant factor is determined by Instructional methodological competence, and methodological transformation of course contents, the third latent dimension can be defined as METHODOLOGICAL EDUCATION.

The fourth factor is defined by manifest indicators of teacher education in the English Language, Serbian Language, Pedagogy, Sociology, Developmental Psychology and Mathematics. Learning outcomes, or variables that have a significant projection on the fourth factor, are the ability to routinely communicate in English, sharing simple information, and using simple terminology to describe oneself, one's surroundings, things and events of interest or understanding, (Foreign language communication competence); to master the foundation of the phonetic, phonological, morphological and formational system of the modern Serbian language and the basic lexicology and syntactic system of the Serbian language (Native language communication competence); to understand basic pedagogical problems of science and create knowledge-base for successful monitoring of teaching in individual subjects of educational science (Pedagogical competence); to be able to think about society in terms of "a changing world" based on contemporary theoretical thought and empirical research (Social and civic competences); to build skills of dealing with children in line with developmental trends and specific physical, intellectual, emotional, social and other needs of a certain age (Psychological competence); to master basic concepts and assertions in the field of Algebra, Number theory, Combinatorics, Probability and Geometry, as well as to increase the level of logical thinking in general (Mathematical competence). Since the factor determines different core competencies in teacher education, the fourth latent dimension can be defined as GENERAL EDUCATION.

The fifth factor is a *bipolar factor*, because it defines the manifest indicators of teacher education both with a significant positive projection, such as Philosophy of Ethics, and with a significant negative projection, such as Methods of Teaching

Music. Certain areas, which do not share the initial teacher education as an object of measurement, represent a specific factor. The reasons for this should be sought in the assessment that the competencies which are provided by the curriculum are misapplied in practice, so instead of Methodological competence in Maths or Music, students need only a mathematical or musical knowledge, abilities and skills.

**Table 2.** Pattern (A) and structure matrix (F) of factors of teacher education of the second order

Factors	A1	A2	F1	F2
1. Basic Education	.79	.01	.79	-.13
2. Special Education	.33	-.48	.41	-.54
3. Methodological Education	.69	-.02	.69	-.14
4. General Education	.77	.07	.76	-.06
5. Bipolar Factor	.17	.92	.02	.89
Eigenvalue	1.88	1.03		
% of Variance	37.56	20.55		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy = .668		r = -.17		
Bartlett's Test of Sphericity = 394.473		Sig. .000		

Factor analysis of the correlation matrix of factors indicates that teacher education in the space of first-order is reduced to two latent dimensions, which explain about 58 percent of the total variance of the system (Table 2). The value of Kaiser-Meyer-Olkin measure of adequacy is .67, while the Bartlett test of sphericity reached statistical significance, suggesting that factor analysis has been justified. The first factor in teacher education in the space of second-order is defined by factors including General Education, Basic Education and Methodology of Education, as formulated in the basic hypothesis about teacher competences. The second factor of teacher education is a bipolar factor. There is a weak negative correlation ( $r = -.17$ ) between these two factors of teacher education in the space of second-order, therefore we can conclude that the second factor of teacher education measures some other objects.

## **Conclusion**

The quality of course instructions as well as the quality of overall teacher education represent key factors that lead to high quality education and improve the level of young people education. This depends on the quality of the teacher education

system of a certain country, on the content and pedagogy of teacher education, but also on the role stakeholders play at the macro, mezzo and micro level. Teachers in Europe are educated in a diverse and wide variety of institutes, faculties, and universities and by a wide range of curriculum models.

The results of this study indicate that the curriculum of teacher training and related education faculties in Serbia, designed for a three-part program structure, generally confirmed the assumption about the latent structure of the curriculum for primary teacher education, which comprises general, basic and methodological education. The competence-based curriculum provides a quality education of teachers. Factors were defined as learning outcomes which are described as competencies that the student receives after satisfying all degree programs. This study justifies the existence of three teaching and scientific fields and the introduction of one-adequate courses of study. This allows adjustment of teacher education to a new competency profile and a new method of changing the education and social system as a whole, not only in national but also in the European context. It is necessary to give priority to further strengthening the quality of teacher education and educational leadership training in continuity, research theory through practice, strengthen partnerships between universities, etc.

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